



Sustaining communicable disease elimination efforts in the Americas in the wake of COVID-19

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Summary

The COVID-19 pandemic has disrupted implementation of health interventions and set back priority programs aiming to control and eliminate communicable diseases. At the same time, the pandemic has opened up opportunities to expedite innovations in health service delivery to increase effectiveness and position health on the development and political agendas of leaders and policy makers. In this context, we present an integrated, sustainable approach to accelerate elimination of more than 35 communicable diseases and related conditions in the region of the Americas. The Elimination Initiative promotes a life-course, person-centred approach based on four dimensions - preventing new infections, ending mortality and morbidity, and preventing disability - and four critical lines of action including strengthening health systems integration and service delivery, strengthening health surveillance and information systems, addressing environmental and social determinants of health, and furthering governance, stewardship, and finance. We present key actions and operational considerations according to each line of action that countries can take advantage of to further advance disease elimination in the region.

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Background and context for disease elimination

In September 2019, the 57th Pan American Health Organization (PAHO) Directing Council endorsed the PAHO Disease Elimination Initiative (EI), an innovative policy that promotes an integrated, sustainable approach to accelerate countries' progress towards elimination of communicable diseases and related conditions.¹ In 2015 PAHO convened a consultation on disease elimination to discuss advancing elimination efforts in the region and bundle the various organization's mandates, plans of actions and strategies focusing on specific communicable diseases into an integrated package that could serve countries to reduce fragmentation on disease elimination.² Building on the significant track record of success in disease elimination

in the Americas over the last several decades, the EI aims to catalyze the political will and technical capacity to eliminate diseases with high potential for elimination.

Following a global effort, smallpox was eradicated worldwide in 1980, and 14 years later, polio was eliminated from the Americas. Since then, rubella, congenital rubella syndrome and neonatal tetanus have been eliminated in the region, and progress has been made against other diseases, particularly in the last decade. By early 2021, 18 countries and territories of the Americas were free of malaria, eight had eliminated mother-to-child transmission of HIV and congenital syphilis, only one focus of river blindness remained, and the region was approaching elimination of leprosy and lymphatic filariasis. Substantial progress has also been made in reducing the adverse impact of Chagas disease, soil-transmitted helminthiasis, schistosomiasis, and hepatitis B.^{3,4}

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The cost-effectiveness of investment in the elimination of communicable diseases are well recognized. Systematic reviews have demonstrated that the per capita investments needed for elimination are comparable to costs identified for the control of malaria and rabies.^{5,6} Estimated returns for each dollar invested in TB diagnosis and treatment range from US\$ 30 to as high as US\$ 115, while meeting targets to end the HIV epidemic by 2030 could avoid US\$ 24 billion in HIV treatment costs and yield a 15-fold return on countries' HIV investments.^{7,8} Elimination of hepatitis B and C through scale-up of new curative therapies for hepatitis C and the highly effective hepatitis B vaccine is also feasible and likely to be cost effective.⁹ Cervical cancer, caused by *human papillomavirus*, is the first cancer type with potential to be eliminated if vaccination and screening are implemented widely.¹⁰ The worldwide socioeconomic benefit of eliminating neglected tropical diseases (NTDs) such as leprosy, leishmaniasis and Chagas disease has been estimated as high as \$16.6 billion for 2021-2030, with an additional \$10.4 billion reduction in out-of-pocket expenses.¹¹ Modelling of the domestic investments needed to achieve universal coverage of services for 17 NTDs has shown that these investments were affordable and cost effective.¹²

The COVID-19 pandemic has highlighted and amplified health and social systems weaknesses and disrupted essential health services worldwide, with disproportionate impact on the poorest and most vulnerable people. It has also had widespread economic impact, presenting significant fiscal challenges to many governments as they face a growing range of health threats, including the rising incidence of non-communicable diseases (NCDs) and the health impacts of climate change. In the last few years, NCDs and climate change have been two of the most rising problems for the region of the Americas.^{13,14} At the same time, the pandemic has dramatically increased awareness of the importance of health to social, economic, and political stability and accelerated the uptake of innovations in health service delivery, creating unique opportunities to increase the resilience of health systems in the face of current and future health challenges.¹⁵

In this context, sustaining and increasing political and financial commitment to strengthen health systems and, therefore, communicable disease elimination in the Americas is more important than ever. Building on experience in the region, scaling up novel approaches, and leveraging lessons and opportunities from the COVID-19 pandemic are critical to reach the last mile and cross the finish line. Investing in the EI by countries will contribute to tackle the health and socioeconomic inequities in the Region and ultimately benefit the peoples of the Americas.

Key elements of the elimination initiative

The vision of the PAHO EI is a future free of the burden of 35 communicable diseases and/or related conditions (Table 1) in the Americas by 2030, by proposing an innovative, integrated, and sustainable approach towards elimination.¹⁶ These diseases are targeted by the EI because of their public health, societal and economic impact as well as the scientific and technical feasibility of elimination. Most of the targeted diseases have their greatest impact on populations living in situations of vulnerability, are marginalized socioeconomically and/or experience difficulties in accessing health services, including women and girls, indigenous peoples, Afro-descendants, people in rural areas, LGBTQIA+ people, migrants, prisoners, and other stigmatized groups. The initiative also targets for elimination two key environmental determinants of health related to communicable diseases – open defecation and use of polluting biomass cooking fuels, both leading to acute and chronic adverse health effects.^{17,18} The initiative proposes four dimensions of elimination including thwarting transmission, ending morbidity, halting mortality, and averting disability. Different degrees and modalities of elimination depending on the disease in question, i.e., elimination as a public health problem, elimination of transmission, or eradication.

