

YOUR LOVE HURTS DOWN TO MY BONES: EXPLORING PUBLIC  
UNDERSTANDINGS OF DENGUE FEVER IN MEDELLIN, COLOMBIA,  
THROUGH AN ANTHROPOLOGY-ART-SCIENCE INVESTIGATION

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## Abstract

Your love hurts down to my bones: Exploring public understandings of dengue fever in Medellín, Colombia, through an anthropology-art-science investigation

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This is a study of the creation and negotiation of different forms of knowledge about dengue fever. I explore how anthropology, in collaboration with ideas and practices drawn from science and art, may transform public understandings of dengue. Dengue is a vector-borne disease transmitted to humans by the bite of a mosquito which is infected with the dengue virus. Mosquito-borne diseases have normally been treated through vector control and the elimination of breeding sites. Until 1960, the use of the pesticide DDT allowed the virtual eradication of *Aedes aegypti* (*Ae. aegypti*) in many places of the world. DDT was banned in most of the world by 1970 and by 1980 the focus on vector-control was replaced by a discourse of sanitation, in which health authorities tried to ‘educate’ populations and ‘teach’ proper hygienic habits to avoid mosquito-human contact. At present, these practices are changing again. The World Health Organisation (WHO) suggests that dengue incidence could be reduced at least 50% by 2020 through applying health campaigns and social interventions that involve having people participating in the control of dengue outbreaks. In this thesis I explore how WHO guidelines are applied in the control of dengue in Medellín, and how we can think about the concepts of ‘knowledge’, ‘education’ and public health campaigns through ethnographic methods. My project has been about looking at how different understandings – or different forms of knowledge – are part of interactions of different ‘publics’, non-expert citizens, virologists, entomologists and artists. My argument is that health campaigns should be re-designed – privileging relations and stimulating debate – by focusing on experience and moving towards managing the disease and living with the mosquito. Contrary to the different models enacted in health campaigns – which neglect the value of everyday experiences – I advocate for interdisciplinary collaboration as a relational art strategy that can generate an intersubjective exchange of experiences.



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*Para mi abuela y sus colores contentos*

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## Chapter 1

### THE MULTIPLE KNOWLEDGES OF DENGUE FEVER

#### Introduction<sup>1</sup>

When we follow the literature of science and technology studies, the concept of ‘knowledge’ may be defined as a contemporary collective interaction between institutions, people, their ideas and beliefs. It is a ‘public good’ (non-appropriable resource), the value of which cannot be depleted (Atkinson et al., 2009). The study of knowledge-making practices connects the macro and micro worlds as a constitutive co-production between micro considerations enacted in scientific practices and the macro structures of the political and social thought (Jasanoff, 2004a; da Costa and Philip, 2008). ‘Knowledge’ is the product of a network of interactions that blur the boundaries between ‘natural’ and ‘social’, as it is embedded into society (Knorr Cetina, 1981; Lindenbaum and Lock, 1993; Jasanoff et al., 1995; Jasanoff, 2004a).

I used to study vector-borne diseases from a biological point of view, carrying out activities such as maintaining mosquito colonies and entomological collections (Valencia-Tobón, 2009a), working on biological assays (Robledo et al., 2012), and developing molecular taxonomy methods for identifying mosquito species with DNA barcoding. In 2008 I began to focus my attention on the way non-academic communities perceived diseases like dengue and leishmaniasis, for example, within traditional medicine, through natural pest control methods, and in healing practices (Valencia-Tobón, 2009b, 2009c). Then I started developing art-science projects that allowed me to explore the everyday life experiences of people in relation to vector-borne diseases (Valencia-Tobón, 2010, 2012a, 2012b, 2015). ‘Everyday life’ is a key concept within the social sciences and cultural studies.<sup>2</sup> It is defined as a sort of

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<sup>1</sup> All the translations from publications in Spanish, as well as the figures, photos or images, unless otherwise indicated, are my own.

<sup>2</sup> Tim Ingold (1994, 2011) argues that studying everyday life is what anthropologists do: their work is not about testing conjectures and abstract ideas about what human beings are like, but rather about paying attention to everyday life in order to understand humans as they really are (Ingold, 1994: xvii; 2011: 15). Henri Lefebvre (1991: 6) holds that ‘everyday life is the supreme court where wisdom, knowledge and

‘connective tissue’ that gives structure and coherence to human thoughts and activities (Gardiner, 2000; Lefebvre, 1991). Studying the everyday involves focusing on ‘the things of the world and transforming them in specific ways so as to give them the kind of determinative form that can be known’ (Rabinow, 2008: 9). Bringing together my past professional experiences, for my PhD research I studied dengue fever in Medellín, Colombia, from an anthropological point of view, trying to show the different ways in which public health campaigns are connected and disconnected, both from the scientific practices and from the public and everyday experience of the disease.

In the Colombian context, the term ‘scientific’ is understood as the institutionalised knowledge legitimated in the formation of universities, research centres, and companies and in their focus on innovation and new technologies (Miranda Canal, 1984, 1992; Quevedo et al., 1993; Colciencias, 2008, 2015). It is related to the academic, professional and expert production of knowledge, characterised by rational techniques of planning, measurement and assessment, which are disseminated through peer review publications or registered as a form of intellectual property,<sup>3</sup> such as patents, industrial design rights, or seed certification (Escobar, 1995, 2008; Universidad de Antioquia, 2015). The idea of the ‘public,’ on the other hand, is understood as popular actors, those who are neither experts nor trained professionals (Escobar, 1995; Vanegas, 2015). The notion of the public is also associated with those resources that can be used or accessed freely by anyone and that are outside of market logics (Fundacion Karisma, 2015; Botero, 2015). Contrary to the ‘all rights reserved’ idea enacted in institutionalised knowledge, the notion of the public is related to ‘copyleft’ or ‘share-alike’ licenses, as established by the Creative Commons, for distributing research outcomes (Botero, 2015; Fundacion Karisma, 2015). The public is a key concept for designing and protecting sustainable, common projects not related to commercial purposes, which are characterised by an

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power are brought to judgement’. It is the ‘human raw material’ that is defined by contradiction – illusion and truth, or power and helplessness (1991: 21) – and that is related to all human activities after considering specialised techniques (1991: 97).

<sup>3</sup> This idea tends to exclude humanities, social sciences and arts (see Universidad de Antioquia, 2015).

exchange of creative knowledge in forms that remain freely available (see MAMM, 2012; Cantor, 2012; Vanegas, 2015). Thinking about the notion of the public implies analysing the collective participation of different actors that are subjects and objects of knowledge, and who reveal complex processes of cultural hybridisation (Escobar, 1995: 219).<sup>4</sup>

By studying the nature of the relation between the scientific and public practices and everyday experiences of dengue fever, I have discovered that there is a question about different kinds of knowledge, which means dengue is not a *singular thing*, or a product of one particular interpretation that is enacted in a single way. As Annemarie Mol (2002) contends in her work about atherosclerosis, a disease is the product of practices that sustain it, because it responds to multiple realities or multiple worlds. She explains, for example, that ‘a plaque cut out of an atherosclerotic artery is not the same entity as the problem a patient with atherosclerosis talks about in the consulting room, even though they are both called by the same name’ (Mol, 2002: vii). In the case of dengue, different knowledge-making practices are linked to different models of the disease, from entomological and virological understandings, to epidemiological analyses, to health care points of view. For instance, entomologists concentrate on vector control while virologists embrace etiological studies and analyse the virus structure and its variations, epidemiologists are concerned with statistical measures for public health control, and health staff focuses on diagnosing the disease; therefore, ‘knowledge’ is very different in each of these spaces. But, at the same time we also have public understandings of dengue and mosquitoes, and the unique experiences of the people who have had the disease,

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<sup>4</sup> Arturo Escobar (1995) offers an anthropological example to understand these ideas. By analysing the production of knowledge around agriculture in Colombia, Escobar argues that the objects of knowledge are defined by the ‘expert’ producers (the researchers) who impose their views on the community – such as the small farmers or peasant women. For Escobar, at stake is the economisation of food in favour of the professionalisation of development knowledge and the institutionalisation of hegemonic practices led by international organisations and national planning agencies. In other words, there is a struggle between biotechnological scientific knowledge and interests and the knowledge and interests of rural and local communities (Escobar, 1995: 19). What is needed is attention to the public knowledge of a particular community, and appreciation of its values and its own organisation, instead of imposing grand alternative models.

which may not necessarily be related to the approaches taken by academic and health institutions. My project addressed these different forms of knowledge, showing disparities and commonalities between the ‘official,’ ‘scientific’ and the various ‘public’ understandings.

### **Health campaigns and participation**

Despite all of these different forms of knowledge, health campaigns remain poorly designed. They generally emphasise sanitation and hygiene through the elimination of mosquitoes-breeding sites, art does not play a role in their design and more fundamentally and morally speaking, the experiences of the people that have had the disease are not part of these campaigns and if they are, they are represented simply as signs and symptoms. I argue that health campaigns should focus on experience, design open-ended and process-based projects, and stimulate debate among the public; collaboration as a goal should be seen as a good in itself (Rabinow and Marcus, 2008; Ssorin-Chaikov, 2013). I develop this position by suggesting a relationship between managing the disease (Chapters 1 and 2), the experience of those who have had the disease (Chapter 3), and the notion of multispecies ethnography as a way for understanding human-mosquito relations. A new relationality is demanded by the ‘evidence’, which is accepting that people live with mosquitoes and a world without mosquitoes is highly unlikely (Fang, 2010). Humans need to accept, as Richard Barnett (2014: 216) argues in his analysis of illustrations of the diseased human body from the 18th to the 20th century, that parasites and viruses – like death – ‘are inescapable’.<sup>5</sup> Contrary to current health campaigns that neglect the experience of the disease, relational art is a good model for constituting a public that can be engaged in projects around dengue. Relational art is defined as a set of artistic practices that are theoretically and practically based on human relations (Bourriaud, 2002: 113). Everyday experiences will have a stronger value by

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<sup>5</sup> Like any other species, human beings need to be controlled, and mosquitoes do this job by sucking blood and spreading pathogenic microbes (Fang, 2010). This is something that not only scientists have noticed. Artists such as Preston Singletary (Schantz Galleries, 2010) and Dan James (2005), and writers like Eduardo Galeano (1985, 2004) and Richard Jones (2012) have commented on the idea that mosquitoes are almost the Devil himself, eating people alive.



provoking intersubjective exchange within micro communities in an open-ended process enacted in models of relational art (Bourriaud, 1998, 2002).

Among these different understandings of dengue, there is also a key issue centred on the idea of ‘participation’.<sup>6</sup> The WHO (2012a) argues that a more participatory approach is required for controlling dengue epidemics. Through environmental clean-up campaigns, health authorities call on the community to participate by eliminating water containers in which mosquitoes can breed: ‘people must assume responsibility for the weekly inspection and control of *Ae. aegypti* in and around their homes’ (Gubler quoted in Parks and Lloyd, 2004: vii).<sup>7</sup> In the Colombian context, ‘participation’ has a local meaning and consequences, and is understood as a process of communication and decision making. In this video (figure 1), for example, the Colombian Ministry of Health and Social Protection encourages people to participate in the decision-making process for designing the national health policy for the next ten years by repeatedly and directly addressing the ‘you’ of a variety of Colombians. The government planned to hold meetings across the country and to empower people to take part in them.

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<sup>6</sup> Throughout the text I describe the idea of ‘participation’ in different forms. It is not only a leitmotif in anthropology, but also in a certain kind of art-making mainly related to the so-called community-based art, socially-engaged art, dialogic/conversational art, interventionist art, research-based art, or collaborative art (Bishop, 2012: 1). In Chapter 2 I address this idea in relation to public health campaigns. In Chapter 4 I explore the perspectives of Claire Bishop (relational antagonism), Nicolas Bourriaud (relational aesthetics) and Grant Kester (engagement in conversation).

<sup>7</sup> The problem here is that community participation around health programmes has been associated with community development and empowerment of individuals, assuming that academics are the only responsible for knowledge production. This is a historically constructed idea that began in 1978 at the Alma-Ata conference – former Union of Soviet Socialist Republics, USSR – (WHO, 1978). The product of this meeting was a declaration where the WHO tried to emphasise that the idea of ‘health for all’ should be part of the agenda during the next two decades (WHO, 1978; Espino, et al., 2004).



Figure 1. Colombian Ministry of Health and Social Protection: Participation and decision-making. Source: <https://goo.gl/wo1ZZN>

Translation: Colombian health is made by you, and you, and you, and you, and you. That's why your participation is important to design the 10-year plan for public health. We invite you to participate in the public consultation exercises. You can find the nearest one at [www.minsalud.gov.co](http://www.minsalud.gov.co).

With regard to dengue fever, the National Health Institute (INS, 2013a) frames *community participation* in terms of social mobilisation and communication. These are in turn related to a discourse of sanitation, hygiene and education – mainly for reducing mosquito-breeding sites. This invocation of participation implies that, on the one hand, the state is no longer solely responsible for eliminating mosquito-breeding sites: it is also a responsibility of the community. On the other hand, there is a sense that people need more information about how to control dengue, and that they do not participate because they have not understood that they should. The INS states:

In articulation with the Organisations for Benefit Plan Administrators [Entidades Administradoras de Planes de Beneficios – EAPB], it's important to develop strategies for communication and social mobilisation to change risk behaviours in the population, related to the identification of dengue symptoms and warning signs; the necessity of seeking medical treatment promptly; avoiding self-medication; brushing water tanks weekly and covering water containers for domestic use; the sanitation of the immediate area around houses and institutions; the clean-up of vacant lots; the reduction and elimination of mosquito breeding sites in public places and special institutions (schools, hospitals, cemeteries, parks, prisons, fountains, among others) and biological control. (INS, 2013a, section I, number 1.12)

## **Relationality and multispecies ethnography**

As relationality and participation were key issues in these health campaigns, I applied these ideas as an artistic method in carrying out my research and presenting its findings. I asked: how we can apply artistic means to re-think and re-present the relation of mosquitoes and viruses with people as multispecies ethnography? ‘Multispecies ethnography’ is defined as the study of contact zones between human and other species, where the division of culture and nature is blurred (Kirksey and Helmreich, 2010: 546). As Donna Haraway (2008) argues, we live *with* animals in an indivisible history of mutual recognition, which can also be seen as a kind of aesthetics of human–animal life. We can think about insects in the same terms: insects have been on the earth for millions of years (mosquitoes for more than 100 million years), longer than humans can imagine, and their effects on human life are unquestionable (Morris, 2004; Kirksey and Helmreich, 2010; Raffles, 2010a).

My fieldwork was divided into three phases. I first focused my attention on the everyday understanding of dengue. How do people talk about dengue? How do they prevent it? How do people perceive health campaigns? How do they talk about the experience of being unwell? This phase was based on the illness narratives of four participants who suffered dengue fever and the documentation of the public understandings of the disease and its health campaigns. These ideas and questions about knowledge are critically related. Attending to the experience of everyday life implies responding to sensorial and corporeal experiences (Highmore, 2002), to show how and why the notions of space and time are socially constructed, revealing the multiplicity of rhythms, and embodied knowledge people have (Lefebvre, 2004). By working with two entomologists and one virologist, and interviewing members of different public health institutes, in the second part of my project, I documented scientific practices, public health discourse and the design of educational campaigns. What kind of knowledge is relevant in the design of health campaigns? Who is responsible for their design? What templates do they follow? What kinds of instructions do they receive? In comparison to formalised and specialised forms of knowledge, Gardiner (2000: 135) writes that ‘everyday knowledge is ruled by emotion and affect; it is highly repetitive, prone to analogical forms of reasoning and over-generalisation; and it is very pragmatic, based upon immediate perceptions and

experiences and subordinated to the requirements of mundane tasks'. These two phases of research, and the different modes of knowing embedded in them, were then linked through an analysis of narratives. As Escobar (1995: 207) holds, 'although nature, bodies, and organisms certainly have an *organic* basis, they are increasingly produced in conjunction with *machines*, and this production is always mediated by scientific and cultural *narratives*'.

By reflecting back on public and scientific understandings, in the last phase I wanted to engage different audiences with the ideas that were at stake in the construction of knowledge about dengue fever. David Chaney (2002) argues that the exploration of everyday life in the modern era means thinking about power, control and the politics of knowledge: 'who decides (and how they decide) what is significant in social life is the most basic level of political control' (Chaney, 2002: 35). Merely collecting details of what people do is not sufficient to determine the relevance of the everyday. So by identifying that *participation* was a key motif around which health campaigns were designed, I identified that there was not an active engagement with the public because these campaigns were assistance-based projects.<sup>8</sup> My fieldwork was an attempt to address this lack of engagement by re-working the notion of participation as an ethnographic experiment in relational art. To do so, I invited six artists and an advertising agency to work together with the people who participated in phase one and two. Through such interdisciplinary collaborations<sup>9</sup> we conceptualised relational art strategies and alternative ways for understanding the multiplicity of relation between humans, mosquitoes and dengue. This meant creating pieces that were placed in public space and that creatively engaged with a wider audience, providing a critical reflection on the traditional health campaigns that neglect the experience of the disease by privileging the discourse around eliminating mosquito-breeding sites. This process implies thinking about conceptual art as a research method in

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<sup>8</sup> See Chapter 2 where I explain how people get clothing, refreshments, working kits, or even money, to participate.

<sup>9</sup> Following Barry and Born (2013a, 2013b), I understand the idea of interdisciplinarity as 'a variety of boundary transgressions, in which the disciplinary and disciplining rules, trainings and subjectivities given by existing knowledge corpuses are put aside' (2013a: 1). Interdisciplinary relations should create a different kind of public knowledge, which is 'in principle unfinished, in process and dialogical' (2013b: 263).

‘ethnographic conceptualism’ (Ssorin-Chaikov, 2013).<sup>10</sup> To do this I used the ideas of *participation*, *appropriation* and *relationality* to generate dialogues between my participants. We then collaboratively created elements that reflected the ideas of how dengue is understood in different contexts.

*Participation* is understood here as a condition of possibility for having a collective interaction with socially oriented projects (Bishop, 2006a: 10), in which ‘people constitute the central artistic medium and material’ (Bishop, 2012: 2). Participatory projects are allied with one (or all) of three concerns: the causal relationship between the physical or symbolic experience and the constitution of a social or political reality; the creation of more egalitarian and non-hierarchical works by privileging collaborative creativity; and ‘the restoration of the social bond through a collective elaboration of meaning’ (Bishop, 2006a: 12). According to David Evans (2009), the idea of *appropriation* criticises the notion of originality and authorship in relation to artistic works. It recapitulates the ideas of ‘allegory’, ‘bricolage’, ‘simulation’, ‘collage’, ‘montage’, ‘parody’, ‘postproduction’ and ‘editing’, and valorises the combination of elements from different sources to produce an artwork, as a process of hybridisation and intercultural transfer (Schneider, 2006; Evans, 2009). In the Latin American context, appropriation is also understood ‘as a strategy and social practice of understanding the other, and a means to identity construction’ (Schneider, 2006: 30). Likewise, *relationality* is the product of the connection between fluctuating existential events in networks of information, and the analysis of intersubjectivities around day-to-day experiences (Bourriaud, 2002; Cooper, 2005).<sup>11</sup>

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<sup>10</sup> According to Nikolai Ssorin-Chaikov (2013: 5) ‘ethnographic conceptualism is ethnography conducted as conceptual art, and conceptual art conducted as ethnography’. Based on the idea of ‘anthropologised art’ and the notion of artist-as-anthropologist (Kosuth, 1991: 107–121), ethnographic conceptualism implies a reconfiguration of the ethnographic method, advocating not ‘an end of ethnography as a method’ but the production of a new kind of ethnography, which does things in the form of events, performances or art exhibitions, constructing the reality that it studies (Ssorin-Chaikov, 2013: 8, 16).

<sup>11</sup> From a philosophical point of view, the idea of ‘relationality’ both within the anthropological discourse around multispecies ethnography and the artistic domain in relational aesthetics is based on the work of Deleuze and Guattari (1983, 1987, 1994) and Guattari (1992): both approaches find new meaning for the multiplicity of everyday experiences as a process of becoming (privileging the transformation of

### **Knowledge-making and art-making practices**

These three ideas were a way of linking knowledge making and art-making practices so as to reflect on issues of evidence, as well as of ontology. What counts as evidence in the laboratory or health campaign is brought into question when we critically engage with the fundamental nature of the disease as a discrete, coherent ‘thing’ – when we critique its ‘thing-ness’. Evidence is also related to interdisciplinary collaboration in the sense that it provides the tools to think about ‘how anthropologists confine their objects of study’ in relation to different disciplines: what are the implications of engaging researchers in the arts and the natural sciences to think about what and how anthropologists investigate? (Engelke, 2008: S3). The interdisciplinary collaborations that made up this ethnographic method show that dengue cannot be understood independently of the multiple ways in which it is known and experienced, and they suggest that these various forms of knowing should be part of the public domain. Anthropological study not only reveals practices, events and ideas, but also makes visible the processes by which they come to appear meaningful (Hastrup, 2004: 468). As Engelke (2008: S3) points out, ‘a truly public anthropology ought to have a language of evidence at its disposal, a way of presenting its findings in a manner that speaks across the academic divide’.

The ideas of participation, appropriation and relationality also helped me to establish dialogues between my groups of study, to collaboratively design changes in the way evidence was conceived so as to reflect on the political ontology of the disease and thus to propose alternatives for public health campaigns. According to Barry and Born (2013a: 19), interdisciplinary collaborations reveal two things in relation to ontological questions about what the world is really like – and, in this study, what dengue is like. First, they show ‘how knowledge practices intervene in the world, bringing the subjects and objects of research into a relational existence’, and, secondly, they generate ‘hybrid or relational objects that cannot be broken down into distinct natural, technical and social components’ (Barry and Born, 2013a: 19).

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subjectivities) and the innumerable flows of objects and interactions, in order to create experiments and generate new and non-hierarchical arrangements of things.

Using art methods to create interdisciplinary approaches was my response to a problem and my anthropological understanding of that problem in Colombia. The objective was to design a number of linked interventions into different public places of the city by creating partnerships and collaborations that took people from the taxonomic studies of mosquitoes and the virological and epidemiological understandings of dengue, to the ways in which people describe mosquitoes and their experiences of being affected by the disease.<sup>12</sup> By doing so, I wanted to push further my anthropological and individual experience into an experimental exercise in bringing together academic and theoretical approaches and fieldwork experiences as a way of creating new relationships between my participants (Marcus, 2000; Mol, 2008; Kirksey, 2014). One example of this is the *Mosquito kite project* (<http://goo.gl/oQt2gV>), an idea supported by the Royal Anthropological Institute and the Horniman Museum, which aimed to go beyond the critique of the discourse used in traditional health campaigns, and to try to re-think how mosquitoes and dengue are understood to interact with people and how the kite interacts with people. Another example is *Serotype* (<http://goo.gl/NnTg6P>), a fictional character, created and introduced to the public during my fieldwork, who embodies the experience of having dengue fever. The last example is *Vampires* (<http://goo.gl/roHz5m>), a series of participatory experiments created with the collaboration of virologists, entomologists, non-academic communities, artists, and the subjects of my ethnography who have had dengue. By taking an ethnographic approach, focused on

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<sup>12</sup> The study of the everyday has also implications in the anthropological understanding of art practices. For example, the ‘appreciative experience’ of the observer who looks at an artwork reveals an active human contribution to such piece (Berleant, 2005). Thanks to the observer, every aesthetic experience acquires a social dimension. So, although the idea of art is frequently conceived as something far away from the ‘mundane and everyday matters’ of the anthropological work – belonging to the ritual domain, rather than everyday life (see Joanna Overing and the debate about aesthetics as a cross-cultural category in Ingold, 1996), the anthropology of art deals with questions of the everyday by enquiring how people conceptualise ideas and ‘how they construct representations of their world’ (Morphy and Perkins, 2006: 22). Similarly, Michael Principe (2005) holds that by studying the aesthetics of the everyday, we can understand the purpose and direction of art. Moreover, art is not necessarily apart from everyday things: there is not only an aesthetic in everyday environments (buildings, theatres, music halls), but it is precisely the people who inhabit those environments who determine their aesthetic value (Light and Smith, 2005). The entire lived experience (from daily walks to work, to a hike in the woods) is full of everyday aesthetic appreciations that anthropologists should take into account (Highmore, 2002; Leddy, 2005).

relationality, to vector-borne diseases and the notion of participation, my thesis helps show how public health campaigns may be conceptual art ethnographies by design (Marcus, 2000; Rabinow and Marcus, 2008; Ssorin-Chaikov, 2013; UCI, 2014), making their application more effective.

### **Overfamiliar and ineffective health campaigns: The example of chikungunya**

The fundamental issue of my thesis is the question about different kinds of knowledge. One way to address this is by looking at the way anti-dengue campaigns have been designed, specifically how they have been based on standardised templates for ‘teaching’ the community how to eliminate mosquito-breeding sites. The consequence of designing campaigns in this way is that the government does not address the disease in a way that would motivate the community to take action. Instead, these campaigns seem to be extremely politicised, and as such they may be revealing of problems of the Colombian state more generally. To illustrate how such campaigns are a subject of immediate political debate, we can track the case of chikungunya, a mosquito-borne viral disease very similar to dengue fever, which emerged in Colombia in the middle of 2014. Between its emergence and the third week of 2015, the INS reported 142,196 clinically confirmed cases of chikungunya and 1,236 cases confirmed by laboratory tests (INS, 2015c).<sup>13</sup> Chikungunya symptoms include high fever, joint and muscle pain, nausea, rash, joint swelling, headache and fatigue, which means that it shares many clinical signs with dengue fever, and therefore, both diseases are often misdiagnosed (WHO, 2015). A very distinctive feature is, however, the post-illness joint pain that characterises chikungunya, something that only began to be identified thanks to the carefully analysis of illness narratives and the different understandings of ‘pain’ that they reveal (see Chapter 3).<sup>14</sup> Considering these common features in the symptomatology,

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<sup>13</sup> Between its emergence and the end of 2014 (week 53), there were 90,481 clinically confirmed cases of chikungunya and only 577 cases confirmed by laboratory tests (INS, 2014a).

<sup>14</sup> According to Marion Robinson (1955: 28), *chikungunya* means ‘that which bends up’. This word and its definition were based on an epidemic that took place on Makonde Plateau in the southern province of Tanganyika in Tanzania between 1952 and 1953. Robinson states that although the epidemic ‘was clinically indistinguishable from



and knowing that chikungunya is more often transmitted by *Aedes aegypti* and *Aedes albopictus* mosquitoes (the two main vectors of dengue fever), the strategies for controlling the disease are the same as those in use for controlling dengue fever (INS, 2014b; WHO, 2015; Halstead, 2015). I use the case of chikungunya to raise questions about how the meaning of health campaigns is partial, contested and contingent (Chapters 1 and 2). This example also permits me to show my thinking about the operations of the state and the possible ways for re-thinking the different kinds of knowledge about dengue fever that are stake (Chapters 3, 4 and 5).

On 3 January 2015, Álvaro Uribe, former president of Colombia (2002–2010), in a thinly veiled critique of President Juan Manuel Santos, stated on Twitter: ‘There *was* a president who would be supporting the citizens affected by the Chikungunya’, meaning that Santos was not paying sufficient attention to the disease outbreak. The day after, he wrote: ‘Santos was concerned about the votes of the people on the Caribbean coast, but [cared] little about the suffering of the patients and doctors of the chikungunya’ (see images in Appendix 1). Uribe, who is currently a senator of the Republic of Colombia, represents a conservative, right-wing party – Centro Democrático – that opposes President Santos. Uribe has massive support in Colombia and Twitter is his main tool to disseminate propaganda against Santos and to critique government policies. These statements were widely covered by various media, who publicised Uribe’s criticism of Santos for not controlling the chikungunya virus. On 7 January, President Santos replied to these comments saying, ‘nobody dies of chikungunya. It is a new phenomenon that came to America less than two years ago and one that inevitably spreads. That means it is impossible to avoid the virus’ (Revista Semana, 2015a). According to Santos, there is no cause for alarm as the government has done everything it can to deal with chikungunya by applying the current available strategies for controlling it: informing the community, promoting educational health campaigns, preparing health staff and carrying out entomological surveillance activities (Caracol Radio, 2015b). Santos also ordered the army to support these activities in areas affected by chikungunya outbreaks (W

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dengue,’ local people named the disease ‘*chikungunya*’. As I show in Chapter 3, illness narratives reveal serious historical problems in the way we currently name both dengue and chikungunya.

Radio, 2015a). Gina Watson, the Pan American Health Organisation's (PAHO) representative in Colombia, supported this declaration, arguing that the Colombian government had correctly responded by following the PAHO and WHO guidelines, and highlighting that the most important tool to stop outbreaks is the education of the community (Ministerio de Salud y Protección Social [MSPS], 2015a). According to the WHO, chikungunya is rarely fatal (WHO, 2015), and indeed, on 8 January 2015, the INS (2015b) confirmed that in Colombia no one had died because of chikungunya. However, on 27 April 2015 the INS reported 43 deaths presumed to be caused by chikungunya, of which 25 had a confirmed association with the virus (INS, 2015d). Even though this is an insignificant number in a country of about 46 million inhabitants,<sup>15</sup> and knowing that international institutions acknowledge the disease is rarely fatal, the debate continued when multiple media outlets reported that those 'who previously advised President Santos about chikungunya issues were wrong' (Revista Semana, 2015b).

Because of this confrontation and the way the disease has been managed in the mass media, chikungunya has become a political and social issue, or what Veena Das (1995) calls a 'critical event'.<sup>16</sup> President Santos has denounced the political opportunism of people who increased the price of mosquito repellents and pain relievers such as acetaminophen/paracetamol, an analgesic normally use to treat dengue and chikungunya symptoms (Revista Semana, 2015a, W Radio, 2015b; Caracol Radio, 2015a) or who distributing smuggled medicine (Noticias UNO, 2015). In addition, Health Minister Alejandro Gaviria stated there were people using this public health problem as a strategy for attracting voters during election campaigns (W Radio, 2015b; Caracol Radio, 2015a), or for attracting business, such

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<sup>15</sup> This is an estimated 2013 population based on the last official census, taken in 2005, which reported 42,888,592 inhabitants (MSPS, 2011).

<sup>16</sup> A 'critical event' refers to moments in which there are disruption of the social order, the rationality of the state and the individual existence (Das, 1995: 6-7; Lock and Nguyen, 2010: 147). Considering that epidemics has social consequences, they are experienced as critical events 'in which the demonstration of the power of biology alone as a standard for calibrating interventions into individual bodies weighed heavily in favour of a biomedical approach' (Lock and Nguyen, 2010: 147). The chikungunya epidemic allows me to show not only that both chikungunya and dengue are 'significant', but it also helps me to open a critical perspective to health campaigns by developing my public experiments.

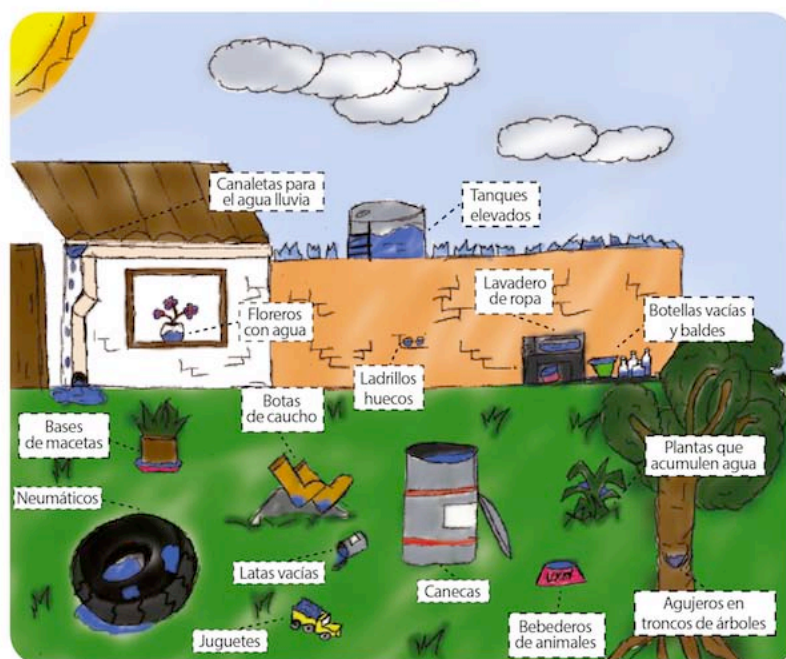
as the pharmacists who sold fake vaccines to prevent chikungunya (Teleantioquia Noticias, 2015a).

The government has addressed the problem by focusing on improving pedagogical strategies for ‘making people understand’ that although the presence of chikungunya is an inevitable phenomenon, there are actions to mitigate its impact (W Radio, 2015a). On 3 February 2015 Fernando Ruiz, the deputy minister of health, came to Medellín to promote campaigns against chikungunya and dengue. He emphasised again that the only available strategy to fight chikungunya is the action people take in their homes, and students take in schools, to prevent and eliminate breeding sites (Teleantioquia Noticias, 2015b). Thus, community participation is a key element of social communication programmes (Gobernación de Antioquia, 2015). Technically, the government has used the template of the anti-dengue campaigns to talk about preventing both diseases in the same way. As we can see below (figure 2), these campaigns invite the community to eliminate mosquito-breeding sites by washing vases, ground tanks and roof gutters; by removing tyres, cans, bottles and even children’s toys; and even by filling in holes in nearby tree trunks (Gobernación de Antioquia, 2014; Secretaría de Salud de Medellín, 2015).<sup>17</sup>

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<sup>17</sup> Spraying insecticides is not a widely used strategy because of insecticide resistance and the daytime activity of *Ae. aegypti*.

Identifica estos elementos en tu hogar, escuela, oficina o comunidad



Es responsabilidad de todos lograr que el Dengue y el Chikungunya no se propaguen en nuestra ciudad.

Figure 2. Anti-dengue campaign in Medellín. Source: <https://goo.gl/1E1Rx7>

Translation: It's everyone's responsibility to make sure dengue and chikungunya don't spread in our city.<sup>18</sup>

There is a key tension that accompanies the dissemination of all this information. If the government starts running around doing something, everyone is going to get 'terrified' and the situation is going to be 'out of proportion' to the danger of the issue. But if they do not do anything, they may be seen as 'incompetent' – as Alvaro Uribe suggests – and a lack of action could even be considered immoral. What can the government do? What does it do? My argument here is that the government is using a model for the campaigns against dengue fever that has been applied without reducing the number of people who get the infection. These health campaigns do not 'terrify' the public, nor do they actually deal with the situation; they merely reproduce the same template that has not worked in the past. So, the political gesture becomes a problem because the chikungunya campaign looks like the other campaigns of the past, and it does not accomplish what it needs to accomplish.

<sup>18</sup> See other examples of anti-dengue campaigns in Chapter 2 and Appendix 4.

There are two factors to consider regarding how the state designs health campaigns. First, public health campaigns only talk about how mosquitoes breed, and by doing so, the views and knowledge of other people who work on these issues, like virologists for example, are not included. Second, the experiences of the people who have had mosquito-borne diseases have never been part of the way these campaigns are designed (this will be discussed in Chapter 3). Considering that both dengue and chikungunya are spreading more quickly, and that the number of cases is higher, it is problematic that people do not respond to how the diseases spread. I argue that they do not respond because the public campaigns do not cause people to feel more motivated to do something. Public health campaigns merely repeat the information by using templates standardised more than 90 years ago to fight mosquito-borne diseases. More people are getting ill than should be the case, not only because of biological and ecological variables, but also because of the quality of information provided by health campaigns and the way these campaigns are constructed. What is at stake is the exclusion of and disconnection from a body of work, knowledge and practices that have not been taken into account.

What are the implications of this problem of knowledge exclusion? What interests are involved? How does an international agenda in the design of health campaigns affect Colombia and why? In this thesis I present a relational argument between the idea of living with mosquitoes – as it is almost impossible to eliminate them from the world – the experience of those who have had the disease, and academic knowledge beyond the elimination of mosquito-breeding sites. This does not imply that the government should stop developing health campaigns, but rather that by accepting that people live with mosquitoes and by incorporating experiential and academic knowledge, we can create different forms of managing the disease through participatory public experiments – which is, in turn, a different way of seeing health campaigns. For example, my participants mentioned that ‘they can be active agents by communicating different ways of seeing dengue, like how to protect others by not allowing mosquitoes to bite us, and not disseminating the virus in the area where we live’.

Recognising the experience of living with the disease allows us to see that the health system should respond in a different way. Not getting access to a proper diagnosis or being told that this is the ‘flu’ does not help. Moreover, when people engage in a deeper way with the virus, or with the disease dynamics, they may be able to think differently about disease symptoms. Finally, when we accept that human beings can destroy any form of life that is ‘dangerous’ for them, we are implicitly accepting what Haraway calls ‘human exceptionalism’, or ‘the premise that humanity alone is not a spatial and temporal web of interspecies dependencies’ (2008: 11).<sup>19</sup> Following this, I sought, as Hugh Raffles suggested in response to my work,<sup>20</sup> to have people engage with the insect itself and to think of it as a living being in all its forms, rather than simply as an object to be eliminated.

