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Addressing two rural health problems at
once: A syndemic approach to malaria and
cutaneous leishmaniasis in post-conflict
Colombia

Working Paper no. 1

August 2023

Lina Pinto-García

In partnership with



Universidad de
los Andes
Colombia

Centro Interdisciplinario de
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The Institute for Science, Innovation and Society (InSIS)
University of Oxford

64 Banbury Road, Oxford, OX2 6PN

e: enquiries@insis.ox.ac.uk www.insis.ox.ac.uk

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Author

Lina Pinto-García

Postdoctoral Researcher, Interdisciplinary Center for Development Studies (Cider),
Universidad de los Andes (Colombia)

Research Affiliate, Institute for Science, Innovation and Society (InSIS), University
of Oxford (UK)

lina.pintogarcia@insis.ox.ac.uk

Research Team

Alejandro Cañizares, Research Assistant, Universidad de los Andes

Ann Kelly, Professor of Anthropology and Global Health, King's College London

Javier Lezaun, Director, Institute for Science, Innovation and Society, University of
Oxford

Juan Camilo Montoya, Research Assistant, Universidad de los Andes

Diana Ojeda, Associate Professor, Universidad de los Andes

Executive Summary

Malaria and cutaneous leishmaniasis are insect-borne diseases endemic in rural Colombia. They usually affect populations that live, work, or move through remote and dispersed areas of the national territory. The public health strategies through which the state addresses these two diseases respond to a biomedical paradigm of health organized around ‘vertical’ programs, each focused on a single disease.

This policy paper provides epidemiological, political, and historical arguments for an integrated-syndemic-approach to malaria and leishmaniasis in a (post-)conflict scenario. It is based on qualitative data collected in two related research projects, as well as a review of the relevant academic and grey literature. We do not suggest the merger of two vertical programs, but rather an integration of key human and technical components of diagnosis and treatment. This integration, we argue, would result in a better state management of leishmaniasis, now coupled with that of malaria, based on a structural, territorial, and socially embedded understanding of health.

Key words

Colombia

Conflict

Vector-borne diseases

Leishmaniasis

Malaria

Post-conflict

Global health

Rural health

Public health

Syndemics

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Introduction

Malaria and leishmaniasis¹ are two parasitic diseases transmitted by insects that occur year after year in rural Colombia. They usually affect populations that live, work or circulate through remote and dispersed areas of the national territory, in places where violence, poverty, militarization, legal and illegal extractive projects, barriers to access to health and many other forms of social and environmental inequity are also prevalent.

The Ministry of Health and Social Protection (MinSalud) is the entity responsible for issuing and updating clinical practice guidelines to standardize the diagnosis and treatment of these two diseases at the national level. Likewise, the National Health Institute (INS), which acts as MinSalud's technical division, is in charge of issuing public health surveillance protocols for both malaria and leishmaniasis. These regulations are elaborated under a biomedical health paradigm, characterized by centralized, top-down 'vertical' programs, so named because each focuses on a single disease. As such, there are two clinical practice guidelines (MinSalud 2023; 2022) and two public health surveillance protocols (INS 2022b; 2022a) to govern, separately, the state management of leishmaniasis and malaria in Colombia.

This policy paper advocates a joint—syndemic—approach to these two diseases. The reasons for such an approach are not only epidemiological. Adopting a syndemic perspective on leishmaniasis and malaria is better suited to the specific (post-)conflict conditions in the Colombian countryside, where the persistence of violence, associated with legal and illegal extractive projects, limits the scope of biomedical public health strategies (see Colombian National Government and FARC-EP 2016; MinSalud 2020b; Partido Comunes 2020).

Our proposal draws on qualitative data collected in two related research projects,² as well as pertinent academic literature, documentary analysis, and dozens of interviews with a wide range of relevant actors. This paper starts from the understanding that vulnerability to malaria and leishmaniasis is a product of social processes of marginalization and impoverishment, related to power structures such

¹ Unless otherwise indicated, in this document, the word 'leishmaniasis' refers to the cutaneous form of leishmaniasis.

² The two projects are:

(1) the doctoral thesis of Lina Pinto-García (2020), which ethnographically studied the relationship between cutaneous leishmaniasis and the armed conflict in Colombia.

(2) the Diseased Landscapes project, developed collaboratively by the Institute for Science, Innovation and Society (InSIS) at the University of Oxford, the Interdisciplinary Center for Development Studies (CIDER) at Universidad de los Andes, and the Department of Global Health and Social Medicine at King's College London. With funding from the British Academy, this project ethnographically explores the nexus between disease, violence, migration, and extractivism, in light of the case of cutaneous leishmaniasis in the context of coca cultivation in Catatumbo (Norte de Santander, Colombia).

as class, race and gender, where the state is also involved. In this sense, we do not suggest the merger of two vertical programs. Instead, we seek an integration that will result in a better state management of leishmaniasis, coupled with that of malaria, based on a structural, social, and contextualized understanding of health.

This document is divided into five sections. In the first, we explain what leishmaniasis and malaria are and how these two diseases are linked to both rurality and the conflict in Colombia. In the second, we review the limitations of vertical disease management and explain what the syndemic approach is and the solutions it provides. In the third part we provide epidemiological, political, and historical reasons why leishmaniasis and malaria should be understood and addressed together. In the fourth section we set out some guidelines on how such an approach should work in practice and, finally, in the fifth part, we give a brief account of our policy recommendations.

1. Leishmaniasis and malaria: persistent health problems linked to (post-) conflict and the rural context

In Colombia, leishmaniasis and malaria are considered endemo-epidemics (Padilla et al. 2017). This means that they occur constantly (endemically) in the national territory and that, from time to time, certain areas of the country witness an unusual (epidemic) surge of cases.

Malaria—better known locally as *paludismo*—is an infection caused by microscopic parasites of the genus *Plasmodium*. These are transmitted through the bite of female mosquitoes of the *Anopheles* genus, which seek to feed on human blood to mature their eggs. In Colombia, most cases of malaria are linked to two types of parasites: *Plasmodium vivax* and *Plasmodium falciparum*. These can occur simultaneously in a person, which is known as mixed infection (INS 2022b).



Figure 1. *Anopheles* mosquito, transmitter of malaria. [Image](#) by [N Fernando Sotelo Castro@Ferchos04 – V.2.0](#), licensed under [CC BY 2.0](#).