The EI can be adopted, adapted, and implemented depending on countries' specific contexts and national priorities. The EI promotes a life-course, person-centred approach (Figure 1) based on four lines of action. Principal activities according to each line of action are summarized in Table 2.

- **Strengthening and integration of health systems and service delivery:** Comprehensive, integrated and quality-assured health services are necessary to achieve and maintain disease elimination targets. Countries should identify how multiple disease approaches could fit into existing, or new, platforms and packages with the perspective of primary care and community-based people-centred services. An inclusive high-level process should be developed to address more systematically issues of fragmentation or poor integration in health systems as well as missed opportunities and inefficiencies for service delivery for the diseases under the EI. Optimizing services for actions across disease can catalyse actions for elimination for multiple disease that would otherwise be lagging.
- **Strengthening health surveillance and information systems:** Effective surveillance at national and regional levels is critical to target efforts, as burden of disease decreases and clusters among subpopulations and geographic areas. Introducing and expanding use of point-of-care technologies can

Disease and conditions	Goal	Current Epidemiologic Situation
Cervical cancer	Elimination as a public health problem	Over 74,410 women were diagnosed with cervical cancer and almost 37,925 died from this disease in the Region of the Americas in 2020. The regional age-standardized incidence and mortality rates are 11.3/100,000 women and 5.3/100,000 women respectively. Cervical cancer mortality rates are three times higher in Latin America and the Caribbean than in North America, highlighting inequities associated with this disease.
Chagas disease	Elimination as a public health problem	Chagas disease is endemic in 21 countries in the Americas, with about 70.2 million individuals in living in areas at risk. Each year an estimated 30,000 new cases resulting from vector transmission occur. Interruption of vector borne transmission have been achieved in 17 countries of the region. Multicountry program initiatives in the Southern Cone, Andean countries, and Central America have furthered best practices exchange and commitment from the countries and partners. Further, implementation of universal screening of blood donors across the countries have advanced interruption by blood transfusion. Latest estimates of number of people with Chagas disease ranges from 6 to 7 million.
Cholera	Elimination as a public health problem	In 2018, 3895 suspect cases of cholera were reported on the island of Hispaniola: 3777 cases in Haiti (including 41 deaths) and 118 cases in the Dominican Republic (including 1 death). In 2019, 773 and 13 suspect cases were reported in both countries respectively. The last culture-confirmed case of cholera in the island was reported in January 2019 in Haiti. Despite the challenges to the surveillance system caused by the COVID-19 pandemic, 4162 acute diarrheal cases were recorded in Haiti between beginning 2020 and November 2021. Of these cases, 99.4% were negative for <i>Vibrio cholerae</i> .
Cystic Echinococcosis / hydatidosis)	Elimination as a public health problem	In 2018, 5,687 human cases were reported in the region of which 4,794 (84.8%) in Peru, 553 (9.7%) in Argentina, and 336 (5.8%) in Chile. 486 (8.5%) cases occurred in children under 15 years of age. At least six countries (Argentina, Brazil, Chile, Paraguay, Peru, and Uruguay) have reported cases of cystic echinococcosis in reservoir animals and humans in the last decade. Countries need to standardize the use of ultrasound in children in high-risk areas and implement actions suggested in the PAHO Action Plan for the Elimination of Cystic Echinococcosis / Hydatidosis 2020-2029.
Fascioliasis	Elimination as a public health problem	The Region's principal endemic areas are in the Andean altiplano of Bolivia and Peru, where an estimated 250,000 people living in indigenous communities are at risk of fascioliasis.
Foot & mouth disease in domestic bovids	Eradication	As of 2021, 95% of the Region is considered free of foot-and-mouth disease. Thus, 99% of the herds of cattle and 96% of total cattle are considered free of disease. PAHO Pan American Center of Foot & Mouth Disease leads and coordinate elimination activities in the region.
Hepatitis B and C infection	Elimination as a public health problem	More than 100,000 deaths each year are associated with viral hepatitis, 99% of them due to hepatitis B or C. An estimated 5.4 million people were living with hepatitis B and 4.8 million with hepatitis C in 2019.
Hepatitis B, mother-to-child transmission	Elimination as a public health problem	Prevalence of hepatitis B surface antigen (HBsAg) in the region has decreased in recent decades, mainly because of the introduction of the hepatitis B vaccine in the early 1990s. By 2019, the regional prevalence of HBsAg among 4-6-year-old children was estimated at < 0.1%, suggesting the regional target has been reached.
HIV	Elimination as a public health problem	In 2020, an estimated 2 million people in Latin America and the Caribbean were living with HIV infection, and approximately 120,000 new HIV infections have occurred in the region each year since 2010. In 2020, the antiretroviral treatment coverage was 81% among those who know their status. There has been a 27% reduction in AIDS-related deaths since 2010.
HIV, mother-to-child-transmission	Elimination as a public health problem	The risk of transmission from pregnant women with HIV to their children decreased from 21% in 2010 to 12% in 2020. An estimated 54,000 HIV infections in children were averted due to interventions for prevention of mother-to-child transmission in Latin America and the Caribbean.
Leishmaniasis (cutaneous)	Elimination as a public health problem	Cutaneous leishmaniasis is endemic in 18 countries of the region of the Americas. The number of cases reported in the region has been decreasing steadily from 67,949 cases in 2005 to 39,705 cases in 2020. Between 2019 and 2020 the Region observed a reduction of 4.8% in reported cases.