While reflecting on these ideas, in this project I tried to present dengue from a different point of view, suggesting that the ‘over-automatisation’ of health campaigns should be replaced by new ways of seeing and thinking about dengue. This demands a sort of *re-enchantment* of the disease, in the sense that any form of knowledge should produce uncertainties, doubts and mysteries (Keats, 1817b: 60–61; Barnett, 2014: 21–22). It requires us to reflect back on imagination, aesthetics and embodiment in order to develop a better sensory-based comprehension of the world (Keats, 1817a: 54; Stafford, 1994, 1999). Art is a good way to reflect on how people experience disease because, as Shklovsky (1916: 16) argues, ‘the purpose of art is to impart the sensation of things as they are perceived and not as they are known’. To do so, art makes objects ‘unfamiliar’ and strange, which ‘increase[s] the difficulty and length of perception because the process of perception is an aesthetic end in itself and must be prolonged’ (Shklovsky, 1916: 16). Because ‘anti-dengue campaigns’ became over-familiar, I sought to make them ‘strange’ by creating the *Mosquito kite*, *Serotype* and *Vampires*. By doing so, I ‘revitalised’ the idea of dengue.

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<sup>19</sup> See also Sagan and Margulis, 1993: 351, for a discussion of the biodiversity discourse and human self-centredness, in the sense that humans are ‘one step above the beast and two steps below God’.

<sup>20</sup> Personal communication [email to the author], 10 January 2012.

## Research on medicine in Colombia

In Colombia there have been many research projects about medical practices.<sup>21</sup> We can find work on pre-colonial and colonial studies (Romero, 1990), historical and sociological approaches to medical practices (Miranda Canal, 1984, 1992; Miranda Canal et al., 1993; Quevedo, 1993; Abel, 1994, 1995; Romero, 1996; Marquez et al., 2004), cultural and social studies (Guerrero et al., 2010), medical journalism (Mendoza, 1997), and political analysis of hygienic practices (Noguera, 2003). In terms of medical anthropology – just to give a few examples – we find the studies on Paeces indigenous communities (Bernal Villa, 1954), traditional medicines in the Pacific region (Velázquez, 1957a, 1957b), and popular medicine in mestizo regions (Reichel-Dolmatoff, 1958). At the Universidad del Cauca, Hugo Portela Guarín (2003) studied traditional health practices in indigenous communities. The medical anthropology group at the Universidad Nacional focuses on health and social inequality, violence and gender, and HIV in children (see Unicef, 2009). Yet anthropological approaches to vector-borne diseases are uncommon. The few examples come from malaria research and the socioeconomic effects of this disease (see Bonilla and Rodríguez, 1995) and the anthropological/sociological projects on malaria, carried out by research groups such as Salud y Comunidad (Health and

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<sup>21</sup> In the Colombian context, anthropologists have studied political issues regarding violence, social conflict, forced displacement, gender, race and minority ethnic groups. The work of María Victoria Uribe (2004); María Teresa Uribe et al. (1992); Forrest Hylton and Gonzalo Sanchez (2006); Peter Wade (2000, 2002, 2009) and the research of Orlando Fals-Borda (1991) are all notable in this regard. Likewise, Arturo Escobar (1994, 1995, 2008) has worked on ethnicity, social movements, biodiversity, political ecology, development, technology and society. Recent projects by the Group of Social Anthropology at the Colombian Institute of Anthropology (ICANH, 2012) have analysed cultural industries (Chaves et al., 2010), the consumption of craft liquors in Colombia (Meza Ramírez, 2014), and nutrition politics in the countryside (Camacho, 2014).

In Medellín, anthropologists such as Isabel González-Ramírez (2012) and the Corporación Pasolini (<http://www.pasolinimedellin.com/>) have provided deep insight into intra-urban displacement, gang fights and invisible frontiers. Michael Taussig (2011) also exemplifies contemporary ethnographic work in Colombia, by depicting new languages for ethnographic research based on drawings. Finally, contemporary projects such as *Tradición y Cambio* (<http://goo.gl/x1AiKY>), the work of the war photographer Jesús Abad Colorado (<https://goo.gl/9g61JV>), and the documentary *Un asunto de tierras* (2015) directed by Patricia Ayala Ruíz are important contributions to Colombian studies.

Community) at the Universidad de Antioquia, and the medical anthropology research on malaria and dengue undertaken at the Universidad de los Andes, led by Roberto Suarez (see Suarez et al., 2005).<sup>22</sup> Although it is not an anthropological approach, it is worth mentioning the eco-epidemiological analysis around dengue, malaria and leishmaniasis guided by the PECET research group; and the Medical Entomology Group at the Universidad de Antioquia that coordinates the entomological surveillance programme in Medellín.

In the Latin American context, Linda Whiteford (1997) suggests that both medical and political ecology models are needed for understanding dengue campaigns in the Dominican Republic.<sup>23</sup> According to her, the failure of community-participation projects lies in the fact that health authorities target women as those responsible for avoiding mosquito-breeding sites. However, she found that the smaller water vessels, which were women's responsibility, were carefully covered, whereas the larger water containers, which were men's responsibility, 'were often only haphazardly covered, if at all' (Whiteford, 1997: 218). Dengue-control programmes, she concludes, would improve if authorities focused on encouraging men and boys to take action against breeding places, such as cleaning and covering the larger water containers.

Finally, we get the ethnographic research of Alex Nading (2012, 2013, 2014), who reflects on the 'politics of entanglement' around participatory dengue-control programmes in Nicaragua. Going beyond biopolitical analysis, he suggests taking into account how *brigadistas* (female community health workers) are fascinated by mosquitoes, which suggests a different engagement with the environment, in what he calls an 'ecological aesthetics' (2012: 591–592). In short, he advocates for a more relational ethic of health where 'environments and bodies are entangled' (2014: 208). Nading is one of the few anthropologists addressing the idea of 'shared ontologies'

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<sup>22</sup> Jose Yezid Rodriguez Martinez is carrying out anthropological fieldwork for his doctoral research entitled 'El discurso salubrista a las narrativas locales en salud y enfermedad en la prevención del dengue y la malaria en Colombia'. He is currently conducting research in five localities: Girardot, Villavicencio, Dibulla, Tumaco and Arauca.

<sup>23</sup> See also the work of Andrew Gordon (1989).



between people and nonhuman others – in this case, mosquitoes – in the context of dengue fever.

Aside from these projects, it is hard to find anthropological projects focused on the knowledge-making processes of dengue, the public understanding of science, and the way people experience the disease, and that also develop direct modes of engagement as part of their ethnography. In the Colombian context, there are no projects that combine ethnographic analysis with art-science methodologies, taking artistic or sensorial approaches to dengue matters.

### **The concept of ‘knowledge’**

Academics in the social sciences have explored the idea of knowledge in different forms. Doyle McCarthy (1996: 1) suggests that ‘*knowledge* is best conceived and studied as *culture*, and the various types of social knowledge communicate and signal social meanings – such as meanings about power, death, and danger’.<sup>24</sup> This implies looking at two social processes: the social production of culture and the acquisition of such culture (McCarthy, 1996: 17). In this respect, Knorr Cetina (2007) argues that ‘a knowledge society is a society whose general knowledge-environment and its structures and policies matter. If knowledge is a productive force, the production cultures and the larger knowledge-related cultures that sustain them become a primary object of cultural investigation’ (2007: 362). Knowledge has also been described as ‘practice’ in relation to indigenous peoples and their transgenerational and communally shared knowledge (Sillitoe et al., 2002),<sup>25</sup> the politics of different environmental visions of nature (Robbins, 2000), and schemes of classification regarding education and literacy policies (Freebody and Welch, 1993; Muller, 2000). As a social-epistemic practice, Alvin Goldman (1999: 5) considers knowledge as ‘the “weak” sense of *true belief*, which concerns both the idea of

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<sup>24</sup> ‘Culture’ here is defined in Geertz’s (1973: 89) terms: ‘it denotes an historically transmitted pattern of meanings embodied in symbols, a system of inherited conceptions expressed in symbolic forms by means of which men communicate, perpetuate, and develop their knowledge about and attitudes toward life’.

<sup>25</sup> See also Fals-Borda (1999: 4–7) and his description of knowledge as practice for ‘empowering the oppressed’.

‘*error* (false belief) and *ignorance* (the absence of true belief)’. Knowledge and its material embodiments are, inevitably, part of any social life.

Many other studies have paid attention to the scientific production of knowledge, based on the idea that cultural and biological phenomena are reciprocally determined and constituted (Lindenbaum and Lock, 1993; Knorr Cetina, 1999; Nichter and Lock, 2002; Lock and Nguyen, 2010; Jasanoff, 2011). Jasanoff (2004a: 3) argues that ‘scientific knowledge both embeds and is embedded in social practices, identities, norms, conventions, discourses, instruments and institutions – in short, in all the building blocks of what we term the social’. Nature and culture are intertwined, and they are constantly subject to purification as well as hybridisation (Latour, 1988; Lock, 2000; Jasanoff, 2004b). Within the anthropological study of scientific knowledge we find works that focus on public health and that interrogate how social phenomena – more than biological ones – give rise to epidemic outbreaks. For example, Paul Farmer (2003: 146–148) points out that in recent decades, the incidence of tuberculosis is not random, nor it is merely linked to biological factors such as co-infection with HIV or antibiotic resistance. Instead, Farmer (2003: 147) holds that it is closely related to economic disadvantage and the inequalities that structure our society: ‘Tuberculosis deaths now occur almost exclusively among the poor’.

Foucauldian ideas on how the conversion of life becomes a matter of governmentality and political action have been applied in anthropological studies of knowledge-making practices (Haraway, 1993; da Costa and Philip, 2008; Lock and Nguyen, 2010; Jasanoff, 2012). For instance, by analysing the historical progression of diagrams illustrating immunological theories, Haraway (1993) argues that they are strongly linked to ideas of control and cooperation. The political meaning of the language of immunity reveals how the body is theorised as a coded text (artificial intelligence system), the organisation of which is based on a ‘master control’ that coordinates the immunological responses of macrophages and T and B cells. This conceptualisation of an organisational system, Haraway comments, came to be popular after the Second World War, revealing militarised ideologies. Similarly,

Jasanoff (2012: 49–51) uses the case of embryonic stem cells<sup>26</sup> to inquire into the limits of what is ethically permissible, morally accepted and ‘impermissible’ research. In the British case, for example, ‘the law does not regard pre-14-day-old embryos as being biologically continuous with fully developed human life’ (2012: 50). This definition places Britain as the most permissive country in Europe for stem cell research, a situation that raises a moral dilemma regarding what is recognised as a ‘living thing’, and what the implications are for establishing the legality of such research.

We can finally consider the research of Lock and Nguyen (2010, 44–45), who argue that the discovery of the malarial parasite and the implication of mosquitoes in the life cycle of the disease played an important part in establishing the ‘germ theory’ around disease causation. This generated the emergence of institutionalised medical discourses that minimise social components, and that favour the understanding of health as control over ‘body invaders’ (parasites, viruses). In essence, anthropological inquiry into scientific knowledge focuses on ‘determining the processes by which certain forms of knowledge achieve a moral legitimacy and appear to be part of the natural order’ (Lindenbaum and Lock, 1993: xiii).

### **Dengue fever**

Dengue is a vector-borne disease, known as ‘breakback fever’ or ‘break-bone fever’, transmitted to humans after being bit by a mosquito of the *Aedes* genus that is infected with one of the four forms – serotypes – of dengue virus. Although it is still ranked as a neglected tropical disease (WHO, 2013b), dengue is also considered as the most important mosquito-borne viral disease because of its presence in countries where it was previously eradicated (WHO, 2012a). The disease can be classified as dengue without warning signs, dengue with warning signs, or severe dengue – which can be lethal. The classification depends on the type of symptoms experienced,

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<sup>26</sup> Embryonic stem cells are undifferentiated cells derived from very early human embryos, which have ‘the capacity to develop into many types of specialised cells that could potentially be used to treat diseases of the heart, brain, nerves, or other organs and tissues’ (Jasanoff, 2012: 49).

which range from pain behind the eyes, aches, fever, joint pain and rash; to lethargy or restlessness; to abdominal pain, persistent vomiting, and mucosal bleeding (WHO, 2012b: 24). Despite the low mortality of the disease, the main problem with dengue is that after the first infection with one serotype of the virus, another infection with a different serotype may be fatal (see Chapter 3). Given that there is neither any antiviral treatment for dengue, nor any available vaccine, and that dengue now affects half the world's population (Bhatt et al., 2013), the morbidity rate is extremely high, and therefore there is a risk for a global pandemic (WHO, 2012a).<sup>27</sup>

The disease only became a serious health problem for the world in the second half of the 20th century. Between 1955 and 1959 there was an average of 908 dengue cases globally, and a relatively poor surveillance system (WHO, 2012a: 2), but during the subsequent decade of the postwar period, that number rose to an average of 15,497 cases globally (WHO, 2012a: 2). Abandoned war materials served as mosquito-breeding sites that – in conjunction with the destruction of the water-distribution systems, domestic water storage, and the movement of refugees and troops infected with dengue – generated this dramatic increase in the number of cases (Slosek, 1986; Vasilakis and Weaver, 2008).<sup>28</sup> In many countries, the use of dichlorodiphenyltrichloroethane (DDT) against the vectors of malaria (*Anopheles* spp.), yellow fever and dengue (*Aedes* spp.) allowed the significant reduction of

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<sup>27</sup> There are potential dengue vaccines in phase 3 field trials, some of which have been tested in Colombia (Guy et al., 2011; WHO, 2012a; Thomas, 2015; Villar et al., 2015). Likewise, a new broadly neutralising antibody was recently isolated from people infected with dengue (Dejnirattisai et al., 2015). However, although these knowledge 'facts' might be important tools to reduce dengue incidence, Boccia et al. (2014) question whether people would change their vector-control practices in the presence of a dengue vaccine. Following mathematical models and empirical field tests – and considering those potential vaccines would not offer 100% protection – these researchers suggest that the most likely effect of such scenario is a 'false feeling of perfect protection', which will cause a significant reduction in vector-control measures. In their words, 'the population will relax vector-control measures, and this relaxation may result in a significant increase in dengue transmission' (Boccia et al., 2014: 630).

<sup>28</sup> This scenario is not only evident in a global perspective, but it also translates into the Colombian context. The highly increased rural-urban migration rate is deeply associated with sociopolitical causes and forced displacement due to the Colombian war (Alvis-Guzman et al., 2015: 6; INS, 2015a). Such phenomena have epidemiological implications, intensifying human-mosquito contact, maintaining disease infections in cities, and increasing the circulation of different serotypes (Rey et al., 2010: 802).

these diseases across the globe, and the virtual eradication of the main vector of yellow fever and dengue (*Ae. aegypti*). By 1972 DDT was banned because of its accumulation in the food chain and its high resistance to degradation, which raised a series of ecological and environmentalist arguments according to which biodiversity and human health would be seriously affected in the coming years if governments continued to use DDT (Manaca et al., 2013; Dunn, 2012: 578). Even though there was poor scientific evidence to support the negative effects of DDT on human health (Bouwman et al., 2011: 744; Dunn, 2012), the mosquito-control scheme was changed to organophosphate and carbamate pesticides, which are more expensive than DDT and which have dangerous effects on human health (Carmona and Lutgen in PECET, 2011). According to Carmona (in PECET, 2011), with new pesticides on the market, DDT was no longer profitable after 1970; instead of ecological reasons, he suggests that DDT was banned because of economic interests and negligent attitudes. Nowadays, although DDT cannot be considered completely 'safe', it can provide great health benefits to reduce the mortality caused by vector-borne diseases (Bouwman et al., 2011). In fact, the WHO (2006, 2011) allows indoor spraying of DDT to control malaria and dengue vectors – a strategy that still raises a lot of controversy (Trewavas, 2012; Chadee, 2013; Yadav et al., 2015).

The entomological control of *Ae. aegypti* has had a simultaneous impact on yellow fever and dengue; of these two, yellow fever is the more dangerous disease. Although most health programmes were focused on decreasing yellow fever incidence by controlling *Ae. aegypti*, after the implementation of Max Theiler's vaccine in 1937 against yellow fever, the control of it was much easier; and dengue began to be in the centre of attention. After 1970, the re-establishment of *Ae. aegypti* in areas where it was previously eradicated (Schneider and Droll, 2001; Guzman and Istúriz, 2010; Brady et al., 2012), as well as the increase in local and international travel, facilitated the co-circulation of the four dengue virus serotypes around the globe (Anders and Hay, 2012: 977). These conditions, plus the implementation of better global surveillance systems (San Martín et al., 2010), generated a significant increase in reporting and visibility of dengue globally: 479,848 cases were reported on average annually between 1990 and 1999, and 2,204,516 cases were reported in 2010 alone (WHO, 2012a: 2). According to the Pan American Health Organisation (PAHO, 2011), the re-emergence of dengue fever was due to the lack of community

participation, the development of insecticide resistance in the vector, the lack of a potable water system (which implies the use of tanks for water storage), and poor waste collection services.

Currently, there are an estimated 390 million infections per year in the world (Bhatt et al., 2013).<sup>29</sup> Even though there are serological and molecular ways for diagnosing dengue (like the ELISA test), they are expensive or not always available; therefore, disease diagnosis and management is mainly based on clinical reports, and it is not always confirmed with serological and molecular techniques (Anders and Hay, 2012; Gutiérrez-Ruiz et al., 2012; WHO, 2012a). Doctors and health centres have a strong responsibility for diagnosis: they are asked to participate in early diagnosis based on a patient's symptoms. In the Colombian context, doctors should complete clinical forms – a time-consuming process that tends to be avoided – and then order a laboratory test confirmation, which is a measure restricted by many health institution in order to save money (see Chapter 3). In Colombia, the sub-register of dengue cases is high, local and national reports do not always match, and people do not always seek medical treatment. Although there is not much available data on this situation, in research undertaken in Villaviecenio, Colombia, Suarez et al. (2005) suggest that patients do not usually seek medical treatment as dengue tends to be confused with a normal flu/cold<sup>30</sup> in the beginning of the infection. In the studied community, dengue was described as a 'harmless disease' that can be easily treated with medication, or 'a little rest' – in fact, 'the risk of contagion is seen as bizarre' (Suarez et al., 2005: 499). However, such statements become questionable when illness narratives, the experience of those who have had the disease, and the role of the Colombian health system are all taken into account. As I discuss in Chapter 3,

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<sup>29</sup> These numbers, which are 'more than three times the dengue burden estimate of the WHO', were calculated using cartographic approaches (see Bhatt et al., 2013: 1). See also Padilla et al., 2012, who offer a review of the dengue epidemiology in Colombia.

<sup>30</sup> This association was also reported by Whiteford (1997: 213) in the Dominican Republic.

there is a missing element here: the power of the word as a healing force or therapeutic action (Entralgo, 1970; Kleinman, 1988).<sup>31</sup>

Although at least five species have been identified in different epidemics,<sup>32</sup> there are two well-established dengue vectors: *Aedes aegypti* – the primary vector – and *Aedes albopictus* – the secondary vector. While *Aedes albopictus* is mainly reported in rural areas, *Aedes aegypti* ‘has evolved to mate, feed, rest and lay eggs in and around urban human habitation’ (WHO, 2012a: 14), which generates disease outbreaks in big cities. Likewise, human-vector contact occurs during daytime because the mosquito is more active early in the morning and before dusk (WHO, 2012a: 14). These characteristics generate very particular conditions for entomological surveillance, in which well-known strategies to control mosquito borne-diseases, such as insecticide-treated bed nets, cannot be used (Anders and Hay, 2012). Therefore, vector control based on the reduction of mosquito-breeding sites and educational campaigns are seen by epidemiologists and entomologists as the main tools to fight the disease (PAHO, 1998; Anders and Hay, 2012: 980). Both the reduction of mosquito-breeding sites and the idea of educational campaigns imply different modes for community participation, issues that I further elaborate in Chapter 2.

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<sup>31</sup> From the Hippocratic Collection until now, the concept of ‘medical reason’ has favoured the ways in which diseases have been understood (Miranda Canal, 1984). This is connected to what the Greeks called ‘*logos iatrikos*’, or the complex aggregation of knowledge, practice and understandings of the body for diagnosing and treating diseases (Laín Entralgo, 1970). However, by highlighting that *logos* had two meanings (‘reason’ and ‘word’) for the Greeks, Laín Entralgo (1970: 152–158) argues that something is missing in how medical thought is understood. While understanding *logos* as ‘reason’ implies a ‘medical thought’ that describes diseases as they ‘really are’ (reading signs and disorders in the body), thinking with *logos* as ‘word’ moves us to a domain beyond the sensations of the body: the ‘rhetorical thought’ as the psychosomatic correlation between words and healing. According to Laín Entralgo (1970: 158) it is possible to read in *logos iatrikos* not only as ‘medical reason,’ but also ‘the word as a therapeutic agent’. This has a fundamental relevance for understanding what Arthur Kleinman (1988) named as ‘illness narratives.’

<sup>32</sup> *Aedes polynesiensis*, *Aedes scutellaris*, and *Aedes hensilli* have been reported as vectors. *Aedes luteocephalus* and *Aedes furcifer* are probable sylvatic vectors (WHO, 2012a: 14).

### **Insects, art and the idea of multispecies ethnography**

Multispecies ethnography engages with the alterworlds of other beings (Kirksey and Helmreich, 2010: 553). As Escobar (1995: 207) contends in his work about knowledge-making practices and development policies, ‘nature is a co-production among humans and nonhumans [...] [W]e have the possibility of engaging in new conversations with and around nature, involving humans and nonhumans together in the reconstruction of nature as public culture’. Multispecies ethnography enacts the problem of addressing relationships with nonhuman others, because ‘the conventional subject of anthropological concern, is no longer a clearly bounded biological subject’ (Kirksey and Helmreich, 2010: 556). The idea is to create spaces for collaboration and reflexivity, in relation to new ethical and aesthetic engagements with the world and the multiplicity of living beings (Dransart, 2013). In Richard Grusin’s (2015: xx–xxi) words, ‘to turn toward the nonhuman is not only to confront the nonhuman but to lose the traditional way of the human, to move aside so that other nonhumans – animate and less animate – can make their way, turn toward movement themselves’.

Kirksey and Helmreich (2010: 557) hold that ‘art forms have proved good to think with about “living with” in a multispecies world’. It is precisely in art practices where we see the bases for the so-called non-human turn in social sciences, especially anthropology. In fact, art is the main component of the ‘multispecies-salon’ (Kirksey, 2014), which is the key example Kirksey and Helmreich (2010) use to introduce the concept of multispecies ethnography.<sup>33</sup> For example, we can consider the work of Marnia Johnston, an interdisciplinary artist who invites us to think about the consequences of using chemicals in our daily lives. In the sculpture *Twins* (2005) Johnston puts wings on insect larvae – larvae do not have wings – to make us reflect on how young people’s bodies are acquiring adult features.<sup>34</sup> She explains that ‘humans are acquiring adult characteristics, such as breasts, at an early age. Endocrine disrupting chemicals, like Bovine Growth Hormone, are working on the bodies of humans and multiple other species’ (Johnston cited in Kirksey and

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<sup>33</sup> See <http://www.multispecies-salon.org>

<sup>34</sup> See <http://marniajohnston.com/artwork/975130-Twins.html>



Helmreich, 2010: 560). But why should anthropology as a discipline care about something beyond the human? Why should we look at animals or other kinds of living beings? According to Eduardo Kohn (2013: 221), animals are part of us, so by looking at animals, we are looking back at ourselves. The idea is that ‘one does not meet oneself until one catches the reflection in an eye other than human’ (Loren Eiseley cited by McVay, 1993: 8). This kind of analysis is what Johnston suggests with her sculpture *Twins*.

Even though mosquitoes are mainly seen in terms of their biological function and features, the interaction between humans and other insects has captured the attention of anthropologists, filmmakers, historians, designers and artists. Our response to insects generates a biocultural interaction, a relationship that affects political, economic and cultural domains (Morris, 2004; Kirksey and Helmreich, 2010; Raffles, 2010a; Nading, 2014). Besides the well-known science fiction-horror film *The Fly* (Neumann, 1958), an interesting historical example of these kinds of relations are Ladislaw Starewicz’s films *The Cameraman’s Revenge* (1912) and *Insects’ Christmas* (1913). These are probably the first works in which insects are the protagonists of a film. They were not only innovative works with a potent mix of science fiction and natural realism, but they also helped advance stop-motion animation by combining live beetles and insect puppets. The films of Jean Painlevé are another example of the earliest ventures into the surrealist representation of human/non-human relations.<sup>35</sup> In his experimental documentaries, Painlevé was focused on making visible the lives of other species to both scientific and non-academic communities. To do so, he edited three different versions of each film using, for example, jazz music and electronic soundtracks for general audience films (Painlevé, 1986: 178–179).<sup>36</sup> The beauty of his work lies in the combination of unrivalled footage with playful storytelling, revealing the wonder of ‘despised’ animals like insects and bats. For this reason, Elie Faure comments that ‘in showing the dancing and glittering life of a mosquito, Painlevé’s films bring to mind the

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<sup>35</sup> He also pioneered underwater cinematography. See for example *The Sea Horse* (1933), *Hyas and Stenorhynchus* (1927) and *Freshwater Assassins* (1947).

<sup>36</sup> The other two versions were for scientists and universities. In *The Vampire* (1945) he used for first time jazz music in a science film (Painlevé, 1986: 178).

enchantment of Shakespeare and allow one to glimpse the exhilaration of the mathematician lost in the silent music of infinitesimal calculations' (Faure cited in Bellows et al., 2000: 19).

Like Painlevé, Luis Buñuel also had a fascination with animals – particularly insects – that is evident in all his work, using them to create powerful images (a sort of ironic anthropomorphism) that were psychologically revealing of human actions. In his ethnographic surrealist documentary *Las Hurdes* (1933), Buñuel has a sequence about mosquitoes and malaria as an example of the 'savage attack' the people living in the village of Fragosa need to overcome (Edwards, 2005: 42–43). Richardson (2006: 80) writes that 'Buñuel makes us uncomfortable by the dislocation he establishes between what we are shown and what we are told about what we see'. Both Buñuel and Painlevé made films questioning the human-centred explanations of the world. Richardson (2006: 84–85) explains this as follows:

Painlevé presented the creatures of the natural world as being out of reach to human interpretation just as they are illuminating about human behaviour. This creates a kind of anthropomorphism *à rebours*. In a way similar to Buñuel's use of insects, under Painlevé's gaze sea creatures reflect and illuminate human depravity without participating in it. In Painlevé's films, anthropomorphism is turned against itself. He shares with other film makers linked to surrealism a fascination with the relationship between humanity and the world, in which the relation to the world is questioned rather than accepted for what it is.

Insects have also been studied through anthropological and social lenses. Hugh Raffles (2010a) published a thorough analysis of human-insect relations, making particular references in the section 'Fever/dream' to mosquito-borne diseases in the Amazonian region. Brian Morris (2004) has produced a materialist representation of insect-human relations for the Malawi people. In his ethnography, Morris also talks about the complex relations between insects and diseases, paying special attention to malaria vectors and the tsetse fly (2004: 161). Two other examples are the work by Jussi Parikka (2010) and Richard Jones (2012). Parikka (2010: 37) examines insect architecture to show how insects' theoretical and materialist knowledge has provided hexagonal references that inform architectural design, something that necessarily

affects the social environment of cities and human life. He invites us to explore insects beyond their representation as a cultural theme, paying attention to their modes of organisation. Jones (2012: 10) offers a complete historical record of the cultural significance of mosquitoes in human life, which he defines as a ‘war’ that is being won by them. It is also worth considering the work of cartoonists Ed Fischer (2004) and Dan James (2005). Fischer suggests 101 things to do with mosquitoes, ranging from giving to Dracula a taste of his own medicine, to using them as bookmarks, or negotiating peace with them. James, on the other hand, uses a graphic horror novel to feature the story of a vampire hunter<sup>37</sup> who travels to South America in search of a beast, and who is then attacked by voracious mosquitoes before dying. These bloodsucking animals have inspired not only science, but also cinema, literature, design and advertising.

### **Dengue as a ‘neglected’ tropical disease**

Tropical diseases are those infectious diseases that occur solely, or principally, in the tropics (WHO, 2013a).<sup>38</sup> One of the subcategories is ‘neglected tropical diseases’ (NTDs), which represent some of the ‘most prevalent, disabling, and stigmatising infections of the world’s poorest people’ (Molyneux, 2010: 3). NTDs receive less than 1% of the health control budget, they usually do not attract long-term donations, and they need more research for specific drugs designs and more precise diagnostic tests (Molyneux, 2010; WHO, 2013b). What constitutes a ‘neglected’ disease for the WHO is, however, not well defined. One example of this is the case of diarrhoeal diseases, which are considered neglected ‘in terms of research resources compared with the burden of mortality’ (Molyneux, 2010: 3), but are not formally part of the NTDs recognised by the WHO, even though they affect mainly poor populations in the tropics.

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<sup>37</sup> *Mosquito* (James, 2005) is based on Bram Stoker’s novel *Dracula* (1897).

<sup>38</sup> The concept of ‘tropical diseases’ is mainly associated with malaria, leishmaniasis, schistosomiasis, onchocerciasis, lymphatic filariasis, Chagas disease, African trypanosomiasis, and dengue (WHO, 2013a).

Dengue is one of the 18 NTDs that, for the WHO, represent the target for control, prevention, elimination and eradication (WHO, 2013b: ix).<sup>39</sup> The WHO identifies five public health strategies that will help to overcome these problems: ‘(i) preventive chemotherapy; (ii) innovative and intensified disease-management; (iii) vector control and pesticide management; (iv) safe drinking water, basic sanitation and hygiene services, and education; and (v) veterinary public-health services’ (WHO, 2013b: x). Strategies to control NTDs should therefore be focused on control and prevention, rather than only on reacting to disease outbreaks. By the same token, the WHO holds that dengue incidence may be reduced at least by 50% by 2020, as a consequence of the implementation of the following strategies: ‘(i) diagnosis and case management; (ii) integrated surveillance and outbreak response; (iii) sustainable vector control; (iv) future vaccine implementation; and (v) basic operational and implementation research’ (WHO, 2013b: 28). By following these five points, dengue should no longer belong to the ‘category’ of NTD in five years. However, if the WHO is trying to bring dengue out of the NTD category, what is driving this change?

Anders and Hay (2012) argue that the number of malaria cases seems to be falling, while dengue transmission is increasing in Asia, Central America and South America. Recognising dengue as a big public health issue, Anders and Hay (2012: 982) point to the necessity of understanding ‘local dengue transmission dynamics’, as well as the vector and infection prevalence in specific contexts. Epidemiological reports registered incidents of dengue cases in Madeira, Portugal, which shows that the disease is once again spreading to areas where it was previously eradicated (WHO, 2012d). In fact, researchers at the Wellcome Trust argue that epidemics of dengue fever could soon affect people in Britain (see McKie, 2015). However, the sub-register is very high since only 46 of 128 dengue-present countries officially report dengue cases (Brady et al., 2012: 6). The situation is made more serious by the fact that ‘[a]s a neglected tropical disease, little or no globally coordinated efforts

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<sup>39</sup> These are the 18 NTDs: Buruli ulcer, Chagas disease, taeniasis/cysticercosis, dengue, chikungunya, dracunculiasis, echinococcosis/hydatidosis, endemic treponematoses, foodborne trematodiasis, human African trypanosomiasis, the leishmaniasis, leprosy, lymphatic filariasis, onchocerciasis, rabies, schistosomiasis, trachoma and soil-transmitted helminthiasis (WHO, 2013b: ix). [See the updated list here [http://www.who.int/neglected\\_diseases/diseases/en/](http://www.who.int/neglected_diseases/diseases/en/), which includes chikungunya]

have been undertaken', therefore a strategy to reduce the infections and deaths resulting from dengue is long overdue (WHO: 2012a: 3). What does it mean to be neglected and who or what precisely is being neglected?

Dengue is also a neglected disease because of the small amount of social research on it in comparison to the amount of scientific studies. Reidpath et al. (2011: 2) state that although 'one might imagine that the social sciences would play a significant, if not central role, in the development of evidence related to understanding and managing pathogenesis in general', less than 4% of the published material is related to the social sciences. They also suggest that even though many of the studies try to explore the social aspects of diseases, they are basically clinical research. In the case of vector-borne diseases, there is little social science research or interdisciplinary approaches, since the biological context is privileged in disease management (Reidpath et al., 2011: 1). However, the WHO wants to integrate environmental/ecological and biological dimensions with social research (WHO, 2012e). Now we find references to community-based interventions supported in 'eco-bio-social research' (Sommerfeld and Kroeger, 2012). In practical terms this means not only spreading insecticides and destroying breeding sites, but also studying ecological and biological variables, and promoting changes in the kind of social research to be used in campaigns. However, what is the cultural place of dengue? It seems that dengue is a neglected disease not only because funding organisations and the pharmaceutical sector do not put money into the treating the disease, but also because it is actually 'culturally neglected', that is, people do not pay attention to it, people do not go to the doctor.

## **Health and illness in Colombia: A historical overview**

### **Colombian medical pluralism**

A core aim of this thesis is to show how different kinds of knowledge are produced in the medical investigation, treatment and patient experience of vector-borne diseases. At stake in this is the centrality, ethos and structure of the medical system in Colombia, which my ethnographic study brings into question. Many researchers have recognised a 'medical pluralism' in Colombia – and Latin America in general

(Luna, 1986; Alcorn, 1990; Voeks, 1993; Jackson, 1995; Sowell, 2003; Fonnegra and Jiménez, 2007). Although the contemporary ‘official’ medical system is framed by academic and scientific principles<sup>40</sup> (Miranda Canal, 1984; Sowell, 2003), less-institutionalised systems, based on popular knowledge and practices, coexist with it. This is the case, for example, in the use of medicinal plants as a way of maintaining collective memory through generations (Yesid Bernal et al., 2011; Fonnegra-Gómez and Villa-Londoño, 2011). Non-academic approaches to healing practices are described in scholarly studies with terms such as ‘folk’, ‘popular’ or ‘traditional medicine’ (Press, 1980; Sowell, 2003; Fonnegra and Jiménez, 2007), and contrasted with ‘professional’ medicine (Press, 1980).

Although there is a debate about what the term ‘medical’ means – some seeing it as a cultural manifestation of health problems, others as a scientific and culturally generated study of diseases – Irwin Press (1980) and David Sowell (2003) have argued that the best way to address this term is by clarifying the historical context of the issue one is addressing. To do so, we should understand ‘medical system’ as ‘a patterned, interrelated body of values, governed by a single paradigm of the meaning, identification, prevention, and treatment of sickness’ (Press, 1980: 47). This means that a medical system may be simple or complex,<sup>41</sup> but in either case it embraces both the biological or objective phenomenon (disease) and the subjective experience (illness). (I will further develop these ideas in Chapter 3 with reference to the ideas of Arthur Kleinman (1988) and Andrew Twaddle (1981).)

Within a medical system we find different approaches; so, for example Irvin Press (1980) differentiates between ‘folk’ and ‘popular’ medicine. ‘Folk’ refers to ‘systems or practices of medicine based upon paradigms which differ from those of a

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<sup>40</sup> The social and historical analysis of medical practices in Colombia is framed by the Hippocratic notion of *tekhne iatrike*, or knowing what is being done – *tekhne*, understood as art or technique, and *iatrike* meaning medicine or surgery (Lain Entralgo, 1970: 134–148; Miranda Canal, 1984). To explore this, see the Colombian history of medicine and healing practices in the project ‘Social history of the sciences in Colombia’ (Quevedo, 1993; Quevedo et al., 1993; Miranda Canal et al., 1993).

<sup>41</sup> For example, in Western biomedicine, complexity arises through the huge interconnection of experimental laboratory techniques, hospitals, and medical schools (Press, 1980: 48).

dominant medical system of the same community or society' (Press, 1980: 48). 'Popular medicine', on the other hand, makes reference to 'all medical practices performed by other than officially sanctioned professionals of a medical system, and which do not directly contradict the paradigm of the system' (Press, 1980: 48). In the Colombian context, though, Sowell (2003) states that both concepts – folk and popular – should be treated as 'traditional medicine', meaning popular knowledge and practices acquired through non-academic or less-institutionalised processes.

Sowell's approach is further supported in the differentiation between 'institutionalised/academic medicine' (*medicina facultativa*) and 'traditional medicine' made by the Colombian medical anthropologist Virginia Gutiérrez de Pineda (1985: 9–30). According to Gutiérrez de Pineda, 'institutionalised medicine' privileges technique as a means to the rational explanation of natural processes, something that becomes tangible through scientific practices carried out in academic institutions. In the Colombian context, 'traditional medicine' is the popular knowledge either empirically acquired or orally transmitted from one generation to another. Traditional medicine includes *curandero* practices – popular knowledge owned by traditional native healers and magic/religious healing practices – which is based on the principle of supernatural powers, and may include magic, ceremonies, religious amulets and prayers.