Malaria is the vector-borne disease that contributes the highest proportion of cases to overall morbidity in Colombia, which differs from other countries in the continent where the contribution of dengue is usually higher than that of malaria (Padilla et al. 2017). Malaria is associated with rural and dispersed areas, located below 1600 masl. It is considered that 66% of municipalities nationwide have geographical, climatic and epidemiological conditions suitable for the transmission of this disease (INS 2022b). After the mosquito bite, it usually takes 7–14 days for symptoms to appear—a sudden increase in fever, chills, headache, sweating, and muscle and joint pain. There are asymptomatic cases (people infected with the parasite with no symptoms), mild cases (uncomplicated malaria) and severe cases that can lead to death (complicated malaria).

Over the past 60 years, the annual number of reported malaria cases in the country has ranged from 80,000 to 120,000. Admitting that there is a major problem of underreporting, the state informs that the number of annual deaths due to malaria has gone from 100 to 25 in the last decades (INS 2022b). Cases of *P. vivax*

predominate in the national territory, although in the Pacific region cases linked to *P. falciparum* are more common. This species is associated with greater complications and mortality (Osorio 2006; MinSalud n.d.).

The standard method to diagnose malaria in Colombia is the so-called ‘gota gruesa’ (thick drop). Briefly explained, this method begins by disinfecting a finger and pricking it with a lancet. The first drop of blood is wiped off and then two separate drops are placed on a slide. Another slide is taken to spread, with the edge, each of the drops. The blood is left to dry for 20 minutes and stained with Field or Giemsa stain. Finally, both drops are observed under the microscope, using the 100x objective that requires immersion oil. The presence of parasites is thus established and, by paying attention to their morphology, it is determined whether it is an infection by *P. vivax*, *P. falciparum* or both species. A parasite count (number of parasites per microliter of blood) is also often performed, which reflects the severity of the infection (INS 2015).

Depending on the type of parasite (*P. vivax* or *P. falciparum*) and the age of the patient, treatment varies. In the case of uncomplicated malaria caused by *P. falciparum*, the first-line treatment in Colombia consists of taking tablets containing both arthemeter (20 mg) and lumefantrine (120 mg), twice a day, for three days. The number of tablets in each dose ranges from 1 to 4, depending on the patient’s weight. In the case of uncomplicated malaria due to *P. vivax*, the first-line treatment in Colombia consists of taking chloroquine bisphosphonate for three days (10 mg/kg of body weight on the first day and 7.5 mg/kg on the second and third days). Additionally, people diagnosed with this type of malaria should take 0.25 mg/kg primaquine for 14 days to eliminate hypnozoites, i.e. the latent forms of the parasite that lodge in the liver and can lead to relapses (MinSalud 2010).

Along with tuberculosis and HIV/AIDS, malaria is considered one of the three most deadly diseases in the world.³ Since 2000, large amounts of funding have been allocated to these three diseases—known in the global health world as ‘the big three’—by actors such as the Bill & Melinda Gates Foundation and the Global Fund (Bourzac 2014; McGoey 2015). In contrast, leishmaniasis is one of 20 tropical diseases called ‘neglected’ for affecting people with low socio-political capital and purchasing power, and for not attracting sufficient interest from states or the pharmaceutical industry (WHO n.d.). Thus, while malaria tends to receive sustained attention from state and philanthropic actors, leishmaniasis suffers from neglect.

³ Approximately 2.7 million people die each year from malaria, tuberculosis and HIV/AIDS. These diseases are responsible for 5% of all deaths worldwide (Prudêncio and Costa 2020).

In Colombia, leishmaniasis is a much less frequent disease than malaria. Between the 1990s and the present, the official number of annual cases has ranged from 6,500 to 20,000, with a notorious peak in the mid-2000s. Between 2014 and 2020, an annual average of 8,275 cases have been reported. Of these, 98.9% correspond to the cutaneous form of the disease. A very low percentage (0.1%) corresponds to the potentially fatal visceral form (INS 2022a), which mainly affects children between 0 and 7 years of age and is distributed in two relatively small and well-characterized foci in Montes de María and Magdalena Medio (Castillo-Castañeda et al. 2021).⁴ This document focuses only on the cutaneous form of leishmaniasis for three reasons: (1) this is the form of the disease that predominates in rural Colombia; (2) its clinical management (diagnosis and treatment) is different from that of visceral leishmaniasis; and (3) the cutaneous form of leishmaniasis is the one most closely related to the Colombian armed conflict and its associated economies and practices (Pinto-García 2020).

Cutaneous leishmaniasis, popularly referred to as ‘*pito*,’ is a non-fatal skin disease. It typically appears as circular, raw, raised-edged lesions. Although usually painless, these ulcers tend to grow larger over time and resist healing. They appear after a jungle sandfly of the genus *Lutzomyia*—popularly known as ‘*mantablanca*,’ ‘*manta*’ or ‘*palomilla*’—bites a human and transmits microscopic *Leishmania* parasites. However, there are also asymptomatic cases (people who do not develop ulcers despite having been infected with the parasite) and even people who manage to heal the lesions without treatment. In medical language, that is called ‘spontaneous resolution’ or ‘self-resolving infection.’

⁴ Mucocutaneous or mucosal leishmaniasis is often described as a third form of leishmaniasis that affects the nose, mouth, and throat when *Leishmania* parasites migrate from a skin lesion to these tissues via the lymphatic or blood route. Since mucocutaneous leishmaniasis is usually a complication of cutaneous leishmaniasis, we consider that some of the recommendations we make in this document are also applicable to mucocutaneous leishmaniasis. Only 1% of the cases reported in Colombia correspond to this form of the disease (INS 2022a).



Figure 2. Jungle sandfly, transmitter of leishmaniasis, popularly known in Colombia as *mantablanca*. [Image](#) by [Mario Bassini](#), licensed under [CC BY 4.0](#).