Table 1 (Continued)

Disease and conditions	Goal	Current Epidemiologic Situation
Leishmaniasis (visceral)	Elimination as a public health problem	Visceral leishmaniasis is endemic in 13 countries. Since 2001 the region has reported 67,922 new cases, with an average of 3400 cases per year. The countries of the region notified 1998 cases in 2020, compared to 2603 in 2019, a decrease by 23%. Such a reduction likely because of the impact of COVID-19 in surveillance efforts. Brazil reports the great majority of cases in the region (97%) in 2020.
Leprosy	Elimination of transmission	There has been a 28% decline in the detection of new cases between 2005 and 2019, from 41,780 to 29,936 cases respectively. The number of cases in 2020 dropped by 37% compared to 2019 but this was also the result of the negative impact of COVID-19. Brazil, the second country with the highest number of reported cases in the world, contributes more than 90% of the burden in LAC. Reaching leprosy elimination in the region involves implementing, country-owned zero leprosy roadmaps in endemic countries, scaling up leprosy prevention, managing leprosy and its complication, and combating stigma.
Lymphatic filariasis	Elimination as a public health problem	Over 4.1 million people living in two countries of the Americas required mass drug administration for lymphatic filariasis in 2021. Only four countries in the region remain with lymphatic filariasis. Brazil and Dominican Republic stopped mass drug administration and are close to achieving elimination, Guyana likely by 2026, and Haiti by 2030 at latest.
Malaria	Elimination of transmission	Approximately 816,000 confirmed cases of malaria and 197 deaths were reported in 2019, compared to 453,000 cases and 159 deaths respectively in 2015. Around 76% of reported cases are caused by <i>Plasmodium vivax</i> . Socio-economic determinants, particularly migration of people due to economic activities such as gold mining which occurs alongside the context of weaknesses in health services for these populations, have notably contributed to these trends. Venezuela (398,000), Brazil (152,294), Colombia (78,109), Peru (24,322), and Nicaragua (13,200) contributed most cases in the Region in 2019. Malaria has been eliminated in 18 countries of the region.
Measles ^b	Elimination of transmission	The region of the Americas was certified free of measles in September 2016, being the only region in the world having achieved such a goal. Since 2016, 14 countries have reported measles outbreak of different magnitude. However, Venezuela and Brazil re-established endemic transmission in 2018 and 2019, respectively. In 2021 cases have been reported only in Brazil, French Guiana, and the United States. The region has the goal to be re-verified as a region free of measles as soon as possible.
Neonatal tetanus ^b	Elimination as a public health problem	Elimination of neonatal tetanus was declared in Haiti in 2017, which made it possible to reach the regional target. It was the sixth vaccine-preventable disease to be eliminated from the Americas, following the regional eradication of smallpox in 1971, poliomyelitis in 1994, rubella and congenital rubella syndrome in 2015, and measles in 2016. The Region has reduced the reported number of neonatal tetanus cases each year, from 93 cases in 2004 to 12 cases in 2020. Regional vaccine coverage reached 91% in 2017.
Onchocerciasis (River blindness)	Elimination of transmission	Onchocerciasis has been eliminated in 11 out of 13 foci and four of the six originally endemic countries have been verified by the WHO as free of disease transmission. Only an estimated 33,750 indigenous Yanomami people remain at risk in the Amazon rainforest between Brazil and Venezuela.
Open defecation	Elimination as a public health problem	In the Americas in 2020, 7.5 million people in rural areas and 2.5 million people in urban areas are estimated to practice open defecation. Four countries reported having more than 1 million people practicing open defecation, with the largest numbers in Haiti, Peru, Colombia, Bolivia, and Venezuela.
Plague	Elimination as a public health problem	<i>Yersinia pestis</i> is endemic in localized animal reservoirs in Bolivia, Brazil, Ecuador, Peru, and the United States. However, human cases remain sporadic. Between 2010 and 2017, 78 cases were reported in Latin America. Two deaths were reported in 2018 (one each in Peru and Bolivia), and two others in 2021 (Ecuador and in Peru [suspect case]).
Poliomyelitis ^b	Elimination of transmission	The Region of the Americas registered its last case of poliomyelitis in 1991, and in 1994 became the first region in the world to receive certification as free of the disease. Countries are consolidating measures to maintain elimination and avoid reintroduction. The status of polio elimination is verified annually by the Regional Certification Commission for the Polio Endgame.

Table 1 (Continued)