Because of this pluralism, people have a variety of medical treatments to select from in modern-day Colombia. In rural areas people either seek medical treatment in local hospitals or visit *curanderos* who apply ointments, prepare beverages, or recite 'secret' prayers with healing powers – known as *rezos* (Sowell, 2003; Valencia-Tobón, 2009c). In places with indigenous techniques, like Putumayo, Caquetá or Vaupés, communities have magical and religious systems linked to healing practices and shamanism (Gutiérrez de Pineda, 1985; Taussig, 1986; Jackson, 1995). For example, Taussig (1986: 393–412) describes the uses in Putumayo of *yagé* (an infusion made of the plant *Banisteriopsis caapi* that produces hallucinations, vomiting and diarrhoea) as a way of dealing with envy. He shows that by using *yagé*, shamans guide people to 'evacuate' the envy of the other (Taussig, 1986: 395). This feeling, thanks to the capacity to wound, creates a kind of theatre where there is an interchange of implicit social knowledge. Thus, when people feel envy, they take

*yagé* to ‘see’ who is affecting them (who is making the *maleficio* – damage caused by witchcraft). In one example, a woman takes *yagé* to see who has caused her blindness (Taussig, 1986: 396-397).

Large cities are not exempt from this medical pluralism. Although places like Medellín, Cali or Bogotá privilege the official medical system – hospitals, clinics and modern medicine – it is also easy to find street vendors, known as *yerbateros* or herbalists, selling plants to treat different problems. This practice is so popular that in 2011 the Colombian singer Juanes wrote a song called ‘Yerbatero’ about these traditional practices. In Medellín, for example, *yerbateros* sell *matarratón* to counteract fever symptoms, and *palosanto*, fringed rue and eucalyptus to drive mosquitoes away (Valencia-Tobón, 2012a). So although the contemporary medical system in Colombia privileges the academic/scientific approach, ‘the medical pluralism of contemporary Colombia means that the residents of cities have a wide range of medical options in seeking relief from their illnesses’ (Sowell, 2003: 926).

The history of medical pluralism is tied in important ways to the formation of the Colombian state. This means that medical perceptions of phenomena like dengue are historically conditioned (for the case of Colombia, see Suarez et al., 2005; for the Nicaraguan case see Nading, 2013: 89–91). For example, in Chapter 2 I show how military discipline in high schools is related to the decree that established institutionalised public education in 1820 as well to current health campaigns in Medellín led by the Student Committees Against Dengue. So, as Taussig (1980: 8) argues, not only are our perceptions of any phenomenon historically conditioned, but ‘the history that informs this activity also informs our understanding of seeing and of history itself’. By re-working fixed categories normally treated as manifestations of the natural and treating them as products of mutual human relations, Taussig (1997: 197) invites us to read the state formation (and its national history) through a model of explanation-as-translation – a ‘pilgrimage’, or a kind of historical journey. In my study, I suggest taking a journey into the world of the disease vector, the health campaigns and the embodied experience of having dengue fever. This means not looking for universal objectivity (where the particular exemplifies the general), but



instead to read the vector of dengue and diseases in the play<sup>42</sup> between ‘official’ and ‘unofficial’ discourses (in my case ‘academic/scientific’ and ‘traditional/popular’ medicine). In the following section, I provide some background for understanding how the idea of medicine in Colombia was constructed in conjunction with state formation and why it therefore privileges scientific/academic approaches over popular/traditional knowledge. In doing this, I clarify the questions I am raising and situate my approach.

### **The Colombian health system during the 20th century**

To contextualise the health system and management of vector-borne disease in the 20th century,<sup>43</sup> we can start with the period between 1910 and 1930 (also known as the last two decades of the Conservative Hegemony<sup>44</sup>). During this period, 10 foreign missions were founded,<sup>45</sup> which included public health programs and educational

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<sup>42</sup> Taussig frequently describes reality as a ‘living theater’/‘theater of metonymy’ with dramatic performances that set up the idea of the state.

<sup>43</sup> The study of healing practices around vector-borne diseases in Colombia may have started in 1492 with the arrival of Christopher Columbus. In this period, Quevedo (1993: 34–35) describes mosquitoes attacking the conquistadors (explorers from the Spanish Empire) and killing some of those who had not died from indigenous poisoned arrows. Whatever informal attitudes towards mosquitoes and the diseases they bear derived from this, it could be argued that a formal understanding of the contemporary – academic/scientific – idea of healing started in 1760 with the arrival of the botanist José Celestino Mutis to the Viceroyalty of New Granada, who introduced the idea of ‘scientific thought’ into the Americas (Miranda Canal, 1984: 136–139). During the 18th century, as the colonial government considered ‘medicine’ to be merely ‘the art of healing’ (Pereira Gamba, 1859a: 4), it was very common to see indigenous and *curandero* practices overlapping with ‘academic’ – or at least more technical – approaches. In the 19th century there was a huge conflict among the different contending medical ideologies, which ended up privileging a scientific/academic approach. The key figure of this process was the physician Antonio Vargas Réyes, who represented ‘academic thought’ against the ‘existent anarchy’ and the ‘false’ and ‘popular’ knowledge that were prevalent in the region (Pereira Gamba, 1859a: 113–115). Vargas Réyes also launched the first medical Colombian publications *La Lanceta* (1852) and *Gaceta Médica de Colombia* (1864) (Pereira Gamba, 1859a; Miranda Canal, 1992).

<sup>44</sup> This is a term used by historians to name the period between 1886 and 1930, when conservative elites held power (Bushnell, 1993: 161–180).

<sup>45</sup> They were lead by the United States, Germany, Italy and Switzerland (Safford and Palacios, 2002: 283).

reform led by the Rockefeller Foundation (Safford and Palacios, 2002: 283). According to the president at the time, Pedro Nel Ospina (1922–1926), the presence of the Rockefeller Foundation would reassure Colombia’s trading partners, making evident ‘the nation’s determination to lower the *Stegomyia* [*Aedes aegypti*] index to the point where the extinction of urban yellow fever could be guaranteed’ (Abel, 1995: 346).<sup>46</sup> While coffee was still an important export product, fruit plantations – especially on the Caribbean coast – interested foreign investors such as the United Fruit Company (Bushnell, 1993). According to Fortou-Reyes (2013), these kinds of companies may have educated their employees about the origin, effects and prevention of some tropical diseases. Christopher Abel (1994: 32) notes that during the 1920s, health authorities began to collect demographic data and to establish regulations: ‘in built-up areas the planting of crops like bananas and maize where mosquitoes could breed in stagnant pools was prohibited within 200 metres of homes. Similarly, such buildings as tanneries, distilleries, soap factories and pigsties were to be located at least 200 metres from human habitations’.

In 1930, the liberals won the presidency for the first time since the 1880s. This marks the beginning of the Liberal Republic period (between 1930 and 1946), during which the conservatives were divided and the liberals united. It was an important period in Colombian healthcare history, because the liberal governments of the 1930s and 1940s (especially Alfonso López Pumarejo’s two terms in office, 1934–1938 and 1942–1944) were very progressive and established many social programs in education, land reform, economy and healthcare (Bushnell, 1993; Palacios, 2006; Fortou-Reyes, 2013). By the 1940s, campaigns against urban yellow fever had an effect, decreasing the number of cases (after the vaccine implementation), but malaria was still a significant health problem (Abel, 1994: 64). Between 1945 and 1946 the state created the Caja Nacional de Previsión (National Provident Fund) and the Instituto Colombiano de Seguros Sociales (Colombian Institute of Social

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<sup>46</sup> Historians conclude that yellow fever and malaria were the main vector-borne diseases in the Colombian territory during the 19th century. The French interoceanic canal project in Panama (while Panama was still part of Colombia) underwent many delays due to yellow fever outbreaks. Likewise, several epidemics were registered in the settlements associated with tobacco cultivation in the Magdalena Valley (Abel, 1994: 5).

Security) in order to provide health assistance to workers during their activities (Abel, 1995; MSPS, 2013a).

Between 1946 and 1953, Colombia had a violent period when the liberals were divided and the conservatives united. Once the government changed hands and the conservatives took power, violence started to erupt in the countryside – the first Colombian civil war since the one of 1899–1902<sup>47</sup> (Bushnell, 1993; Palacios, 2006; Fortou-Reyes, 2013). During this period, external resources remained as the main source of funding health campaigns against endemic and mosquito-borne diseases. This was a key element because ‘projects containing an element of foreign funding were for the most part free from politicisation because external donors would not countenance the partisan selection [between conservatives and liberals] of personnel’ (Abel, 1994: 71). During the early 1950s the National School of Public Health was founded in Medellin with the support of the Rockefeller Foundation (Abel, 1994: 72). In 1953, General Gustavo Rojas Pinilla – with the support of both conservative and liberal elites – deposed President Laureano Gómez. General Rojas held power for three years in a dictatorship period, during which television and TV broadcasting arrived in Colombia. Now the state could reach citizens in a new way, alongside radio programs that were broadcast, for example, by the National Nursing School (Abel, 1995: 336; Fortou-Reyes, 2013).

After the civil war and the dictatorship, democratic order and peace were mostly re-established through a bipartisan agreement that was supported by a referendum. This agreement, known as The National Front (1958–1974), had the support of the US (under President John F. Kennedy) and its programme Alliance for Progress (Fortou-Reyes, 2013). This programme focused on the promotion of development, education and land reform in Latin America, with a massive increase in public health programmes against tropical diseases. As I will discuss in Chapter 2, during this period the army supported health campaigns based on ‘inspection’ and ‘health surveillance’, trying to ‘teach’ hygienic habits for controlling mosquito-breeding sites (Suarez et al., 2005; Schneider and Droll, 2001). By 1969, the medical

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<sup>47</sup> After the assassination of Jorge Eliécer Gaitán (the main Liberal leader) on 9 April 1948, the conflict left between 100,000 and 200,000 dead.

assistance programme was divided into four categories – level 1, 2, 3 or 4 – depending on the geographical location and the availability of specialists at each hospital. The national health system was then reorganised by 1975, and although it was divided into national, regional and local authorities, it was largely centralised in the national government and its institutions in Bogotá (Marquez et al., 2004; Bustamante, 2008; Guerrero et al., 2010). There were no more significant reforms to the Colombian health system until the new constitution of 1991.

### **Contemporary Colombian health system**

The 1991 Political Constitution of Colombia<sup>48</sup> describes ‘the right to life’ as a ‘fundamental right’ (Article 11). ‘Health’ is only explicitly described as a ‘fundamental right’ for children (Article 44), but otherwise is only declared as a ‘social right’. The constitution states that ‘health care and environmental protection are public services that the state should provide’ (Article 49). This means that the state should guarantee the provision of access to health services. After implementation of the constitution, one of the main goals of the Colombian government was to achieve coverage by the health system of the whole population. In this respect, official reports show a dramatic change in terms of health security coverage: prior to 1994, less than 10% of the population was covered and by 1997 this proportion increased to 32.3% (Restrepo, 2007). In 2011, a report by the Ministry of Health and Social Protection (MSPS) stated that 90.87% of the population was covered by the health security system in 2011 (MSPS, 2011). Part of this change was due to the implementation of the 1993 Ley 100 – Law 100 – in which the health system was divided between the private and public sectors. Before 1994, coverage was very low since only the employee of a legally constituted company, his pregnant partner and their child under one year of age were covered by the system. After the implementation of Law 100, the health system not only covered the employee, but also his/her family group. The system is divided into two categories: a contributory and a subsidised scheme. In the first system, the employer designates a certain percentage of the employee’s salary as a monthly payment to the health system. In the subsidised scheme – which applied after 1995 – the government

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<sup>48</sup> This document summarises the laws under which the country is governed.

subsidises people with low incomes (Restrepo, 2007). The implementation of both schemes enabled the government to achieve wider coverage of the health system (Abadia and Oviedo, 2009; Desde Abajo, 2015). Between 1994 and 1997, there was a significant increase in the coverage in the General System of Social Security and Health. Nevertheless, the financial viability of the system has been always a concern, mainly because after the implementation of Ley 100, private health providers (Entidades Promotoras de Salud [EPSs]) control the administration of the system (Agudelo, 1999).

The main critiques of the current Colombian health system are about the poor quality of service. The origin of this problem lies in the 1991 constitution because ‘the right to life’ and ‘the right to health’ were treated in different ways: only ‘the right to life’ was a fundamental right (Hernández in Desde Abajo, 2015). So although many people were affiliated to the system, they did not get proper treatment by the private health providers. As a response to this, people began to look for legal mechanisms to defend fundamental rights (known in Colombia as *tutelas*), arguing that by not providing a good health service, the state was putting their lives at risk – and therefore neglecting the fundamental ‘right to life’ (Hernández in Desde Abajo, 2015). For many years, the Constitutional Court approved these legal arguments, as for many people this was the only way to get the treatments they needed (Abadia and Oviedo, 2009; Corte Constitucional, 2008; Desde Abajo, 2015). According to Agudelo (1999: 119), ‘quality assurance’ and ‘health coverage’ should be differentiated, but the problem is precisely that they are one and the same in the current health system. The government believes that registration in the system implies health services’ good quality, but this is not necessarily true. In other words, this terminology generates a misunderstanding where the quality of the system is measured in relation to the number of people affiliated to it.

Since government-regulated systems prioritise the low cost of health services, many diseases are treated with generic drugs, which do not offer a high quality of health care. On top of this, many complex treatments are not covered by the system, so people need to take legal actions to pressure the government for such services. While there are many general doctors, because of the high cost of specialised medicine, the health system lacks specialists. In 2012, the government suspended

many of the private health providers due to the large number of irregularities in the cost and quality of health services that they provide. Today, the viability of the system is seriously questioned. There is a strong difference between the service in rural and urban areas, and in the case of vector-borne diseases such as leishmaniasis, Chagas and malaria, disease incidence is associated with class and poverty (Bonilla et al., 1991).<sup>49</sup> The latest reforms to address these problems are discussed in Chapter 3.

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<sup>49</sup> Please see the Salud y Comunidad projects in the Urabá region regarding gestational/placental malaria and class, and the eco-epidemiological research of the PECET group during the decade of the 1990s and 2000s regarding leishmaniasis, class, gender and armed conflict. Also see the work of Juan Carlos Dib and the Fundación Salud Para el Trópico with Kogi indigenous.

## Chapter 2

### HEALTH CAMPAIGNS

#### Introduction

In this chapter I explore how in health campaigns – either in the local, national or international context – information is produced and repeated in light of ideas about *education, communication* and *marketing*. This, I argue, leads to a lack of critical reflection about the discourse of eliminating mosquito-breeding sites as a community responsibility when the notion of community is universalised. This issue is connected to a WHO initiative calling for a ‘more participatory approach at the local level’, and the integration of ‘key decision-makers’ and ‘community leaders’ (2012a: 23) and is one way to understand how information is produced through repetition. Using examples from my fieldwork in the city of Medellín, I trace and explain the models behind the notion of ‘community participation’ in the Colombian context. Along with the ‘classic’ entomological surveillance strategy (avoiding human-vector contact by eliminating mosquitoes in any stage in their life cycle), the different ways that community participation has been applied to the control of dengue fever can be classified into five approaches: social mobilisation, social marketing, information–education–communication (IEC), eco-bio-social research, and communication-for-behavioural-impact (COMBI). These strategies take a different approach to sanitation and hygiene by reducing-mosquito breeding sites, but the objective is ultimately the same. Studying health campaigns reveals a lack of critical reflection on the elimination discourse. Like ‘old wine in new bottles’, health authorities have changed the theoretical frameworks for the design of the campaigns, but their discourse and rationale is the same.

The examples presented here are all based on the guidelines issued by the WHO and the PAHO. In the international context, it seems that ‘community participation’ is understood as a mixture of the models of entomological surveillance, social mobilisation and IEC. It does not matter the country, campaigns against dengue fever all look the same. They all repeat the same ideas about not having used tyres, vases or any other water containers at home because these are the breeding grounds for mosquitoes. My argument is that although health campaigns presumably imply

different ways for understanding the participation of the community, the boundaries between these models get blurred in the course of the actual health campaigns.

### **Medellín: Participation of the Student Committee against Dengue**

Medellín is the second-largest city in Colombia with a population of 2,441,123 inhabitants (DSSA, 2014). As the capital of the department of Antioquia, it is the most important municipality of the metropolitan area of the Aburrá Valley, a region made up by 10 towns whose borders are almost inexistent (Barbosa, Bello, Caldas, Copacabana, Envigado, Girardota, La Estrella, Medellín, Itagüí and Sabaneta).

It lies within mountains, with a territory divided into 16 areas (named as '*comunas*' or communes) and 249 neighbourhoods. Urban areas of Medellín have 100% coverage in water service and wastewater collection, with 11 water treatment plants, and a network of 3,580km across the city (Empresas Públicas de Medellín [EPM], 2013). In Medellín, dengue outbreaks are mainly registered after the two rainy seasons (April and August). While in 2010, health authorities reported 15,782 dengue cases and 112 severe dengue cases, in 2011 there were 828 total cases and 19 severe cases (DSSA, 2013). In 2012, there were 709 dengue cases and 12 severe dengue cases, and during 2013 there were 2,490 total cases and 47 severe cases (DSSA, 2013).<sup>50</sup> Likewise, in 2014 the INS reported for Medellín 1,274 dengue cases and 34 severe dengue cases (INS, 2014c), and the last official report states that Medellín has had 633 dengue cases and 9 severe dengue cases by mid-August 2015 (INS, 2015e).<sup>51</sup> The variation between the years corresponds to the epidemic nature of dengue in America, where peak outbreaks are normally reported in three-to-five-year intervals (San Martín et al., 2010: 131).

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<sup>50</sup> See also the nacional reports at INS, 2013b.

<sup>51</sup> Other social problems such as intrafamilial violence (2,624 cases) and sexual violence (1,112 cases), also have a strong influence on the inhabitants of Medellín (DSSA, 2013). Likewise, there is a high incidence of tuberculosis (1,311 cases), varicella (3,907), and foodborne illness (398 cases) (DSSA, 2013).



I mainly conducted my fieldwork in four neighbourhoods of the city: Pedregal, Belén Rosales, Laureles and Aranjuez (the area surrounding the University of Antioquia, Explora Park and the Botanical Garden). These areas were selected because they all report a high incidence of dengue fever, I had contacts there who facilitated my work, and they are areas with different socioeconomic backgrounds. Whereas Laureles (*comuna* 11) and Belén Rosales (*comuna* 16) are upper- and middle-class neighbourhoods, Pedregal (*comuna* 6) and Aranjuez (*comuna* 4) are mostly lower- and working-class areas.

In the northwestern zone of the city, you find Pedregal, a neighbourhood with a marginalised identity that is characterized drug traffic, disorganized and unplanned urbanisation, and social conflicts. In one of the public schools there, I arranged a meeting with Diego, who was coordinating the anti-dengue programme. He is a 50-year-old teacher who has worked in the school since 2010. The school director introduced me to Diego, who kindly agreed to talk about the Student Committee Against Dengue (SCAD). This is a programme led by Medellín's secretary of health to empower students and invite them to participate in health campaigns against dengue fever. By initiating SCAD, health authorities wanted the community to acknowledge that their participation was important in the control of the disease. This programme aimed, first, to teach primary and secondary school students how to manage dengue vectors and how to identify disease symptoms; second, to invite students to participate in brigades that eliminate mosquito-breeding sites; and, finally, to explain to their neighbours what they learned.

Being a lower-class area, the northwestern zone of the city historically has lacked a strong state presence. Communes 5, 6 and 7 are controlled by different gangs – of which the Picaho gang may have the greatest influence in the social conflict – fighting for control of the drug trafficking territory (Alcaldía de Medellín, 2012; RCN, 2013; Noticias Telemédellín, 2014). However, during the last nine years, the previous three administrations' mayors have tried to invest public funds to recover marginalized areas of the city. Part of this effort involves the incorporation of social programmes into the public schools. Local administrations have designed two initiatives to promote health among the student population: Healthy Schools

(Escuelas Saludables) and the Integral Unit for Social Renovation (Unidades Integrales de Renovación Social, or UNIRES).

In 2005 the Healthy Schools programme was launched to encourage health promotion and illness prevention, covering public schools, community homes and public libraries. A year later, the UNIRES programme started as a public initiative to promote the mental health of children and young students in the city's public schools. Until 2010, Metrosalud<sup>52</sup> was responsible for implementing Healthy Schools and the University of Antioquia was responsible for UNIRES. Under the supervision of the secretary of health and the secretary of education, both programmes were integrated in 2011. The idea was to provide a more complete primary health-care system, integrating different institutions to promote health education, participation and social mobilisation in public schools (Alcaldía de Medellín, 2013). Metrosalud now implements the new integrated strategy. This health promotion education programme covers psychological and physical aspects (including environmental risks<sup>53</sup> for disease transmission, sex education, hygiene habits, waste manage, vector-borne disease control and wastewater management).

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<sup>52</sup> Metrosalud is a public promoter of health services that cover low-income residents under the subsidized health scheme in Medellín. The secretary of health of Medellín is responsible for monitoring, controlling and regulating all public health promoters (which not only include medical centres, but also dental centres, beauty centres and clinical laboratories) in the municipality of Medellín. These activities aim to promote patient safety.

<sup>53</sup> The idea of 'risk' should be understood here as the statistical calculation for measuring the likelihood of future dengue events. Discussing the framing of the idea of 'risk' in terms of urban planning and governance in the Colombian context, Austin Zeiderman (2012: 1581) writes that it is 'an ongoing attempt to render the uncertain future an object of official decision making in the present'.



Figure 3. Medellín, a home for life. Mayor of Medellín, Secretary of Health. Programme for dengue prevention and risk-factor control. Source: <http://goo.gl/WiXFXy>

Under the slogan ‘Medellín, a home for life’ the local administration called on the community to have a more active participation in disease control, and the SCAD is part of this initiative. At the school I visited, the committee consisted of two students from each level at the primary school. The programme was led by Diego, who told me that he normally gets a phone call from the secretary of health once or twice a year to organise an anti-dengue committee. Once they have decided a date for a meeting, he goes to each classroom asking for student volunteers who would like to be part of the committee. As he put it: ‘Students want to be part of something, so they say “yes” to anything that may put them in the centre of others’ attention, but I also need to acknowledge that in many cases students just want to “escape” from class’. Children in Pedregal, as in many other places of the city, do not have lots of opportunities. Their parents normally have informal jobs, or simply work as street vendors or housekeepers, and leave them alone or with a neighbour. Children usually grow up without the support of the family, and their reference for success becomes, in many cases, gang leaders – they have money, cars, motorcycles and guns that legitimate their power and are figures that can be easily recognised. In some ways, being part of this committee against dengue allows them to act as a different kind of leader, drawing the attention of other kids who also want to excel.

Once the team is put together, they wait for the health staff’s visit, and on that day, the students are excused from class. During the visit, the health staff explained the

objective of the programme and general information about the disease. In doing so they used Power Point presentations and posters.<sup>54</sup> This slide below (figure 4) is an example of the instrumental style of visual material that was presented to the students. Its main purpose is to describe mosquito-breeding places: vases, water plants, bottles, tyres, and buckets.



Figure 4. *Aedes aegypti* breeding places. Source: <http://goo.gl/WiXFXy>

Translation: The mosquito lays its eggs in water containers both outdoors and indoors’.

Once the short introduction to dengue, its symptoms and consequences was finished, the students were invited to have a walk around the institution to detect mosquito-breeding places. According to Diego, they were asked to look for puddles, bottles, vases, cans and plastic bottles. After these activities, there was another meeting in which the students and the secretary’s staff talked about the risk factors associated with what they saw in the institution and the surrounding area.

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<sup>54</sup> The posters and Power Point presentations are available at these sites: <http://ceantidengue.blogspot.com/> and <http://es.slideshare.net/CEAntidengue/>



Figure 5. SCAD cleaning brigades. Photos by the secretary of health. Source: <https://goo.gl/yaAqY8>

Some months after this meeting, the secretary of health invited Diego to attend another one to ‘review’ the information previously provided to the students. The staff from the secretary of health’s office also brought some mosquito eggs in a dry napkin and invited students to put them into a water container to follow the mosquito’s life cycle.



Figure 6. Macro photo of *Ae. aegypti* eggs in a dry napkin

A week afterwards, there were some larvae in the plastic cups. The idea was that students from the committee were observing and taking notes of the process, however because of the lack of food most of the larvae soon died, as students did not receive good instructions about how to feed them.



Figure 7. *Ae. aegypti* larvae

During the following weeks, the committee planned to continue the campaign by informing other students about what they had learned, principally by designing small posters. Only a few posters were designed and the activity was stopped because of the other academic responsibilities of the students. It seemed to me that after these activities, the interest of students in the anti-dengue committee disappeared and that it would be this way until the next phone call from the secretary of health.

### **Inspection and discipline: Eliminating mosquito breeding sites as the standard template for health campaigns**

The spatial model and surveillance template of inspection that is at work in such educational initiatives derives from a much larger field of application. At the broadest level, as a mosquito-borne disease, dengue has mainly been managed via reducing its vector (Espino et al., 2004: 17), a strategy that is commonly named 'entomological surveillance'. According to Anders and Hay (2012: 980) this is because 'vector control is the only currently available approach for prevention and control and is pursued mainly through the reduction of larval development sites, via environmental clean-up campaigns, so as to dispose of discarded or unnecessary

water containers, and to prevent mosquito access to breeding sites'. Health authorities manage this process by spreading insecticides that normally affect adult mosquitoes, using bacteria-based biological control,<sup>55</sup> using larvicides – the effects of which are limited in urban contexts – and quantifying the potential dengue transmission in one specific community by measuring the number of pupae or larvae per person (WHO-TDR, 2006; WHO, 2014).<sup>56</sup> Likewise, through environmental clean-up campaigns, health authorities ask the community – mainly understood as householders – to 'participate' by eliminating used tyres, vases and water containers at home (Gubler and Clark, 1996; Anders and Hay, 2012). This strategy is closely linked to the biological history of the vector, and the way it has been understood over time in terms of spatialisation and surveillance.

The geographical origin of *Ae. aegypti* has been studied for many years. Although according to Rickard Christophers (1960) some authors state that this species may have originated in the New World, he and many others argue that there is strong biological evidence to suggest it originated in Africa (species of the same subgenus have been found in Africa, for instance). Harrison Dyar (1928) was the first researcher supporting this theory in a book called *The Mosquitoes of the Americas*. Dyar (1928: 240) also argued that *Stegomyia fasciata* – the taxonomic name for *Ae. aegypti* around 1900<sup>57</sup> – may have been introduced by Christopher Columbus: '[i]n the early days of navigation, with long voyages and water conserved in open wooden receptacles, the species readily bred on board ship, and was carried wherever the vessel went'. Knowing that the mosquito breeds in water, and considering that it was spread through human journeys, mosquito-breeding sites have long had a leading role in the description of the disease. Thus, all campaigns have been based on the

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<sup>55</sup> *Bacillus thuringiensis*, *Lysinibacillus sphaericus* or *Wolbachia* spp. are bacteria that affect mosquitoes.

<sup>56</sup> This information is correlated with surveys of demographic information regarding sex/gender, age, ethnicity and social class (Sommerfeld and Kroeger, 2012).

<sup>57</sup> To track the history of the main dengue vector – today known as *Ae. aegypti* – we need to go back to 1762, the year in which Linnaeus described this species with the name of *Culex aegypti*. Even though there have been different taxonomic synonyms since that day, the International Commission on Zoological Nomenclature (ICZN) has validated the name *Ae. aegypti* for general use (Mattingly et al., 1962; ICZN, 1964).

spatial understanding of ‘vector control’ and the reduction of water sources. This process necessitates inspection and surveillance activities for monitoring humans and the environment, as well as biological and social interventions. ‘Inspection’ and ‘surveillance’ are military terms that imply an officially sanctioned regime of seeing that is both disciplined and disciplining.

In biological terms dengue surveillance is basically linked to epidemiological metrics based on data-collection processes. During larval/pupal surveys in houses, health authorities are not only surveilling the vector, but also, indirectly, the disease and the human population. In the analysis of instruments for disease control – such as biocontrol strategies – knowledge about mosquito densities is linked to cartographic studies and the ecological understanding of the city (Kelly, 2011: 66, 71). According to Ann Kelly (2011: 70), since mosquito-breeding sites are easily located, the entomological and ecological understandings of the disease can be related to human-mosquito dynamics on spatial scales. These surveillance methods are ways to ‘map the city’ based on the distribution of mosquito-breeding places (Kelly, 2011: 71), and can also be seen as a strategy for measuring the level of hygiene practised in homes and neighbourhoods. In parallel to the biological understanding of dengue control, then, ‘community participation’ offers another way to address these issues from a social point of view. Health promoters are no longer the only ones responsible for preventing dengue; instead, control strategies invite the community to participate and actively take part in entomological surveillance programmes. The militarised ideas of ‘inspection,’ ‘surveillance’ and ‘scrutiny’ are embodied in the secretary of health’s efforts to train the SCAD, one of the most important initiatives for involving the community in the control of dengue fever in Medellín.

At first this programme was called Anti-dengue Command, and some years later the name was changed to Student Committee against Dengue. The word ‘command’ in the original name also shows how the concept of hygiene is related to military discipline. Likewise, using this word in a country such as Colombia, with its history of conflict between the army, guerrillas and paramilitary forces, is, as some of my subjects argued, a way to make a deep impression on public consciousness. The connection is overt in the videos or photos of the programme (see figures 8 and 9), which show students performing military gestures. This military element is



reminiscent of the period in which soldiers and police forces in Panama, Colombia, Brazil and Ecuador tried to ‘teach’ hygienic habits (Suarez et al., 2005). And, as happened during the 1950s with the soldiers in Colombia, these students are now responsible for ‘inspection’ and ‘health surveillance’ activities, materialised in the destruction of mosquito-breeding sites (Suarez et al., 2005; Schneider and Droll, 2001).

As Christopher Abel (1994: 67) holds, ‘social security in Colombia had its roots among the military. Military charitable funds to protect the widows and orphans of soldiers had been founded in 1827 by Bolivar; and the need for labour law and social security, with an emphasis upon the bereaved of the civil wars, was underlined by the Liberal caudillo General Rafael Uribe in 1904’. If we go back further in time to the period in which the Colombian state was in formation, when the first constitution of the Colombian Republic had yet to be issued, we can also find links to military discipline. On 6 October 1820, Vice President Francisco de Paula Santander published the first decree that institutionalised public education (Biblioteca Nacional de Colombia, 2014). This decree stated that in addition to teaching reading and writing, instructing on moral Christianity and the rights and duties of man in society, it was the responsibility of the teacher ‘to teach military discipline every holiday and on Thursday afternoons. Children will have wooden rifles and they will be arranged in military units. Among those who are older and have better aptitude, the teacher will name sergeants and corporals. The teacher will be the commander’ (Jaramillo Uribe, 1980: 255–256; Miranda Canal, 1984: 140).

As mentioned in Chapter 1, other researchers have noted that scientific discourses often use military terms. For example, Haraway (1993) argues that the technical language constructing the idea of ‘immune system’ is an elaborate icon to legitimate militarised ideologies in a capitalistic world. Immunological diagrams visualise such system in form of wars within bodies, where viruses ‘invade’ cells-as-factories. Concepts such as *killers T cells*, *intraorganismic defence reaction*, *recognition*, *processing* and *response*, suggest that what is not consider part of the ‘self’<sup>58</sup> is the

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<sup>58</sup> The ‘self’ is defined by Jan Klein (cited in Haraway, 1993: 394) as ‘everything constituting an integral part of a given individual’.

object of a defensive reaction (Haraway, 1993: 394). The power of biomedical language reveals that ‘pathology results from a conflict of interests between the cellular and organic units of selection’ (Haraway, 1993: 388). The human body and the participation in health campaigns are semiotic objects that are theorised and materialised in light of postwar discourses.



Figure 8. Student Committee against Dengue from the Nuevo Amanecer school.

Source: <https://goo.gl/k0yO1A>

Translation:

We are the ‘Student Committee against Dengue’.

We are going to prevent the reproduction of *Aedes aegypti* mosquitoes.

Right now, we are going to look for mosquito-breeding sites.

A mosquito-breeding site is the place where you find clean and standing water.

Do you know that mosquito eggs are developed in seven days?

This is a mosquito-breeding site for dengue vectors.

You should avoid littering and prevent standing water.

A person that is suffering from dengue has these symptoms: vomiting, diarrhoea, retro-orbital eye pain, headache, rash, fever, bone pain or tenderness.

Severe dengue causes haemorrhaging.

Avoid self-medication.

In case of haemorrhaging, please go immediately to the doctor.

This is a message by the Student Committee against Dengue from the Nuevo Amanecer school.



Figure 9. Anti-dengue command / Student Committee against Dengue. Source: <http://goo.gl/4ARaQd>

These instructions for finding mosquito-breeding sites were also visually represented in the video and photos above. In the video, after performing military gestures, students proceed with inspecting water receptacles around their school. I talked about this idea of militarising the response to the disease with Juanita, a clinical psychologist who has worked for three years with UNIRES. During a period of six months, I joined in daily activities with her. Because of Juanita's experience with health promotion and prevention programmes in Metrosalud, and considering the fact that she got ill during my fieldwork (see Chapter 3), Juanita was a very important participant in the research – not only for helping me analyse the way health campaigns are designed but also in informing the design of the public experiments I carried out (see Chapter 5). By taking into account her experience working with children, she argued that one thing she found very special in working with them was that their words that are always full of emotions and feelings. However, she said, 'in the video you don't see that; and what is more worrying is that apart from not having feelings, what you see is a military posture'. In order to produce a more socially engaged campaign, she stated that it was essential to produce another kind of content, one that would not reproduce the standards of military inspection. Diego also commented that the idea of 'discipline' should not be the strategy in use, and that in his school they would like to have more active ways of participating.

This idea of inspection and the uses of military terms in official regimes of surveillance of mosquito-breeding sites are also seen in other countries in the region. ‘Warriors against Dengue’ (Guerreiros contra a Dengue) was the name of an anti-dengue campaign in Brazil (conducted in Magé and Rio de Janeiro) that used posters and performative interventions in the streets, with people in mosquito costumes, to explain to people how to deal with the disease. In my view, there is a logical contradiction in this campaign: as mosquitoes are the ones who put life at risk, people who are dressed up like mosquitoes should not be expressing fear – they are the ones who induce fear. In fact, it was not clear who the ‘warriors against dengue’ were because if the main characters were the mosquitoes, they would have had to perform a different attitude or there should have been another character that embodied the persona of ‘warrior’. Ultimately it is the public that ‘fights’ against the disease, and they are supposed to be the ‘warrior’ who inspects their own houses to eliminate mosquito-breeding places.



Figure 10. Guerreiros contra a dengue. Source: <http://goo.gl/1LkltZ>  
<http://goo.gl/QNqUiJ> and <https://goo.gl/Ey1sK3>

There is a history of military forces behind the health campaigns against vector-borne diseases. For example, Lock and Nguyen (2010: 148) argue that malaria and dengue were used by Europe and North America (between the 19th and early 20th century) ‘as a tool of empire to protect the health of settlers and soldiers’. These authors also mention the case of anti-dengue campaigns in Latin America as ‘top-down programmes with a military-like organization’ (2010: 153), which aim was to validate a pure biological understanding of the disease. In both malaria and dengue, theories about the microbial causes of epidemics were at stake to reinforce that ‘the future of imperialism lay with the microscope’ (Dr J. L. Todd cited in Lock and Nguyen, 2010: 153) (see also Chapter 3).

Timothy Mitchell (2002) links the invasion of Egypt in 1942 during the Second World War (and specifically the use of landmines during the Battles of El Alamein) and the infestation with *Anopheles gambiae* (and the subsequent malaria outbreaks) as phenomena that deeply modified the natural and social environments. The invasion and the infestation are described some of the most powerful transformations in modern Egypt, which determined the state as a techno-economic power linked to military and political forces (Mitchell, 2002: 21). In instances such as the Belgian colonial medical service, as well as the London and the Liverpool schools of tropical medicine, which were involved in the control of the spread of sleeping disease in Africa during the early twentieth century (Lyons, 1992: 64-68) as well as in America, there was a ‘constructive imperialism’ through ‘civilising missions’ that began with the support of the US, the UK, France and Germany. Health systems in the region were deeply influenced by the policies of the WHO and PAHO, in what were known as ‘strategies to monitor both diseases and people from tropical countries’ (Suarez et al., 2005: 497). Health authorities under the supervision of the state conducted these activities.

Around 1985, the concepts of ‘inspection’ and ‘health surveillance’ were replaced by ‘education’ discourses. This implied that the eradication of the vector was not only seen as a ‘responsibility’ of the state, but also of the community (Suarez et al., 2005). As a consequence, people were asked to take part in the implementation of health campaigns. However, in most of the cases, as I have outlined above, this just meant having people control the mosquito by eliminating mosquito-breeding sites. Even

today the idea of vector control has not changed dramatically. Health authorities still emphasise the need for surveillance of mosquito-breeding sites, which is in turn related to the careful inspection of people's houses and their private spaces. The SCAD have drawn on these ideas and made them into performative acts that can be read as a militarization of disease control.