The disease is commonly diagnosed through a method popularly referred as ‘*raspado*.’ A sample of tissue fluid and cells is obtained by scraping the surface of the lesion with a sterile scalpel, without using anesthesia. This sample is stained with Giemsa and observed under the microscope. If visualization of *Leishmania* parasites is achieved, the patient must undergo 7–8 laboratory tests before proceeding to the administration of two daily injections of Glucantime for 20 days in the buttocks, the volume of which is calculated based on patient’s body weight (MinSalud 2018a).⁵ As this drug is highly toxic and entails much discomfort and effects poorly understood by science (Pinto–García and Sánchez–Parra Forthcoming), such tests seek to establish whether the person is physically able to withstand the drug. Paradoxically, while cutaneous leishmaniasis is a mostly benign disease, the pharmaceutical

⁵ According to the MinSalud clinical practice guideline (2018b), Glucantime (meglumine antimoniate) should be administered intramuscularly or intravenously. However, intramuscular administration (injections in the buttocks) is predominant in Colombia.

treatment recommended in Colombia—and other countries—is potentially fatal (Pinto-García 2022).⁶

After Brazil, Colombia is the country with the second highest number of cases of leishmaniasis in Latin America. In the Americas, leishmaniasis is usually described as a disease that mainly affects men of productive age who, for occupational reasons, enter the rural and jungle environment where the parasite-transmitting sandfly thrives (INS 2022a). In Colombia, this group of individuals has often included participants in the armed conflict, from soldiers of the state army to people who belong to guerrilla organizations or paramilitary groups (Patino et al. 2017; Correa-Cárdenas et al. 2020).



Figure 3. Colombian army soldier with a leishmaniasis lesion on his right arm. Photo by the author.

An awful consequence of this close association between leishmaniasis and the conflict is that the disease remains stigmatized as ‘the guerrilla disease’ (see Molano Bravo 2005). For fear of being labeled as guerrillas, with the violent effects that such labeling can entail, many people do not seek health services when they develop the characteristic ulcers of leishmaniasis. In addition, the sandfly and the

⁶ There are other ways to diagnose leishmaniasis—for example through a PCR test or culture—but the ‘*raspado*’ remains the most common method in the country. There are other drugs, therapies, and routes of administration to treat leishmaniasis—for example miltefosine, pentamidine, amphotericin B and thermotherapy—but intramuscular injections of Glucantime, administered in the buttocks for 20 days, is the procedure usually employed in Colombia (see Pinto-García 2022).

parasite it transmits circulate in rural, remote and dispersed territories. There, the distance separating people from health services is not measured in minutes but in hours or days, and aboard canoes, mules or *chivas*. Of course, all this contributes significantly to the underreporting of leishmaniasis cases in the country (Pinto-García 2020).⁷

Additionally, the stigma attached to leishmaniasis is reinforced by the restrictive control the state practices over Glucantime. In theory, the drug should not circulate outside state institutions (Glucantime sale in pharmacies, for example, is considered illegal) and should be administered in a timely manner to all Colombians diagnosed with the disease. This control takes the form of multiple bureaucratic barriers whose justification is based on medico-scientific arguments associated with the toxicity of the drug (Glucantime should only be administered under medical supervision), but also on logics linked to the conflict (the state seeks to prevent illegal armed actors from appropriating Glucantime). As a result, it is very difficult for the drug to move beyond the departmental health secretariats and meet the needs of people living or working in endemic areas (Pinto-García 2020).

In the end, the conflict and the drug's characteristics have created insurmountable access barriers precisely in those places where Glucantime is most needed. As a result, there is a black market that supplies the Glucantime needs of illegal groups and people in rural Colombia who cannot access the drug via state channels. This black market is supplied through smuggling and corruption of state officials, mainly members of the military (Pinto-García 2020; Rincón and Gaitán 2022).

In her ethnographic research on the relationship between leishmaniasis and the armed conflict, Pinto-García (2020) had the opportunity to talk and interact with dozens of active army soldiers, as well as with former FARC guerrillas. Former guerrillas repeatedly told her that leishmaniasis and malaria were the diseases that most affected them during the war. "I believe that leishmaniasis, malaria, and having been sanctioned at least once [for a disciplinary fault] were requirements to be a guerrilla combatant," were the words used by a former FARC combatant in an interview.⁸ In addition to these two diseases, they also mentioned dengue fever, and gastrointestinal and urinary infections (in the particular case of women) as common problems in the conflict context.

As for the army, leishmaniasis is considered a disease inherent to the soldier, part of the vicissitudes of the military role, and a bodily mark of military belonging left by

⁷ The official figure of approximately 8,000 cases per year (INS 2022a) must be far below the actual number. According to Alvar et al (2012), the actual number of cases is estimated to be 2.8 - 4.6 times higher.

⁸ Semi-structured interview conducted in February 2020 with a former FARC guerrilla.

the jungle. Therefore, it is rare that a male member of the army has not suffered from this disease and has not undergone antileishmanial treatments at least once during his time in that institution (Pinto–García 2020). Although the Peace Agreement signed in 2016 between the state and the Revolutionary Armed Forces of Colombia (FARC) led to a 17% decrease in reported cases of leishmaniasis (Iza Rodríguez, Iza Rodríguez, and Olivera 2021), it is important to consider that this figure likely reflects only a reduction in military cases, whose reporting is mandatory and predominant in official public health databases.

The relevance that leishmaniasis has had for state combatants directly involved in the armed conflict contrasts with the limited knowledge of cases among people with no or indirect relationship with this phenomenon (see National Health Observatory 2017). Such is the situation of Indigenous, Afro and Peasant communities, biologists, tourists, anthropologists, photographers and other people who enter the jungle for various reasons unrelated to the war. Likewise, leishmaniasis also frequently affects individuals working in extractive economies, both licit and illicit, such as coca production, gold mining, and logging (Pinto–García 2020; Hernández et al. 2019). These activities frequently take place in jungle environments where both the insect vector and wild animals considered reservoirs of the parasite are prevalent—opossums, armadillos, sloths, anteaters, bats, wild rats, porcupines, pumas, and jaguars, among others (Roque and Jansen 2014).