Disease and conditions	Goal	Current Epidemiologic Situation
Polluting biomass cooking fuels	Elimination as a public health problem	In 2019 there were an estimated 73.7 million people still relying on polluting fuels for household energy. In five countries in the Region, more than 30% of the population uses household solid fuels (Haiti, Guatemala, Nicaragua, Honduras, and Paraguay). Overall, in 15 of the 35 countries in the Region, 10% or more of the population still use polluting cooking fuels.
Dog-mediated human rabies	Elimination of transmission	Efforts over the last several decades have reduced the dog-mediated human rabies burden in Latin America from 292 cases in 1970, peaking to 352 cases in 1981, to only 7 cases notified in 2021 in Bolivia (6) and Cuba (1). Incidence of dog-mediated human rabies in the Americas has been reduced to more than 98%. The great majority of countries of the region has eliminated the disease. Coordinated actions led by the Pan American Center for Foot & Mouth Disease Regional Program for the Elimination of rabies since 1983 for the countries of the region include access to post-exposure prophylaxis, mass dog vaccination campaigns, improving diagnosis and surveillance, awareness through educational campaigns, and regular convening of the rabies programs of the Americas.
Rubella ^b	Elimination of transmission	In 2003, the countries collectively set the goal of eliminating endemic transmission of rubella by 2010. From 1998 to 2008 an estimated 250 million adolescents and adults in 32 countries were vaccinated against rubella in mass vaccination campaigns. The last cases of endemic rubella in the Americas were reported in 2009. The Region was certified free in 2015 and has sustained it for 11 years.
Rubella, congenital ^b	Elimination of transmission	In 2003, the countries collectively set the goal of eliminating endemic transmission of rubella by 2010. From 1998 to 2008, an estimated 250 million adolescents and adults in 32 countries were vaccinated against rubella in mass vaccination campaigns. The last cases of congenital rubella syndrome in the Americas were reported in 2009. The Region was certified free in 2015 and has sustained it for 11 years.
Schistosomiasis	Elimination as a public health problem	Estimates suggest 25 million people are at risk of infection, most of them in Brazil. Disease is still endemic in several foci in Brazil and Venezuela. Elimination has been likely achieved in Antigua and Barbuda, Dominican Republic, Guadeloupe, Martinique, Montserrat, Puerto Rico, Saint Lucia, and Suriname. Further studies and compilation of evidence are required to verify interruption of transmission in these countries.
Soil-transmitted helminthiasis	Elimination as a public health problem	In 2018 approximately 58 million children aged 1–14 years, living in 20 endemic countries, were at risk of morbidity and complications (including stunting and anemia) from soil-transmitted helminthiasis. It is also estimated that 47.3 million women of childbearing age are at risk. Preventive chemotherapy in school-age children at risk was 70.8% in 2018. Due to the pandemic, in 2019 and 2020 countries stopped almost all activities regarding deworming. Countries carry out regular deworming activities 1-2 times a year, depending on the risk of infection assessed through prevalence surveys or access to improved WASH conditions. Majority of countries have been deworming in schools in coordination with ministry of education; or integrated with other programs.
Syphilis, congenital	Elimination as a public health problem	The incidence rate of congenital syphilis has increased since 2010, reaching 2.1 per 1000 live births with over 30,300 reported cases in 2020. Notwithstanding the increase in treatment coverage among pregnant women with syphilis, coverage of syphilis screening during prenatal care have decreased prompting to the need to accelerate efforts further.
Syphilis and gonorrhoea	Elimination as a public health problem	In 2020, there were estimated 1,200,000 new cases of syphilis in females and 1,300,000 in males in the Region of the Americas. Regarding gonorrhoea there were 4.3 million new cases of gonorrhoea in females and 5.5 million in males.
Trachoma	Elimination as a public health problem	Worldwide, an estimated 136 million people were living in endemic areas as of 2021. Trachoma is endemic in areas of Brazil, Colombia, Guatemala, and Peru where 5 million people are considered at risk of the disease. Mexico eliminated trachoma as a public health problem in 2017. Implementation and strengthening the SAFE strategy (surgery, antibiotics, facial cleanliness, and environmental improvement) in the endemic countries will be critical to free the region of trachoma.

Table 1 (Continued)

Disease and conditions	Goal	Current Epidemiologic Situation
Tuberculosis	Elimination as a public health problem	Incidence rate has been estimated at 28.5 cases per 100,000 population in 2020, representing a total of 291,000 new cases (3.7% change in incidence rate between 2015 and 2020). More than half of the incident cases (57%) were concentrated in three countries: Brazil, Mexico, and Peru. The estimated total number of TB deaths in the Region in 2020 was 26,900 deaths (9.6% change in total number of TB deaths between 2015 and 2020). Increase in incidence is related to various factors including an upward trend in a few countries, rate of inequalities in the region, and improvements in diagnostic efforts. Disruptions to diagnosis and treatment caused by the COVID-19 pandemic and supply chain issues have impacted mortality.
Yaws (endemic treponematoses)	Eradication	While likely eliminated in the Americas, surveys may be necessary to demonstrate evidence of hemispheric eradication of Yaws.
Yellow fever epidemics	Elimination of transmission	In 2018, Bolivia, Brazil, Colombia, French Guiana, and Peru reported confirmed cases of yellow fever. In Brazil, the historical area of yellow fever enzootic transmission expanded since mid-2016 to coastal areas previously considered risk-free. Four seasonal waves of human cases followed. Overall, in 2019-2021, 457 human cases were reported in five of the above countries, of which 414 (90.1%) in Brazil, 31 (6.8%) in Peru, 8 (1.8%) in Venezuela, and two (0.4%) in Bolivia and French Guiana respectively. Limited availability of vaccine doses and COVID-19 disruptions have adversely impacted yellow fever immunization in the region.

Table 1: Communicable diseases and related conditions targeted for elimination^a in the Americas by 2030.

^a Elimination as a public health problem is a term related to both infection and disease, defined by achievement of measurable global targets set by WHO in relation to a specific disease (e.g., for MTCT of syphilis, or for lymphatic filariasis). When these are reached, continued actions are required to maintain the achievements of the targets or to advance toward elimination of transmission. The process of documenting elimination as a public health problem is called "validation".

Elimination of transmission (also referred as "interruption of transmission" is defined as the reduction to zero of the incidence of infection caused by a specific pathogen in a defined geographical area, with minimal risk of reintroduction, as a result of deliberate efforts. The process of documenting elimination of transmission is called "verification".

Eradication is the permanent reduction to zero of a specific pathogen as a result of deliberate efforts, with no risk of reintroduction. The process of documenting eradication is called "certification".

Extinction occurs when the specific infectious agent no longer exists in nature or the laboratory, which may occur or without deliberate efforts.

Source: Report of the WHO Strategic and Technical Advisory Group for Neglected Tropical Diseases (WHO: Geneva; April 2014, amended April 2015). Available from: https://www.who.int/neglected_diseases/NTD_STAG_report_2015.pdf?ua=1.