### **Repetition: Information vs. critical reflection**

What we see today are the same ideas that Dyar described in 1928, when he wrote '[t]his species is the dreaded carrier of yellow fever and dengue fever, its close association with man rendering this possible. As breeding-places are limited to artificial receptacles, its destruction, when necessary, is a matter of the simplest [actions]' (241). Eighty-six years later, in a flyer distributed during my fieldwork in Itagüí – one of the cities of the metropolitan area of the Aburrá Valley – health authorities echoes Dyar, stating: 'there are simple actions to practise to discourage mosquito breeding', and they are as simple as 'covering, cleaning or eliminating water containers' (see figure 11). Although there are posters that talk about dengue symptoms (see Appendix 2), health staff always promote the elimination of any container that can accumulate standing water. According to them, this is because 'it is easier to eliminate 200 larvae in a breeding site than a mosquito flying' (Angel, 2014: 7). In other words, there has been a repetition of two things: the uses of the mosquito as a symbol for the disease (nobody has talked about the virus or the ill person), and the idea of destroying its breeding places as the solution for eliminating the disease.



Figure 11. Flyer distributed in Itagüí. Source: [www.itagui.gov.co/](http://www.itagui.gov.co/)

Translation:

There are simple actions to practise to discourage mosquito breeding.

Frequent cleaning of roof gutters.

Responsible disposal of solid waste, taking into account scheduled collections.

Store tyres under roof and eliminate any water they have inside.

Keep any water containers upside down.

How to control dengue?

Cover water containers.

Clean vases with soap and an abrasive cloth at least once a week, or use water beads to preserve plants.

Pay attention to these recommendations.

This strategy of repeating the message is based on the assumption that the community lacks the capacity to fully understand and act on information and needs to be reminded and cajoled into active participation. Different people that I interviewed (in institutions such as Metrosalud, the Secretary of Health of Medellín, the National School of Public Health and the INS) acknowledged that this idea of filling in knowledge gaps was framed into a model called ‘information–education–communication (IEC)’, which is the main strategy used in most health campaigns in Medellín. IEC is a methodological approach based on awareness-raising strategies, focusing on knowledge change (Parks and Lloyd, 2004). In order to work on awareness and education, these programmes produce posters, videos, t-shirts, radio

podcasts, leaflets, and other products that can inform the community about health issues. However, researchers suggest that there is not necessarily a positive correlation between the level of knowledge about dengue, the actions taken against the vector, and the effects on its transmission (Whiteford; 1997; Caballero Hoyos et al., 2006; Nading, 2014). For example, Caballero Hoyos et al. (2006) carried out a study in three municipalities of Mexico (Cuauhtémoc, Tapachula and Tonalá) concluding that even though people had knowledge about dengue symptoms, risks and modes of prevention, the community did not participate in health programmes. In fact, Whiteford (1997: 218) writes that ‘lack of action to prevent dengue fever stems not from lack of knowledge of disease transmission’.

In Medellín you can easily find references to IEC in mass media (newspapers, TV and radio, or social networks such as YouTube). During my fieldwork I found this statement by a member of the secretary of health in a local newspaper:

The strategy of information, education and communication is carried out with communities that are associated with high risk. This programme tries to motivate healthy behaviours against the disease. To achieve this end, student committees against dengue are created, aiming to empower students in preventive actions. With this information, not only students, but also teachers can search for and eliminate mosquito-breeding sites in their community (Angel, 2014: 7).

Thus the SCAD is incorporated into the IEC strategy and, without exception in this case, health campaigns are based on the repetition of the same information. As I said in the beginning of this chapter, members of the SCAD were invited to disseminate the information health staff taught them, explaining to their parents, other students or neighbours what they had learned. Although during the time I worked in the school in Pedregal such repetitive reinforcements were relatively infrequent, the SCAD website provides many examples that show how the information is replicated. In the images below, students have clearly designed their own hand-made posters by replicating the information that the health staff previously showed them – posters with white background – rather like making photocopies of their content.





Figure 12. Everybody against dengue. Source: <http://goo.gl/vyMk9I> and <https://goo.gl/Ro84MY>

Translation:

Everybody against dengue. We can eliminate mosquito-breeding sites.



Figure 13. *Aedes aegypti* breeding sites. Source: <https://goo.gl/Xa2Sxh> and <https://goo.gl/4NUHXO>

Translation:

Image on the left:

*Aedes aegypti* breeding sites.

The breeding sites are containers that accumulate water, either accidentally or deliberately, both outdoors and indoors.

Among the possible mosquito-breeding sites are: vases, water plants, bottles, tyres, buckets.

Other potential breeding sites are: water tanks, pots, cans, bottle caps, among others.

Image on the right:

If we don't have breeding places such as: tyres, vases, tanks, bottles, among others, life would be better.



Figure 14. We can eliminate breeding sites. Source: <https://goo.gl/WTPMq9>, <https://goo.gl/PTXA19> and <https://goo.gl/3xRzof>

Translation. Image on the left:

To eliminate the breeding sites of *Aedes aegypti*, you need to change the water in vases, and wash them with soap.

Without mosquito-breeding sites there are no mosquitoes, and without mosquitoes, there is no dengue.

Mosquito life cycle: egg, larva, pupa, *Aedes aegypti*.

Translation. Image on the right:

Everybody against dengue...

We can eliminate breeding sites.

Dengue control is everyone's responsibility.

We need to keep water containers clean and dry.

Cover water tanks used for storing water, and change their water frequently.

Without mosquito-breeding sites there are no mosquitoes, and without mosquitoes, there is no dengue.

We need to avoid being ill.

As you can see in the above pictures, not only the message is the same, but also the composition and the distribution of the elements in the space is mimicked. In the original and in the 'copy' images, you find a mosquito drawing on the top right corner, a child dressed with the yellow uniform, and a list of the mosquito-breeding sites. In the slide from the Secretary of Health you find: 'tyres, vases, water tanks, pots, cans, bottle caps, among others.' On the poster designed by the students, you can read: 'tyres, vases, tanks, bottles, among others.' Students have replicated the information that the health staff previously showed them.

Diego and Juanita spoke about this repetition in terms of a ‘lack of reflexivity’. When we discussed the different campaigns and the information provided to children as part of the SCAD campaign, they made statements like this one:

Have you seen that young people, and almost every person in you are talking with says something like ‘Ah! Yes, we all know such and such a thing about dengue – mosquitoes breed in vases, tyres, bottles, tanks’, and the point is that health campaigns have repeated the same things for quite a while, and when you hear what they are saying it’s like a recitation; and you repeat it as if singing a song without knowing what it says. Everybody knows what the health campaigns repeat. These programmes lack reflexivity. These campaigns remind me of when I was a child. I used to memorise the lessons and recite them, as a proof that I knew the lesson. However, when someone interrupted me to ask me something, I couldn’t continue anymore, after that I could not remember what I was talking about.

The IEC-influenced strategy of most of the health programmes in Medellín, being based on the assumption that the community needs information, suggests that there is a lack. To deal with this, campaigns provide information and then ask people to memorise and repeat it. But this is not only the problem: Juanita and Diego pointed out that such information was also presented in a technical way. Looking at the video presented in Figure 8, they highlighted that children could not even pronounce some of the words the teachers asked them to repeat, such as ‘retro-ocular pain’.

I talked with Tatiana about this issue, who, like Juanita, is a psychologist with substantial experience working in health promotion and prevention programmes led by public and private institutions (including UNIRES and Healthy Schools). In our conversations I realised that her point of view was very similar to that of Juanita and Diego. In interviewing these people, statements like this were made:

When health authorities repeat the same information about mosquito-breeding sites, it becomes a message without meaning. It no longer has content, because it is something you are used to hearing. When somebody asks you about how to prevent dengue infections, you just repeat the ideas about eliminating breeding places, without thinking about what you are saying. It’s like saying ‘smoking produces

cancer', which is something that everybody knows but it doesn't necessary mean that people are reflecting back on why not to smoke.

Diego, Juanita, and Tatiana's resistance or antipathy towards this repetition of dengue information tells us something about the wider Colombian context in which the model of education is based on repetition. Teachers commonly ask students to memorise a lesson and then repeat it. My participants argued that this is one of the fundamental mistakes in the education system: learning without context, memorizing without making relations between the different elements. A proof that this approach is a problem is that Colombia was ranked in the last place of the Programme for International Student Assessment (PISA). After looking at the results of this international test of education, the minister of education stated that it was necessary to improve the quality of education, because the secondary school programmes were outdated and did not respond to the needs of the twenty-first century. Likewise, it was necessary to change the evaluation system, because it was based on multiple-choice questions instead of open-ended questions to solve problems (Revista Semana, 2013, 2014a).

**Causality: 'Without mosquito-breeding sites there are no mosquitoes; without mosquitoes, there is no dengue'**

It seems that for the WHO – and most of the health promoters – there is a search for a universal statement that can summarise the mechanism that underlines dengue fever transmission. This is exemplified in the sentence repeated by students: 'Without mosquito-breeding sites there are no mosquitoes; without mosquitoes, there is no dengue'. This is a claim that implicates a correlation between three variables: mosquito-breeding sites, mosquitoes and dengue. However, as Russo and Williamson (2007, 2011) state, correlation does not necessarily imply causation. In the case of dengue, for example, Heintze et al. (2007a: 324)<sup>59</sup> argue that 'although community-based control strategies in addition to or together with biological and chemical vector control tools are able to reduce classical *Aedes* larval indices, it is unknown whether this reduces dengue transmission'. In other words, the fact of

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<sup>59</sup> See also Pérez et al., 2007 and Heintze et al., 2007b.

controlling the vector does not necessarily mean decreasing dengue incidence. In this section, I first explore this statement as a ‘material conditional’ and then as a ‘causal claim’ (exploring some ideas of logical consequence as simple philosophical analysis). See these three examples for understanding the uses of the statement:



Figure 15. Without mosquito-breeding sites there are no mosquitoes, and without mosquitoes, there is no dengue. Source: <http://goo.gl/dGXHSM>, <https://goo.gl/dxVZ5G> and <http://goo.gl/oQB3St>

Translation:

Without mosquito-breeding sites there are no mosquitoes, and without mosquitoes, there is no dengue.



Figure 16. Campaign in Cordoba, Argentina. 'Without mosquitoes there is no dengue'. Source: <https://goo.gl/YrpwEL>

Translation:

Text on the video: fever, headache, rash, muscle pain

Voice: Dengue is an acute viral disease that can affect anybody. The infected *Aedes aegypti* mosquito transmits it. This mosquito breeds in places where there is water accumulation. We can prevent dengue by cleaning yards and gardens and emptying water containers. Keep the containers upside down when you are not using them. Cover water tanks, clean vases and change their water. Clean roof gutters. As insecticides only kill some of the mosquitoes, surveillance of our home and our neighbourhood to eliminate any mosquito-breeding site is fundamental. Preventing dengue is everyone's job. We need your help and your awareness.



24SIETE Gente 100, EN mayo 29 del 2012 17

**SUGERENCIAS PARA MITIGAR EL ZANCUDO**

- 1 Identifique y elimine en su hogar los criaderos de larvas, que generalmente se encuentran en aguas limpias, frescas y estancadas.
- 2 Si detecta que en un recipiente hay larvas del insecto, lívelo con abundante agua y jabón y luego desinfecte con limpiador con limpiador y agua bien caliente.
- 3 Si presenta síntomas como fiebre, malestar general, dolor en los ojos y debilidad, consulte con su médico para determinar si está infectado.

Antes de que se inundara este área, los skaters practicaban telenor. Ahora el espacio está lleno de basura y en las aguas represadas quedan insectos de todo tipo.

“  
LOS VECINOS DEBEN ENTENDER QUE  
SIN CRIADEROS NO HAY MOSQUITOS Y  
SIN MOSQUITOS NO HAY DENGUE”

**FERNANDO MONTES**  
Médico Secretaría de Salud

**123**  
es la línea de atención para reportar las sospechas de dengue.

**15**  
reportes en Medellín ha recibido por semana la Secretaría, en 2012.

**Comunidad atenta**  
Vecinos de la calle 15A con la 79, en la loma de Los Bernal, se comunicaron con GENTE para denunciar que un skater pará del sector está inundado hace varias semanas y empezaron a aparecer zancudos, que podrían transmitir dicho virus.

De acuerdo con el vecino Tomás Echeverri, “la comunidad está preocupada por el peligro que esta inundación representa, pues allí pueden incubarse y proliferar los insectos, sobre todo en esta época de lluvias”.

GENTE le comunicó al médico Fernando Montes la denuncia del lector Echeverri y el funcionario ordenó una visita de técnicos de la Secretaría de Salud al sitio en cuestión. Sin embargo, Montes explicó que “es poco probable que en ese reemplazamiento haya larvas del *Aedes aegypti*, zancudo transmisor de la enfermedad, pues esta especie incuba sus huevos en aguas cristalinas y no lo hace en la suciedad”.

Asimismo, este medio le informó a EPM sobre la situación y, aunque la empresa dijo que el mantenimiento de esas instalaciones le compete al Inder, los funcionarios intentaron destapar el sifón del área, pero fue imposible lograrlo porque los equipos están concebidos para redes públicas.

Entonces, la solicitud fue reenviada al Inder y al cierre de esta edición, el miércoles 23, los encargados informaron que dentro de los exonerados que están bajo el cuidado de la entidad no está incluido ese espacio.

Constituiremos pendientes de este caso.

**INGLÉS PARA TODOS**

¿Y qué estás haciendo hoy para alcanzar tus metas?

**Aprende inglés**

Próximamente  
Sede en  
**Los Molinos**

**Matriculas abiertas**

Tel: 513 2444

CENSO Medellín 65

Figure 17. Neighbours don't understand. Source: Cañas, 2012.

Translation: A member of the secretary of health of Medellín also argued: ‘Neighbours should understand that without mosquito-breeding sites there are no mosquitoes, and without mosquitoes, there is no dengue’ (Fernando Montes in Cañas, 2012: 7).

Behind this discourse we may identify this axiom: *If you control mosquito breeding-sites you will not have dengue*. We can go beyond that and suggest that *if mosquitoes are well adapted to human dwellings, and many of their breeding sites are artificial*

*receptacles, you just need to destroy these receptacles and the disease will disappear.* Can health promoters support this?

### **Logical argument and conditional statement**

The statement in question is not always true from a formal logic point of view. First I show how to establish the deductive validity of this argument, and then I use a material conditional test to show two cases in which the statement is not necessarily true. In order to make people believe in anti-dengue campaigns, health authorities present an argument and try to ‘convince’ people to take actions and prevent the disease. To explain how an argument should work, let us consider a logical example: knowing that *Sara has dengue*, and given that *anyone who gets dengue was bitten by a mosquito*, you can conclude that *Sara was bitten by a mosquito*. This is to say that if a sequence of premises is true, the conclusion will also be true. These statements can be represented in logical forms:

Premises	a) Sara has dengue. b) Anyone who gets dengue was bitten by a mosquito.
<hr/>	
Conclusion	c) Sara was bitten by a mosquito.

From a formal logic point of view, this is a valid deductive argument.<sup>60</sup> Pau Teller (1989: 2) describes logic as ‘the science of arguments’ or ‘the reason-giving connection’. According to him, an *argument* is ‘a collection of declarative sentences one of which is called the conclusion and the rest of which are called the premises’ (1989: 1). In the example, the declarative sentences are ‘Sara has dengue’ and ‘anyone who gets dengue was bitten by a mosquito’; these are not questions, commands, or exclamations. An argument can have one or many premises, and they support or give reasons to believe in the conclusion (Teller, 1989: 2). In the example,

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<sup>60</sup> Logicians make a distinction between ‘valid deductive arguments’ and ‘good inductive arguments’. The former include cases in which, without fail, ‘if the premises are true, the conclusion will also be true’ (Teller, 1989: 3). The latter are those in which the premises provide good reasons to believe the conclusion, but it may be false (Teller, 1989).



there are good premises to believe that the conclusion is true – Sara was bitten by a mosquito.

Now, analysing the Statement<sup>61</sup> ‘without mosquito breeding sites there are no mosquitoes; without mosquitoes, there is no dengue’,<sup>62</sup> you might think that it does not necessarily suggest an explicit conclusion (a premises–conclusion relation), but instead an antecedent–consequent relation. If so, you could call it a ‘conditional statement’ that links three elements: breeding sites, mosquitoes and dengue. Conditional statements are compounded by a series of facts, which can be compared to the English construction ‘If ... then ...’. In our case, this can be seen as a conditional statement according to which there are two implications:

- 1) ‘If there are no mosquito breeding sites, then there are no mosquitoes’.
- 2) ‘If there are no mosquitoes, then there is no dengue’.

Understanding the truth-value of a conditional statement shows that anti-dengue campaigns’ message is not necessarily true from a logical point of view. Let *A*, *B* and *C* be the statements ‘there are no mosquito-breeding sites,’ ‘there are no mosquitoes,’ and ‘there is no dengue’, respectively. I can write implication 1) as  $A \rightarrow B$ . In this case, *A* is a conditional<sup>63</sup> and *B* is its consequence, where there is an implication for *B* to occur depending on the condition that *A* holds (Teller, 1989; Rosen, 2012).<sup>64</sup> I can also write implication 2) as  $B \rightarrow C$ .

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<sup>61</sup> I use the word ‘Statement’ with capital letters to mean the statement: ‘Without mosquito-breeding sites there are no mosquitoes; without mosquitoes, there is no dengue’.

<sup>62</sup> Most of the time, this Statement does not have a transitional word between the two ideas. Although it is rare, you can find the word ‘then’ or ‘and’.

<sup>63</sup> It can also be called antecedent, premise or hypothesis.

<sup>64</sup> Please note that here you do not have a causal relationship between *A*, *B* and *C*, and you should read this as ‘if *A* is true, then *B* is also true’ (‘If it is true that there are no mosquito-breeding sites, then it is also true there are no mosquitoes’).

Most of the time, health institutions do not write a transitional word between the two ideas; however, in the logical analysis I am proposing, we do need a transitional word (either ‘then’ or ‘and’). By considering this, the whole conditional statement can be written in two forms:

$(A \rightarrow B) \rightarrow (B \rightarrow C)$ , which is equivalent to saying: ‘If there are no mosquito-breeding sites, then there are no mosquitoes’ THEN ‘If there are no mosquitoes, then there is no dengue’

$(A \rightarrow B)$  and  $(B \rightarrow C)$ , which is equivalent to saying: ‘If there are no mosquito-breeding sites, then there are no mosquitoes’, AND ‘If there are no mosquitoes, then there is no dengue’.

In the first case, the *if-then* construction can be represented in a truth table when ‘ $p \rightarrow q$ ’ is false only when  $p$  is true and  $q$  is false (Teller, 1989; Rosen, 2012).<sup>65</sup> In the second case, however, you have two premise–conclusion relations linked by the transitional word ‘AND’, which is called ‘logical conjunction’. In this case, apart from having the same rules of the *if-then* construction, you would say that the logical conjunction ‘ $p$  AND  $q$ ’ only produces a true value when both propositions  $p$  and  $q$  are true – in all the other cases, it is false (Teller, 1989; Rosen, 2012).

<b>A</b>	<b>B</b>	<b>C</b>	<b>A → B</b>	<b>B → C</b>	<b>(A → B) → (B → C)</b>	<b>(A → B) and (B → C)</b>
T	T	T	T	T	T	T
T	T	F	T	F	F	F
T	F	T	F	T	T	F
T	F	F	F	T	T	F
F	T	T	T	T	T	T
F	T	F	T	F	F	F
F	F	T	T	T	T	T
F	F	F	T	T	T	T

F = false / T = true

Figure 18. Truth table: Logical argument and conditional statement.

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<sup>65</sup>  $p$  is a conditional and  $q$  is its consequence

In order to provide a logical understanding of the table, I can say that the Statement written in the first form  $(A \rightarrow B) \rightarrow (B \rightarrow C)$  is false in two cases (highlighted in yellow):

- When  $A$  and  $B$  are true, but  $C$  is false (there are no mosquito-breeding sites, there are no mosquitoes, but there is dengue)
- When  $A$  is false,  $B$  is true, and  $C$  is false (there are breeding sites, there are no mosquitoes, and there is dengue).

Likewise, the Statement written in the second form  $(A \rightarrow B)$  and  $(B \rightarrow C)$  is false in two cases (highlighted in blue):

- When  $A$  is true,  $B$  is false, and  $C$  is true (there are no mosquito-breeding sites, there are mosquitoes, but there is no dengue)
- When  $A$  is false,  $B$  is true, and  $C$  is false (there are breeding sites, there are no mosquitoes, and there is dengue).

Having presented the previous arguments, it is clear, from a logical point of view, that the Statement is not necessarily true in all the possible cases for linking breeding sites, mosquitoes and dengue. The three cases in which the statement is false are completely plausible in reality:

- There are no mosquito-breeding sites, there are no mosquitoes, but there is dengue: In this case, you neither find breeding sites nor mosquitoes, but you do get dengue fever reports. This setting may be framed into the idea of ‘mobility’, in which people get infected outside of their homes (place of study or work), even though they do not have breeding places where they live. As I have mentioned, the movement of people infected with dengue is highly associated with an increase in the number of cases (Vasilakis and Weaver, 2008; Adams and Kapan, 2009). In the Colombian case, the rural-urban migration caused by forced displacement due to the war also increases the circulation of serotypes and the infection rate (Rey et al., 2010: 802;

Alvis-Guzman et al., 2015). During my fieldwork, some entomologists reported that epidemics in Medellín were deeply associated with people who got infected at workplaces, or during their short holidays (going to touristic places near the city like Santa Fe de Antioquia) and who then came back to the city reporting symptoms. In fact, Adams and Kapan (2009) suggest that the movement between homes and places of employment, commerce or education have significant effects on the incidence of vector-borne diseases like dengue. So not having breeding sites near your home does not necessarily mean that you would not get the infection elsewhere.

- There are breeding sites, there are no mosquitoes and there is dengue: you may find mosquito-breeding sites at someone's house, but you cannot find mosquitoes. This basically means that the fact of having containers with standing water on its own is not a sufficient condition to affirm that there are mosquitoes.
- There are no mosquito-breeding sites, there are mosquitoes, but there is no dengue: the fact of having mosquitoes does not necessary imply the presence of the virus in them, and they can be breeding in other places. Therefore, you can find houses without breeding sites that still have mosquitoes, without having dengue transmission.

### **Mechanisms, causal claims and dengue transmission**

In most of health campaigns, mosquito-breeding places are described as 'artificial water receptacles': Vases, bottles, tyres, buckets, ground tanks, pots, cans, bottle caps, and roof gutters. This is in perfect congruence with Dyar's (1928: 241) description. Very few health campaigns though, discuss *natural* water receptacles. So when health authorities present the Statement, they more likely mean 'without *artificial water receptacles* there are no mosquitoes; without mosquitoes, there is no dengue'. On its own, this Statement leaves a gap for us to think about the role of non-artificial water receptacles. Imagine the case in which you do not have the artificial water receptacles I mentioned above, but you still have mosquitoes. This is in fact very common in nature because some mosquito species, including *Aedes* and

*Anopheles* mosquitoes, can breed in natural environments – regardless of their close association with human dwellings. So water-filled tree hollows, or any plant that accumulates water and allows mosquitoes to breed (the term ‘phytotelmata’ is used to describe these plants) can be considered natural water receptacles. It is thus possible to read the discourse of anti-dengue campaigns as a series of premises that provide good reasons to believe in some implications and conclusions, but they may be false (classified as a good inductive argument) (Teller, 1989). This rational way of thinking is very common in everyday life, even though it may lead to untrue conclusions.

### **A world without mosquitoes**

Ultimately, there seem to be few things that mosquitoes do that other organisms can’t do just as well – except perhaps for one. They are lethally efficient at sucking blood from one individual and mainlining it into another, providing an ideal route for the spread of pathogenic microbes.  
Janet Fang (2010: 434)

As there is a widely shared desire to kill all mosquitoes, there is also a romantic notion according to which every creature has a vital place in nature – a ‘niche’ (Fang, 2010). But in a world with 3,500 named species of mosquitoes, of which more than 100 bite or bother humans (Fang, 2010: 432), what is their ‘vital place’? What’s their ‘function’? If eradicating an organism would have serious consequences for ecosystems, what would happen if we eradicate mosquitoes? Would we miss them? Janet Fang (2010) has an interesting article in the journal *Nature* seeking answers to these questions. In it, Fang (2010) describes the ‘vital place’ of mosquitoes as a source of food for other animals: spiders, salamanders, lizards, frogs and migratory birds feed on mosquitoes (also bats at a very low rate). Likewise, their larvae are also important part of the biomass in water pools, and thus fish food. Mosquitoes, especially from the Ceratopogonidae family<sup>66</sup> (*Forcipomyia* genus) also provide ‘ecosystem services’ by being pollinators of tropical crops such as cacao (but they

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<sup>66</sup> In this family you will find the *Culicoides* genus, which feeds on blood and therefore is a vector for diseases and parasites.

are not the only pollinator). So in a world without mosquitoes, some plants would lose a group of pollinators, and some insect-eaters would lose part of their diet, but most likely no ecosystem disruption would take place and other species could overtake that niche (Fang, 2010). The same situation would happen after eliminating a disease-vector mosquito. This scenario would only generate a temporarily relief, because, from an ecological point of view, another insect would fill its niche. To exemplify this, Fang references the work of Phil Lounibos, who has shown that eliminating *Ae. aegypti* would be futile, because *Ae. albopictus* could easily overtake its niche (Lounibos in Fang, 2010: 434).

The point of Fang's article is not to argue that mosquitoes should or should not be wiped off the earth, but rather to acknowledge that because of the limitations of mosquito-killing methods, a world without mosquitoes is highly unlikely (Fang, 2010: 434). In other words, we have not been able to eliminate them not because we have had limitations of intent, but because we have not been able to. Overall, mosquitoes do not seem to have an unassailable niche in the nature, and if they were eradicated, 'the ecosystems where they are active will hiccup and then get on with life' (Conlon in Fang, 2010: 434). But mosquitoes do play an important role in controlling human population: one ecological effect of eliminating 'harmful' mosquitoes is that the world would have more people (Strickman in Fang, 2010: 434). The problem is that this 'niche' – biological control – does not fit into the romantic notion of human exceptionalism, where we are more important than any other living beings (see Chapter 4).

Humans believe they have power over every single living being, but mosquitoes, with their buzzing sound and their ability to transmit diseases, have proven how vulnerable and powerless humans are (Valencia-Tobón, 2015). As Hugh Raffles (2010a: 61) argues, insects 'enter our bodies and make us shiver with apprehension. What other animal has this power over us?' While rethinking the premise that mosquitoes could be removed from the earth, it is also worth considering other ways for engaging with mosquitoes as living beings in all their forms, rather than simply as objects to be eliminated.

## Ovitrap

Health authorities sometimes produce artificial breeding sites as a control strategy. For example, by knowing that odours expelled by grass infusions, particularly *Panicum maximum*, influence *Ae. aegypti* oviposition (Santana et al., 2006), researchers use such infusions to attract them in certain places. This strategy to monitor and reduce the mosquito population uses ovitraps, devices to catch up gravid mosquitoes. Most of the ovitraps are made out of water, with infusions that attract mosquitoes and an insecticide to kill eggs, larvae or adult mosquitoes (see Chapter 3). This mechanism of ovitraps somehow contradicts the Statement because they are intentionally created breeding sites that in turn reduce the number of mosquitoes. In Medellín, researchers from the CES University and the University of Antioquia have used plastic receptacles with hay infusion as ovitraps to control *Ae. Aegypti*.<sup>67</sup> They applied permethrin or deltamethrin as insecticides, getting good results in field tests in the Aranjuez neighbourhood (Quimbayo et al., 2014). This also provides evidence to contradict the causal claim established in the relation between breeding sites, mosquitoes and dengue.

Now, by knowing that *Aedes* mosquitoes feel attracted by odours expelled by grass and hay infusions, it would be worth thinking about the concept of ‘clean water’ that health campaigns normally refer to as a breeding site for these mosquitoes. As I described above, it is argued that *Aedes* mosquitoes only breed in clean and standing water, but what does ‘clean’ mean? Manuela, an entomologist who worked with me during my fieldwork, emphasised that the concept of ‘clean’ should be better defined. Health authorities may be referring to non-turbid water; water with grass or hay infusions is not entirely ‘clean’.

### Plants, vases: mosquito-breeding sites?

We love plants in Colombia. Almost everybody has flowers at home. This could also explain why health-campaign posters always include vases as mosquito-breeding

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<sup>67</sup> See also the case of the Urabá region in Alarcón et al., 2014.

places. They are represented as containers of the disease. But given the problems with proving the Statement, we must ask: What if vases are not that important as mosquitoes-breeding sites? In other words, considering how much Colombian people enjoy having plants in their houses, should health campaigns really be focusing on modifying this habit? Are flower vases actually responsible for much of the production of *Ae. aegypti*?

In order to assess the risk of dengue transmission, the WHO-TDR uses an index that measures the number of pupae per person in a community by class of container (e.g. bottles, vases, tyres, ground tanks, among others). Since the pupal mortality is low, with the pupal and demographic survey it is easy to correlate the number of pupae with the number of adults and, therefore, this index helps to assess risk and direct-control operations in a particular area (WHO-TDR, 2006). A study carried out in Barranquilla, Colombia inspected 131,336 water-filled containers, and 16,336 *Ae. aegypti* pupae were observed (Romero-Vivas et al., 2006). The authors concluded that flower vases only represent 2.7% of all pupal production. Contrary to what is shown in the posters and the health campaigns, Romero-Vivas et al. (2006: 11) state that ‘probably no effort should be directed at flower vases, and further, that the manipulation of these elements by health authorities could be considered as intrusive to the house inhabitants’.

They also argue that if health programmes eliminate the most representative water-filled containers such as bottles (which represent 82.2% of all water-filled containers, but only 0.1% of *Ae. aegypti* pupae production), tyres and other used containers (that account for 12.8% of all containers and 16.3% of pupal production), the result would be a 16.4% reduction in the pupal population (0.1% + 16.3%). In short, 95% of the water-holding containers in the environment were found to be almost irrelevant for the production of mosquitoes. Interestingly, what the authors describe as large and ‘rare’ containers were responsible for much of the production of *Ae. aegypti*. These are ground tanks and drums, which although only accounting for 4.3% of the water-filled containers, were responsible for more than 80% of the *Ae. aegypti* production. In other words, the ‘risk’ will not be significantly reduced if health authorities continue focusing their attention on smaller containers. So what is the reason why we still find graphic references to these elements in the posters of health campaigns?



Certainty, more studies are needed, but it should be worth thinking about different ways of defining what is a ‘breeding site’.

### **Cleaning/hygiene, guilt and personal responsibility**

Elkin Osorio<sup>68</sup> has that stated you find dengue transmission in areas where people ‘don’t help’ to control mosquito-breeding sites, even though they know that this transmission is because of the way waste and breeding sites are managed (Osorio in INS, 2013c, between minutes 06:02 and 07:22). During my fieldwork I found posters and videos that used phrases such as ‘we need to avoid being ill’, ‘health or dengue? It depends on us’, ‘dengue control is everyone’s responsibility’, and ‘dengue kills, protect your family’. These statements not only show that individuals are responsible for avoiding dengue fever, but they are also implicated in a guilt complex, in which health staff suggest that people get sick because they did not take the necessary actions to protect themselves. This deflection along with the logical anomalies in the Statement show how the concept of ‘community participation’ in this context has been constructed and presented as *personal responsibility* and *individual guilt*.

In the poster below (figure 19), designed by one of the students in the SCAD, reads: ‘What kinds of situations make you sick and not your neighbour?’ and the answer that the child has learned to this question is ‘your neighbour doesn’t have standing water that allows that the mosquito breeds’. There is a clear effort to emphasise that ‘without mosquito-breeding sites in your house, there is no dengue’. However, plainly, you need not get bitten only by the mosquitoes of your own house to get ill, and in any case, these mosquitoes would have bitten someone infected with dengue before in order to be able to transmit the disease to you. Overall, you would never be able to predict where the infected mosquito came from.

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<sup>68</sup> Head of health prevention and promotion programmes at the INS

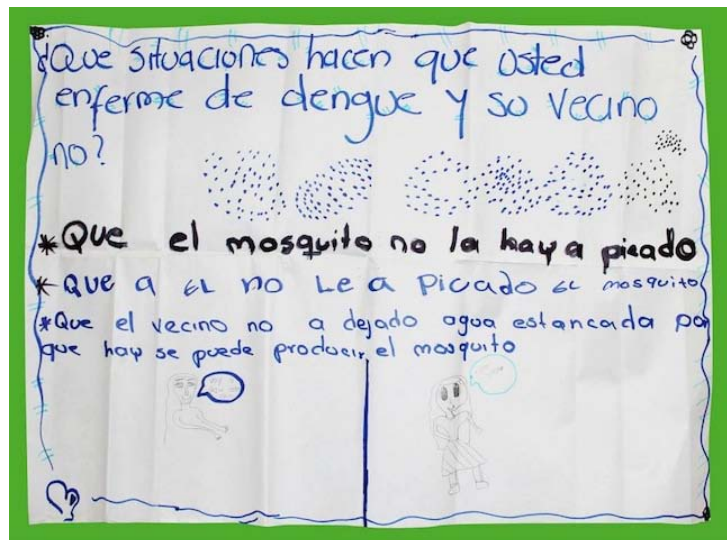


Figure 19. Poster designed by students of the SCAD. Source: <https://goo.gl/uZa9iv>

Translation:

What kinds of situations make you sick and not your neighbour?

-The mosquito hasn't bitten him.

-Your neighbour doesn't have standing water that allow to the mosquito to breed.

In interviewing some people who had worked in the design of health campaigns in Medellín, the issue of individual guilt arose, but it was presented in terms of spreading the disease. During the entomological surveillance activities, the health staff at the Secretary of Health often stigmatised those who had some larvae in a breeding place inside their houses. They were described as 'responsible for spreading the disease' and, according to my interviewers, even 'guilty' if somebody dies in their area because of dengue infection. This happened even knowing that having a breeding place with larvae does not mean that there would be an infected mosquito, and that being diagnosed with dengue does not necessarily mean that you are going to die.

In the international context, health campaigns from Singapore and Malaysia are very good examples for seeing how the concept of community participation was transformed into the idea of individual guilt (see figures 20 and 21). 'My child has become a victim because of me', says the main character of the Malaysian video. He didn't prevent and destroy mosquito-breeding sites and, because of that, his daughter died. Nading (2014: 158) states that behind this kind of material the goal is to appeal to an individual's sense of responsibility for taking care of their family, and for

meeting the citizen's obligation of being vigilant. There is an assumption, then, that with better information (about not preventing mosquito-breeding sites) people would behave differently, and by doing so they would be taking responsibility for their own health care.



Figure 20. Anti-dengue campaign in Singapore. Source: <https://goo.gl/SMBu1t>



Figure 21. Anti-dengue campaign in Malaysian. Source: <https://goo.gl/aFL8nf>

### **Social marketing: advertising dengue as laundry detergent**

The social marketing method is a communication strategy to reach an audience or a segmented social group with products, messages or training programmes (Parks and Lloyd, 2004). It is based on theories drawn from sales promotion, advertising, and public relations (Asian Development Bank and WHO, 2013). According to Antonio Arbo (2010: 11), under this model *participatory involvement* is only possible by

targeting the correct channels of communication. Therefore, the use of radio, the Internet, social networks, television advertisements, or any other communication or mass media channel are very common (Asian Development Bank and WHO, 2013). The community is treated here as a set of consumers who should be targeted through marketing programmes. As Parks and Lloyd (2004) state, this programme tries to appeal to the individual and sell health as a product. An example of this is the case of the ‘Challenge against dengue’, the main strategy carried out at the national level during my fieldwork. This consisted of a series of advertisements designed by the Colombian Ministry of Health that were broadcasted throughout the day, including during primetime hours, using TV, radio, and the Internet. To see how they were made and what kind of information they showed, see Figure 22. (see also videos in Appendix 3):



Figure 22. Challenge against dengue at home. Source: <https://goo.gl/EpJPTj>

Translation:

The anti-dengue challenge.

In Colombia, more than 60,000 people get infected annually with dengue, and more than 50 die because of it. Let's see if this house passes the anti-dengue challenge...

- Do you protect yourself against dengue?
- Yes... of course.
- Let's see if there are mosquito-breeding sites.

Look! Here there is clean standing water, a potential breeding site.

This house didn't pass the anti-dengue challenge. Will yours?

Don't leave clean standing water where mosquitoes can breed. Brush water tanks weekly.

The challenge against dengue at home: zero mosquito-breeding sites, zero mosquitoes!

Minister of Health, Colombian Government

To deconstruct this material, I contacted the Publicidad Ábaco and Daniel Ronderos. Publicidad Ábaco ([www.publicidadabaco.com](http://www.publicidadabaco.com)) is a Bogotá-based advertising agency with experience working with health institutions such as the Fundación Santa Fe and the Colombian Society of Urology. Daniel Ronderos ([www.danielronderos.com](http://www.danielronderos.com)) is a professional photographer, head of this advertising agency. Over the course of a year, I frequently travelled to Bogotá to analyse many public health campaigns with them. They also worked with the subjects I will introduce in Chapter 3 on the design of the public experiments that are part of this ethnography (see Chapter 5). Looking at the video in figure 22, Daniel commented: 'This campaign is a complete disaster. It has no relation to any model of social communication. Unfortunately, they made a mistake by emulating a series of clichés or advertising models of laundry detergent, which used the same stereotype'. Daniel was talking about a series of advertisements designed by detergent brands such as Ace or Ariel, which became the standard format for advertising many products over a period of two decades. These advertisements 'challenged' people to test two different products and then discover which one was more powerful. The interviewer/presenter would typically be a handsome man – often a famous actor – who knocked on the door of a house, or appeared at a grocery store, and asked the person who opened the door or emerged from the store if he or she would like to participate in a challenge. Along with the presenter, a team of 5 to 10 people walked around – all of them dressed with uniforms bearing the detergent brand – handling dirty clothes, two microphones and two cameras. One of the TV advertisements also showed 'behind-the-scenes' footage of the challenge. All these elements were replicated in the anti-dengue campaigns. The difference is that people were not challenged to choose between two brands of laundry detergent, but to choose between having or not having mosquito-breeding places, and to compare this to the result obtained in other houses or schools.