In Tumaco (Nariño), one of the two municipalities where most coca is planted in the country (in addition to Tibú, in the subregion of Catatumbo, Norte de Santander), the vast majority of cases of leishmaniasis correspond to people who work in these crops. They are mainly involved in '*raspar*' (harvesting) the leaves of the plant, which are then processed to produce coca paste and later cocaine (Pinto–García 2020; ¡Pacifista! – Proyecto Coca 2018). Similarly, the Diseased Landscapes project has shown that leishmaniasis is a health problem experienced regularly by people who work in the coca fields of Catatumbo, many of whom are Venezuelan migrants. However, these cases are rarely captured by the National Public Health Surveillance System (SIVIGILA) databases, as large distances separate people from health services in rural areas. In addition, stigmatization and pain associated with the antileishmanial drug discourage them from seeking medical help, while violence hinders the work of institutions and public health workers (see CEV 2021). In the particular case of Venezuelans, leishmaniasis is not considered an emergency, so its diagnosis and treatment are not guaranteed by the Colombian state. Consequently, leishmaniasis and its close relationship with illicit crops is an illegible problem for the state, absent in public health programs to control the disease, but persistent and pressing in the daily life of Catatumbo.

The relationship between conflict and the transmission of vector-borne diseases is generally a neglected aspect in dealing with public health problems. As the report published by the National Institute of Health (INS) and the National Health Observatory (ONS) on the consequences of the armed conflict on health notes, “[i]n Colombia there are still few studies that account for the relationship between conflict and malaria” (2017, 101). Based on quantitative data from SIVIGILA and a composite index of conflict intensity developed by the authors, that study did not find a clear association between malaria morbidity and mortality and conflict-related events. However, it suggested further investigation of the issue before ruling out such a relationship.

The relationship between conflict and vector-borne diseases has at least two related dimensions: the increased risk of infection of people directly affected by the conflict, and their lack of access to diagnosis and treatment, which can reduce the clinical impact of these diseases. When focusing on recent qualitative studies, such as the one published by the Truth Commission (CEV), it is evident that the right to health has been systematically violated in the context of the armed conflict (CEV 2021, 5). Specifically, malaria is one of those health events that has been experienced in particular ways in the midst of the war. The CEV report describes how malaria and leishmaniasis—as well as colds, intestinal infections, fungi, skin diseases, and snake bites—were the health conditions that most affected guerrillas and paramilitary groups (CEV 2022b, 51). Also, it reiterates that medicines for malaria and leishmaniasis, because they were considered “guerrilla diseases”, were subject to restrictions by the state army and paramilitary groups (CEV 2022a, 482).

On the other hand, the CEV report also emphasizes that “[t]he deterioration of natural resources due to the armed conflict has had a negative impact on the health of the Colombian population” (2021, 9). In this context, illegal mining and illicit crops are identified as generating financial resources for the war and causing health problems. Although a 50–75% reduction in malaria transmission and a 75% decrease in mortality was observed between 2000 and 2015, seasonal outbreaks continue to occur linked to deforestation and human migration. These phenomena go hand in hand with the expansion of illicit crops and mining, and these with the perpetuation of conflict and inequity (Padilla et al. 2017).⁹

⁹ Currently, the close relationship between malaria, extractive activities and generalized violence is particularly evident in the artisanal mining areas of the Arco del Orinoco in Venezuela. This area has become the epicenter of the largest epidemic outbreak in the Americas (Grillet et al 2021).

2. Why an integrated approach to diseases?

One of the most prominent debates in the field of international health since the second half of the 20th century has been the opposition between ‘horizontal’ and ‘vertical’ approaches to dealing with health problems. Vertical approaches target one disease at a time, typically in a top-down fashion. They usually rely on biomedical, purely chemical technologies that act specifically against the pathological event in question. In this approach, drugs, vaccines, insecticides, and access to medical services are seen as cost-effective, measurable, and sufficient solutions to problems considered purely natural or biological, which are defined in terms of the pathogen causing the infection (Cairncross, Periès, and Cutts 1997).

In contrast, horizontal approaches do not understand diseases as purely natural phenomena, limited to individual infection, but as the result of social inequities that must be balanced to generate healthy lives. In short, they are mainly interested in the social determinants of disease and the synergistic relationship between different forms of vulnerability. Therefore, promoting health implies a bottom-up strategy that involves the participation of communities and aims at access to safe water, healthy food, environmental sanitation, quality housing, sufficient economic income, a peaceful environment and other elements that allow for a dignified life.¹⁰

The vertical approach has been criticized for maintaining a reductionist vision of health, which does little to transform the realities where diseases incubate. Nevertheless, it continues to be notoriously predominant (see Abadía-Barrero and Bugbee 2019; Cueto 2004). In Latin America, the persistence of the vertical approach to address health issues is linked to the structural reform policies of the Washington consensus, imposed by the World Bank and the International Monetary Fund at the end of the 1980s and early 1990s. Since then, states have been forced to reform the health sector under the principles of the market, economic efficiency, and profitability. This weakened the capacity of many countries to support basic health system development, resulting in a return and entrenchment of vertical programs, fragmentation of health services, neglect of the social determinants of disease, erosion of community health infrastructures, and loss of intersectoral collaborations between ministries (de Jong et al. 2015).

In Colombia, these reforms materialized prominently through the approval of Law 100 in 1993. It restructured the health system to implement what is known today as the General Social Security Health System (SGSSS). As César Abadía points out, this

¹⁰ Comprehensive primary health care, promoted by the famous Declaration of Alma-Ata in 1978, embraces this more holistic and intersectoral perspective on health.

is nothing other than “a system of regulated markets for health insurance and managed care, in which the state favors and finances the privatization of health” (2004, 130). Until the late 1980s, the Colombian health system was heavily influenced by the Latin American social and community medicine movements and, despite deficiencies in the quality of public health services, the country had some of the best public health indicators in the region (Abadía 2004). With Law 100, this situation changed markedly. Since then, fewer people have access to health services and indicators such as maternal mortality, vaccination rates, and morbidity and mortality from acute respiratory infection have worsened notably (Abadía 2004).

The syndemic approach emerged in the 1990s as a critique of the verticality of health systems and programs. Specifically, it opposes the way in which these, following the biomedical model, artificially segregate and isolate diseases, their causes and treatments (Singer 2009). A syndemic is defined as the aggregation of two or more epidemics in a population, which interact synergistically, exacerbating the negative effects of each disease or health condition. It goes beyond the medical conceptualizations of comorbidity or multimorbidity, as it pays attention to the social, political and economic aspects that, added to environmental, anthropogenic and biological factors, lead to exposure to multiple diseases and their spatiotemporal aggregation in a given context (Singer and Bulled 2012). Since medical anthropologist Merrill Singer proposed it,¹¹ the syndemic approach has gained considerable traction. Its use has expanded to various health disciplines and mediated understanding of phenomena as pronounced and complex as the COVID-19 pandemic (Singer, Bulled, and Ostrach 2020; Singer et al. 2021; Ecks 2020).