^b Diseases to sustain elimination status.

boost efficiencies, strengthen linkages, support adherence and retention, and improve quality of care.¹⁹ Combined mapping of diseases and conditions using integrated, interoperable information systems, is critical to ensure success in early phases of elimination as well as in post-elimination monitoring to prevent reintroduction.²⁰

- Addressing environmental and social determinants of health:** Communicable diseases are linked to a range of complex overlapping social and environmental determinants of health, including safe drinking water and basic sanitation, housing conditions, education, poverty, gender and other inequalities and the growing health risks of climate change. These links tend to become stronger when diseases approach elimination and action needs to increasingly focus on the remaining burden of

disease. The EI approach is to promote addressing health determinants through multisectoral engagement and action.

- Furthering governance, stewardship, and finance:** The EI proposes inter-programmatic and intersectoral collaboration including public-private partnerships and closer engagement of civil society and other non-governmental actors in the elimination agenda, increasing efficiencies, effectiveness and resilience in health systems and governance. The EI builds on the essential public health functions to further health governance and stewardship.²¹ Building trust and partnerships with local governments and civil society and promoting a health in all policies approach will facilitate elimination efforts, mobilization and maximization of resources, and prevention of duplication.

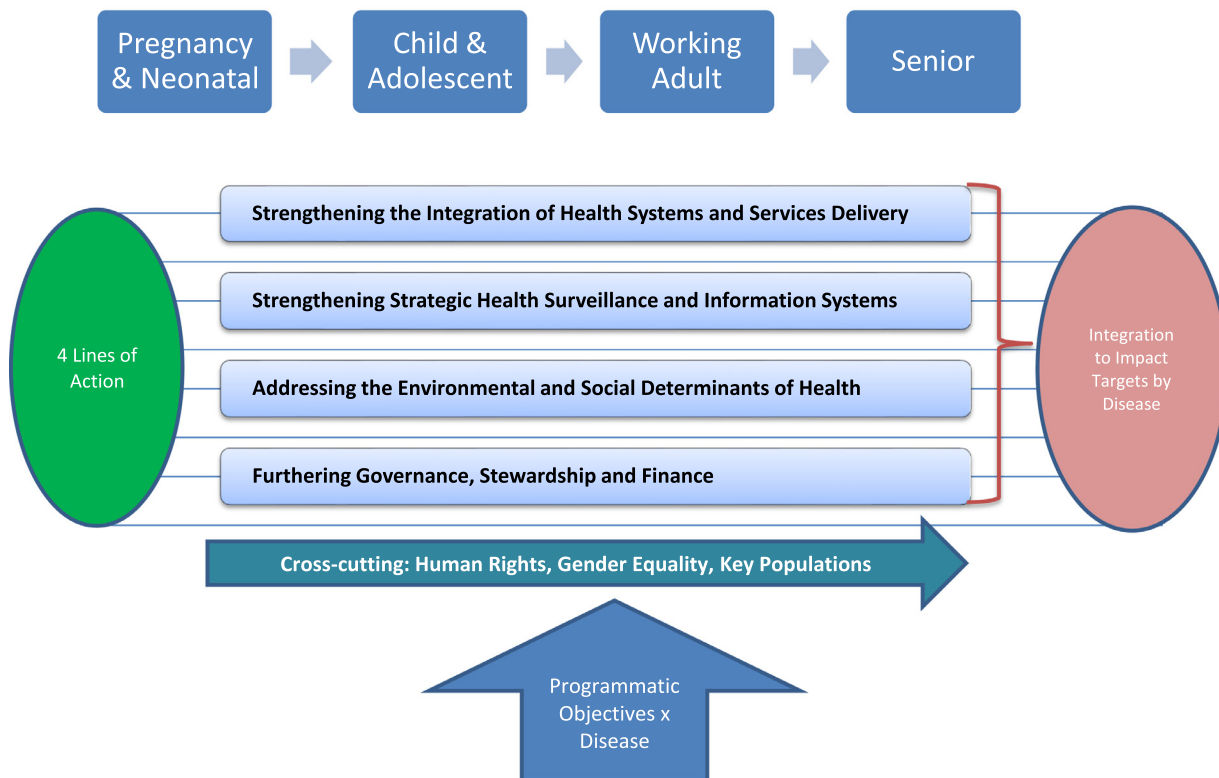


Figure 1. Conceptual framework: lines of action for integrated communicable disease elimination in the Americas through the life course.

Challenges and opportunities for the future of disease elimination

The Americas have experienced significant and disproportionate impact of COVID-19. With only 8.4 per cent of the world’s population, the region accounted for nearly 30 per cent of cases and 44 per cent of deaths from the pandemic globally by the end of May 2022.²² Structural challenges of poverty, inequality and weak health systems have exacerbated vulnerability in a region where public expenditure on health –is still below PAHO’s recommended level of 6 per cent of Gross Development Product (GDP) - and more than a third of health costs are met by out-of-pocket expenditure.

COVID-19 has led to significant disruption of essential health services worldwide. Notably, one million fewer people were treated for TB globally in 2020 compared to 2019 and global TB deaths increased in 2020 for the first time in a decade.²³ People reached with HIV prevention programs and services globally fell by 11 per cent and progress against malaria stalled.²⁴ In the Americas, countries reported disruptions in TB diagnosis and treatment (65 per cent), HIV testing (50 per cent) and prevention services (59 per cent), and malaria diagnosis and treatment (50 per cent).²⁵ Likewise, 55 per cent of countries in the region reported disruptions to primary health care and immunization services and

nearly half experienced disruptions to services for NTDs and other communicable diseases. Further, supply chain systems for health were disrupted in 40 per cent of countries.

Despite these setbacks, the pandemic has also accelerated uptake of innovations in health service delivery such as provision of home-based care (reported by 80% of countries in the region), telemedicine to replace in-person consultations (76 per cent), novel prescribing and dispensing approaches for medicines such as multi-month prescriptions for HIV antiretroviral therapy (44 per cent), task shifting or role delegation (38 per cent) and integration of several services into a single visit (28 per cent).²⁵ If retained and scaled up more broadly, such approaches represent opportunities to increase effectiveness and efficiencies in the health system and achieve disease elimination goals.