Figure 23. Challenge against dirt on clothing [*percurdido*]. Ace advertisement.

Source: <https://goo.gl/rMfQIp>

Translation:

— Hello... hello...

— Come here that I want to show you something... Do you see that ball?

— Ugh!

— Is there any detergent that you sell here that can clean up this ball?

— Without scrubbing? No...

— I challenge you to test Ace against your detergent to see which one leaves it whiter.

— We are going to wash. We are going to cut two pieces of cloth, and then we will wash one of them with Ace, and the other with the other laundry detergent.

— I am going to suggest my people use Ace because it leaves clothes whiter and it has a better price.

— It was found in Bogotá that only Ace makes the whitest whites without scrubbing.

The idea of ‘challenge’ here suggests that controlling dengue is an issue of competition in which someone may be superior to others. Daniel indicated that the social marketing touch of this commercial would not reach audiences because it was ‘contaminated’ with an advertising language that has become overused, not only in Colombia but also in Latin America (see examples in Appendix 3). Daniel pointed out that ‘the use of this language does not increase or reduce the sense of

seriousness,<sup>69</sup> but it detracts from the message itself because it [dengue] is compared with something as simple as detergent’.

The graphic design of this campaign also has many inconsistencies. In public health terms, the sentence ‘zero breeding sites, zero dengue’ should be more important than the idea of ‘challenge against dengue’, but it was minimised inside the composition. It was placed behind a kind of magnifying glass on the left side of the image, and because of this, the message about breeding places does not seem to be integrated in the logotype. Likewise, the proportions of the corporate images were small (Ministry of Health and National Government), and it is difficult to read them. The fist holding the brush is what stands out most in the composition. Taken together they could symbolize something like ‘the power of cleaning’. The fist is a political element that symbolises power. It connotes strength and a fighting spirit. However, the green-like colours are not congruent with the symbols. According to Daniel, the purpose of the green colours in this logotype is not quite clear. Although the green colour can be associated with quiet, calm, natural, harmonic or healthy environments, the tonalities used here neither respond to these objectives nor do they show political power. Furthermore, the brush, as a symbol of ‘hygiene’ or ‘cleanliness’, may create a close association to the laundry detergent advertisements and consistent with the concept of washing water tanks, but reducing dengue fever to the fact of washing tanks is a very simplistic interpretation.

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<sup>69</sup> Another distinguishing feature of this advertisement was that in the challenge against dengue people were handing brooms and mops as if they were guns – remembering the soldiers during the 1950s, and the ‘wooden rifles’ mentioned by Francisco de Paula Santander on the decree published on 1820. These elements, along with the fist holding the brush in the logotype (figure 24), also reinforce the argument presented before about the idea of ‘military’ aspects around dengue control.



Figure 24. Logotype: Challenge against dengue. Source: <https://goo.gl/EpJPTj>

When the ‘anti-dengue challenge’ is presented in the Colombian context, it immediately recalls the idea of the laundry detergent advertisements. In fact, during my fieldwork I showed those videos to all my participants and, without exception, they all responded that they were like the old-fashioned soap advertisements. In this respect, Daniel stated, ‘I think that people who designed this were more concerned about mimicking a model that had worked in the past, so then they said to themselves “it worked in the laundry detergent advertisements, so it will also work with dengue”. This is a chaotic design, the message of which loses credibility because of the use of cliché formats’.

### **Social mobilisation, patronage and class**

*Social mobilisation* is the idea of bringing together different social groups, in this case with the objective of raising people’s awareness for preventing and controlling dengue (Parks and Lloyd, 2004). Most of the educational campaigns have highlighted how to reduce water storage containers with discourses that emphasise community empowerment, and rely on patronage and class-based approaches. The objective is to ‘strengthen community participation for sustainability and *self-reliance*’ (Parks and Lloyd, 2004: 9; emphasis added). The desirable outcomes of the mobilisation process are achieved when people understand the consequences of their actions, and thus the idea of *knowing the disease* is key. While it is important to provide health education regarding specialised knowledge, it is also important to



avoid a paternalistic attitude that presumes only professionals hold knowledge (Berjemo and Bekui, 1993).

The community that participates in health activities extends beyond householders, and includes local and national health authorities, policy makers, NGOs, doctors, political parties, community leaders and academics (Berjemo and Bekui, 1993; Parks and Lloyd, 2004), though ‘community empowerment’ refers mainly to educating householders about efforts they can take in their neighbourhood. This idea of ‘the community’ as a coalition of different groups is materialised in the phrase ‘*all united against dengue*’, which is common in health campaigns. What is interesting is that this plurality is not visually represented during the course of health programmes. Two examples from Perú and Paraguay, while promoting social mobilisation, still represent ‘the community’ as the householder.



Figure 25. Anti-dengue campaign in Perú: ‘All united against dengue’. Photo by Mario H. Valencia

Translation:

All united against dengue. The *zancudo*<sup>70</sup> breeds in standing water such as: tyres, buckets, bottles, cans, vases, among others. Eliminate this rubbish.



Figure 26. Anti-dengue campaign in Paraguay: ‘Everybody against dengue’.

Source: <http://goo.gl/ka4qGl>

Translation:

Everybody against dengue. We should eliminate mosquito-breeding sites. Clean gardens and places where you can find rubbish. You should discard useless objects and cover water containers. It doesn't matter where you are, always use repellent. If you have a fever, you must go to the doctor. At the first sign, go to the nearest health centre. Health or dengue? It depends on us.

In these examples, there is a sense that private space needs to be reordered, and that it is the responsibility of a house's inhabitants to maintain its cleanliness. There is a biopolitical (Dumit, 2008: xii) arrangement of territory taking place: a problem in private space necessitates a control strategy to prevent an epidemic outbreak. In this way, these campaigns present a set of norms that should be followed in order to avoid human-insect contact. They are a kind of exercise in biopower for monitoring and managing biological processes through an emphasis on hygiene. With these campaigns, health promoters are employing a discourse of ‘unifying power’, for controlling and modelling behaviours. Foucauldian ideas of medicine and laboratory practices as a set of imposed norms and as regulatory controls are combined here in a single *epistème* (Mol, 2002; da Costa and Philip, 2008). These kinds of campaigns

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<sup>70</sup> ‘Zancudo’ is a popular term in Latin America for mosquitoes.

have been designed around 'teaching' the public how to clean the home and its surroundings, as this is supposed to be the method for controlling mosquito-breeding places. These health programmes also highlight a class differentiation between 'poor' and 'rich' in this hygienist social movement (Latour, 1983), as health staff homogenise the space of the poor, and so that it could look like the space of the rich.

This class-based approach was also part of the SCAD, and the idea of providing uniforms was an effective way to express the class issue. The secretary of health provided a vest and a hat for each child, which they were to wear while participating in the committee's activities. They seemed happy to be dressed in uniform and, according to Diego, even requested a uniform because it made them feel part of a team:

This is like when you are part of soccer team: you get crazy to have the t-shirt, the shorts, the cleats and the socks, even knowing that you are a poor player and that you would never play during the match. This is a way of stimulating the children to participate in the campaign. I think this is also a kind of 'placebo' that the Secretary of Health uses because they abuse the student's shortcomings. But if this would be a place where basic needs were met, students would not care about the uniform.



Figure 27. Uniforms of the SCAD. Source: <https://goo.gl/MPV7JM> and <https://goo.gl/ehuZ3Q>

The image above not only reinforces the idea of community participation as military discipline, but also, as Diego pointed out, allowed me to understand how proud students felt dressing up in this uniform. This situation happened precisely because public health schools are normally located in poor areas of the city, so health staff and politicians had taken the needs of the population and had transformed them into

a way of involving the community in ‘participatory’ projects. I talked about this matter with Luis Fernando, an electronics technician who works as a telecommunications instructor for UNE (the biggest telecommunication company in Colombia) and who participated in this study since the beginning of my fieldwork. Luis was one of the subjects who got dengue during the course of my fieldwork (see Chapter 3) and who became a key informant in the design of the public experiments that are part of this ethnography (see Chapter 5). When we talked about SCAD, he stated, ‘this uniform could be Sunday clothing [*ropa dominguera*]’,<sup>71</sup> meaning that the vests and hats became valuable objects for their wearers because they otherwise lacked the resources for buying new clothing.

The strategies used to mobilise the SCAD are linked to a wider set of circumstances in Medellín. According to Tatiana and Juanita, a kind of paternalistic policy has begun to appear in the last decade. Based on their experience in different health promotion and prevention programmes in the public sector, they stated that many health campaigns are meant to be assistance-based projects and that the secretary of health simply came up with guidelines to transmit certain kind of knowledge that the politicians or those who designed the programme considered ‘relevant information’. Therefore, the community was conceived only as a passive audience. Diego recounted that he had received phone calls from different people at the local administration informing him that a team of psychologists and special educators would visit the school to ‘diagnose’ their needs. They came and then left the school after a couple of meetings; three months later, the same people called him again to arrange another meeting to provide some help with the needs of the school. According to Diego, it is like a ‘game’ or a ‘vicious circle’ and sometimes he made jokes about them, saying it was like they were “‘playing” with us by providing this little bit of support in certain areas every three or four months’.

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<sup>71</sup> Antioquia is a region with conservative and catholic traditions, in which people used to dress in their ‘best clothing’ on Sunday, for mass. While many people still do, it is also common to hear people talking about ‘*ropa dominguera*’ to refer to clothes that are new or look new.

Diego, Tatiana and Juanita commented that, in many cases, before the end of the financial year, public institutions provide support for different activities such as the Healthy Schools programme, and suggested this is a way of including additional data in the report that the mayor presents every year. In other words, health campaigns are used to prove that public funds have been invested. As I was talking with Diego, he saw a calendar on the wall, and he dryly commented, ‘Oh, they should call in two or three weeks time’. I also observed that the first thing the people who are carrying out health campaigns do is to give out refreshments, clothing or working kits (pencil, crayons, eraser, notebook), absolutely free,<sup>72</sup> or even give money in exchange for community participation (this approach is in some ways a Colombian phenomenon).<sup>73</sup> Overall, there are very few policies to intervene permanently in public institutions. In the case of the SCAD, I would say that it was a kind of policy to show that money is invested in some way. This programme has lacked permanence, consistency and regularity. Figure 28 exemplifies this, as it reads: ‘Please find us in August with new activities. We are taking a temporary break’.

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<sup>72</sup> When you translate the word ‘free’ in Spanish you have a problem: everybody thinks this means ‘*gratis*’ but not ‘*libre*’. The word ‘*gratis*’ conjures a world in which there are things we don’t need to pay for. This is a problem because once people get used to receive everything for ‘*gratis*,’ they will almost get angry when they have to pay. This is the case of many cultural or artistic events in Medellín. According to Juanita and Tatiana, the same model has been applied in health campaigns when certain kinds of benefits (such as clothing, refreshments or working kits) are offered to those who attend to the event.

<sup>73</sup> See for example Cóclea Oyola BuenaSalud (<http://cocleaoyolabuenasalud.weebly.com/>) or the Eliminate Dengue Program (<http://goo.gl/GwN1s0>).



Figure 28. Temporary breaks of the SCAD. Source: <https://goo.gl/rgs4w2>

Translation:

Please find us in August with new activities. We are taking a temporary break.

### **Eco-bio-social research**

*Eco-bio-social research* is an interdisciplinary methodology that tries to understand dengue transmission by analysing ecological, biological and social aspects together, and, as a consequence, promotes an integrated vector management. Stating that dengue incidence is deeply associated with environmental factors (temperature or atmospheric pressure) and human behaviours, this approach suggests reducing the use of insecticides and pesticides and trying to integrate community-based approaches with ecological and biological studies to promote environmental hygiene, education and sanitation (Sommerfeld and Kroeger, 2012; Ecosalud ETV Colombia, 2014). The biological approach is mainly focused on vector management by identifying mosquito-breeding sites. The community is then mobilised to eliminate these water containers. With the help of the public and private sectors, the idea is to empower students, women and environmental health groups to design site-specific interventions (Sommerfeld and Kroeger, 2012). A classic example of this methodology in the Colombian context is the project Girardot Free of Dengue (Girardot Libre de Dengue). Local administrators and the Fundación Santa Fe carried

out a project for developing more environmental approaches to reducing the mosquito population. The project brought together community leaders to talk about mosquitoes and together design strategies for controlling them. For example, the inhabitants of the community who decided to participate covered water containers and began to use mesh curtains treated with insecticide in the doors and windows of their houses (Ecosalud ETV Colombia, 2014). Again, there is not a significant difference between this model and the others previously presented.

### **Communication-for-behavioural-impact**

*Communication-for-behavioural-impact* (COMBI) integrates communication and marketing theory in public health campaigns (WHO, 2012c). The WHO (2012c: x) defines it as ‘a planning framework and implementation method for communication based on behavioural models and communication and marketing theory and practice to achieve behavioural results in public health programmes’. The behaviourally focused communication tries to minimize practices that facilitate the reproduction of mosquitoes by working at the local level with community leaders (WHO, 2012a). Since COMBI is the latest approach introduced by the WHO to fight against dengue fever (WHO, 2012a, 2012c), what then is unique about this approach? Parks and Lloyd (2004: 10) state that there are six reasons why people should give greater attention to this methodology and be committed to COMBI planning: ‘1) To have greater behavioural impact, 2) To get the most out of your budget, 3) To attract more funding, 4) To measure impact, 5) To motivate people, 6) It’s just plain, good management’. According to COMBI theory, educating the community is not enough to produce social mobilisation, or to convince people to adopt certain behaviours. COMBI recapitulates the previously discussed methodologies: ‘sustainability will come only through community participation in mosquito control programmes. [...] Sustainability requires that this be an ongoing programme that never ends as long as the threat of epidemic dengue transmission exists. *Ae. aegypti* control therefore, must be an ongoing environmental management programme’ (Gubler in Parks and Lloyd, 2004: vii).

For the WHO, social interventions during disease outbreaks are seen as a function of behavioural results that integrate the efforts of community groups (such as



associations for women, students or environmental volunteers) with campaigns organised by the public and private sectors (Sommerfeld and Kroeger, 2012). Although the WHO states that ‘social scientists and communication specialists, public health entomologists, vector control personnel, epidemiologists, diagnostic laboratory staff, and health-care personnel play essential roles and need to work together’ (2012a: 23), with COMBI the WHO seems to be advertising dengue prevention as a product that should be consumed by ‘customers’ around the world in order to meet needs:

Private sector marketing and its use of anthropological research have taught us two lessons. First, the importance of ‘listening to the consumer’ in order to move beyond identification of risk behaviour (what people do to put themselves and others at risk) and behavioural objectives (what people should do to protect themselves and others), to understanding the reasons that people do what they do. Secondly, businesses do not sell a product or service, they sell how their product or service meets a need, want or desire that people already have (WHO, 2012c: 27).

As I have previously shown, we find two problems here. The first is that the actual plurality of the public is never visually represented in health programmes. The second is that advertising dengue prevention as a product does not work either, which was the case with advertising dengue prevention like a laundry detergent.

After the publication of the first step-by-step communications and behaviour change manual<sup>74</sup> (Parks and Lloyd, 2004) there were different programmes in the Latin American region that tried to apply behavioural models to dengue control (Lloyd, 2014). Based on these experiences of COMBI planning, in 2011 the WHO published

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<sup>74</sup> Parks and Lloyd (2004) propose 15 steps for applying COMBI methodologies: 1) Assemble a multidisciplinary planning team, 2) state preliminary behavioural objectives, 3) plan and conduct formative research, 4) invite feedback on formative research, 5) analyse, prioritise and finalise behavioural objectives, 6) segment target groups, 7) develop your strategy, 8) pre-test behaviours, messages and materials, 9) establish a monitoring system, 10) strengthen staff skills, 11) set up systems to manage and share information, 12) structure your programme, 13) write a Strategic Implementation Plan, 14) determine your budget, 15) conduct a pilot test and revise your Strategic Implementation Plan. This scheme was then modified (PHAO, 2011) to integrate some of the steps and reduce the process to 10 or 11 steps in a non-linear scheme.

the book *Lessons Learned from COMBI Projects for Dengue Prevention and Control in 15 Countries in the Region of the Americas* (PAHO, 2011; published in Spanish only). This publication was the result of a meeting in Lima, Perú,<sup>75</sup> in December 2009. The behaviours highlighted by this report as causes for the increase in dengue cases are mainly related to storing water – either rainwater or tap water – for daily use at home. This is explained, according to the report, by the high cost of water utilities, as well as the longstanding practice of storing water and the habit of leaving unused containers and waste outdoors (PAHO, 2011: 22).

The document states that to change these behaviours, *community participation*, *social communication* and *social mobilisation* are needed. This can be achieved by integrating ecological and social strategies to involve the community in changing individual and collective behaviours. According to PAHO, the strategy that synthesises all these elements is COMBI. In Latin America, this book references an effort in San José, Costa Rica,<sup>76</sup> whose main behavioural objective was to ‘collect old used tyres, where dengue mosquito breeds with high productivity’ (PAHO, 2011: 55). In Ecuador, the behavioural objective of a COMBI project in Santa Cruz de Galápagos was to ‘wash and brush the internal walls of water containers’ (PAHO, 2011: 56). It is not yet clear what is the difference between the ‘old’ and the ‘new’ strategies, as it appears that COMBI is merely used to ‘educate’ people about reducing mosquito-breeding sites. On the one hand, health authorities argue that the community should be part of these campaigns and that there are different epistemological frameworks that should be taken into account in their design. On the other hand, although health authorities present different epistemological frameworks for addressing the community, the way these campaigns are designed simply reproduces information about eliminating breeding sites.

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<sup>75</sup> Countries that participated in the meeting include: Argentina, Brazil, Chile, Costa Rica, Colombia, Ecuador, El Salvador, Guatemala, México, Nicaragua, Paraguay, Perú, República Dominicana, Uruguay and Venezuela (PAHO, 2011).

<sup>76</sup> Although Colombia was part of the meeting, the PAHO does not reference experiences from this country.

Studying policy models of behavioural changes demonstrates that they are based on the assumption that if people have different kinds of knowledge, they will do something different. The issue here is that it may not be a problem about ‘not knowing’. In fact, COMBI was originated precisely because although people in endemic areas had knowledge about dengue transmission, there were no reliable metrics reporting human behavioural changes resulting from such knowledge (Whiteford, 1997: 218; Nading, 2014: 154–155).

For Nading (2014: 156), one of the key problems of COMBI programs is that they emphasise that ‘*data*, properly collected and disseminated, can lead to better decisions about health’. He further explains that data is mostly coded in binary ways (people see something as bad, or not; there are rumours around dengue that promote the lack of participation, or there are not), and lack of knowledge is then described as ‘evidence’ to promote empowerment, participation and mobilisation (Nading, 2014: 156–162). COMBI works on the assumption that ‘local culture’ and ‘local knowledge’, as obstacles to be overcome, can be measured in standardised data-collection methods (Nading, 2014: 160–161). However, illness narratives cannot be coded in binary ways. That is why, although public health promoters argue that more informative health campaigns might be able to change people’s attitudes, behaviours or practices, Juanita and Luis noted that people already have the information. The problem is taking people’s experiences into account. As I will show in Chapters 3 and 5, illness narratives open the door for reading such elements not as obstacles, but as source of a different kind of knowledge – embodied knowledge, for example.

In the case of sex education and contraceptive methods – a strong component of the Healthy Schools programme – Juanita and Tatiana both argued that the problem was not a lack of knowledge, nor was there a lack of money to develop the campaign. They commented that there was a huge investment in public resources to develop campaigns that provide information about sexually transmitted diseases or contraception in order to persuade young people to change their habits and take personal responsibility. However, when Juanita and Tatiana were able to talk with the girls in private, they realised that the girls already were informed about condoms, contraceptive pills and so on, indeed even more so than Juanita and Tatiana. So the issue was not about how to design a health campaign that could provide information

to people in order to change certain kinds of ‘bad’ sexual behaviours, but about rethinking the design of a campaign based on the repetition of information. As Whiteford (1997) has previously noted, the problem around redesigning health campaigns can be a lack of political will.

### **The problem of using marketing methods for public health messages**

Behavioural theories are the product of paradigms from economics and psychology (Ajzen, 1991), and they are also supported in the inclusion of social sciences in the analysis of disease transmissions. Psychological and economic theories of behavioural change argue that there is a deep connexion between volition and choice in relation to old habits, and the possibility for breaking them in order to impose new ones. As Elizabeth Shove (2010) holds, these theories mix ideas of ‘attitude,’ ‘behaviour,’ and ‘choice,’ to fill a ‘value-action’ gap. Values should be transformed into actions, and to do so, it is fundamental to study people’s drives, so a particular behaviour can be disseminated. Shove (2010: 1273) argues that we all can agree that there are problems regarding policy-making and public management, and social sciences have a role in generating debate in areas where natural sciences have held sway. The problem is the utilitarian view of social sciences when their interventions are only measured in behavioural terms. For example, the ‘knowledge, attitudes and practices survey’ is used in health interventions to measure what is believed, known and done in relation to diseases (Adedotun et al., 2010; Handicap International, 2009; PAHO, 2011: 71; WHO, 2007). The main objective of this methodology is to produce a representative survey in which data can be analysed quantitatively or qualitatively. Interviewees’ knowledge is measured in terms of ‘bad behaviours,’ ‘lack of knowledge’ and ‘cultural beliefs,’ but there are a multiplicity of other theories that anthropology and social sciences can work with.

In Shove’s study of climate change policy and behavioural theories, she calls for the inclusion of a much more extensive range of approaches in social research – with goals beyond behavioural changes (Shove, 2010: 1274). For her, behavioural theories emphasise personal responsibility because behaviour is understood as a product of the personal sphere. The concept of ‘choice’ (framed by ideas such as persuasion, pricing and advice) appear as strategies of intervention, but they are

based on an assumption that only individual actions are responsible for environmental damage, and therefore, a better information system would help individuals to choose a different behaviour (Shove, 2010: 1275). For Shove, going 'green' is the brand that we need to 'choose' to minimize the effects of climate change (2010: 1277). Nevertheless, what would achieve this objective is not always clear, and indeed such objective tends to be arbitrarily defined. In behavioural theory, the subject is located outside of the system, and the concepts of 'need' and 'desire' are understood in terms of the causes of the change. In social theory, 'need' and 'desire' do not exist, or if they do, they are seen as products/outcomes of a sociotechnical change. This also means exchanging the idea of 'practice' – very common in behavioural theories – for the idea of 'process'. Here the individual is part of the system and not only limited to the roles of 'the driver' and 'the driven' (Mol, 2008; Shove, 2010).

In the analysis of the body of literature published by the WHO, the PAHO, and the INS, it would appear that they have decided to use a communication strategy that reinforces moral discourses toward the end of achieving dengue fever control. Although the WHO is trying to emphasise strong community participation in the destruction/prevention of mosquito-breeding sites, by keeping the same long-held arguments about how to achieve this by environmental hygiene and sanitation, the person is treated like an empowered consumer. Rather than 'teaching you' because you have to learn, it is about showing you that there are choices. You do not say 'you must do this because you have to', rather offer a choice: 'if you get/do/use this, your life will be better'.

A different kind of subject is being constituted by these new interventions: subjects capable of choosing different behaviours and being responsible for themselves. In this respect, Mol (2008) argues that there is need to move from the 'logic of choice' to the 'logic of care'. The former is concerned with individuals who want to be 'free' from the patriarchal rule of professionals and academics. As Mol (2008: 74) writes, 'In the logic of choice making normative judgements is the moral activity par excellence, and it is this activity that this logic endorses'. The logic of care, on the other hand, is an attempt to improve health care on its own terms, paying attention to the experience of living with an unpredictable body that is susceptible to disease

(Mol, 2008). According to Mol, this logic of care is articulated in the specific relations between humans and non-humans as multispecies entanglement (Mol, 2008: 114). This suggests we should think about patients, entomologists and virologists not merely as objects of study, but rather as people who have embodied knowledge about having dengue or investigating mosquitoes and viruses. Dengue fever, as a complex problem, cannot be analysed from a single point of view. It involves 'the blending of data collection with storytelling, the entanglement of scientific and political practices' (Nading, 2014: 159). In other words, scientific data-driven knowledge is not enough in the control of disease outbreaks.

### Chapter 3

## UNDERSTANDINGS AND EXPERIENCES: SCIENTIFIC, PUBLIC, AND EMBODIED

### Introduction

This chapter shows that there are ‘specialist understandings’ and ‘public understandings’ of dengue; these are complex, and can overlap and inform each other in various ways. As Law and Mol (2002: 20) state, things are complex if they ‘relate but don’t add up’, if they are parts of events that occur in non-linear processes, and if they cannot be defined in binary form. Complexity characterises the relationship between the general and particular; it enacts the multiplicity of knowledge practices for ‘describing the world while keeping it open’ (Law and Mol, 2002: 16–18).

I begin this chapter by discussing scientific and official understandings, and scientific techniques and their application. In these understandings, visualisation and evidence are key issues. Halpern (2014: 22) writes, ‘Visualisation is the language for the act of translation between a complex world and a human observer’. It is a practice for making ‘evident’ information that is beyond human sensorial recognition by dealing with ‘the formulation of an interaction between different scales and agents – human, network, global, nonhuman’ (Halpern, 2014: 22). For example, virologists culture cells to visualise the cytopathic effect that dengue virus produces; doing so allows them to observe the morphological changes associated with the infection (Gutiérrez-Ruiz et al., 2012: 419). Researchers can then measure the replication capacity of the virus at different post-infection times. This data is further visualised in graphic forms and used as evidence to support hypotheses linked to dengue-transmission dynamics (Quintero-Gil et al., 2014). These ways of visualising dengue are therefore very different in relation to those described in the previous chapter, as specialist understandings generally do not figure in public health campaigns. Following Halpern (2014), who argues that data visualisation implies thinking about the flow of information, I discuss visualisation and its link state bureaucracy and institutional practices.

Matthew Engelke (2008) defines evidence as information, facts and details that help to support an argument and set of questions, and that provide standards of judgements about the validity of our own and others' claims. As evidence relates to concepts of truth, certainty and reliability, it is therefore connected to the production of scientific and anthropological knowledge (Engelke, 2008: S18). Evidence in science is related to 'the truth' as 'knowledge in conventional positivist terms, attributing more "reality" to numbers than to countless experiences' (Hastrup, 2004: 461). The key principles of the scientific method locate the production of knowledge in a set of repeatable and reproducible experiments. But evidence in anthropology also constructs knowledge as derived from an ethnographic experience that is specific and therefore unrepeatable (Spencer, 1989: 152). Maintaining a balance between the subjective and objective, anthropologists look at patterns in the social life, understanding 'social facts' as forms of 'social evidence' (Hastrup, 2004: 468; Engelke, 2008: S8-S9). The connection between historical and social events is what constitutes the idea of evidence in the anthropological production of knowledge (Hastrup, 2004: 468).

In reflecting on different modes of visualisation and forms of evidence, I start this chapter by presenting the first description of dengue fever and then exploring why the clinical management of the disease has changed over time. I then introduce etiological studies and laboratory techniques for dengue diagnosis, and the idea of a 'serotype' and virus structure. After presenting some scientific practices, I introduce the experience of Juanita, Sara, Luis Fernando and Juan David – the participants who suffered dengue fever. I then will reflect back on their experiences in developing an ethnographic analysis, and argue that illness narratives are important for understanding not only the patient's experience but for better conceptualizing the disease itself.

### **Scientific and official understandings**

There are three main areas for the medical investigation of diseases such as dengue: clinical, biological and epidemiological (Miranda Canal, 1984: 128–130). In the clinical domain, the relation between physicians and patients, in order to make diagnoses, is at the core. Palpations of organs, listening to sounds (auscultations) and



observing signs in the body are some of the key activities during the diagnosis and treatment of the disease.<sup>77</sup> During the 19th century, the idea of ‘experimental medicine’ gave rise to the emergence of biological investigation (Miranda Canal, 1984). Necropsy and the study of the dead body were not enough to understand diseases – or their ‘causal agents’ – so pathological problems began to be studied from another point of view with the introduction of laboratories for carrying out experimental research (Barnett, 2014). In the 19th century the idea of ‘scientific research’ appeared across a wide range of medical investigations.<sup>78</sup> In close association with urbanization, modernization and industrialization, epidemiological research – and public health studies – began to have a key role in medical investigations.<sup>79</sup> The purpose was to study the disease on a larger scale via a population in a defined territory. Although epidemiological research is not so concerned with the relation between physicians and patients, it does provide support for clinical research and, significantly for our purposes, the role of the state in the control of disease is more pronounced. The result is that policymaking around the design and the control of health programs should be the product of statistical analysis, demographic and ecological studies, epidemiological surveillance, clinical trials and data modelling (Miranda Canal, 1984).

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<sup>77</sup> Technically, the origins of the clinical research date back to the Hippocratic philosophers. However, some researchers have held that the Egyptian polymath Imhotep was a precursor of the healing practices, before Hippocrates (Kente Asante, 2000: 79–80). However, Guenter Risse (1986: 622) argues that there is little evidence to support this life (suggesting that Imhotep was not actually alive). Risse instead depicts him as a religious divinity that combined qualities of a sage and magician, and that had healing function by protecting people from illness and death – analogous to Asclepius, the ancient Greek god of medicine (1986: 623). In either case, what differentiates the Egyptian physicians from the Greek ones was that the latter applied philosophical thinking in the creation of theoretical systems for understanding nature and the body (Laín Entralgo, 1970: 142–143).

<sup>78</sup> Sometimes it is described in literature as ‘scientific medicine’, making reference to the period in which medicine began to be supported by other sciences (experimental biology, chemistry, microbiology) to provide a better understanding of the disease.

<sup>79</sup> In a way, Hippocrates may also be the precursor of the epidemiological discipline, as he talked about the imbalance of the four humours as the main cause of disease, and with it the relation between the environment and disease (Laín Entralgo, 1970: 144; Miranda Canal, 1984). Hippocrates was also the author of the book *Epidemics* (see Laín Entralgo, 1970, who provides a complete analysis of the *Hippocratic Corpus*).

It could be argued then that since the end of the 18th century with the rise of modern clinical research, the relation between physicians and patients has been the main objective of medicine, closely allied to biological research (Miranda Canal, 1984: 129; Barnett, 2015). So what is at stake and what is missing in the case of dengue in Colombia and specifically in Medellín? My argument here is that today in Medellín and elsewhere illness narratives are not taken into account and while there are reasons specific to the Colombian context to explain this there are also broader historical reasons that need to be appreciated. Chief among these is the way that modern medicine produces a disenchantment of the disease by providing techniques for rationalising knowledge (Kohn, 2013: 89–90; Barnett, 2014: 21–22), and leaving a big gap in the understanding of what patients feel and how they experience the disease.

### **The clinical management of the disease**

The first reports of a clinical case similar to what is today known as ‘dengue fever’ have been found in the Chinese medical encyclopaedia around the years AD 265–420, in which the disease was called ‘water poison’, making reference to ‘water-associated flying insects’ (Vasilakis and Weaver, 2008; Guzman and Istúriz, 2010). Afterwards, cases of ‘suspected dengue’ were reported in Martinique and Guadeloupe, in the French West Indies, in 1635 (Schneider and Droll, 2001). Benjamin Rush (1789: 108) made the first clinical description<sup>80</sup> during an epidemic in Philadelphia and coined the well-known expression ‘break-bone fever’ to name the disease.<sup>81</sup> This idea of ‘break-bone fever’ was very important in the way the disease was understood by the people who had suffered it. So whilst fully acknowledged in the 18th century, curiously, the idea of dengue as a painful disease

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<sup>80</sup> Although Vasilakis and Weaver (2008) also extend the credit to the epidemic description made by David Blyden in 1779, in Jakarta, Indonesia, Halstead (2015: 558–559) suggests that based on the clinical descriptions (the strong pain and the arthritic component lasting for up to three weeks), it is more likely that this outbreak was caused by chikungunya.

<sup>81</sup> Rigau-Perez (1998) provided some documents from Spanish archives referencing the use of the word ‘*quebranta huesos*’ (broken bones) in the description of a febrile illness in Puerto Rico in 1771.

later disappeared from the official discourse. To exemplify this, let us consider Rush's description in 1789:

This fever generally came on with rigor, but seldom with a regular chilly fit, and often without any sensation of cold. In some persons it was introduced by a slight sore throat, and in others, by a hoarseness which was mistaken for a common cold ... A giddiness in the head was the forerunner of the disease. This giddiness attacked so suddenly, as to produce, in several instances, a faintness ... The pains which accompanied this fever were exquisitely severe in the head, back, and limbs. The pains in the head were sometimes in the back parts of it, and at other times they occupied only the eyeballs. In some people, the pains were so acute in their backs and hips, that they could not lie in bed. In others, the pains affected the neck and arms, so as to produce in one instance a difficulty of moving the fingers of the right hand ... A few complained of their flesh being sore to the touch, in every part of the body ... A nausea universally, and in some instances a vomiting, accompanied by a disagreeable taste in the mouth, attended this fever... A rash often appeared on the third and fourth days ... In some cases, the discharge of blood from the nose accompanied a solution of the fever on the third or fourth day; while in others, a profuse haemorrhage from the nose, mouth, and bowels, on the tenth and eleventh days, preceded a fatal issue of the disease ... Most of those who recovered, complained of nausea and a total want of appetite. A weakness in the knees was universal ... From these circumstances, the disease was sometimes believed to be rheumatism; but its more general name among all classes of people was, the *break-bone fever* [italics in original] (Rush, 1789: 107-116).

The 'break-bone' sensation makes direct reference to pain, and the above account makes clear such pain is connected to an embodied experience, one that has disappeared in the way the WHO describes the disease, where it has been mainly discussed in terms of 'signs' and 'symptoms'. According to Law and Mol (2011), when it is time to talk about 'the disease' from a clinical perspective, doctors touch and look for 'signs of' something in the body. According to the WHO (2012b: 24), the presumptive diagnosis of dengue – based on a revised dengue case classification – these signs should be pursued by determining whether patients: 'Live in / travel to endemic area, plus [have] fever and two of the following: anorexia and nausea, rash, aches and pains, leucopenia, or tourniquet test positive'. Doctors should also check

‘warning signs,’ which include ‘abdominal pain or tenderness, persistent vomiting, clinical fluid accumulation, mucosal bleed, lethargy or restlessness, liver enlargement >2cm, laboratory: increase in HCT concurrent with rapid decrease of platelet count’ (WHO, 2012b: 24). If the patient does not have these signs, he/she is diagnosed with ‘dengue without warning signs’. This means that he/she can be at home waiting for a laboratory test confirmation. If the patient has warning signs, he/she is either ‘referred for in-hospital care’ or ‘requires emergency treatment’, depending on how severe the signs are. The first case is classified as ‘dengue with warning signs’ and the second as ‘severe dengue’, also known as ‘dengue haemorrhagic fever’, which may be fatal.<sup>82</sup> In both cases, patients remain in the hospital and wait for the results of a laboratory test. After the infection (dose-dependent viremia), the person may suddenly develop a high-grade fever (WHO, 2012b), which can last two to seven days. Other symptoms include facial flushing, skin erythema, generalized body ache, myalgia, arthralgia, retro-orbital eye pain, headache, and photophobia (WHO, 2012b: 2). After the febrile phase, patients may recover after some weeks (see figure 29 visualising this process). One problem is how to make people aware of dengue symptomatology – something that is poorly addressed by health campaigns – and the other problem is the long wait for a diagnosis via laboratory test, which places the responsibility on doctors and their ability to identify a patient’s symptoms. But another problem altogether, with all of this, is that the bodies of the people who suffer from the disease are only understood in the biological domain.

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<sup>82</sup> According to the WHO, 2.5% of those affected with severe dengue die (<http://goo.gl/dkYTmO>)

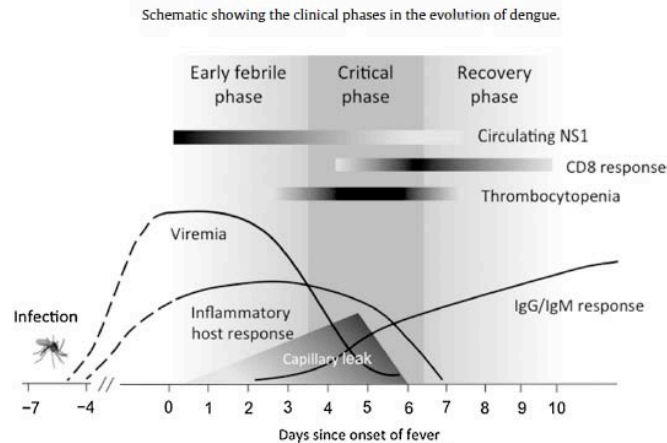


Figure 29. Schematic representation of the clinical phase in the evolution of dengue.