This document proposes to address malaria and leishmaniasis as a syndemic in Colombia. This follows Merrill Singer and Nicola Bulled’s (2012) proposal to adopt an integrated approach to understand and respond to the aggregation between neglected and other diseases (including ‘the big three’, i.e. tuberculosis, HIV/AIDS and malaria). We believe that this approach is suitable for a contextual understanding of the territorial and differential conditions that shape human health and its deterioration in rural areas. In particular, territories affected by the armed conflict and extractivism, even after the signing of the Peace Agreement in 2016, would benefit from a syndemic approach to design institutional mechanisms capable of

¹¹ It was initially used to explain that drug use, gang violence, and AIDS were not three separate problems affecting the Puerto Rican community of Hartford (Connecticut, USA), but rather the interrelated components of a health crisis that arose in the midst of poverty, unemployment, alcoholism, and low levels of education (Singer 1996).

acting under such conditions.¹² Moreover, a syndemic perspective enables us to connect these local realities with national and transnational dynamics, in order to recommend some practices capable of addressing the needs for diagnosis, treatment and prevention of malaria and leishmaniasis in populations historically marginalized and affected by violence.

3. Three reasons to tackle malaria and leishmaniasis jointly

3.1 Overlapping geographies and populations

In peripheral areas such as Tumaco (Nariño) and Catatumbo (Norte de Santander), considered particularly challenging in terms of peace building, phenomena such as deforestation, illegal mining, human migration, illicit crops, and the armed conflict have not been reduced but rather intensified despite the agreements reached in Havana. In these areas, malaria and cutaneous leishmaniasis are common health problems among people for whom coca is the only way to make a living. Also among armed conflict actors and migrants who cross borders and move between farms or places where they find a way to make some money.

Given the need to prioritize rural health strategies aimed at closing the rural–urban gap, it is useful to think about the development of health strategies that cover more than one disease at a time. Therefore, attention should be paid to the fact that malaria and leishmaniasis affect populations that concentrate spatially around extractive economic activities.

Vector–borne disease distribution maps, usually produced by the INS, generally do not combine data on two or more diseases, which hinders the visualization of syndemic events taking place in rural Colombia. However, it is known that the aggregation of malaria and leishmaniasis is not only a characteristic of the conflict, but also occurs around coca cultivation, mining, and migration—all phenomena that need to be addressed if the goal is territorial peace and a dignified life in rural zones. This suggests the need and relevance of creating integrated and comparative diagnoses that allow for equally integrated interventions to achieve better results and avoid effort duplication and fragmentation.

¹² After four years of negotiations in Havana (Cuba), in November 2016, the Colombian state signed a peace agreement with the largest guerrilla group in the Americas—the Revolutionary Armed Forces of Colombia (FARC).

3.2 Extending malaria attention to leishmaniasis

As mentioned earlier, malaria, tuberculosis and HIV/AIDS are the infectious diseases that, due to their high mortality rates, concentrate most resources and attention from governments, international cooperation agencies, NGOs, and donors such as the Bill & Melinda Gates Foundation and the Global Fund. Therefore, state programs for the management of malaria, tuberculosis and HIV/AIDS are usually well developed and funded. This has taken attention and resources away from other infectious diseases such as leishmaniasis (Singer and Bulled 2012).

In addition, the fact that malaria is potentially lethal has meant that this disease, nationally and internationally, receives much more surveillance than non-lethal diseases such as leishmaniasis. As a departmental public health official told us, the state “prioritizes diseases of public health concern that kill, that have a higher risk of people dying.”¹³ As such, departmental health authorities always consider it a priority to prevent fatal cases of malaria. They constantly make efforts to provide timely attention to the danger signs of malaria, to have antimalarial drugs available, and to have people trained in diagnosis, treatment and case notification throughout the territory. “We can have an epidemic of malaria and we can have 20,000 sick people, but deaths should be zero; if I have only five cases of malaria in the year and one dies, I didn’t do my homework properly,” explained another public health official at the departmental level.¹⁴

That permanent concern to keep malaria mortality at bay has been forged by a succession of—failed or not entirely successful—programs of eradication, control, eradication again, and elimination (Blair 2012; WHO 2017). Since the 1950s, these have been prescribed by international actors such as the World Health Organization, the Pan American Health Organization, and more recently by the Bill & Melinda Gates Foundation (Blair 2012). The current elimination strategy, set forth by the World Health Organization in 2017 and adopted by Colombia, is Detection, Diagnosis, Treatment, Investigation and Response, better known by its acronym “DTIR” (INS 2019). A public health official described it to us in the following terms:

What is the goal? Not only diagnosis and treatment, but also going to the place where the case occurs, investigating if there is contact—if there are more sick people. “R” is the intervention according to what the investigation of the case reveals, whether it is spraying [with insecticides], treatment of [mosquito] breeding sites or installation

¹³ Semi-structured interview conducted in July 2022.

¹⁴ Semi-structured interview conducted in March 2017.

of mosquito nets. If we were in an ideal world, eight days after identifying the case we should have the capacity to intervene and react to that case. We still have a long way to go, but in the mid-term it is expected that we will be able to do that.

Although malaria remains a major public health challenge in Colombia and strategies to address it still require significant improvement (Recht et al. 2017; Castellanos et al. 2016; Feged–Rivadeneira et al. 2018; Chaparro–Narváez et al. 2016), it is clear that the current state management of malaria in Colombia is much more powerful and effective than for leishmaniasis. All this attention on malaria, which translates into resources and concrete public health actions, can be used to alleviate to some extent both the stigma and the neglect that characterizes leishmaniasis in Colombia. Addressing these two diseases from a syndemic perspective would allow expanding attention from malaria to leishmaniasis. It would also serve to leverage care for rural populations historically affected by violence, barriers to health access, and marginalization.