Furthermore, the need to rebuild from COVID-19 and strengthen public health systems based on primary health care will in turn help to advance elimination. The experience accrued through the COVID-19 response, and the leap progress experienced by epidemiology and surveillance, will be also critical to accelerate elimination. In that regard, PAHO Member States adopted in 2021 a series of key strategies and policies to increase regional capacity to develop and produce medicines and other health technologies, foster building

Lines of action	Main result	Key activities within the approach
Strengthening health surveillance and information systems	Integrated surveillance	Maximize use of point-of-care technologies Laboratory multiplex platforms Interoperable systems using common unique identifiers Combined mapping of diseases Monitoring of integrated actions and communication of results on integrated programs.
Addressing environmental and social determinants of health	Multisectoral engagement	Health in all policies with local governments to address multiple disease challenges. Ensure dialogue and cooperation among relevant sectors
Furthering governance, stewardship, and finance	Effective governance	High level joint process to develop national elimination agenda and plans for elimination of all diseases within the EI; Mapping of enabling factors: existing initiatives on elimination and control of communicable diseases, resources and programs; Advocacy for joint elimination and garnering of political commitment.
Strengthening and integration of health systems and service delivery	Partnerships and community participation Integration of services with decentralization to primary health care networks	Engage communities to address the elimination of disease under the EI; Integrated extramural activities with civil society participation. Single visits for multiple health issues (screening and treatment in the same visit); Guarantee availability and accessibility of medicines, diagnostics and vaccines through the first level of care Task shifting; Guidelines and protocols at service level that operationalize the joint elimination plan.

Table 2: Specific actions needed to implement the Elimination initiative approach.

resilient health systems and post COVID-19 recovery to sustain and protect public health gains, and advance One Health to help prevent and prepare for current and future health challenges at the human-animal-environment interface in the region.^{26,27,28}

Considerations for policymakers and implementers

To further advance of communicable diseases elimination, several key actions and considerations are required, particularly at country level.

Leveraging existing capacity

The first step for countries to implement the EI framework is the development of joint elimination plans. Technical comprehensive missions by PAHO and partners can be arranged to advise and guide national authorities on this endeavour. Mapping of available resources is essential as well as existing initiatives and single specific programs on control and elimination of communicable diseases. The enabling elements for previous success in eliminating communicable diseases are opportunities that should be leveraged for further achievements. Examples of enabling factors to identify are areas with strong program management; the use of evidence-based, standardized public health approaches building on the first level of care; access to vaccines, treatments, and diagnostic technologies; and

engagement of communities, together with strategic, financial, and technical support from partners. Furthermore, countries can push forward joint elimination efforts by maximizing the use of available tools such as the PAHO Revolving Fund for Access to Vaccines and the Strategic Fund for Access to Quality Medicines and Health Supplies. These regional technical cooperation mechanisms for pooled procurement have provided access to life-saving vaccines, drugs, and diagnostics to millions of people in the Americas.^{29,30}

Building and sustaining support for disease elimination

Continued effort is needed to build political and financial support for disease elimination as part of a more ambitious vision for health and development in the wake of the COVID-19 pandemic. This should include emphasis on the EI's potentially significant role in increasing health system efficiency, effectiveness and resilience and helping to accelerate progress towards Universal Health, development of regional and national investment cases for multi-disease elimination and showcasing successful approaches.

Tailoring the regional policy to country context and priorities

The EI is designed to be implemented in a staged manner based on local epidemiology, population contexts,

and building on existing disease control and other programs, particularly those where some level of integration already exists, such as for NTDs, HIV, TB, hepatitis and sexually transmitted infections; and in services presenting opportunities for impact on multiple diseases through the life course, such as maternal and child health platforms for HIV, syphilis, hepatitis B and Chagas disease; integrated preventive chemotherapy for children and adults through mass drug administration for simultaneous treatment of NTDs; combination of vaccine campaigns with deworming packages; integrated vector management for multiple vectors.

To adopt and adapt the regional policy, countries need to develop a national elimination agenda or plan based on epidemiological profiles and priority disease/conditions, preferably as part of the overall national health plan and with a strong focus on integration and coordination of service delivery. The four dimensions presented in the elimination framework can be tuned to the specificities of each disease. The national elimination agenda should address key technical, programmatic, and financial needs at various levels of the health system, particularly for primary care, such as well-advanced innovations in laboratory testing with the potential of expanding integrated serosurveillance. Multiplex bead assays and point-of-care diagnostics will bring the ability to simultaneously measure antibody responses to multiple pathogens. Advances in supply chain management; human resources, including approaches to task-shifting; improving health literacy and mechanisms to involve civil society and communities.

Improved analysis of surveillance and monitoring data, and operational and implementation research is critical to enhance the effectiveness of current strategies, evaluate novel approaches, quickly incorporate new evidence and policy into practice, ensure that interventions reach those who need them and mitigate risks such as financing or human resource constraints. This will require investing in health information systems and ensuring that key indicators for disease elimination are tracked and monitored periodically.

Effective governance and partnerships

The region of the Americas has a long tradition of partnership in health. Achieving multiple disease elimination goals requires governance and collaboration across programs inside and outside of government, including strong engagement with civil society and the private sector. The health sector must proactively engage other sectors with a shared vision and clear roles and responsibilities in the elimination agenda.