Source: Simmons et al., 2015: 2

In Taussig's (1992) analysis of the body, he highlights that a major problem in anthropology is the distinction between the social and the biological body. Scientists do not entirely understand the significance people give to physical effects. He writes: 'medical science can explain the "how" but not the "why" of disease; it can point to chains of physical cause and effect, but as to why I am struck down now rather than at some other time, or as to why it is me rather than someone else, medical science can only respond with some variety of probability theory which is unsatisfactory to the mind searching for certainty and for significance' (1992: 85). For Taussig, understanding the *how* of a disease as a fact, and the *why* as a value, shows how the etiological problem becomes a physical, social, and even moral one: 'a cause of my physically obvious distress is to be located in my nexus of social relations' (1992: 85). Disease is also a social problem that is manifested in physical symptoms and signs, but is not merely symptoms and signs.

Rachel Prentice (2013) has shown how bodies that have been rebuilt become decontextualized and left aside from the person. Although technology (human-machine interaction) has resulted in new medical practices – particularly in relation to anatomy and surgery studies, it has not strongly benefitted dengue patients, or any other person suffering from neglected tropical diseases. Even with better laboratory techniques for dengue diagnoses, the experience of the people who carry the disease is still underestimated. How do they feel? How do they talk about this disease? How do they experience pain? According to Osterweis et al. (1987), it seems that 'pain'

does not even figure that much in the epidemiological or clinical domain, even when we talk about chronic diseases, and because of this, there are few interdisciplinary studies for understanding pain in the clinical and social domain. In this respect, Osterweis et al. (1987: 117) state that ‘considering the number of people affected with chronic pain and the magnitude of its personal and social consequences, surprisingly little valid information is available’. Pain is no longer part of the official discourse on dengue, and the ways people describe the disease do not figure in health campaigns.

### **Etiology, laboratory techniques for dengue diagnosis**

Etiology is a medical discipline that studies the ‘causal agents’ of a disease, such as viruses or bacteria. Parasitology, virology and microbiology are research areas involved in this study of ‘causation’ (Miranda Canal, 1984: 127). The etiological agent of dengue fever is dengue virus and the idea of ‘virus’ has a central role in what a disease like dengue is. However, public health campaigns only talk about the insect, not the virus as such.<sup>83</sup> This is perhaps because you cannot ‘see’ the virus, and the use of visual representation is important not only in scientific work, but also in health campaigns. In fact, this issue was raised by Carolina, a virologist who has a lot of experience in research on dengue virus.<sup>84</sup> Carolina took part in my fieldwork not only to provide information about the scientific research around dengue fever, but also to participate in the design of the public experiments (see Chapter 5). While in Chapter 2 I provided an analysis of the rationality of anti-dengue health campaigns, it is important to show how scientists understand the disease, and how visualisation has played an important role in etiological studies.

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<sup>83</sup> It is an idea that I have appropriated in various ways. I will provide examples in Chapter 5.

<sup>84</sup> It is not possible to see the virus with a naked human eye, or even with an optical microscope. Scanning and transmission electron microscopes are needed to visualise most viruses.

The main investigations to determine the mode of propagation and the pathology of dengue were carried out almost simultaneously in Lebanon by Harris Graham<sup>85</sup> (1902, 1903), Australia by Thomas Bancroft (1906), and the Philippines by P. M. Ashburn and Charles F. Craig (1907).<sup>86</sup> Considering the similarities between dengue and yellow fever, these researchers noted the association of *Aedes* mosquitoes in the transmission of yellow fever, and then suggested that the mode of propagation of dengue should be similar (Reed et al., 1900). Graham was the first to emphasise that dengue was transmitted by mosquitoes. He conducted experiments with *Culex fatigans* and *Stegomyia fasciata*,<sup>87</sup> concluding that the former was the dengue vector. Graham claimed to have found the cause of dengue, and provided some evidence – based on drawings – to show that it was a protozoan parasite with amoeboid movement, like *Plasmodium malaria* but without pigment – figure 30 (Graham, 1903: 212).

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<sup>85</sup> Graham also made reference to Syria.

<sup>86</sup> Also see Carey (1971), Vasilakis and Weaver (2008), and Halstead (2015) who provide a historical view of the evolution of dengue fever research.

<sup>87</sup> *Culex fatigans* is today known as *Culex quinquefasciatus*, and *Stegomyia fasciata* is today known as *Aedes aegypti*.

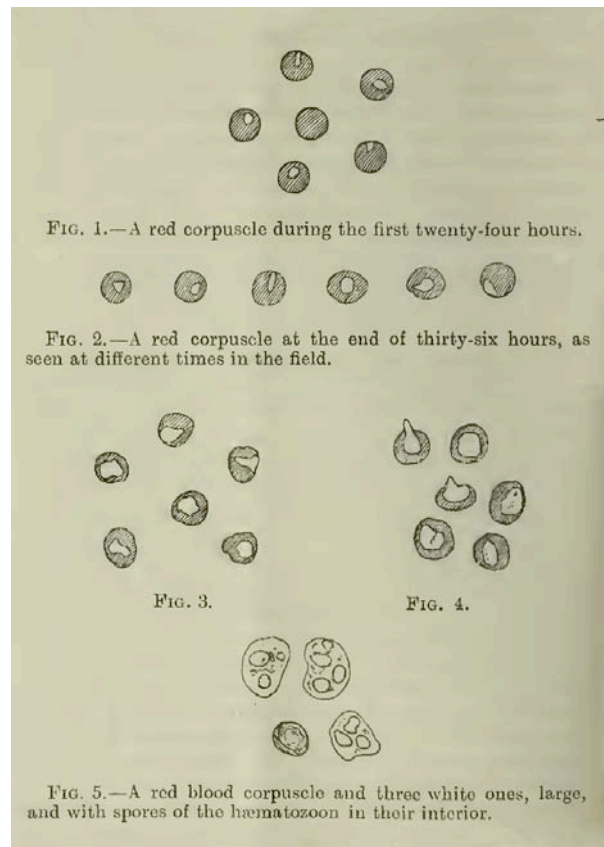


Figure 30. Images from Graham's (1903: 212) paper. They illustrate the presumptive causal agent of dengue fever, which was found in red blood cells of infected people.

For Bancroft (1906: 17), the main issue of Graham's work was that his visual evidence was not enough to support his conclusions, and that Graham did not provide details of his experiments so that anyone could replicate and verify his results. Contrary to Graham's observations, Bancroft noted that even though both *Culex fatigans* and *Stegomyia fasciata* could transmit the disease, it would more likely be the case that *Stegomyia fasciata* was the vector, as people who travelled to Brisbane during the day to visit relatives infected with dengue also got the disease (Bancroft, 1906: 17–18). While Bancroft (1906: 17) was trying to find the cause of the disease, he noted that 'I have not been able to *see* an intracorpuseular parasite; neither have I found any bacterium that would grow on agar inoculated with dengue blood, and am inclined to consider that the organism of dengue is ultra-microscopic'. Similarly, Ashburn and Craig (1907: 475) concluded that '[t]he cause of the disease is probably ultramicroscopic in size' – not bacterial or protozoal organisms – and



that ‘dengue was transmitted by the mosquito *Culex fatigans*’ (1907: 475).<sup>88</sup> It is important to pay attention here to the use of visualisation as a form of evidence.

The two currently recognized main vectors *Ae. aegypti* and *Ae. albopictus* were incriminated in the disease-transmission cycle in 1925 and 1931 respectively (Siler et al., 1925, 1926; Simmons et al., 1931). They also proved that *Culex quinquefasciatus* does not transmit dengue. However, it was not until 1952 that the first isolation, identification and modification of the virus was published by Susumu Hotta (1952), who carried out research between 1942 and 1945 during an epidemic in the Nagasaki-Sasebo area of Japan. That year, it was clear that dengue fever was caused by a virus, and that it was transmitted by mosquitoes. An example of this is the visual evidence provided by Hotta to support the isolation of dengue in mice:

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<sup>88</sup> Burton Cleland, Burton Bradley and W. McDonald were also investigating the role of mosquitoes (*Stegomyia fasciata*) in the transmission of dengue in Australia (Cleland and Burton, 1918).

## ISOLATION OF DENGUE IN MICE

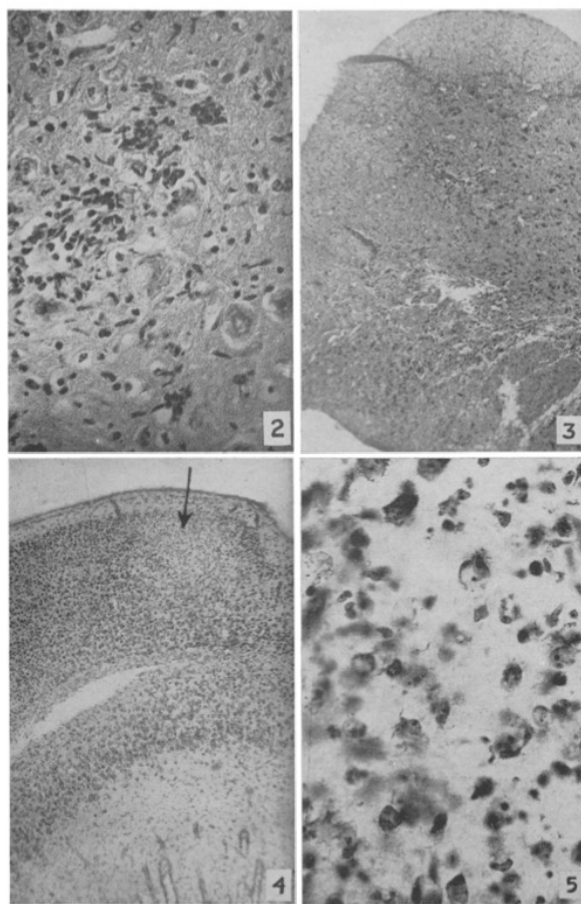


FIG. 2.—Brain, grey matter. Cell infiltration and glial proliferation. Hematoxylin-eosin stain.  $\times 448$ .  
 FIG. 3.—Spinal cord, lumbar region. Cell infiltration. Hematoxylin-eosin stain.  $\times 70$ .  
 FIG. 4.—Brain. Necrosis in cortex. Nissl stain.  $\times 62$ .  
 FIG. 5.—Higher magnification of figure 4. Degeneration of the neurons.  $\times 620$ .

Figure 31. Isolation of dengue in mice. Source: Hotta, 1952: 3

Recent theory suggests that the dengue virus (DENV) may have had its origin in Asia as an ‘arboreal mosquito virus’ that then was adapted to ‘lower primates in sylvan environments’ (Gubler, 1997 cited in Vasilakis and Weaver, 2008: 8). Subsequently and as a result of deforestation and human settlements, DENV could adapt to other environments near humans (Vasilakis and Weaver, 2008), creating new strains (DENV-1, DENV-2, etc.). These conclusions were possible thanks to the analysis of DNA and RNA sequences. For example, in areas such as molecular ecology, scientists track virus genotypes by using phylogenetic methods and computational analysis (Brady et al., 2012; Vasilakis and Weaver, 2008). The virus is analysed through mathematic models, and the visual representation of it is a phylogenetic tree (see figure 32). This mathematical operation for modelling complex data reveals what Halpern (2014: 239) calls the ‘pure aesthetics of

computation'. In such processes, visualisation is understood as 'the practice of making complex data 'dynamic', 'universal', and 'valuable', allowing previously invisible relationships in data to become 'visible' and operable' (Halpern, 2014: 21–22). The kinds of questions behind these methodologies and ways of visualisation are linked with co-evolutionary relationships and the evolutionary history of different dengue lineages. Such techniques facilitate the etiological studies of the disease, and reveal 'invisible' host-virus interactions and their implications in epidemiological terms (Usme-Ciro et al., 2008; Aquino et al., 2009; Méndez et al., 2010, 2012).

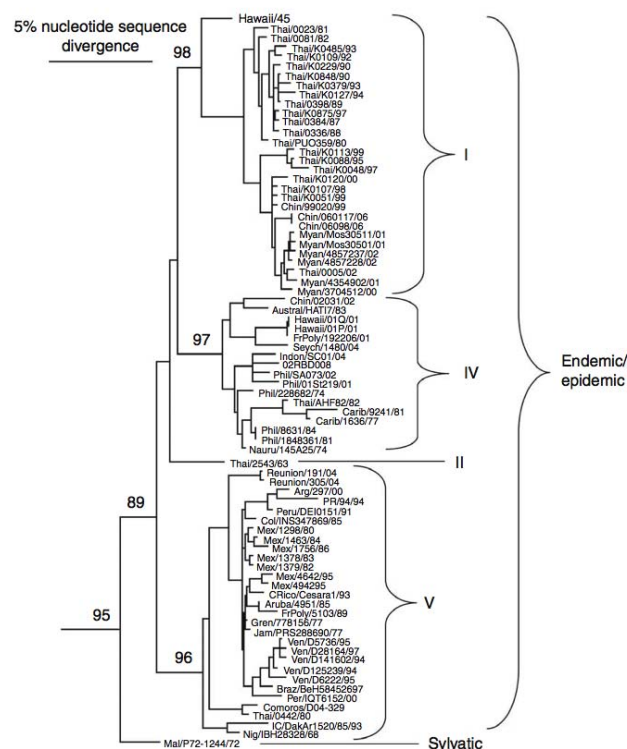


Figure 32. Phylogenetic relationships of DENV-1. Source: Vasilakis and Weaver, 2008: 6

### Dengue virus: Serotype and virus structure

Current research has established that dengue virus (DENV) is a positive-strand RNA virus from the family *Flaviviridae* (Cologna et al., 2005). This characteristic determines how the cell-virus interaction takes place, and how the host cell translates the genetic information into viral proteins. With Carolina, I discussed the DENV structure and the description of the different ways scientists visualise and detect the virus, covering some serological and molecular techniques (such as enzyme-linked

immunosorbent assay [ELISA], polymerase chain reaction [PCR], viral isolation techniques, cell culture and mosquito inoculation). Most of the things Carolina and I talked about during our meetings are described in the article ‘Update on Dengue Diagnosis’ (Gutiérrez-Ruiz et al., 2012), in which she and other colleagues discuss different techniques for dengue diagnosis. Carolina explained to me the virus’s structure, which is made up of three key elements: genetic material (in this case RNA), the viral envelope and the capsid. In DENV, the viral envelope is in turn composed of the envelope protein (E-protein) plus the membrane protein (M-protein). Carolina and her colleagues visualise the DENV structure in this way.<sup>89</sup>

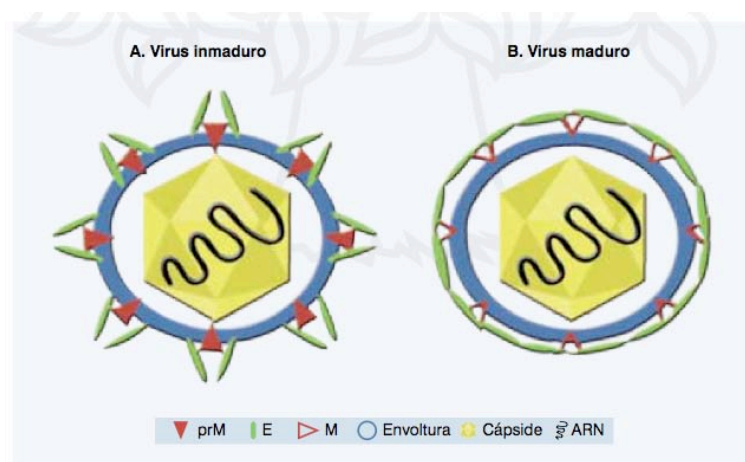


Figure 33. DENV structure. Source: Gutiérrez-Ruiz et al., 2012: 414.

We then talked about the concept of *serotype*, which refers to one of the four forms or variations that DENV may have (Cologna et al., 2005). Dengue virus serotypes are named DENV-1, DENV-2, DENV-3 and DENV-4, each of which generates different interactions with human antibodies (Nature Education, 2014).<sup>90</sup> Although the pathogenic effect of DENV depends on host-virus interactions, it could be argued

<sup>89</sup> See more visual representations of the virus in *Nature Education* (2014).

<sup>90</sup> These four forms are very similar, sharing approximately 65% of their genomes (Nature Education, 2014). Recent research also suggests the discovery of a fifth serotype of dengue virus (DENV-5) (Normile, 2013; Mustafa et al., 2014). This virus was collected during an outbreak in Malaysia’s Sarawak state, on Borneo, and presumably diverges strongly from the other four serotypes. As there are not clear implications for public health (Normile, 2013), and this serotype is not circulating in human populations (Mustafa et al., 2014), I decided not to include this in my discussion or the public experiments.

that DENV-2 has stronger pathogenic effect than the others, and secondary DENV-2 infection can cause more severe symptoms (Cologna et al., 2005; Thomas et al., 2008; Martina et al., 2009; Gutiérrez-Ruiz et al., 2012; Gubler et al., 2014: 234–235; Simmons et al., 2015). Ocazonez et al. (2006) confirmed these findings in Santander, Colombia. Likewise, *Ae. aegypti* mosquitoes tend to be more susceptible to infection by DENV-2 (Armstrong and Rico-Hesse, 2003; Quintero-Gil et al., 2014). Furthermore, DENV-2 strains belonging to the Southeast Asian genotype are more virulent than other strains (Armstrong and Rico-Hesse, 2003; Cologna et al., 2005; Anderson and Rico-Hesse, 2006; Gutiérrez-Ruiz et al., 2012; Pawitan, 2011).

All this information is relevant, for example, to generate theories about how people develop severe dengue, because it is still not quite clear how people get it. One of those theories is the ‘model of antibody-dependent enhancement of dengue infection’, which states that after a primary dengue virus infection, the person only gets antibodies against the specific serotype that produced it.<sup>91</sup> So, for example, if someone gets DENV-1, he/she will be protected against DENV-1 (and thus will not get ill again), but in some cases not against the other three serotypes. This hypothetical model suggests that severe dengue cases occur when a person that has had a primary dengue virus infection, recovers, and then gets infected with a different serotype. To continue with the example, let us consider that the person previously infected with DENV-1 (and who had developed antibodies against this form) gets another infection with DENV-3. In this scenario, the antibodies against DENV-1 try to attack DENV-3, but they cannot neutralize it, as they were not developed specifically for attacking DENV-3. What happens instead is that these antibodies bind the DENV-3 particles and facilitate the infection of monocytes. This phenomenon intensifies the replication of the virus, increases the viral load, and therefore increases the cascade of pro-inflammatory cytokines, that are ultimately cause endothelial damage, and a more severe disease (Whitehead et al., 2007: 52; Halstead et al., 2010).

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<sup>91</sup> Having infections with two DENV serotypes (co-infection) has been also implicated in the increased frequency in cases of severe dengue (Quintero-Gil et al., 2014).

### **Distribution of the different dengue serotypes in Colombia**

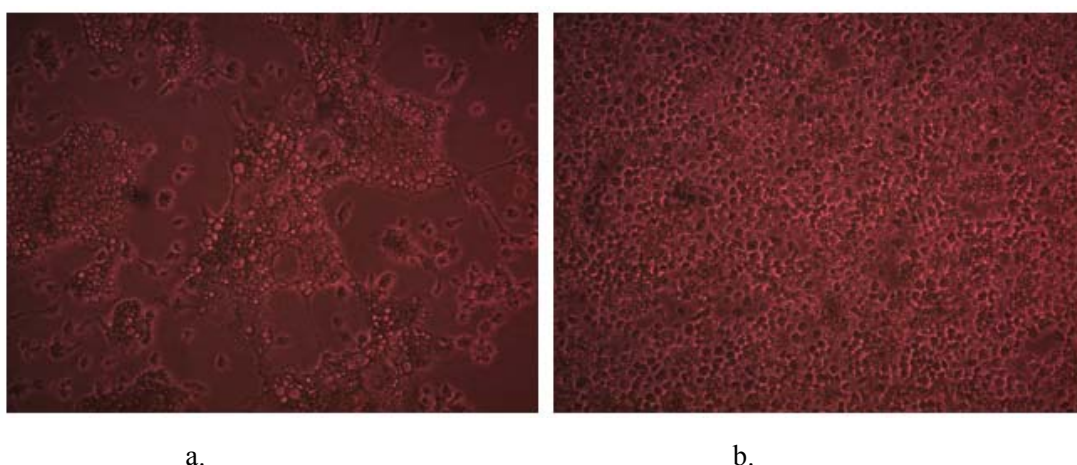
Even though the four DENV serotypes have all been reported in Colombia, Carolina states that we cannot say that there is a unified distribution of them across the country. According to the Ministry of Health, between 1971 and 1972, there were 500,000 cases caused by DENV-2 on the Atlantic Coast of Colombia (MSPS, 2013b: 12). By 1983, the co-circulation of multiple serotypes generated variations in the nature of the epidemics. While during the first 15 weeks of 2012, the proportion of DENV serotypes was 62% of DENV-1, 6% of DENV-2, 30% of DENV-3, and 2% of DENV-4 (MSPS, 2012: 24), the epidemiological record at week 52 of 2012 showed that the proportion had changed: 55% of DENV-1, 15% of DENV-2; 24% of DENV-3, and 6% of DENV-4 (MSPS, 2013b: 14).

The variation in this data depends on several variables such as the region where this information is recorded, the time of year, and the size of the sample tested. So in order to compare the distribution of DENV serotypes we should take a specific period of time in a defined geographical region. The problem is, however, that this information might change even from one month to another. Moreover, the sub-register of dengue cases is very high. On a global scale, only 46 of 128 dengue-present countries officially report dengue cases (Brady et al., 2012). Likewise, dengue normally has cyclical periods, and with its incidence intensified over three-year periods. In the specific case of Colombia, confirmation tests (ELISA, PCR) are not always performed and, subsequently, there is not always an accurate diagnosis. Even if doctors may have a presumptive diagnosis of dengue based on a patient's symptoms, a laboratory test confirmation is required. As Carolina argues, 'health authorities don't normally have updated epidemiological records. If you consider the possible mistakes during the diagnosis, it would be imprecise to say which is the right DENV serotype distribution in Colombia or even in Medellín. Therefore, the accuracy of the information shouldn't be higher than 60%'.

### **Dengue diagnosis**

In the laboratory there are different methodologies for diagnosing dengue, which include isolation in cell culture, and serological and molecular techniques (Guzman

et al., 2010). The way each of these work is different, the visualisation process is different, and their sensibility and specificity are also different (Gutiérrez-Ruiz et al., 2012). Sensitivity measures the ‘true positive rate’, meaning that it determines the percentage of positive samples that were correctly identified as ‘positive’. Specificity, on the other hand, measures the ‘true negative rate’, or the percentage of people who were healthy and who were identified as not having the disease.<sup>92</sup> In the case of isolating the virus in cell culture, it is very common to use cell lines from mosquitoes *Ae. albopictus* (C6/36). The samples for the analysis with this technique should be obtained during the viremia period – between the first and the fifth day after the beginning of symptoms – (Gutiérrez-Ruiz et al., 2012: 419). The values of sensibility and specificity for the virus isolation are 26.7% and 73.2%, respectively (Gutiérrez-Ruiz et al., 2012: 420).



a. b.  
Figure 34. Cytopathic effect in C6/36 HT cells after 8 days of infection with DENV serotype 2 (a). C6/36 HT cells without infection (b). Source: Gutiérrez-Ruiz et al., 2012; Quintero-Gil et al., 2014

In the case of serological assays, the more common one is the enzyme-linked immunosorbent assay (ELISA) test (Guzman et al., 2010: S10-S11). The ELISA technique is based on an antigen/antibody reaction. This technique detects IgG or IgM antibodies, based on the use of a specific enzyme that reacts with a specific substrate, and which is measured as a change of colour in a photometer, or

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<sup>92</sup> Negative controls are essentials to confirm that there is no contamination in the sample that is being tested.

sometimes in rapid manual tests. The values of sensibility and specificity are variables that depend on the time the sample was taken, the type of infection (primary or secondary) and the brand used. However, it is known that sensibility can range between 59% (detecting only IgG) and 78% (detecting only IgM), and can even be 100% when the test detects IgG and IgM simultaneously (Gutiérrez-Ruiz et al., 2012: 425–426). Additionally, Carolina explained to me that considering that the sensitivity values are variables, this test is not completely reliable – the result varies, depending not only on the immunological condition of the patient, but also the patient's nutritional condition and even stress levels. Therefore, to get a proper diagnose it is advisable to have two IgM tests (the first one is done during the first consultation, and the second one should be done eight days later) or to combine different diagnostic tests.

### **Different ontologies**

Working with entomological controls or working in the clinical, etiological/virological and epidemiological domains implies different modes for interacting with the disease, the virus and the patient. Techniques are in turn related to particular ways of presenting evidence and visualising data. In the case of dengue the object of evidence that is visualised, analysed, measured or traced is different for different domains. Doctors look for symptoms, diagnostic laboratory staff look at cell cultures, and epidemiologists analyse macro variables affecting transmission. In causation studies, scientists track serotypes using molecular methods and computational analysis. Each practice implies different interactions with the object; they have different questions and different techniques or epistemic models in the course of the research (Law and Mol, 2011: 2). The issue here is not that we are dealing with a disease understood in different ways as a matter of different perspectives of reality, but rather we have a reality that is enacted through different practices.

In order to control a disease we must understand where the virus comes from and where it may spread, what kind of serotypes are in circulation, and what the vector density is (Guzman and Istúriz, 2010; Law and Mol, 2011; Reidpath et al., 2011; Sommerfeld and Kroeger, 2012; WHO, 2012a). Although there are different



practices in the epistemic models applied by different sciences, they all, in some way or another, try to visualise the invisible and transfer it to a time-related process of 'knowing something' (Knorr Cetina, 1999). When we translate these epidemiological, clinical and laboratory practices into a pure scientific domain, we find perspectives that overlap and others that produce isolated knowledge. This may be the reason why the information included in health campaigns is so confined to the discourse around mosquito-breeding sites. One may argue that in pure science, a hypothetico-deductive method does not necessarily respond to social necessities. To put this in Richard Lewontin's (2008: 13) words: 'An awful lot of what scientists do is of no use to anybody, and never will be'. And although I agree with Lewontin, I would also like to suggest that we can re-enchant and revitalise the idea of dengue in the social domain by simply taking into account the ways in which entomologists and virologists look at virus and insect structures in detail, and combine that knowledge with people's embodied experiences. I also want to suggest that a problem may be that health campaigns evade the kind of concentrated looking that characterises entomological and virological work. These campaigns show mosquitoes in detail on very few occasions. They rarely invite people to closely look at insects with admiration or surprise. In health campaigns, mosquitoes are seen partially, not through a gaze, but a glance. Campaigns neither include the different forms in which the virus is visualised, nor do they consider what 'serotype' means. In short, the multiple ways for making evident virological knowledge is left aside.

In my research, by analysing the various epistemic models at work across the study of dengue, a new relationality began to appear. It became clear that health campaigns should focus on the multiplicity of experiences that constitute what 'dengue' is – inviting virologists, entomologists and physicians to take part in how health campaigns are designed. This also meant designing experiences to engage the public in the various ways academics visualise and interpret complex information.<sup>93</sup> However, merely displaying the various academic methods at work is not sufficient,

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<sup>93</sup> An example of this is The Institute for Figuring, 'an organization dedicated to the poetic and aesthetic dimensions of science, mathematics and engineering' (<http://www.theiff.org/>). By aiming to engage people with highly abstract concepts through physical forms of playing, they creating spaces in which people experience ideas by making things – touching, modelling (Wertheim, 2009).

as this would not generate a truly interdisciplinary collaboration (Barry and Born 2010, 2013a, 2013b). And beyond such a collaboration, the question remained: how do people experience the disease?

### **‘Warning signs’ and the experience of being ill**

The state that we are accustomed to call ‘illness’  
is *always* body, but is never *only* body.  
(Pedro Laín Entralgo, 1970: 170)

This section is about the experience of having dengue fever. As my participants perceived the disease through their bodies, I use illness narratives to describe the way they experienced it. According to Merleau-Ponty (2002) science does not completely account for the world as we live in it and particularly as we experience it. Prior to the symbols of science, my own experience of the world is what gives me knowledge of it. My body is the source of experience and this is what defines what I am. In this respect, he comments: ‘Science waits upon explanation, which means looking beneath phenomena for the circumstances upon which they depend, in accordance with the tried methods of induction’ (2002: 129–130). The analysis of my participants’ bodily experience gives us insight into illness, and helps us to think about it as an intersubjective world, rather than a universal/objective one. I then discuss medical understandings of the disease within the context of the Colombian health system. By reflecting back on these different kinds of knowledge, I advocate an understanding of symptoms not as ‘warning signs’ but as ‘pain’.

In order to understand the narrative of dengue fever, it is important to think about the difference between the biological domain, the personal or subjective experience, and the social dimension of a disease. According to Andrew Twaddle (1981: 111–112) and Arthur Kleinman (1988: 5–6), these three ideas correspond to different concepts: disease, illness, and sickness, respectively (Twaddle, 1981: 112). Although they seem to refer to the same idea, Twaddle describes ‘disease’ as the clinical domain and the ‘objective’ phenomenon that surrounds laboratory tests, the way the virus infects cells in the body, and disease ‘signs’. This is what was described in the previous sections regarding the clinical management of the disease. Illness, on the

other hand, alludes to the subjective experience of the person who is suffering from the disease. This domain covers the way people talk about symptoms and being ill. Sickness, finally, refers to the social domain and the way other people perceive someone as ‘unhealthy’ (Twaddle, 1981). According to Arthur Kleinman (1988: 6) this domain also comprises macro-social dimensions, such as economic and political implications (in this particular case, the political, economic and social implications of health campaigns described in Chapter 2).

### **Juanita: Getting ill**

People who have had dengue do not necessarily recognise the symptoms in the same way that doctors do. Or, they might be aware of dengue symptoms, and still avoid seeking medical treatment. This happens because, as Kleinman (1988) argues, symptoms have meanings for people beyond the ‘natural’ and biological domain. People have knowledge about their body and with this they produce narratives of their illness. After a month of going to Juanita’s house, on September 2013 she got sick. Even though she had symptoms much like those used to describe dengue in official documents, Juanita did not want to go to the doctor. It started with some intermittent headaches. Juanita described them as twinges on the sides of the head. During the second night, she began to feel pain in her hands and her feet. During the day, she got fever and chills, and ate very little food as she felt she wanted to vomit. When I saw her and listened to the descriptions of how she felt, I immediately thought about what I had read in textbooks such as the *Global Strategy for Dengue Prevention* (WHO, 2012a), or the *Handbook for Clinical Management of Dengue* (WHO, 2012b). However, when I talked with Juanita about the possibility of having dengue, she preferred to wait and see how the symptoms developed; in the meantime, she began to self-treat by taking acetaminophen (500mg) every six hours.

The day after, she told me she had a bad night, and didn’t feel better: ‘When I woke up I felt dizzy. That was very strange for me. I then had nausea and I realised I got a very particular pain behind the eyes, in the base on my neck, and in the muscles of my back’. Although I again suggested she get medical treatment, she didn’t go. On the fifth day, Juanita described the symptoms in this way: ‘although I have joint pain, especially in my feet, knees and heels, in my hands, elbows, wrists and fingers, I

think the fever has begun to disappear now, and I think I'm getting better'. She decided not to go to the doctor, and the symptoms gradually disappeared after a week and a half. When I asked Juanita about why she did not seek medical treatment, she told me that, considering her symptoms, she would not be classified as an 'emergency' within the triage process at the hospital. She also suggested that when the fever began to disappear, the urgency also began to disappear. Although Juanita has a high level of education, and has, in fact, worked in health promotion and prevention programmes, she decided not to go to the doctor. In this situation, therefore, is the a problem one of 'lack of knowledge', as the Departmental Institute of Health (Dirección Seccional de Salud de Antioquia – DSSA) focuses on? In Juanita's case, there was not an absence of knowledge of the symptoms. So, was it her knowledge of the hospital system and an antipathy towards this system that prevented her from seeking treatment?

Juanita argued that she had been taught that the body usually needs one to five days to recover after viral infections. 'Based on the experience with my children, I know you don't normally get treatment unless you have a bacterial infection. So, I thought I would just get acetaminophen in the hospital', which was what she used to treat herself during the illness process. In her particular case, the febrile period did not last that long and after five days the fever began to disappear, so she told me that she had no reason to seek medical treatment. The fever was a 'warning sign' for her, and the pain was the way in which she experienced the disease.

### **Sara: Getting ill**

'I remember very clearly the pain behind my eyes, and the fever. Those were the symptoms I hated the most about my experience. That was the first time I felt that sensation in my eyes. It was very weird'. These were the first words Sara used to describe her experience. At the time of my fieldwork, Sara was a 24-year-old student who was finishing a bachelor's degree at the University of Antioquia. Besides being very open to talking about her illness, Sara was also participating in a research project where scientists were tracking the evolution of patients who had had dengue in Medellín. All of this made her very critical of health campaigns and, therefore, she

played an important role in informing the public experiments I developed (Chapter 5).

The first disease symptoms started when Sara was at her grandmother's house getting ready to go to a concert. Just before leaving, her body began to feel very 'heavy' and there was a sort of pain in her eyes when she moved them. Although Sara said the symptoms were not very strong, she felt weird and decided not to go out. Although the next day was not too bad, she described that night as a 'terrible thing': 'I had a high fever and during the night I sweated a lot. In the morning, I could almost wring out the pillow. After two days, I felt really bad'.

Although the fever did not go away, Sara did not think about seeking medical treatment during the first days of the infection – she self-medicated with acetaminophen/paracetamol to deal with her symptoms. Sara argued that now it would not be an emergency for the doctors at the hospital and, additionally, she was not affiliated with the healthcare system, and therefore she could not go to see a doctor. However, when blood started coming out of her nose, she decided to pay for a private medical service. That is when she was diagnosed with dengue. After examination, she was sent back home with directions for using pain relievers (acetaminophen). Like Juanita, Sara's case does not demonstrate a lack of knowledge of symptoms, when to seek medical treatment, or what would be available to her at the hospital. Rather, it was a situation that reveals a different kind of knowledge in operation.

Three days after that, Sara still had a fever, and then began to break out in a rash and experienced a kind of mucosal bleeding in the groin area. She visited the doctor again, who gave her other medications (anti-allergy drugs and local anaesthetics such as Lidocaine). However, the situation got worse due to a bacterial infection on the skin near to the rash area. The wounds burned and itched. Because it affected the groin area, she could not wear blue jeans and urinating was very painful. Although she recovered after two weeks, Sara commented that since she got dengue, whenever she had fever, she felt worried about having dengue because she did not want to live through that sensation again. She remembered dengue as one of the worst

experiences she had ever had. 'I don't recall anything ever bringing me to my knees like that', she told me.

### **Luis Fernando: Getting ill**

Luis Fernando was diagnosed with dengue fever during the first week of November 2013. During the last week of October he went to Cartagena to teach telecommunication courses at a branch of UNE. Even though it is more probable that he had gotten the virus while he was in Cartagena and not in Medellín (because of the incubation period of the virus), his case is very relevant for highlighting why mobility is important in the debate about the disease (see Chapter 2 and the section on 'causality'). Luis Fernando came to Medellín on Saturday, 2 November. The night before, he was about to reply to some emails, but he was not able to do so. Luis Fernando described this as not being able to articulate his ideas, and somehow being 'blocked'. He remembered being too tired and feeling his body was 'heavy', but he did not associate this with any kind of disease, but instead with the long working day.

Although he felt a bit awkward during the weekend and did not sleep well, it was not until Monday, 4 November, that he began to feel a bit of fever and pain in his joints. He did not think about going to the hospital though. He thought it could be the flu, or maybe he was feeling that way because of something he had eaten, so he just took two acetaminophen every six hours – he never thought it might be dengue. With his job as a telecommunications instructor, on Tuesday he had to teach classes. Although he taught the classes, he felt bad during the day; he did not have lunch and mainly drank water. At night he had high fever. 'This was the first time in my life I was shaking, I mean shivering, because of the fever', Luis Fernando told me. Having fever between 39.5°C to 40°C, he not only went to bed with three blankets, but he was also wearing a t-shirt, sweatshirt, socks and sweatpants, telling me that was the first night he had ever worn that much clothing. He took more acetaminophen during the night.

On Wednesday he went back to work in the morning experiencing pretty much the same symptoms as the day before. He went back home early, as this day was the 15th

birthday of his daughter. Luis Fernando stayed for a bit with his family, and then went to bed, with fever and the shivers. On Thursday, 7 November, he had classes again. 'I did not feel comfortable and there were moments in which I felt incoherent in the explanations I was giving', he told me. When it happened he stopped for a few seconds to regain his composure and coherence. Now he had a headache and felt pain behind his eyes and in his joints, limbs, muscles, abdomen and bones. Luis Fernando finished his classes at midday, called his wife, and decided to go to the Medical and Dental Service Unit (Unidad Servicio Médico y Odontológico, EPM). In his particular case, he had a very good health service, so going to the doctor was not about 'knowing' (or dreading) the quality of the services at the hospital or being confronted by a precarious economic situation.