3.3 Microscopists

In Colombia, state strategies to control malaria date back to the 1950s, when the newly created World Health Organization deployed the global malaria eradication campaign. That campaign, which failed in terms of its global reach, consisted of the implementation of vertical programs focused almost exclusively on intradomestic and periodic fumigation with dichloro-diphenyl-trichloroethane (DDT) (Packard 2016). In this context, the Malaria Eradication Service (SEM) was created in Colombia in 1956. This depended directly on the Ministry of Health and had 16 operational areas in the national territory (Padilla–Rodríguez et al. 2022). In several rural areas of Colombia, the SEM was colloquially called '*malaria*' and SEM officials were called '*malaríos*'. However, SEM not only took care of malaria, but also of other diseases that eventually included leishmaniasis (Urrego Mendoza 2011).

In 1975, the National Health System was created and SEM continued to implement the vertical malaria eradication program in a centralized manner, as dictated and financed by MinSalud. In this context, diagnosis, treatment, and intradomestic fumigation were offered free of charge to the population (Jiménez, Hinestroza, and Gómez 2007). In the 1980s, a process of decentralization of the state began which, in departments such as Antioquia, resulted in better management of malaria and greater coordination between departmental authorities and SEM (Jiménez, Hinestroza, and Gómez 2007). However, with the structural reforms of the late 1980s

and early 1990s, mainly with Law 100 of 1993, the SEM disappeared and decentralization processes deepened, creating gaps and financial and logistical problems in the continuity of malaria control.

In particular, dismantling of installed capacity and direct actions in the municipalities was aggravated by the loss of acquired experience (Jiménez, Hinestroza, and Gómez 2007). Programs for the promotion, prevention, surveillance, and control of vector-borne diseases, focused on collective health, were left under the responsibility of departmental health authorities. On the other hand, diagnosis and treatment actions, aimed at individuals, were left under the responsibility of the insurance companies, better known as *Entidades Prestadoras de Salud* or EPS (Jiménez, Hinestroza, and Gómez 2007). These reforms have resulted in “the fragmentation of actions, the disconnection of management, and the predominance of economic utility as the guiding principle of the model,” which has had a negative impact on public health (Jiménez, Hinestroza, and Gómez 2007, 115).

Despite the above, the day-to-day work of diagnosing and treating malaria in many rural areas of Colombia, as well as reporting cases to SIVIGILA, continues to depend on people known as *microscopistas* (microscopists), whose role emerged with the establishment of SEM. They are rural residents that respond to cases locally. Acting as a link between the health system and the communities, microscopist networks remain critical to cover the diagnostic and treatment needs of various territories, even in remote places, far away from urban centers.

Tumaco provides a notable example. There, the microscopist network is made up mainly of women, usually chosen by their own community. They handle malaria cases from the microscopy station, which is usually their own home, regardless of whether the patient is a local, a migrant, a miner, a coca worker, or an armed actor. As long as violence permits, the microscopists' presence in these places and their commitment to public health is usually quite strong. Those who want to be microscopists are not required to have any specific level of schooling; it is enough to be able to read and write, and to be willing to play the role. “Generally, more women apply than men because they are more at home; it is more convenient for us because there is more permanence,” a public health official in Tumaco told us.¹⁵ Microscopists receive a microscope and a two-week training (including weekends) to diagnose malaria by the *gota gruesa* method (sometimes also using rapid tests), identify the parasites in all their forms, quantify them, report the cases, and provide treatment according to the schemes stipulated by MinSalud.¹⁶ Every month and a

¹⁵ Semi-structured interview conducted in July 2022.

¹⁶ Such training is reinforced every two years.

half to two months, a public health official visits each microscopist, examines the slides of the positive cases, reinforces the training if necessary, and restocks the treatment and the implements that have been used: slides, stains, immersion oil, formats, pencil, pen, etc.

In general, microscopists work on a voluntary basis, meaning that they do not receive any type of financial compensation for their work. Thanks to the implementation of a particular program,¹⁷ economic resources have been sporadically made available to hire or pay microscopists.¹⁸ This has allowed, unusually, microscopists to fully engage in activities related to the diagnosis, treatment, and reporting of malaria cases. Otherwise, this work is secondary to the other tasks they carry out to ensure the care and livelihood of their families. “For us, it is much better that the work [of microscopists] is paid because the person will spend more time caring for their community, more time at home working with the microscope,” explained a public health worker in Tumaco.¹⁹

We believe that the need to generate and maintain a strong rural health system that provides nearby and timely care for the medical conditions of Peasant, Indigenous and Afro communities can benefit significantly from the historical experience of microscopists. Despite the deterioration that reforms such as Law 100 have caused to community health practices that existed in rural areas, the microscopists have persisted. So have the ways in which these women train and work to make concrete and possible the state’s management of malaria in rural, remote, and dispersed areas. Rethinking rural health without taking into account this experience and installed capacity in some territories would be a lost opportunity. Similarly, to rethink the joint management of leishmaniasis and malaria without taking advantage of the microscopes already available and the work already being done by microscopists would be ill-advised. It is necessary, therefore, not only to build on what already exists and works. It is also necessary to strengthen with sustained resources and fair compensation the networks of people, mainly women, who act as key players in rural public health. In this way, they will be able to expand their capacities and skills to address more than one health condition.

¹⁷ For example, the Regional Malaria Elimination Initiative (IREM), launched since 2019 in Colombia, is one such program that has enabled the financial compensation of microscopists. This initiative involves actors such as the Inter-American Development Bank (IDB), Bill & Melinda Gates Foundation, the Carlos Slim Foundation, the Global Fund, the Pan American Health Organization and MinSalud.

¹⁸ They are usually hired by the municipality’s public hospital, which in the jargon of the Colombian health system is known as *Empresa Social del Estado* or ESE.

¹⁹ Semi-structured interview conducted in July 2022.

4. How would a joint approach to malaria and leishmaniasis work in practice?

How can we begin to shift the verticality of malaria and leishmaniasis programs towards a much more horizontal approach to health? We consider that a syndemic approach, applied to these two diseases, is a promising way to address frequent health needs in rural Colombia. This implies generating recommendations that recognize the impossibility of separating health deterioration from the historical, social, political, and economic dimensions that produce vulnerability. Taking into account the way in which these two diseases are entangled with violence (Pinto-García 2020), in practice we propose to modify the ways in which leishmaniasis is diagnosed, treated, and mapped, connecting these processes with the management of malaria.