The goals and approaches of multi-disease elimination challenge disparate civil society actors to collaborate in new ways and they are beginning to do so. In 2020, diverse civil society groups in the region developed a manifesto outlining how civil society can contribute in a

more coherent way to ending the epidemics of HIV, TB, hepatitis, and sexually transmitted infections by 2030.³¹ The manifesto's priorities include holding governments accountable for elimination goals and commitments and supporting service integration and person-centred approaches.

Partnerships between provincial and municipal governments and civil society are particularly important for more decentralized decision-making and service delivery and ensuring local ownership and engagement, as illustrated by experience with malaria in the region.³²

Conclusion

Disease elimination in the Americas has proven feasible. There is great potential to eliminate an additional 35 diseases and related conditions in this region. COVID-19 has revealed gaps in health systems, highlighted the need for greater investment in health, and presented new opportunities for delivering health services through a comprehensive approach. Multi-disease elimination has the potential to be a driver of more integrated, effective, efficient, and equitable health services in the Americas and can help countries to resume and accelerate progress towards Universal Health in the wake of the pandemic.

The PAHO Disease Elimination Initiative provides a flexible framework for countries to pursue multi-disease elimination that is feasible, aligns with public health principles and local context, builds on experience and existing infrastructure, and promotes the uptake of innovative technologies. Its integrated and sustainable approach to multi-disease elimination can spearhead an ambitious 21st century response to communicable diseases and related conditions in the Americas. The region as a living workshop for innovation in responding to communicable diseases points to experiences and benefits that go beyond regional boundaries and may well contribute to building up a global know how as well as elimination foundations. The current decade presents country governments with a bold opportunity to ensure the people of the Americas are free of major scourges.

Contributors

The conception for this Health Policy was a collective effort based on group discussion, with many suggestions discussed in several virtual and presential meetings as well as email exchanges. MAE, LGC, MG and JB conceptualized the elimination initiative and the manuscript and contributed to writing, reviewing, and editing the manuscript. MA, LS, RE, MS, AMR, EB, FP, MV, AS, SL, and AV contributed to the methodology, data collection, analysis, writing, and editing. All authors contributed further comments and suggestions on various subsequent drafts. MAE, MA and LS managed the process of reviews and edits.

Declaration of interests

The authors declare no conflict of interest. No direct funding was provided for this work, though all authors are employed by PAHO/WHO. The authors alone are responsible for the views expressed in this publication, and they do not necessarily represent the decisions or policies of the Pan American Health Organization.