After an examination, the doctor said it was a viral infection but he required a blood test for confirmation. In the meantime, Luis Fernando was prescribed with pain relievers and cough syrup to treat what the doctor thought could be some symptoms of pharyngitis. On Friday, Luis Fernando's blood test showed altered values in hematocrits and platelets, and he was diagnosed with dengue. Although normal platelets values are 150,000 to 400,000/mm<sup>3</sup>, he had 73,000/mm<sup>3</sup>. He reported a burning sensation on the skin and that his skin was very sensitive to the touch. Luis went back home and after that he began to use an insecticide for killing flying insects. He was killing everything, he said, it did not matter whether the insect had the characteristic pattern of white lines. It was a way, he felt, to protect others from getting the disease.

On Saturday he had another blood test, and it showed platelets on 53,000/mm<sup>3</sup> and, because of this, Luis Fernando was transferred to a higher-level hospital. He stayed there for the day, receiving an intravenous administration of Hartmann's solution. Although at first doctors suggested remaining in the hospital overnight, they allowed him to go home if he agreed to come back the next day. On Sunday he went back to the hospital. His doctors were very concerned about the platelets values, as they were hoping to get this value higher, so Luis Fernando had another test, which showed platelets at 62,000/mm<sup>3</sup>. Abdominal pain, headache, lethargy, and the break-bone sensation had not disappeared, so he got a prescription for pain relief. As things seemed to get better, he was asked to come back in two days time to the medical

centre he had first visited. In the meantime he just needed to pay attention to not having blood in his stools, or gingival bleeding.

‘I got a big surprise on Tuesday, when I came back on Tuesday, because I was asked to tell the story from the beginning. It is like that in our health system, everything needed to start from zero. It was like resetting everything because of the beginning of the week’, Luis Fernando commented. After telling the story again to the new doctors, on that day, another blood test showed platelets on  $100,000/\text{mm}^3$ . He had headaches and break-bone sensation for a couple more days, but he recovered completely after a week and a half resting in his home.

### **Juan David: Getting ill**

Juan David is a 30-year-old dentist who lives in Bello and works in Medellín. I started working with him some months after he was diagnosed with dengue fever. He remembered first feeling flu-like symptoms. He then had headache, body pain and lethargy. Some people told him he had ‘the break-bone fever’, but he did not actually associate it with dengue.

As a dentist, Juan David is used to working in hospitals, but he did not think about asking his friends to get a blood test, at least at the beginning. During the fourth day though, he went to the hospital feeling much worse (he had fever, pain behind the eyes, and joint pain) and he had a blood test that showed a dramatic decrease in the platelets level. He then had another test that confirmed he had dengue. At the end of the day he vomited several times. He had diarrhoea, fever, pain behind the eyes, and joint pain. He told me that once he got the positive diagnosis he actually felt worse.

After talking with his colleagues, he decided to receive care in hospital. He was eating very little, feeling a lot of pain and having diarrhoea. For this he was prescribed pain relievers and intravenous administrations of serum to keep him stable and hydrated. The day after diagnosis, he began to have a rash, which was treated with antihistamines. When I asked him about the memories of those days, he told me that not wanting to eat was what affected him the most: ‘I was not able to eat, and when I did so, I had more diarrhoea’. Likewise, he remembered feeling



discombobulated for some moments. Sometimes Juan David felt dizzy and, like Luis Fernando, he also felt unable to articulate his ideas. The sickness of Juan David implied two forms of isolation: the first one was related to his hospitalization as a way of getting the proper hydration that his body needed. The second one was related to his desire to not to tell his family about his hospitalization, as a way of not worrying them. He made this decision after looking at the platelets levels – he told me he knew this was really bad news. Throughout the days in which he stayed in the hospital and during the recovery period at home, he kept an insecticide next to him all the time.

### **Understanding the idea of pain in relation to violence**

The understanding of pain allows us to have an insight into both the biological and the social dimension of diseases. One of the earliest definitions of pain used in the medical/biological domain was given by Margo McCaffery in 1968, who described it as ‘whatever the experiencing person says it is, existing whenever s/he says it does’ (cited in Berry et al., 2011: 4). Pain is a concept people learn in childhood through injury-related experiences (Merskey and Bugduk, 1994: 210), which means that it is always a subjective experience that cannot be measured objectively (Osterweis et al., 1987: 123; Merskey and Bugduk, 1994; McCaffery, 1990). So, how do people talk about pain in Colombia? What does pain mean in the Colombian context? Based on psychological therapy with mourners whose relatives died from cancer or social violence in Medellín, Zapata (2006) and Tobón Betancur (2005) describe pain as a corporeal sensation that does not allow people to do daily activities and that undermines productivity. Pain produces ‘restlessness’ and ‘lethargy’ in the whole body. These fatigue-like symptoms are very similar to the ones described by Juan David, Sara, Juanita, and Luis Fernando. When they had dengue, they did not want to get out of bed because of the break-bone sensation. In the case of the mourners’ experience described by Tobón Betancur and Zapata, they did not want to get out of bed as they also felt a physical pain linked to bereavement. In both cases, talking about their experience was a way of healing. The dengue sufferers who participated in this ethnography stated that my project gave them a voice. They expressed a desire to help change the way health campaigns were designed, suggesting that their experience could be useful in generating better communication with the public.

In this section, I connect the understandings of pain deriving from the oral testimony of mourning in psychoanalytic terms (mostly studied in Colombia as the consequence of social violence and the loss of a loved one) and the possibility of understanding dengue as pain, based on illness narratives. Using Taussig's (1992) analogy of the state as nervous system, I suggest that dengue sufferers are facing a nervous system that does not listen to words. Taussig (1992: 113) holds that the state is not only implicated 'in the cultural construction of reality, but delineates that reality as masked and inherently deceptive, real and unreal at one and the same time – in short, a thoroughly nervous Nervous System'. I argue that in both cases the possibility of 'the word' as a therapeutic agent is neglected by the state. Why does this happen? Illness narratives about dengue are not taken into account nor is psychological support provided by the health system to bereaved victims of social violence – a loss also typically felt in terms of pain.

My participants talked about dengue as a very painful disease. They associated it with pain behind the eyes and a break-bone sensation. For example, when I asked Sara how she would describe the disease, she told me 'dengue was painful and disgusting. Because of the way I felt it, dengue involved isolation and a lot of pain. That's the way I remember it – and the memories of these feelings, the pain and the weariness sensation, is what stays with you'. *Memory* and *remember* are, according to Piers Vitebsky (1993), the words humans use to recall processes of the past that in some way affect our present life.<sup>94</sup> These two elements are not only linked to the description Sara gave in the context of dengue fever, but also to the way mourners deal with their feelings.

Freud (1957: 243) defines 'mourning' as the 'reaction to the loss of a loved person'. This is a feeling that allow humans to keep 'the loved one' alive. When people lose a loved one, there is a pain that goes beyond the biological dimension. It hurts the past, the present and the future, so the psychological, social and familiar domains are also affected (Montoya Carrasquilla, 1998; Zapata, 2006). In Colombia, this is a domain that has been explored in relation to violence. Díaz Facio-Lince (2003) and Tobón

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<sup>94</sup> In his ethnographic approach, death is a sort of relationship between persons over time (Vitebsky, 1994: 9).

Betancur (2005) have studied local realities linked to violence, death and mourning. Tobón Betancur (2005) describes the bereavement process of people whose relatives died in violent ways in Medellín, and shows that mourners not only feel psychological but also physical pain. They isolate themselves from visitors, and express high sensibility to noise. Most of the time mourners want to lie in bed, expressing physical discouragement because of the loss of the loved one. Tobón Betancur's argument is that talking about this and receiving psychological therapy helped them to deal with the pain, but this support is not always provided by the state. In response to this, Tobón Betancur's work illustrates how psychological therapy based on psychoanalytic theory helps mourners to deal with the silence from the state, which does not provide answers to questions like 'Who disappeared our loved ones? Who killed our loved ones? Why did it happen to them?'

Díaz Facio-Lince (2003) talks about pain in relation to forced disappearance in the Colombian political conflict. Díaz Facio-Lince's argument is that the symbolism linked to justice and ritual help mourners deal with the yearning that disappearance generates. This is to say that the balance between death rituals and truth – thanks to public justice that should be offered by the state – helps mourners recover from the painful feelings of losing a loved one. The problem here is again that the state does not always respond to those feelings, and pain is underestimated by the Colombian state. If patients require psychological care, private health providers (Entidades Promotoras de Salud [EPSs]) will only order a 30-minute consultation, once a month. This consultation is only considered a therapeutic measure, in support of the medical attention provided by physicians. Likewise, the state does not take into account the feelings of people affected by dengue as they also do not figure within the medical emergency domain.

When the state does not face social problems, and does not respond to the needs of those affected by social problems, it responds with silence – not listening to words. Michael Taussig (1992: 16) comments that Colombia is a State of Emergency characterised by an 'ordered disorder' that has been present 'for as long as most people can remember... For decades Colombia has been defined as being in a state of chaos such that predictions of imminent revolution, a blood bath, or a military dictatorship have been made on an almost daily basis'. He reflects back on this

‘silence’ as a form of war: ‘The point [behind silencing] is to drive the memory deep within the fastness of the individual so as to create more fear and uncertainty in which dream and reality commingle’ (Taussig, 1992: 27). Memory becomes nightmare in this ‘war of silencing’, and as happened with violence, the Colombian health system does not provide the answers people need. Campaigns similarly do not reflect the experience of those who suffered the disease. The word – whether the oral-testimony process for dealing with mourning or illness narratives – are somehow equally important to deal with pain, even if the state responds with silence, even if the pain is underestimated by the health system.

### **Pain and the body**

The body is the element through which we perceive the world. According to Merleau-Ponty (2002: 170) ‘my body is that meaningful core which behaves like a general function, and which nevertheless exists, and is susceptible to disease. In it we learn to know that union of essence and existence’. In short, the way we give meanings and understandings is by being-in-the-world.<sup>95</sup> Although my body exists, and therefore is susceptible to disease, we do not think about getting ill. Because of this, the unexpected illness implies a self-reflexive process of asking questions and looking for answers to our afflictions. This unpredictability and uncertainty is what, according to Kleinman (1988), gives rise to injustice-value questions during the course of the disease: *Why me? What can we do?* Like Kleinman, Taussig (1992: 85) also comments that during the course of a disease ‘the body asks me *why me? why now?*’ As Kleinman (1988) states in relation to chronic diseases, during the first period of the disease there is a sense of lack of control that has to be confronted because scientific explanations are not enough. In this respect, Zapata (2006) argues that cancer is also symbolically associated with pain and silence and sensations that go beyond the biological domain. Diseases point to a failure in the explanations we give to the world (Kleinman, 1988), and, in a moral sense, not including the feelings of the people who suffered dengue in health campaigns leaves a gap for raising the same injustice-value questions.

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<sup>95</sup> For Merleau-Ponty (2002: 500) this world always remains ‘subjective’.

For Taussig (1992: 84), the body is not only ‘a thing’ but also ‘my being’. This is to say that during the illness process, there is not only a materiality of the body that can be studied and defined from the outside – from the physician’s point of view – but that by experiencing the disease, *my being* – sometimes understood in terms of ‘soul’ or ‘spirit’ – is also affected. These elements are tied together through bodily experiences. As Merleau-Ponty (2002: 97) comments, ‘the fusion of soul and body in the act, the sublimation of biological into personal existence, and of the natural into the cultural world is made both possible and precarious by the temporal structure of our experience’. Far from a soul-body dualism, this invites us to see the significance that people give to the physical effects of a disease on *their being* through their bodies and their existence. For example, in the first official description of dengue, Rush (1789: 116–117) talks about a patient who suggested changing the name ‘break-bone fever’ to ‘break-heart fever’, as the disease caused weakness and an uncommon dejection of the ‘spirits’:

But the most remarkable symptom of the convalescence from this fever, was an uncommon dejection of the spirits. I attended two young ladies who shed tears while they vented their complaints of their sickness and weakness. One of them very aptly proposed to me, to change the name of the disorder, and to call it in its present stage, instead of the Break-bone, the *Break-heart fever* [italics in original].

This description emphasises Sartre’s (1994: 318) notion of the ‘body-for-itself,’ where, by experiencing the world through the body and through a practical engagement, people experience their body as their own. In this respect, Sartre (1994: 337) also comments that illness is the ‘body on a new plane of existence’, which means that the idea of ‘break-heart fever’ encompassed the bodily action of consciousness – as a self-reflexive experience – of the particular patient that Rush was treating. In my project, these self-reflexive processes and value questions were also related to the absence of a specific medication or antiviral drug, and it was precisely when people like Luis Fernando or Sara found out that the only available medicine was acetaminophen, that they realised that they needed to enter into a week-long recovery process – likened to a mourning process – in which the body would deal with the disease by itself. In this respect, Luis Fernando commented:

This was the first time in 49 years I experienced something like this. When I went to the doctor and asked ‘what can I do? what kind of medicine should I take?’, it was a surprise for me that there was no drug for this! I mean, I just had to wait until my body reacted against the virus... and the only way to deal with the symptoms was by taking acetaminophen... You feel the pain down to the bones, joints, and muscles. Everything hurt, even when I touched my skin I felt it hurt and burn.

Pain is, as Byron Good (1994: 125) suggests, ‘a part of the subject, a part of the self, [and] as a consequence, the body itself becomes personified as an aversive agent’. By the same token, Caslav Covino (2004: 119) argues that ‘pain is the deconstruction of the self’. Although the purest meaning of pain may belong to the person that suffers it, we can also address the symbolic understanding of dengue through the eyes of those who suffer the disease. Sara, Juanita, Luis Fernando or Juan David had ‘embodied experiences’ that could be linked to other illness experiences (Good, 1994). Luis Fernando: ‘I can talk about dengue from a different approach, because after having it, it gave me a particular kind of knowledge. I can say that this is different to having the flu. We [people who have had dengue] can be active agents by communicating different ways of seeing dengue, like how to protect others by not allowing mosquitoes to bite us, and not disseminating the virus in the area where we live’.

Luis Fernando’s experience was a kind of embodied knowledge that allowed him to remember. As Kleinman (2006: 135) points out, ‘embodiment – namely, experiencing meaning through bodily processes such as pain, is a means of collective as well as individual memory’. In contrast, Scarry (1985) holds that pain is an *unshared* subjective perception. Scarry works on warfare and torture and her argument is that intense pain destroys the human world and therefore, it becomes ‘visible’ through the process of producing it. Scarry (1984: 52) describes pain as negation: ‘of something being against one, and something one must be against. Even though it occurs within oneself, it is at once identified as “not oneself,” “not me,” as something so alien that it must right now be gotten rid of’. Dengue is, however, not entirely applicable to Scarry’s approach as it can become visible through the experience of the people who suffer it. Following this, I suggest that we can

understand illness narratives in the light of the body as a creative source of experience (Good, 1994: 118). Such perception, as a personal experience, has two main components: a sensation that can be localized in the body (or in the somatic body structures), and an unpleasant quality (the severity of which varies between people) that produces a need for relief (Osterweis et al., 1987: 123). This is to say that illness narratives allow people to recall the illness process and as I show in Chapter 5, it is possible to communicate and make visible these feelings through community-generated and community-performed art.

### **Measuring pain as a subjective experience**

The practice of measuring pain also offers an insight into different forms of knowing. In scientific terms, variables like transduction, transmission, and modulation are measured to determine neuronal action and, therefore, provide a 'standardised' pain measure (Osterweis et al., 1987; Merskey and Bugduk, 1994). However, Osterweis et al. (1987) argue that even when doctors can measure the activity of pain-transmission neurons, it would require an 'inference based on indirect evidence' to conclude that such a person feels pain. This is to say that the 'awareness of pain' is a perception and therefore, such perception is the most accurate measure of pain (Osterweis et al., 1987: 124). So although from a biological point of view pain is associated with a stimulus, and therefore a potential damage to tissue, it is also acknowledged that pain is overall an emotionally unpleasant experience (Merskey and Bugduk, 1994: 210). In fact, the International Association for the Study of Pain (IASP) states that people can report pain in the absence of tissue damage, which means that there are subjective experiences linked to pathophysiological causes that may be described as pain for people. Therefore, 'if [people] regard their experience as pain and if they report it in the same ways as pain caused by tissue damage, it should be accepted as pain' (Merskey and Bugduk, 1994: 210). IASP defines pain as 'an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage' (Merskey and Bogduk, 1994: 210). Accordingly, the strict biological understanding, linking pain to a stimulus, is not always adequate.

As having dengue is a complex experience, during my fieldwork I asked Luis Fernando, Juan David and Sara to measure their pain on a 0-to-10 rating scale. The idea with this methodology was to try to understand their pain and increase their ability to describe the pain (McCaffery, 2002). On this rating scale, 1 is equivalent to minimal pain, and 10 is ‘pain as bad as you can imagine’ (Serlin et al., 1995: 280). These were their answers:

Luis Fernando: ‘The pain I had would be measured between 7 and 8, especially during the second day because I had high fever, and a lot of pain in my head, joints and limbs and skin’.

Juan David: ‘During the day I would say 7. I felt a lot of pain... but somewhat tolerable if I was lying on the bed. During the night it was about 9 despite the medicine I got at the hospital. I thought that with a little more I would die’.

Sara: ‘My pain was very strong. I would not say 10 because I think that would be a pain that generates fainting, but because of the pain in the back of my head, bones, and limbs, plus the fever and the wounds... I think 7-8 would be more accurate’.

According to Serlin et al. (1995: 278), ‘pain severity and the degree to which the patient’s function is impaired are clearly highly associated’. Ratings of 7 to 10 are classified as *severe pain*, and at that point, pain prohibits most everyday activities. Pain becomes disruptive to many aspects, even affecting mood and sleep (Serlin et al., 1995).

When Sara was describing her experience, she emphasised the idea of pain and how the disease affected her. She explained to me that because of the fever, resting on the floor made her feel better. Because of her pain, she could not go out and therefore she was isolated in her room, without being able to talk much with other people – even on the phone or the Internet. She used to have a little table with her computer on it where she played the science fiction game Halo (<https://www.halowaypoint.com/>) to entertain herself. In this video game, players kill pseudo-humans or a kind of alien parasite, and she told me that playing this game was a way to handle the pain she felt while she was ill – like a non-pharmacological pain reliever. When I talked with Sara about this idea of dengue as ‘pain’, she said it



was worse than having a migraine. Sara had suffered from migraines for many years, and she had learned how to live with them; in her experience, dengue was worse, and it impacted her life in a unique way. She felt a lot of pain, and because of this, Sara stated that dengue was one of the worst diseases she had ever had.

Like Sara, Juanita also talked about dengue as a very painful disease:

I have heard people naming dengue as ‘break-bone fever’, ‘break-joint fever’ or something like that. That was exactly what I had: a joint pain that doesn’t allow me to move easily, like my feet being all stiff. That worried me because I couldn’t walk normally. When I tried to walk, I felt I was forcing the movement, so I didn’t want to do it again in order to avoid joint damage. These symptoms also caused a kind of weird fatigue.

According to my participants, this broken-bone sensation is one of the most disruptive symptoms. It was what actually worried them. My participants stated that there are other symptoms that may be tolerable, but the break-bone sensation and its associated pain really worried them. In the next section, I will show how important these illness narratives are for understanding dengue from a historical point of view.

### **Illness narratives as a way of re-reading the course of a disease**

The value of illness narratives in relation to anthropological literature and the biological understanding of disease changed after the 19th century as etiological studies displaced the value of the ‘word’ in descriptions of the disease. However, recent publications make clear that illness narratives are fundamental to the way diseases are described (Halstead, 2015). So it is not only a matter of creating new laboratory techniques for dengue diagnosis, genetic differentiation, or virological understandings of the disease, but also about how the disease *is* and *has been* described. For example, based on historical facts and illness narratives, Scott Halstead (2015: 557) shows that ‘in the course of history, a remarkable name change has taken place because of the similarities between the clinical syndromes caused by dengue and chikungunya virus infections’. He shows that the term ‘dengue’ was originally applied to ‘present-day chikungunya’, and consequently, ‘present-day

dengue' should be read historically as 'break-bone fever'. This would not have been possible without the illness narratives of the 1800s – before the emergence of experimental medicine and the biological or serological confirmation of cases.

Donald Carey (1971: 262) was the first to suggest that 'chikungunya may be the real dengue virus'. Carey based his analysis on the detailed descriptions made by James Christie in 1872 and 1881 of narratives that had gone unnoticed for many years. Christie, who suffered a disease called *Ki-dinga pepo* (present-day chikungunya) stated: 'I suffered most severely for more than *two months afterwards*. There was general muscular pain and stiffness, but all was comparatively slight to the excruciating pain endured at the insertion of the deltoid muscle of the left arm. The slightest movement of the arm caused unbearable pain' (1872: 578). He further commented saying that people experience the symptoms 'for weeks and even months' and they were 'most painfully severe, and far exceeded anything experienced during the acute stage of the disease' (Christie, 1872: 578). Based on Christie's descriptions – which are so detailed and can be read as 'clinical descriptions' or 'illness narratives' – and additional historical data, Scott Halstead's (2015: 558) work reinforced Carey's arguments, concluding that the post-illness arthralgia and disability historically associated with 'dengue', actually correspond to the symptomatology of what we know today as 'chikungunya'. Hence, *post-illness joint pain* is what differentiates present-day chikungunya and break-bone fever (present-day dengue).

According to Christie (1881), the origin of the word 'dengue' comes from the Swahili expression '*Ki-dinga pepo*'. He had treated an epidemic in the Zanzibar region in Tanzania during 1870, and noted that the older inhabitants of the region called the disease in this way, making reference to a disease that produced 'a sudden cramp-like seizure,' and which was caused by an 'evil spirit' (Christie, 1881: 165).<sup>96</sup> He also pointed out that during an epidemic in the same region between 1823 and

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<sup>96</sup> Christie (1881: 164–165) also comments on other names such as '*Baridiyabis*' or rheumatism, and '*Homa Mguu*' or leg fever, and explains that, in the purest Swahili spoken by the Luma natives, the expression *Ki* means 'a kind of', *dinga* or *dynga* means 'a sudden cramp-like seizure', and *pepo* means 'wind' or 'a spirit'.

1829, the disease was named ‘*denga*’ (Christie, 1881: 168), a word that entered the Caribbean via the slave trade from East Africa (through the Mozambique channel). It first appeared in the St. Thomas islands (around the 1820s) where ‘English speaking negros’ called it ‘dandy fever’ (Stedman, 1828). The disease was present in Cuba by 1828, where the Spanish speakers changed the designation to ‘*dunga*’ and then to ‘*dengue*’, from the Spanish expression ‘*andar en dengue*’, which means ‘fastidiousness,’ ‘prudery’ and ‘to be too punctilious’ (Christie, 1881: 170–171; Vasilakis and Weaver, 2008: 11; Halstead, 2015: 558). Christie (1881: 166) further supports his arguments for the correlation between the Spanish designation ‘*trancazo*’, which means *stroke*, for naming the post-illness symptoms, and the Swahili meaning for ‘*dinga*’ as *a sudden cramp-like seizure*. In summary, according to Carey (1971) and Halstead (2015), the Swahili meaning has been historically maintained – even in the newer Spanish designation – for naming a disease with a post-febrile rheumatic symptom. Thus, *present-day chikungunya* is the ‘original dengue’ and is characterised by a post-illness arthralgia.

For Halstead (2015), the key problem was that in the time in which the previously cited etiological studies of dengue were carried out (see the section on ‘Etiology, laboratory techniques for dengue diagnosis’) there were no ‘*chikungunya*’ epidemics (*ki-dinga pepo*) in the world. Because of this, researchers made all the etiological descriptions using the word ‘*dengue*’, but actually meaning break-bone fever. It could be argued then that in both present-day *chikungunya* and dengue, the idea of pain is understood and differentiated in different ways. The former is mainly associated with a post-illness sensation, and the latter with a break-bone sensation – something that was confirmed by the participants of this ethnography, and that takes us back to Rush’s (1789) description. Now, closer attention to descriptions of the disease before the 19th century reveals that people’s experiences were indeed taken into account, unlike current health campaigns and public health discourses. Without the careful analysis of illness descriptions and the narratives of patients, it would not be possible to acknowledge this misunderstanding and change of name over time.

### **Exploring smell, olfactory memory and the somatisation of the disease**

As I have previously shown, visualisation is embedded in the laboratory and the state-run health campaigns. Although visualisation is the standard way for representing state/institutional knowledge, the sense of smell is also key for understanding knowledge-making processes. By providing some evidence of how the concept of ‘dengue’ is created and how it is applied through various means by using the sense of smell, I explore in this section a shared sensory category among scientific and public understandings, suggesting that there is a missing dimension.

Olfaction plays an essential role in the vector-host interaction (Kaur et al., 2003; Takken and Knols, 2010). Mosquitoes use olfactory cues to locate breeding sites (Millar et al., 1992; McCall and Eaton, 2001; Kaur et al., 2003; Herrera-Varela, 2014). Odours tell them where there is a ‘good’ or a ‘bad’ place to lay their eggs, that is to say, some compounds attract them and others repel them (Herrera-Varela, 2014). Scientists know that, and they have worked for many years on this ‘sensory world’ to determine which chemicals are perceived by females to locate suitable oviposition sites (Millar et al., 1992; McCall and Eaton, 2001; Eiras et al., 2010; Okal et al., 2013). This has a strong impact, for example, in the creation of artificial mosquito-breeding sites – ovitraps – for monitoring and controlling mosquitoes (see Chapter 2 and the section on ‘causality’). Other odours have also proven to be effective alternative and environmentally friendly mosquito-control strategies, such as the cases of the plants *Eucalyptus* spp., *Cymbopogon* spp., or *Ocimum* spp., which have been shown to repel mosquitoes (Seyoum et al., 2003; Strickman et al., 2009; Stella Nerio et al., 2010). In the same way, understanding the experience of the people who have dealt with the disease also offers us an insight into the sensory world – olfaction in this case – that both mosquitoes and disease create. For example, Juanita drove away mosquitoes with used coffee grounds, and Juan David associated the odour of an insecticide with the experience of having dengue.

Even though you do not see standing water in Juanita’s home, it was not difficult to find mosquitoes in her house. She used coffee as a kind of natural mosquito repellent. According to her, the coffee odour was a natural repellent, and using it allowed her to avoid chemical fumigations. After she prepared the coffee, she

collected the used coffee grounds (known as '*ripio*' in Colombia) and placed them into little bowls that would later be placed in every bedroom. She put the bowls in dark places: behind the bed, the nightstand, or the desk, where, according to her, this is where adult mosquitoes dwell. Juanita had used this method for at least four years. She told me that there were two key aspects to make it work: firstly, it was important not to mix the used coffee grounds with other things, such as sugar or any other kind of sweetener, because that would produce the opposite effect; and secondly, when the used coffee grounds dry out they no longer expel the characteristic odour, so it is mandatory to change them regularly.

'Coffee is a natural and key element to keep the mosquitoes away. My mother told me that, and I also heard it on a TV programme', Juanita stated. As Juanita's mother also used this preventive repellent, this was a way to keep a collective memory of dengue across generations, and was also linked to a wider notion of Colombia as a coffee producer. 'My mother used to live in the countryside, near the coffee crops, and she mentioned me a lot about the positive effects that this kind of practice had for repelling mosquitoes', Juanita explained. As mentioned in Chapter 1, in contextualising the medical pluralism in Colombia in relation to the state's formation, the influential 19th-century physician Várgas Réyes also made reference to the use of coffee as a medicine to treat fever, glycosuria, and pertussis (whooping cough), and as an antidote to poisoning from narcotics or drugs (Pereira Gamba, 1859b: 62). In the traditional medicine studies by Fonnegra and Jiménez (2007: 68–70), it is reported that a decoction of coffee grounds is used as an antibiotic and bronchodilator, and the decoction of coffee leaves as an anti-asthmatic. Likewise, caffeic acid is reported as an antiseptic (Fonnegra and Jiménez, 2007: 69). They also state that 'three coffee leaves and five green fruits, taken before breakfast, are used against malaria' in Colombia (2007: 68). And finally, they report that caffeine increases the effect of acetaminophen, generating a sense of well-being (2007: 69). The effects of caffeine and used coffee grounds have also been reported in the scientific domain (Laranja et al., 2003; Guirado and de Campos Bicudo, 2007). These substances restrict the development of *Ae. aegypti* larvae, leading to their elimination (Laranja et al., 2003). Laranja et al. (2003) showed that a caffeine concentration of 1.0 mg/mL was ideal for controlling larval stages, and used coffee grounds also reduce adult longevity (2003: 426).

Another source for understanding how odours play a role in scientific practices around dengue is the research by Drapeau et al. (2009), who combined behavioural studies of *Ae. aegypti* and human olfactory tests with a group of 50 volunteers, to determine whether essential oils (extracted from different plants) had potential repellent properties. The experiment was divided in two phases. At first, *Ae. aegypti* mosquitoes were exposed to 19 essential oils by using a Y-tube olfactometer device. They tested the reduction of the mosquito activity in the presence of these substances, and how attracted the mosquito was to a human finger placed inside a chamber with a paper doused with the essential oils (this variable was called 'attractivity'). The second phase sought to determine the 'hedonic dimension', using a test to measure human preferences for the selected oils with a scale that ranged from -3 ('a very unpleasant odour') to +3 ('a very pleasant odour'). As researchers not only wanted to determine how 'pleasant' an odour was, but also how 'acceptable' it would be for the volunteers to use a repellent product on their skin with that odour, they decided to add an 'acceptance test'. First, volunteers smelled the oils placed in vials; then, the solution was applied directly onto the skin of the volunteers. The 'acceptance test' was measured by using a scale that ranged from -2 ('absolutely not suitable as a repellent product') to +2 ('very suitable as a repellent product'). Although a product may score as 'a very pleasant odour' (+3) in the hedonic test, it also may have a score of 'absolutely not suitable as a repellent product' (-2) in the acceptance test (Drapeau et al., 2009). Results showed that the essential oils from *Laurus nobilis*, *Calamintha nepeta*, and *Rosmarinus officinalis* had good scores in both the hedonic dimension and the acceptance test (Drapeau et al., 2009: 169). Likewise, testing of essential oils from *Eucalyptus camaldulensis*, *Laurus nobilis*, *Lavendula stoechas*, *Cupressus sempervirens*, and *Helichrysum italicum* showed a reduction in the *Ae. aegypti* flight activity and its 'attractivity' to the fingers of the volunteers (Drapeau et al., 2009: 164).

With the same idea of repelling mosquitoes by using a plant's odours, Juanita stated that her mother also kept different plants around her house to drive away mosquitoes. She mentioned that plants such as *palosanto* and *ruda* (fringed rue) and eucalyptus (*Eucalyptus* spp.) were some of those plants. This is something I previously reported on in research carried out with street vendors to explore traditional medicine and

natural healing practices linked to dengue fever (Valencia-Tobón, 2012a). Sellers of alternative medicine argued that eucalyptus should be cooked until it produces a vapour, because this vapour drives mosquitoes away. Likewise, they described *palosanto* and *ruda* as plants with a ‘bad odour’, which should be left in a little bowl; this odour on its own will drive insects away.<sup>97</sup> In the scientific domain, fringed rue extract (*Ruta chalepensis*) has been found to be a strong repellent (Debboun et al., 2007: 306; Strickman, et al., 2009: 136). Likewise, thermal expulsion and the burning of different plants, including *Corymbia citriodora* (previous taxonomic name *Eucalyptus citriodora*) have shown positive effects repelling mosquitoes (Seyoum et al., 2002: 230).

Different understandings of dengue are also constructed through forms of ‘olfactory memory’, defined as the process in which behaviour is influenced by prior exposure to certain odours.<sup>98</sup> In order to understand how olfaction plays a part in the public and scientific practices around dengue, during my fieldwork I studied how odours modify not only mosquito but also human behaviours, and found that these can be related through a somatisation process. Besides being interested in listening to Juan David’s memories of having the disease, I was struck by a narrative in which he linked the odour of Raid, a commercial insecticide for killing flying insects that he used during his days in hospital and during the recovery period in his home, with the symptoms of dengue:

When I had dengue, I used a lot of Raid. This was my defence tool because I did not want to have mosquitoes close to me. I began to use it while I was ill. Because of my symptoms, I could say I was not really aware of the way it smelled and I got used to it. I used Raid for about two weeks, and although once I completely recovered I stopped using it, from that moment if I smell Raid’s odour I immediately associate it with dengue and with the experience I had while I was ill. It reaches the point in which I actually feel symptoms... like lethargy and some kind of pain. I know this is

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<sup>97</sup> Part of this sensory media project is available here: <http://goo.gl/1UvVsl>

<sup>98</sup> Olfactory memory also proves some kind of plasticity, or ecological responses to environmental changes.

like a somatisation process, but I really don't feel well when I smell it. That's why I am telling you that there are places and situations that smell like dengue...

Although Juan was aware that he was having a psychological reaction (he was not infected again with dengue), he did not feel well and therefore he never stayed in places where people used this product. Raid's odour represented the disease and immediately recalled for him how it was to be in the hospital. Luis Fernando, who also used an insecticide all the time as a way to avoid contact with mosquitoes while he was ill, described similar experiences. According to Luis and Juan, using insecticides were important because they were an 'intuitive' way of protecting other people, but at the same time they left an 'olfactory memory' recalling some of the dengue symptoms, and even somatising them.

Odour also plays a role in the way mosquitoes behave. Even though most of the time we tend not to think about insects as 'living beings' with sensory qualities, studies show not only that there are innate habits in selecting oviposition sites, but also that 'memory' and 'learning' play a role in their decision making (Millar et al., 1992; McCall and Eaton, 2001; Kaur et al., 2003). To exemplify this, let us consider the case of *Culex quinquefasciatus*, a vector of West Nile virus, St. Louis encephalitis virus, and Western equine encephalitis virus. Using chemical cues, this mosquito is attracted to 4-methylphenol (p-cresol) and repelled by high concentrations of 3-methylindole (skatole), which are odours present in grass infusions (Millar et al., 1992; McCall and Eaton, 2001). However, McCall and Eaton (2001) found out that 'mosquitoes reared in skatole preferred to oviposit in skatole' (2001: 200). In other words, after rearing *Culex* larvae in water solutions containing skatole in concentrations that should repel them, these adult mosquitoes became more attracted to this solution than to the odour of p-cresol. According to the authors, this fact demonstrated a modification (plasticity) in odour preference.

That olfactory information related to breeding habitats affects mosquitoes was not only proven to exist in *Cx. quinquefasciatus*, but also in *Ae. aegypti*. By comparing repellent-treated solution with clean water, Kaur et al. (2003) also showed a kind of 'reversal behaviour' for breeding preferences; mosquitoes reared in solutions treated with a repellent such as neem and citronella (Mozaway™) tended to prefer this



breeding site over a site with clean water – the latter being the expected ‘natural’ choice. The works of McCall and Eaton (2001) on *Culex quinquefasciatus* and Kaur et al. (2003) on *Ae. aegypti* are key studies for understanding how innate preference can be changed because of a learning process in response to chemical cues. I would argue that as it is shown to happen with mosquitoes, Juan David and Luis Fernando also had a sort of ‘olfactory memory’ while they were recalling the experience of having dengue.

As I have described it, the idea of ‘olfactory memory’ offers a useful insight into how and why dengue and mosquitoes create a sensory world. This allows us to examine not only the experience of the people who have had dengue, but also the way ecologists and entomologists explore mosquito behaviour. This is a shared category between public and scientific understandings of the disease. During my fieldwork, I had direct contact with this domain through the experience of Manuela, an entomologist who got involved in my ethnographic research and who had worked for the last four years exploring the sensory world of mosquitoes (Herrera-Varela et al., 2014). Although she was mainly based in Kenya, we met on four occasions and we had many discussions via email and video phonecalls. She was a key participant in the creation of some of the public art events described in Chapter 5.

Manuela’s work with afro-tropical malaria vectors showed that mosquitoes do have a sensory world that allows them to make choices. Some of the questions Manuela asked were: How do *Anopheles gambiae sensu lato* gravid females decide where to lay their eggs? What is the role of chemical cues in the process? To answer these she designed a series of experiments to test the mosquito’s response to natural infusions made from soil, rabbit food pellets and lake water (Herrera-Varela et al., 2014). In artificial ponds she evaluated the behaviour of wild *Anopheles* females, investigating which infusions they selected to lay their eggs. She asked, does the decision change when the options change? How many offspring do they have? She found that mosquitoes expressed ‘avoidances’ and ‘preferences’ (a push-pull system) in the process of choosing breeding-sites (2014: 7) by making decisions that benefit the offspring’s survival: mosquitoes lay eggs in places where a higher number of offspring are more likely to survive. Likewise, chemical cues play a significant role in finding oviposition sites. There were preferences for six-day-old soil infusion even

when mosquitoes had a choice between infusions of similar turbidity and colour (2014: 9-10). However, despite the learning and memory demonstrated by species such as *Cx. quinquefasciatus* (McCall and Eaton, 2001) and *Ae. aegypti* (Kaur et al., 2003), Manuela could not find evidence that the environment in which larvae develop influenced the olfactory memory of gravid *An. gambiae s.l.* mosquitoes (2014: 11). Still, her sensory study of mosquitoes showed that there were chemical cues in the breeding sites that control oviposition behaviour, information that can now be used in the design of different traps for monitoring and control of *Anopheles* mosquitoes (2014: 12). Manuela was also part of a team of international researchers that identified *cedrol* as the first reported chemical to attract gravid *An. gambiae s.l.* mosquitoes (Lindh et al., 2015). This volatile chemical was released from natural infusions made from soil and proved to be an oviposition attractant (Lindh et al., 2015). Clearly, olfactory cues – experienced both by humans and by mosquitoes – play a large role in human-mosquito interactions and in mosquito reproduction.