4.1 Diagnosis

The way in which the diagnosis of leishmaniasis is usually performed is one of the major limitations for cases to be identified and for people to receive treatment. Since the *raspado* method requires not only a microscope, but also personnel trained and experienced in sampling, staining, and visualization of the parasites, very few people manage to visit a health post where all these conditions are met (Adams et al. 2014).

Additionally, visualization of *Leishmania* parasites under the microscope is the minimum requirement for a person to receive treatment. Since Glucantime is a highly toxic drug, whose systemic administration (intramuscular or intravenous) can even cause death (Pinto-García 2022), it is considered very risky to inject it without being certain about the parasitological origin of the skin lesions. However, such visualization of parasites is not always feasible, even if the person comes from an endemic area and has a painless, circular ulcer with raised edges (the typical characteristics of a leishmaniasis lesion). Using medical terminology, this means that lesions clinically compatible with leishmaniasis often remain without a positive diagnosis (Escobar et al. 1992). This happens because the presence of parasites in a sample is highly variable, and decreases if the lesion has several days or months of evolution, and/or if the patient has used some popular (usually herbal plasters) or pharmacological treatment (e.g., some ampoules of Glucantime obtained on the black market).

Despite the above, we believe that microscopists who currently diagnose malaria in areas where leishmaniasis is also prevalent could, with appropriate support from state institutions, take on the diagnosis of leishmaniasis. They already have practical skills that closely resemble the work they would have to do to determine, using a microscope, whether a person has *Leishmania* parasites in skin lesions. Additionally, if the way in which MinSalud recommends treating leishmaniasis in Colombia were modified and updated—as we suggest in the next subsection (4.2)—the requirement for parasitological diagnosis (visualization of parasites under the microscope) in order to proceed with treatment could be taken more flexibly. In other words, microscopists could be trained to ask a series of simple questions and calculate a score that would allow a presumptive diagnosis of the disease. This type of diagnosis has been designed and tested in rural communities in Tumaco by the Centro Internacional de Entrenamiento e Investigaciones Médicas (CIDEIM) (Rojas et al. 2002) and would be extremely useful if other ways of treating leishmaniasis—other than systemic administration of Glucantime—were adopted as standard.²⁰

4.2 Treatment

Today, the first-line treatment used for cutaneous leishmaniasis in Colombia consists of intramuscular administration (injections in the buttocks) of Glucantime for 20 days. This drug, produced by the French multinational company Sanofi, was developed in the context of World War II and since then has not shown significant improvements (Pinto-García 2022). Its active compound is meglumine antimoniate, a highly toxic substance that affects the heart, liver, kidneys, and pancreas. Moreover, Glucantime's effects have not yet been thoroughly studied by science (Pinto-García and Sánchez-Parra Forthcoming). In fact, it is paradoxical that, in Colombia and other countries, we continue to use such a toxic, potentially fatal treatment to systemically treat a mostly benign disease such as cutaneous leishmaniasis (Pinto-García 2022).

²⁰ The presumptive diagnosis of leishmaniasis was initially achieved thanks to the development of a wooden tower that includes two elements: a basal box with instructions and, on top, six colored blocks that correspond to the six variables on which the person making the presumptive diagnosis asks the person suffering from the skin lesions. It was shown that this device can be very useful in the detection of cases at the primary health care level (Rojas et al. 2002). Almost twenty years later, this device was transformed into an application for smartphones (Rubiano et al. 2021). Although its use was evaluated with very favorable results, in areas of conflict and illicit crops, the use of smartphones is not only restricted or prohibited by armed actors, but connectivity is often very poor. In addition, not all people are equally skilled in handling these devices, for example, to take photos with good resolution. It is worth considering the use of analog tools such as the wooden tower, as digital applications do not necessarily solve the problems or are better (see Greene 2022).

This is even more serious considering that there are effective and cost-efficient treatments, less harmful than systemic Glucantime, which could be used at least in cases of localized cutaneous leishmaniasis²¹—the application of heat to the lesions (thermotherapy) or the injection of Glucantime directly into the ulcers (intralesional treatment) (PAHO 2022; López et al. 2012; Cardona-Arias et al. 2017; 2018). Compared to the administration of Glucantime injected into the buttocks, these local therapies do not carry as many risks, and could be practiced by people, such as microscopists, who do not have medical training.²² In fact, the use of red-hot spoons or machetes to cauterize leishmaniasis lesions—something quite similar to thermotherapy—is a very common practice in rural Colombia. So is the intralesional administration of Glucantime, especially by people who had medical responsibilities within the FARC guerrilla (Pinto-García 2022).

We consider that local leishmaniasis therapies, such as thermotherapy and intralesional administration of Glucantime, could be implemented as first-line treatments in rural Colombia. Microscopists could be trained in both methods in such a way that, as they do for malaria, they could diagnose (parasitologically or presumptively) leishmaniasis and provide treatment where the cases occur, without generating unnecessary delays between the two procedures.

4.3 Mapping

If the diagnosis and treatment of leishmaniasis were modified as we have recommended in subsections 4.1 and 4.2, this would lead to better tracking of cases and, therefore, to some extent remedy the underreporting of the disease. Likewise, if actions to identify and treat malaria cases in a timely manner continue to be strengthened, this can leverage the detection of leishmaniasis cases that remain undiagnosed, unreported, and untreated.

In order to be able to jointly address these two diseases, however, it would be ideal to have not only more reliable data for both diseases, but also integrated maps. By combining the information collected on malaria and leishmaniasis in the country, we

²¹ Localized cutaneous leishmaniasis refers to the presence of 1-3 lesions up to 3cm in diameter in any area of the body, except the head and periarticular areas (PAHO 2022).

²² When Glucantime is administered intralesionally, the absorption of the drug is lower and, therefore, so are its toxic effects. Additionally, as much lower doses are used than in systemic treatment, both the toxic effects of the drug and the costs are lower in the case of intralesional treatment (Brito et al. 2019; Vasconcellos et al. 2012). The most common adverse effects linked to intralesional administration of Glucantime are pain, edema, pruritus and redness. These, however, are usually benign and tend to resolve on their own (Arboleda et al. 2019).

could have greater clarity on the areas of the country where it would be worthwhile to intensify a diagnosis and syndemic response to these two endemoepidemic diseases.