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References

- Pan American Health Organization. *PAHO Disease Elimination Initiative: A Policy for an Integrated and Sustainable Approach to Communicable Diseases in the Americas*. Washington, DC: PAHO; 2019. <https://www.paho.org/sites/default/files/2020-01/2019-cde-dc57-elimin-init-framework-en.pdf>. Accessed 26 November 2021.
- Pan American Health Organization. *Regional Consultation on Disease Elimination I the Americas*. 2015 March 12-13. Washington, DC: PAHO; 2015. <https://www.paho.org/en/documents/regional-consultation-disease-elimination-americas>. Accessed 24 May 2022.
- Arnold BF, van der Laan MJ, Hubbard AE, et al. Measuring changes in transmission of neglected tropical diseases, malaria, and enteric pathogens from quantitative antibody levels. *PLoS Negl Trop Dis*. 2017;11(5):e0005616. <https://doi.org/10.1371/journal.pntd.0005616>.
- Bangert M, Molyneux DH, Lindsay SW, Fitzpatrick C, Engels D. The cross-cutting contribution of the end of neglected tropical diseases to the sustainable development goals. *Infect Dis Poverty*. 2017;6:73. <https://doi.org/10.1186/s40249-017-0288-0>.
- Shretta R, Avancena AL V, Hatefi A. The economics of malaria control and elimination: a systematic review. *Malar J*. 2016;15(1):593. <https://doi.org/10.1186/s12936-016-1635-5>.
- Shwiff SA, Elser JL, Ernst KH, Shwiff SS, Anderson AM. Cost-benefit analysis of controlling rabies: placing economics at the heart of rabies control to focus political will. *Rev Sci Tech off Int Epiz*. 2018;37:681-689. <https://doi.org/10.20506/rst.37.2.2833>.
- Stop TB Partnership. The paradigm shift: global plan to end TB 2018-2022. Geneva: Stop TB Partnership; 2019. https://stoptb.org/assets/documents/global/plan/GPR_2018-2022_Digital.pdf. Accessed 26 November 2021.
- Joint United Nations Program on HIV/AIDS. Fast track: ending the AIDS epidemic by 2030. Geneva: UNAIDS; 2014. https://www.unaids.org/sites/default/files/media_asset/JC2686_WA_D2014report_en.pdf. Accessed 26 November 2021.
- Aggarwal R, Chen Q, Goel A, et al. Cost-effectiveness of hepatitis C treatment using generic direct-acting antivirals in India. *PLoS One*. 2017;12(5):e0176503. <https://doi.org/10.1371/journal.pone.0176503>.
- Brisson M, Kim J, Canfell K, et al. Impact of HPV vaccination and cervical screening on cervical cancer elimination: a comparative modelling analysis in 78 low-income and lower-middle-income countries. *Lancet*. 2020;395(10224):575-590. [https://doi.org/10.1016/S0140-6736\(20\)30068-4](https://doi.org/10.1016/S0140-6736(20)30068-4).
- Lenk EJ, Redekop WK, Luyendijk M, et al. Socioeconomic benefit to individuals of achieving 2020 targets for four neglected tropical diseases controlled/eliminated by innovative and intensified disease management: human African trypanosomiasis, leprosy, visceral leishmaniasis, Chagas disease. *PLoS Negl Trop Dis*. 2018;12(3):e0006250. <https://doi.org/10.1371/journal.pntd.0006250>.
- World Health Organization. Investing to overcome the global impact of neglected tropical diseases: third WHO report on neglected tropical diseases. Geneva: WHO; 2015. <https://www.who.int/publications/i/item/9789241564861>. Accessed 26 November 2021.
- GBD 2019 Diseases and Injuries Collaborators. Global burden of 369 diseases and injuries, 1990-2019: a systematic analysis for the global burden of disease study 2019. *Lancet*. 2020;396:1204-1222. [https://doi.org/10.1016/S0140-6736\(20\)30925-9](https://doi.org/10.1016/S0140-6736(20)30925-9).
- Yglesias-Gonzalez M, Palmeiro-Silva Y, Sergeeva M, et al. Code red for health response in Latin America and the Caribbean: enhancing peoples' health through climate Action. *Lancet Regional Health - Americas*. 2022;00:100248. <https://doi.org/10.1016/j.lana.2022.100248>.
- Pan American Health Organization and the Economic Commission for Latin America and the Caribbean. The prolongation of the health crisis and its impact on health, the economy and social development. Washington, DC: PAHO; 2021. <https://iris.paho.org/handle/10665.2/54991>. Accessed 26 November 2021.
- Pan American Health Organization. *Integrated Sustainable Framework to Elimination of Communicable Diseases in the Americas*. Washington, DC: PAHO; 2019. <https://www.paho.org/en/documents/integrated-sustainable-framework-elimination-communicable-diseases-americas-concept-note>. Accessed 3 December 2021.
- Mara D. The elimination of open defecation and its adverse health effects: a moral imperative for governments and development professionals. *J Water, Sanitat Hygiene Develop*. 2017;7(1):1-12. <https://doi.org/10.2166/washdev.2017.027>.
- Lee KK, Bing R, Kiang J, et al. Adverse health effects associated with household air pollution: a systematic review, meta-analysis, and burden estimation study. *Lancet Glob Health*. 2020;8(11):e1427-e1434. [https://doi.org/10.1016/S2214-109X\(20\)30343-0](https://doi.org/10.1016/S2214-109X(20)30343-0).
- Land KJ, Boeras DI, Chen XS, Ramsay AR, Peeling RW. REASURED diagnostics to inform disease control strategies, strengthen health systems and improve patient outcomes. *Nat Microbio*. 2019;4(1):46-54. <https://doi.org/10.1038/s41564-018-0295-3>.
- Pan American Health Organization. *Roadmap for the Digital Transformation of the Health Sector in the Region of the Americas*. Washington, DC: PAHO; 2020. <https://www.paho.org/en/documents/cd596-roadmap-digital-transformation-health-sector-region-americas>. Accessed 3 December 2021.
- Pan American Health Organization. The Essential public health functions in the Americas: a renewal for the 21st century, conceptual framework and description. Washington, DC: PAHO; 2020. <https://iris.paho.org/handle/10665.2/53124>. Accessed 16 February 2022.
- World Health Organization. Coronavirus (COVID-19) dashboard. 2020. <https://covid19.who.int/>. Accessed 1 June 2022.
- World Health Organization. Global tuberculosis report 2021. Geneva: WHO; 2021. <https://www.who.int/publications/i/item/9789240037021>. Accessed 26 November 2021.
- The Global Fund to Fight AIDS, Tuberculosis and Malaria. Results Report 2021. Geneva: GFATM; 2021. <https://www.theglobalfund.org/en/results/>. Accessed 26 November 2021.
- World Health Organization. Second round of the national pulse survey on continuity of essential health services during the COVID-19 pandemic. Geneva: WHO; 2021. <https://www.who.int/publications/i/item/WHO-2019-nCoV-EHS-continuity-survey-2021.1>. Accessed 26 November 2021.
- Pan American Health Organization. Increasing production capacity for essential medicines and health technologies. Washington, DC: PAHO; 2021. <https://www.paho.org/en/documents/cd598-increasing-production-capacity-essential-medicines-and-health-technologies>. Accessed 26 November 2021.
- Pan American Health Organization. Strategy for building resilient health systems and post-covid-19 pandemic recovery to sustain and protect public health gains. Washington, DC: PAHO; 2021. <https://www.paho.org/en/documents/cd5911-strategy-building-resilient-health-systems-and-post-covid-19-pandemic-recovery>. Accessed 26 November 2021.
- Pan American Health Organization. One Health: a comprehensive approach for addressing health threats at the human-animal-environment interface. Washington, DC: PAHO; 2021. <https://www.paho.org/en/documents/cd599-one-health-comprehensive-approach-addressing-health-threats-human-animal>. Accessed 26 November 2021.
- Lal A, Lim C, Almeida G, Fitzgerald J. Minimizing COVID-19 disruption: ensuring the supply of essential health products for health emergencies and routine health services. *Lancet Reg Health Am*. 2021:e100129. <https://doi.org/10.1016/j.lana.2021.100129>.
- Andrus J, de Quadros C, Ruiz C, Luciani P, Hotez P. New vaccines for developing countries: will it be feast or famine? *Am J Law Med*. 2009;35:311-322. <https://doi.org/10.1177/009885880903500204>.
- ACTBISTAS. Contribución de la Sociedad civil al fin de las epidemias de TB, VIH, ITS, y hepatitis virales para el 2030. 2021. <https://actbistas.org/contribucion-de-la-sociedad-civil-al-fin-de-las-epidemias-de-tb-vih-its-y-hepatitis-virales-para-el-2030/>. Accessed 26 November 2021.
- Pan American Health Organization. Municipalities for Zero Malaria. Washington, DC: PAHO; 2019. <https://www.paho.org/en/topics/malaria/municipalities-zero-malaria>. Accessed 26 November 2021.