4.4 Destigmatization

As noted earlier, leishmaniasis—but also malaria—are diseases that remain stigmatized as ailments of guerrillas or illegal armed groups. As such, sufferers have also gone through the fears and discrimination that such a perverse association brings, resulting in underreporting of cases, barriers to access to diagnosis and treatment, and other forms of violence for people in rural Colombia (Pinto-García 2020).

Assuming that the stigmatization of these diseases disappears with the signing of the Peace Agreement is misguided, since it is necessary to develop active destigmatization strategies at the community and clinical level, and within public health and defense institutions (Pinto-García 2019). In other words, it is essential that in places where stigma persists, concrete actions are established to identify and counteract the friend/foe logic whenever it operates and puts the health and safety of those suffering from leishmaniasis or malaria at risk.

4.5 Clearing up confusions

Given the health access barriers that characterize rural Colombia, one of the first places where people go to seek a solution to a problem such as leishmaniasis or malaria are pharmacies, better known as *droguerías*. This has been confirmed by the Diseased Landscapes project, which has found that the pharmacies located in Catatumbo are virtually the first (and sometimes the only) level of care for a large number of diseases and health conditions. There, it is very common for people to acquire, without any medical prescription, all kinds of oral antibiotics. In the case of leishmaniasis, these help to eliminate the bacteria that secondarily infect the skin lesions, but leave the *Leishmania* parasites intact.

Such a practice, extremely common in rural and urban contexts, entails a problem of still poorly understood dimensions regarding the development of various forms of antibiotic resistance, which demands urgent research and attention from the state. However, it is also a missed opportunity to address problems such as leishmaniasis.

Working hand in hand with—and not in spite of—pharmacies in places like Catatumbo and Tumaco may be a promising measure to identify possible cases of malaria and leishmaniasis, as well as to achieve proper diagnosis and treatment. This strategy is also necessary to regulate the sale and use of antibiotics in Colombia.

Likewise, working collaboratively with pharmacies could address another confusion that pervades the experience of leishmaniasis in rural areas: the idea that Chagas disease and leishmaniasis are the same thing. Since leishmaniasis is popularly known as “*pito*,” and this is also the name given to the insects that transmit Chagas disease, the misconception that leishmaniasis and Chagas disease are the same and that the vector of Chagas disease is the vector of leishmaniasis is very common. In fact, carrying a dead triatomine bug in one’s wallet is one of the ways some people believe they protect themselves from leishmaniasis in rural Colombia (e.g. state soldiers). Pharmacies could also be a strategic place to break these ambiguities between leishmaniasis and Chagas disease.



Figure 4. Triatomine bug that transmits Chagas disease, popularly known in Colombia as *pito*. Because cutaneous leishmaniasis is also known as *pito*, it is often believed that this insect transmits leishmaniasis. Photo by the author.

5. Recommendations

As we have argued throughout this document, it is necessary to address leishmaniasis and malaria syndemically, paying attention to the ways in which these

diseases are experienced, understood and confronted in war-torn rural areas. To do so, we recommend the following actions:

1. Modify and update the clinical practice guidelines for cutaneous leishmaniasis so that local therapies such as thermotherapy and intralesional administration of Glucantime are first-line treatment for localized cutaneous leishmaniasis, that is, for cases with the following characteristics: 1–3 lesions up to 3 cm in diameter, in any area of the body except the head and periarticular areas. **[Recommendation addressed to MinSalud].**
2. Modify and update the clinical practice guidelines for cutaneous leishmaniasis so that oral treatment with Miltefosine is the first-line therapy for cases of non-localized leishmaniasis that cannot be treated with local therapies. In this way, systemic treatment with Glucantime (intramuscular or intravenous administration of Glucantime) would cease to be the first-line treatment in Colombia and would become the second-line treatment only for cases of non-localized leishmaniasis in which treatment with Miltefosine did not work. **[Recommendation addressed to MinSalud].**
3. Modify the clinical practice guideline for cutaneous leishmaniasis so that the diagnosis of the disease can be made presumptively for localized leishmaniasis lesions. In that case, a positive presumptive diagnosis should be treatable with local therapies such as thermotherapy or intralesional administration of Glucantime. **[Recommendation addressed to MinSalud].**
4. Develop a periodic training plan for microscopists so that they acquire the necessary skills to diagnose (presumptively and parasitologically), treat (with local therapies) and report cutaneous leishmaniasis. **[Recommendation addressed to MinSalud].**
5. Include in the annual state budget (at the national, departmental or municipal level) the fair and sustained remuneration of the people who make up the microscopist networks to enable their full-time dedication to the diagnosis, treatment, and notification of malaria and leishmaniasis. **[Recommendation addressed to MinSalud, departmental health secretariats, departmental health institutes, and municipal health secretariats].**
6. Strengthen with sufficient resources and constant monitoring and evaluation the coordinated work between the health system and microscopist networks. **[Recommendation addressed to MinSalud].**
7. Combine the data that the state obtains on leishmaniasis and malaria in weekly, monthly and annual maps and reports to make integrated analyses and identify which areas of the country lend themselves best to a joint approach to these two diseases, which adequately takes advantage of the existent

microscopist networks capacity. **[Recommendation addressed to the National Institute of Health].**

8. Design and implement a campaign to destigmatize leishmaniasis and malaria at the community level, in health centers, and public health and defense institutions. Likewise, work collaboratively for this purpose with pharmacies located in PDET municipalities, i.e., in places affected by armed conflict, mining, and illicit crops. **[Recommendation addressed to MinSalud, departmental health secretariats, departmental health institutes, municipal health secretariats, Agencia de Renovación del Territorio (ART) and the pharmacies association (ASOCOLDRO)].**
9. Establish a sustained program aimed at pharmacies in rural areas of the country, based on educational strategies and the dissemination of pedagogical materials. This is intended to break existing confusions about leishmaniasis—those related to its transmission cycle, the diagnosis and treatment of the disease, and the differences between leishmaniasis and Chagas disease. **[Recommendation addressed to MinSalud, departmental health secretariats, departmental health institutes, municipal health secretariats, and the pharmacies association (ASOCOLDRO)].**

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