### **Seeking medical treatment: The role of the Colombian health system**

According to Taussig (1980: 9), in a society governed by the market, fiction becomes reality, and this may indeed be the case with the Colombian health system. Jorge, a doctor involved in this research, commented that if we compare dengue diagnosis and the quality of the health care system, we find a paradox. Firstly, people believe that if they go to the doctor, treatment will be based on acetaminophen and fluid administrations. Secondly, many physicians do not order laboratory tests since medical protocols state that diseases should be treated in a continuum from simple to complex, due to cost-saving measures and as a requirement of the EPSs. This means that basic treatment is typically started without laboratory tests to confirm a diagnosis. Additionally, private health providers limit the time that doctors may spend per medical consultation, and exceeding these limits may result in a penalty. Meanwhile, national and local health authorities' protocols ask for immediate clinical reports once doctors detect dengue symptoms. This, however, is a time-consuming process, so doctors tend to avoid it to save time in the consultation.

The participants in this study spoke about these ideas in relation to types of health services. So for example, if someone has a prepaid medical scheme, there are not be

problems getting an appointment with a doctor. As they point out, ‘if you have the prepaid scheme,<sup>99</sup> you can seek medical treatment whenever you want. It is just a matter of calling the doctor or going to the hospital. Someone will take care of you immediately’. However, when someone has the standard contributory scheme, EPSs will charge you for each appointment. In this case, a person would probably wait two or three days before going to the hospital, reasoning that what they have may not be that serious, perhaps the fever will go away, and in the meantime they can take acetaminophen. The problem gets more serious though, when people are part of SISBEN (the System for the Identification of Potential Beneficiaries of Social Programmes<sup>100</sup>), as did many people at the school where I worked. Diego explained: ‘If you go to the doctor, you will also get acetaminophen, and then you will be sent back to your place. This occurs by pure medical malpractice, and because of it, people prefer not to go to the doctor, and just buy the acetaminophen themselves. We only go to the doctor if the case is really serious, otherwise we wait a couple of days and in the meantime we take acetaminophen’.

The economic situation is an important variable to take into account. With the case of Sara, for example, we see that as she neither had SISBEN nor another health scheme, she did not go to seek medical treatment at the beginning of the infection – she just took acetaminophen. Only when blood started coming out of her nose did she worry that something serious could happen. As she pointed out, she considered such bleeding a ‘medical emergency’. My participants described an emergency as ‘something that puts your life at risk’. Juanita also talked about how to deal with an infection, when to go to the doctor, and why to wait until a symptom easily associated with an ‘emergency’ appears:

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<sup>99</sup> This is a special scheme that is normally paid by people with very high incomes, which can ensure much better access compared to the standard contributory scheme. The coverage rate depends on the benefits the person decides for him/her and members of their close family.

<sup>100</sup> SISBEN (Sistema de Identificación de Potenciales Beneficiarios de Programas Sociales) aims to implement social policies among the lowest-income populations. As part of the obligatory health plan, health services are included in the SISBEN ([www.sisben.gov.co](http://www.sisben.gov.co)).

This is the thing: the hospital is too far from my house, and that's the only place where I can go. So if I want to go to the clinic centre where I am affiliated, I would need to take a bus for an hour and a half, and then wait for the triage at the hospital. So, if I don't consider what I have as an emergency, I would prefer not to go because otherwise I would need to wait a while to see a doctor. If I don't have the need to go, I wouldn't have reasons to go there. In my case, because of the vomiting sensation, the pain, the fever, and the chills I knew I needed to take serum and some acetaminophen. But for example, if I had any kind of bleeding, I would immediately go to the doctor.

This issue was also enacted in the SCAD video, when the children said 'in case of haemorrhaging, please go immediately to the doctor' (see Chapter 2, figure 8). When I was watching this video with Luis Fernando, he commented, 'This is like saying "if there is no blood, there is no need for going to the doctor"'. In other words, the campaigns implied that dengue was only a 'risky' disease if certain symptoms appear. Because pain is not necessarily classified as a 'medical emergency' in hospitals, people prefer to wait before seeking medical treatment. Thus, while the symptoms of dengue may be experienced by individuals as pain they do not exist within the same register of understanding within the hospital system.

Another key point in the management of the disease is the amount of time that people experience symptoms. Because Juanita began to feel better after a few days, she said there were not too many things to be worried about. She did not feel her life to be at risk – it was not an 'emergency' for her – and she just took acetaminophen as it was the drug she knew would be available for her in the hospital. With this we see that the idea of 'medical emergency' is not only related with the symptoms that were manifested, but also with the amount of time they are manifested during the course of the infection.

Jorge argued that 'most of the people only seek medical treatment when they feel really bad – when the disease has progressed too much, and there is a compromise of many organs in the bodies'. According to him, in Colombia most people believe in the concept of 'health' as 'absence of disease', and although this is fundamentally wrong, it is also caused by the way the health system was designed. For him, health

is a balance between mental, physical, and social aspects. In 1946 the WHO declared that ‘good health is a state of complete physical, social and mental well-being, and not merely the absence of disease or infirmity. Health is a resource for everyday life, not the object of living, and is a positive concept emphasizing social and personal resources as well as physical capabilities’ (WHO, 1946). In Colombia, the problem is that the health system has worked through an assistance-based approach (Abadia and Oviedo, 2009; Grupo de Medicina Social, 2012; also see Chapters 1 and 2). According to Jorge, there should be a health system in which people can go to the doctor whenever they have concerns about their health, whether in an emotional, physical or psychological domain: ‘In my consultations, sometimes you find people who come in for problems that are more emotional than physical, and that should be also valid within the health system’. The problem is that in EPSs doctors do not have that much time to establish a dialog with patients during consultation.

Other researchers have shown that in the Colombian health system, if people do not have vital emergencies then after their initial evaluation they may not get treatment or may have to wait in a very long queue (Abadia and Oviedo, 2009; Grupo de Medicina Social, 2012). After analysing interviews and illness histories of 458 patients’ cases in Bogotá, Abadia and Oviedo (2009) concluded that the Colombian health system is made of ‘bureaucratic itineraries’. Patients’ experiences of medical diagnosis, laboratory tests and treatments are not satisfactory, and in many cases they do not respond to their needs. Many of them are forced to look to legal mechanisms to get proper treatment (Abadia and Oviedo, 2009). The system’s structures ‘delay and limit care through cost-containment mechanisms, which has resulted in harmful consequences for people’s lives’ (Abadia and Oviedo, 2009: 1153). While the experiences of the people who took part in this ethnography seem to indicate that the whole medical system is geared towards emergency and efficiency and accountability, other works show that the system does not even work in the case of an emergency. In this respect, the documentary *Medellín en Urgencias* (Grupo de Medicina Social, 2012) reveals the so called ‘death ride’, the popular way for describing the long bureaucratic process for accessing hospitals when people have a medical emergency. Visiting five public and private hospitals of Medellín, this film portrays the pain of the people who are waiting to be seen by a doctor. In many cases, they go from one hospital to another after triage, waiting for a positive

response. Media has also covered cases of this ‘death ride’. For example, Noticias UNO (2012) reported on the case of a person who died after visiting different hospitals six times, being rejected at all of them and receiving no medical assistance. The official reports of the clinics state that there was no capacity to attend to more patients (Noticias UNO, 2012).

To deal with these problems, since March 2013, Santos’s government has launched a campaign to modify the health laws and provide a solution to many of the problems of the system. After many debates, the president has signed a new law – *Ley Estatutaria de Salud* – on 16 February 2015 and, as a consequence, substantial modifications of the health system are expected to take place within a two-year period (Presidencia de la República, 2015). The government not only intends to provide health services as a ‘fundamental right’, but also to modify four key aspects: 1) there will be an increase in the number of medicines that are covered by the service, 2) there will be fewer restrictions for urgent care, eliminating the ‘death ride’, 3) the state will regulate medicine prices, and 4) EPSs will no longer implement cost-saving measures to control what doctors can prescribe; therefore, doctors will have the autonomy to determine which treatment and medicine patients need (MSPS, 2015b; Dinero, 2015; Presidencia de la República, 2015).

Although Santos presented this law as a great achievement of his government, it was actually the result of many years of struggle by civil society. After 1991 many people were forced to use legal mechanisms to get the health care they needed when the EPSs refused to treat them. Those demands were based on the argument that, by neglecting ‘the right to health’, the state was putting their life at risk and therefore failing to fulfil the fundamental ‘right to life’ (Desde Abajo, 2015). In 2008 the Constitutional Court published the *T-760 Sentence*, a judgement aimed at establishing a better regulatory health system. This Sentence not only established that ‘the right to health is a fundamental right’, but also ordered the government to modify and regulate the system. From that year, civil society and the academic sector began to pressure the government for the modifications that were needed in the health service, according to the guidelines of the *T-760 Sentence*. The government, on the other hand, only wanted to provide the same cost-effective service. The first project of the *Ley Estatutaria de Salud* was indeed rejected by the Constitutional

Court in 2014 (the Constitutional Court reviews these kind of laws in a mandatory process), arguing that this project was not only maintaining the same problems of the current system, but it was also restricting the legal mechanisms that people could use to ask for the service (Robledo, 2015). The Constitutional Court then modified the law and asked the government to sign it, something that was rejected by the Santos's government. Part of the discussion was that the government wanted to include a sentence that stated 'no authorization is required for the *initial* care of medical emergencies'. The court asked the government to remove the word 'initial', because in a medical urgency, life is at risk until the person fully recovers his/her health (Hernández in Desde Abajo, 2015).

The discussion even reached the point at which Health Minister Alejandro Gaviria stated that 'the Constitutional Court wants that all Colombians eat lobster' (Revista Semana, 2014b; Robledo, 2015). Gaviria wanted to show that the Constitutional Court was trying to institute something that was 'impossible' to fulfil for the whole Colombian population. Conversely, the argument of the court was that 'life is a non-tradable value [...] health is a fundamental right and a non-delegable duty of the state', so a new law could not longer benefit EPSs (Hernández in Desde Abajo, 2015). The law was only signed after many social movements began to pressure President Santos to meet the court's requirements. A re-arrangement of the financial system is now expected, and some social movements state that the government will try to 'read' this new law in a 'restrictive way' (Desde Abajo, 2015). It is also expected that the national development plan will limit, in some way or another, what is stated in the law (Desde Abajo, 2015).

### **Literalizing metaphors: Acetaminophen and the idea of health as a service**

Acetaminophen is an important medicine in the Colombian health system. It is estimated that Colombians have spent more than 500 billion Colombian pesos on acetaminophen between 2009 and 2013 – about £125 million (Las2Orillas, 2013). This is not only an embarrassment for a government that wants to provide a 'good health system', but a fact that at the same time reveals that people know what is/is not available for them during a basic consultation. Acetaminophen is the medicine doctors are most likely to prescribe to treat joint and muscular pains generated by the

dengue virus and at the same time the first choice for self-treatment by many people. This echoes what Taussig (1997) describes as *the magic of the state*.

In Taussig's work on South America, and particularly Colombia, he has highlighted a need to approach the symbolic realm that conceals human relations in a society based on commodity production (Taussig, 1980: 8-9; 1997). In this particular case, this means thinking about health as a service that the state should provide. By going beyond the surface of a phenomenon, Taussig (1992: 147) suggests that 'the everyday is a question not of universal semiotics but of capitalist mimetics', meaning not an allegorical or metaphorical relation between events (signifier/signified relation<sup>101</sup>), but rather a metonymical connection between them. As an example, Taussig (1997: 189-195) discusses how the Colombian guerrilla movement M-19 stole the sword of Simón Bolívar on January 1974, which was kept in the Quinta de Bolívar museum as a symbol of the freedom and legitimacy of the Colombian state. For Taussig this was both a sacrilegious and a sacred act to pull down the Colombian state (Taussig, 1997: 190). Although from a utilitarian point of view the sword was only a museum piece, Álvaro Fayad Delgado, one of the leaders of the *guerrilla* group, stated that the theft was a historical event linked in time to the moment in which Simón Bolívar was fighting against *conquistadores*. The idea was to remake Bolívar's struggle, not through the use of arms but with political theatre, or what Taussig describes as a *ritual act*, meaning 'a defacement which allows sacred powers to emerge' (1997: 190). This is to say that with the sword, the M-19 did not want to eliminate state power, but instead to overthrow state power as a metonymic act: to take the sword as a way of taking the Colombian state. It was a theft of the 'magical properties' of the state apparatus represented in the sword.

According to Taussig (1997: 192), an art form of sacrilege worked as an inversion of sacrifice: 'sacrifice involves the mediation of extremes by some object that connects the extremes metonymically, not metaphorically and has to be extinguished in the

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<sup>101</sup> Regarding this interpretation, Taussig (1980: 9) commented: 'unless we realize that the social relations thus signified are themselves signs and social constructs defined by categories of thought that are also the product of society and history, we remain victims of and apologists for the semiotic that we are seeking to understand'.



process. If with sacrifice it is the emptiness that fulfills, with sacrilege it is the filling of the space with the extremes that not so much fulfills as spills over in proliferating cascades'. He further supports this description by referencing Thomas Hobbes, and commenting that 'covenants without the sword are but words' (cited in Taussig, 1997: 192). So by looking back and putting everything together, the sword was an object that connected the idea of *force* and *word*, and the sacrilegious act can be read as a literalizing metaphor, or a metonymy. If the sword of state is the element that mediates between *force* and *word*, the stolen sword represents both the state and the absence of the sword of the state (Taussig, 1997: 192-193). In short, by taking the sword of state, the state is overthrown.

There seems to be a very interesting connection between Taussig's analysis of historical events in relation to state formation, the official health system, and the use of acetaminophen. As I described in Chapter 1, in Colombia, many people equally believe in the healing powers of God, Virgin Mary, *yerbateros* and physicians (Press, 1971; Sowell, 2003; Valencia Alzate, 2013: 52). They equally trust in the pharmacist and their neighbours. The analysis of the prescription of pain relievers (namely acetaminophen or paracetamol) offers a very good insight into this medical pluralism, and also reveals *the magic of the state*. This drug is not only the first choice for self-medication and what dengue-fever patients should take for pain, but it is also the most prescribed treatment as a way to reduce expenses in the official health system.

One day in 2012, I went to visit Rosa to talk about her thoughts about mosquitoes. At the time she was a 70-year-old woman with cancer, and although her pain was so strong that even morphine could not reduce it, she repeatedly stated that acetaminophen made her feel much better (most of her thoughts about dealing with mosquitoes can be found in the *Buzzing* project, Valencia-Tobón, 2012b). When I asked her about her pains, she replied she was feeling better because 'acetaminophen is the God of the earth!' This sentence surprised me a lot. Rosa equally prayed to the Virgin Mary, asking for better health, and to the 'blessed' acetaminophen, because she 'was told this drug was really good for treating pain'. As morphine is prescribed for treating severe acute pain, such as trauma, post-operative pain, or cancer pain (Berry et al., 2011: 29), it is evident, from a biological point of view, that morphine

is a stronger analgesic than acetaminophen. In Rosa's case, we are facing a case of non-pharmacological pain control or placebo effect (McCaffery, 1990; Leslie and Marlow, 2006; Guess et al., 2002). In other words, in the Colombian context there is such a strong belief in acetaminophen as a 'very good' medicine for pain control that Rosa could experience pain relief or a peaceful experience after taking it, a consequence of a psychological association.



Figure 35. Photo at Rosa's house. Photo by Mario H. Valencia

In Rosa's description, we see how acetaminophen connects both the sacred and the secular. Acetaminophen has been not only a 'God' for Rosa, but also for many doctors in the Colombian health system. It has been a drug widely prescribed to treat different illnesses as a way of avoiding prescriptions of more expensive drugs – and in general to save money for the EPSs (Desde Abajo, 2015). It is believed by many that if you go to the hospital, it will not matter what condition you might have, you will most likely first get acetaminophen prescriptions. The subjects of my ethnography often said sentences like, 'There is nothing more disappointing than when a doctor tells me that the only thing he can prescribe for me is acetaminophen'. And this is precisely why they treated themselves with it. However, as there is neither specific antiviral drug/treatment for dengue, nor any available vaccine, acetaminophen is actually one of the first-choice treatments to relieve joint and

muscular pains (while severe dengue cases require in-hospital care, this does not mean that patients receive antiviral drugs). Because of the excessive use of acetaminophen and the symbolic association it has, some people feel really disappointed when they are prescribed with acetaminophen to treat dengue symptoms.

As happened with the Libertador's sword (Taussig, 1997), it seems to me that acetaminophen also reveals a political theatre in which fiction becomes reality. On the one hand, acetaminophen is what dengue fever patients should take to relieve their pains, but on the other, it is the drug that reveals that the state is not properly responding with the examinations and treatments people require. It is both a self-medication and a prescribed treatment. In other words, acetaminophen is a 'one-size-fits-all' medication, a strategy that has been shown to be inconsistent and inadequate in other neglected tropical diseases (Parker and Allen, 2011). It represents both the state and the absence of the state, the service that should be provided by the government and the absence of that service. Around acetaminophen there are two symbols: the symbology associated with a self-treatment (the folk medicine), and the symbology of the service that the state provides (official health system). Whilst the uses of acetaminophen are very explicit from an official point of view, as doctors widely prescribe it, the ministry of health talks about it as a pain reliever; the symbology of it in popular culture is implicit. This shows how official and folk medicine are connected. As seen in Rosa's case, it combines the 'magical properties' of the official health system with the healing powers of God, literalizing a metaphor that enacts a medical pluralism.

## Chapter 4

### ANTHROPOLOGY AND ART

#### **The science as art of human-dengue relations: an experiment in ethnography**

The public understandings of dengue that this thesis investigates are addressed through direct modes of engagement using art methods. In this chapter I explore how these modes of engagement constitute ethnographic knowledge. Anthropological knowledge is *relational* not only in the sense that it is based on ‘relations between people or between people and objects’ (Hastrup, 2004: 456), but also because it links social experience and historical events to provide explanations beyond the ‘truth’ of the facts themselves (evidence in positivist terms), providing alternative ways of seeing things (Hastrup, 2004: 469). In the classic public<sup>102</sup> engagement discourse, as Nowotny et al. (2001) describe it, the scientific academy (in the present case virologists, entomologists, epidemiologists, etc) is only responsible for knowledge production, and non-expert citizens ‘learn’ from the authority and neutrality of science. Nevertheless, reworking the idea of interdisciplinarity so as to accommodate ethnography can help to think about how ‘public understanding’ is the result of a dialogue between peoples from different academic backgrounds (da Costa and Philip, 2008; Barry and Born 2010, 2013a, b). I call this exercise ‘ethnography as public experiment’ for while in science there are a series of processes delimited by objective and rational theories in a hypothetic-deductive method, the study of social relations in anthropology is more related to subjective realities, and in art to aesthetic expressions. In such a context, interdisciplinarity implies the problematisation of situations that require novel responses, raising questions and providing means for the interaction of new forms of thought, dialogic and experimental approaches, rather than simply considering problems as obstacles that need to be overcome (Barry et al., 2008: 29–30; Barry and Born, 2013a: 10). These ideas are critically connected with the interaction between scientific, public and everyday understandings of dengue. On

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<sup>102</sup> Following Monica Greco, ‘public’ is understood here ‘as *other* with respect to the expert or the professional’ (2013: 234).

the one hand, interdisciplinary<sup>103</sup> relations ‘portray the microsocial collaborative endeavour between artists and scientists as a crucible for creativity and as itself a focal value’ (Barry et al., 2008: 30). On the other, these relations allow forms of interactive communication and ‘participatory engagement’ where the human element and the subjective experience of ‘real people’ (non-expert citizens or publics) are taken into account (Nowotny et al., 2001: 256–257). One of the main examples cited in literature about this theoretical approach is the art-science project *PigeonBlog* (da Costa and Edwards, 2006). Aiming to provide low-tech means to collect data on air pollution, da Costa and Edwards equipped urban pigeons with GPS-enabled sensing devices (Arts Catalyst, 2009). The result is a ‘social experiment between humans and animals’ that invites people to reflect on environmental problems (Arts Catalyst, 2009; Barry and Born, 2013b: 261).

With the help of the main participants in my ethnography (the people introduced in Chapters 2 and 3 as ‘non-expert citizens’), I brought together two artists, a photographer, a virologist, a physician, and two entomologists to collaboratively produce ‘public experiments’. In these experiments we exchanged different ideas about what dengue is, and how it was described from all these different perspectives. A ‘public experiment’ is understood here as a reflexive relationship between different people that are seen as objects and subjects of knowledge across their disciplines (da Costa and Philip, 2008; Barry and Born 2010: 114; 2013b: 261–4). Barry and Born (2013b) differentiate between ‘public information’ and the practice of a public experiment in the sense that the former only presents data in public as ‘finished or inert information’. In the public experiment, on the other hand, ‘the practice takes an experimental and local form to develop a different kind of public knowledge that enfolds both themselves and their relations with their immediate environment’ (2013: 262–263). During these reflexive processes we re-worked the different experiences of participants as an ethnographic experiment in relational art.

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<sup>103</sup> Other academics use the term ‘transdisciplinarity’ to describe the kind of research projects that are not derived from pre-existing disciplines, which suggest stronger and more radical implications than the interdisciplinary projects (see Barry and Born, 2013a).

As previously described, my fieldwork was divided into three phases. I first focused on the everyday understandings of dengue and particularly the experience of the people who have had the disease (Chapter 3). I then examined the public health discourse and the design of educational campaigns (Chapter 2). In the last phase, I wanted to achieve an anthropology-art-science collaboration, and to do so needed to consider different points. Firstly, in Phase III I already had the ethnographic information from Phases I and II, so at that point the question was about how to design ‘experiments’ in conjunction with the subjects of my ethnography that not only invited them to participate, but that at the same time created a relationship with the public in different locations around the city.

The other issue was about how to collaboratively re-work the information I had gathered so far. The ideas about dengue are relational, embedded in and emergent from particular relationships. These public art experiments were a way of investigating and representing this relationality. This meant creating pieces that first, could be placed in the street, in art galleries or in public spaces, second, creatively engaged with a wider audience, and third, provided a critical reflection on the kind of top-down relations at work in the health campaigns (see Chapter 2). Examples of this are found in Chapter 5, which include the *Mosquito kite project* (<http://goo.gl/oQt2gV>), an intervention element that invited a re-thinking of how mosquitoes and dengue were understood to interact with people; *Serotype* (<http://goo.gl/NnTg6P>), a fictional character who embodies the experience of having dengue fever; and *Vampires* (<http://goo.gl/roHz5m>), a series of participatory experiments set up in public and private spaces. These were made up of sound installations, drawings, photographs, and large-scale video interventions.

To understand how the concept and design of these interventions are interrogative of the public health campaigns, we need to appreciate how they derive from the productive intersections of anthropology, art and science. I will be making an argument not only based on a methodological approach, but also addressing two themes: ‘public’ and ‘evidence’. The notion of ‘public’ I am proposing is undifferentiated in public health campaigns as they only present a tiny part of institutionalised and scientific knowledge. My relational art interventions complicate the idea of public by showing how understandings of the disease are relational.

Therefore, they suggest an exchange of creative knowledge in forms that remain freely available. Likewise, the artwork reveals a more complex and nuanced understanding of what counts as ‘evidence’ of dengue and its prevention. Beyond the claims regarding the reduction of mosquito-breeding sites, the emergent meanings given to dengue by those who have had the disease show that the question of evidence goes beyond knowledge facts in positivist terms. As Hastrup (2004) argues, seeing anthropological knowledge as a relational process, by linking social experiences, historical events and the processes by which they come to be meaningful, implies that ‘knowledge is gradually incorporated’ and that objects of study do not have ‘fixed ontological status’ (2004: 468). These evidential and ontological questions arose when, for example, we exchanged the taxonomic analysis of mosquitoes and the epidemiological understanding of the disease in the city for street performances around the city that relate in the public imagination. In the follow sections, I will provide a critical insight into the relation between anthropology, art and science. In this way, this chapter sets up the theoretical basis for understanding Phase III, the ethnographic material from which is presented in Chapter 5.

### **Relationality, participation, appropriation**

The conceptualisation and design of my relational art experiments aimed to find a way of building relations with the public about and through an anthropological and artistic re-working of different types of knowledge that emerged from a network of relations during my ethnographic work. Simply showing to the public the various scientific methods at work would not be sufficient and could have been confusing. I wanted to involve the people who had the disease in a relationship with the ‘expert producers of knowledge’ (academics and scientist), as producers of knowledge. In light of this, I used the ideas of *relationality*, *participation* and *appropriation*.

### **Relationality: Relational art as a way of revealing local knowledge**

In Chapter 3, I showed why, as Mol (2002) and Law and Mol (2011) state, disease is not a single object, and how it is enacted differently depending on the kinds of techniques used or the approach taken. I described different methodologies to

represent, show, enact or see a virus or a disease, and with them I argued that there are different goals and different purposes around dengue fever research. This means, therefore, that the ontology of dengue is enacted in different ways. By bringing together a virologist, entomologist, and physicians, my objective was, therefore, to understand the various kinds of knowledge that were instrumental to all of these actors, and the ways in which they could be part of models of social change during contact with the public. To do so, the experiences of people who had the disease was fundamental. Therefore, the last part of my ethnography was about understanding that among these different approaches some ideas can never ‘travel’, some things can ‘travel’ and some others are just ‘incomprehensible’ to the other. The way I addressed this was by applying the *co-existence criterion* (Bourriaud, 2002: 109). This criterion indicates that works of art should be created as a form of sociability and therefore, a fundamental question should be asked in terms of public participation: *does this work allow me to enter into dialogue?* (Bourriaud, 2002: 109). People exist and their thoughts are as important as the artwork as such. Relational art is a way of opening up the context, and giving people the possibility to complement the work of art. For example, in Chapter 5 I will show how people re-interpret what they saw in the public experiments, and how they produced derivative works by using drawings, photographs, or audio recordings. This was, in other words, an invitation to appropriate the kind of work that the main subjects and I had created together, to open up a door to an endless dialogue to collaboratively design ontological changes and alternative ways to understand public health campaigns.

We can consider relational art as a way of re-reading human ‘relations’ in different social contexts (Bourriaud, 2002, 1998). My art works helped the participants to re-read the human relations that are at stake in dengue disease prevention, providing a critique of public health campaigns and revealing local knowledge. In this respect, I am particularly interested in the body of work that has been recognised through the writings of the French curator Nicolas Bourriaud. Bourriaud’s approach advocates a different use of gallery space in which curators bring in works which are not so much about content, as about relationships. Relational aesthetics is defined as the ‘aesthetic theory consisting in judging artworks on the basis of the inter-human relations which they represent, produce or prompt’ (Bourriaud, 2002: 112). For Bourriaud relational aesthetics refers to the necessity for a constant re-enacting process, in an inter-human



game that goes beyond the production of an artefact. It is more about the relations that artists produce than about the aesthetic pieces that they create (Bourriaud, 1998, 2002).

Art<sup>104</sup> should be understood, therefore, as a ‘negotiation’ of intersubjectivities, rather than as a ‘commodity’ (Bourriaud, 2002). One example of this kind of work is that of Rirkrit Tiravanija, who develops hybrid installation and performances in which he cooks for the people attending the museum (Bishop, 2004: 55–56). By doing this artwork, he creates a relational space in which he facilitates a relationship among the audience members, and between the audience and himself as an artist. A question for my project here is, what insights into the particular qualities of human relations with dengue may be revealed with this kind of work? The significance of this question is that it offers a critical perspective on the structures of relations among virologists and entomologists in the way that they produce knowledge about dengue, and insights into how the ‘public’ is conceived and what counts as ‘evidence’. Therefore, my collaborators and I designed and performed different experiments to reproduce this structure and invited people to take part in their design and operation. The experiments highlighted how the laboratory science and state education structurations of the relationships between people and dengue/mosquitoes were made and allowed participants to play with and reconfigure these structures. In this process, it was fundamental to identify what was happening in the way that the work was made for the purpose of expressing relationships between people and dengue/mosquitoes and then to follow the understandings of dengue that emerged in participants’ responses to this work.

In the Colombian context there is already an understanding of how public art can work to appropriate scientific ideas or convey anthropological research. Public and private organisations have been involved in understanding processes of knowledge making by drawing together perspectives and approaches from art, science, and

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<sup>104</sup> Although Bourriaud acknowledges that nowadays the word ‘art’ is overused and seems more likely to be a ‘semantic leftover’, he describes this term as ‘an activity consisting in producing relationships with the word with the help of signs, forms, actions and objects’ (2002: 107).

technology. *Unloquer* (<http://unloquer.org/>), for example, is a multi-disciplinary collective that tries to re-define science and technology, through the creation of ‘hackerspaces’. They basically build experimental laboratories to produce ‘garage science’, where participants can interact with different objects, recycled material and free software. They work in cooperation with *Casa3Patios* (<http://www.casatrespatios.org/>), a non-profit organisation that engages contemporary artists not only to produce art exhibitions, but also to develop connections between art and community-based projects. In parallel to these kinds of independent initiatives, the Planetarium of Medellin (<http://www.planetariomedellin.org/>) or the Explora Park (<http://www.parqueexplora.org/>) are both private- and state- sponsored institutions which work to promote a ‘scientific culture’ through interactive exhibits. They engage primary and high school students, university members, and academics from social, natural or applied sciences, in the discussion of scientific knowledge in areas such as biology, astronomy, physics, and chemistry. Likewise, they offer a free entrance to many of the events, so people of any economic class may participate.

Two local examples of the connection between anthropology, art and technology are *Pregones de Medellín* (<http://pregonerosdemedellin.com/>) and *InspiraLab* (<http://www.inspiralab.net/>). *Pregones de Medellín* is an interactive web documentary directed by Ángela Carabalí and Thibault Durand (2015), which offers a sensory journey into the world of street vendors in Medellín. By emulating street walk experiences through the computer screen, this documentary invites people to navigate along fifteen narratives from different street sellers who advertise their products by singing. *Pregones de Medellín* encapsulates a unique sonic landscape created thanks to the creativity of these particular street sellers, and by doing so, this journey-form explores the multiplicity of trajectories of the people walking around the streets of Medellín. *InspiraLab* is a multidisciplinary team lead by Felipe Arboleda that works as a ‘laboratory’ for shifting new understanding of human relations. Based on the integration of theories drawn from anthropology, geography, art, advertising, mathematics and biology, this team co-produces innovative and creative projects for public and private institutions. An example of this is the project *Centro Imaginado* (<http://centroimaginado.com/viz/mapaoportunidades/>), an economic, anthropological and cartographic investigation of the city centre of

Medellín. By asking people how they would imagine the city centre of Medellín, the idea was to visualise a set of projects that could be developed in small, medium or large scale and that could improve the quality of life in this area in the present and the future. This project firstly explored the redefinition and re-appropriation that different inhabitants make of three areas of the city centre: Guayaquil, Prado Centro and Estación Villa. Afterwards, the *InspiraLab* team geo-referenced a set of locations that corresponded to areas that offer economic or cultural opportunities so as to create the kind of city centre that people envision for themselves and for generations to come. The project was finally presented as a form of cyber-ethnography that is freely available for the public.

The two previous examples can also be framed in community art theories. ‘Community art’ is not about pictures or images, but about the practices and appropriations of objects in particular social contexts, in order to make a critique – so it is critical and contextual (Fraser, 2005). On one hand, although *Pregonos de Medellín* got the support of the Colombian government, this project is implicitly reflecting back on informal jobs and unemployment as issues neglected by many local administrations.<sup>105</sup> On the other, *Centro imaginado* is an attempt to re-configure one of the most disorganised areas in Medellín, in a city that grew with virtually no urban planning. Another example of this is framed in the work of Hans Haacke, who pays particular attention to systems and processes in the social, political and biological domains. The idea of symbolic capital (Pierre Bourdieu) is used to criticise institutions and the power relations that governments impose on societies through the Art World. In the work called *Moma Poll* (1970), for instance, Haacke set up a voting system as an art piece, where the audience was asked to answer this question: ‘would the fact that Governor Rockefeller has not denounced President Nixon's Indochina policy be a reason for you not to vote for him in November?’ (Haacke, 1970). This piece not only had deep political implication, but it also challenged viewers to have a direct engagement with the political context behind the production of ‘art’.

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<sup>105</sup> During the late 20th century job opportunities decreased dramatically because of violence, drug trafficking and political conflicts. With an unemployment rate of 13.9%, there are an estimated 25,000 street vendors, of which the government legally recognises 9,320 (Telemedellín, 2012).

In the Colombian context we can see the influence of this approach to art making as social critique in the work of Camilo Cantor (2012) who uses art as a tool to promote free knowledge. In the project *LIBRE-ria*, he uses QR- codes to create libraries in public spaces by using content with Creative Commons licenses. In his urban interventions, he also invites the audience to be part of ‘hacking processes’ so as to achieve change in the system of cultural values linked to copyright policies. In the same way, the anthropology-art-science relations of my project were a way to develop a critical investigation of everyday experiences of dengue and the structuration of relations, and to show why a change in policymaking around dengue fever is needed. For example, by including the experiences of people who have had dengue and by inviting a virologist to take part in the public experiments (whose modes of understanding dengue are not part of the public health campaigns), I have tried to show why narratives are deeply implicated in the notion of knowledge itself as different forms of evidence. On the one hand, you get the scientific and expert discourses producing powerful truths, but equally embedded in narratives (Escobar, 1995: 20; Haraway, 1993), and on the other, ‘the profoundly performative and relational mode of knowing in anthropology implicates us deeply in a narrative ethics that is the source of anthropological authority, and gives force to the argument that connects the ‘true’ in new ways’ (Hastrup, 2004: 469).

We can also understand ‘relations’ as part of an institutional critique<sup>106</sup> where art is considered to be a social field which can only be legitimated by defending the institution as an expression of political power or market values (Fraser, 1997, 2005). The performance artist Andrea Fraser is known for her critique of the commercial art world through methodologies of critically reflexive site-specificity (Fraser, 2005). This means developing artwork that is meticulously designed and particularly focused on specific contexts. For example in *Museum highlights: a gallery talk* (1991) she performs tours inside museums as a way to juxtapose discourses around the idea of what a public institution represents. By using dramatic terms and academic quotations, she criticises the social distinctions of taste that are produced through the operation of art institutions. According to Fraser, relations with institutions can only be changed if we work within and through them. These

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<sup>106</sup> Andrea Fraser also uses the term *institution of critique*.

processes recreate relations of power in order to critique them. It is not about directly attacking the institutions, but about subversively re-thinking the interactions that take place within them. In my case, the re-design of science as art may be seen as an institutional critique of the pre-established paradigms in the educational campaigns. A key point here is that two of my informants were part of some of the health institutions that these kinds of interventions want to criticise.

Works such as mine that present science as art are ways of seeing human-mosquito 'relations' as dynamic processes. To illustrate what is meant here by processes, we can consider the work of the artist Mark Dion, who appropriates archaeological methods in his art-making (Coles and Dion, 1999; Renfrew, 1999; Sheehy, 2006). For Dion, the making and the presentation of art is a matter of processes that are not simply a question of discretely separating out what goes on in the artist's studio and the subsequent presentation of discrete objects for audiences in galleries. In the first stage of his work, Dion meticulously mimics archaeological processes in order to raise questions about how they constitute ideas about the past and the present. He then subverts the rules of modern natural history museums by displaying the objects (which includes rocks, broken pottery, rusty keys, knives, toys, and animal bones encountered in the first stage) in galleries as a series of 'cabinets of curiosities'. Commenting on Dion's *Tate Thames dig* (1999), the archaeologist Colin Renfrew (1999) holds that Dion's installations are not only a material 'archaeology' but also a disciplinary archaeology.

In the Colombian context, Gabriel Vanegas with his project *Botaniq* (<http://botaniq.org/>) has explored how to 'preserve' the experience of the people when they are confronted with media art. *Botaniq* tries to replicate the illustrated diaries kept by European *conquistadores* in the 16th century to document what they saw in the new natural landscape of the American tropics. These conquistadores faced problems such as how to preserve the taste and smell of a pineapple and share this in Europe, since these unfamiliar fruits and animals could not be transported during months across oceans. The way they did it was by using illustrated diaries in which they wrote about and drew their perceptions. In this way, other Europeans could 'meet' these unknown animals and plants. Vanegas suggests that, like the smell of the pineapple, people's reactions to media art are equally intangible and

ephemeral, for there is no object to be preserved. The most we can do is find a way of collecting the experiences of the people who interact with the artwork. Thus, in collaboration with art galleries or art festivals that incorporate media art exhibitions, Vanegas creates four-day workshops where he invites people to choose an artwork and respond to it by registering their impressions and thoughts in personal diaries. After the workshop, these diaries are collected and compiled in a book, or ‘codex’, that preserves the essence of a particular media art exhibition. These books are then digitised and placed on the Internet for free access (<http://botaniq.org/codex-media-art/>). The objective is to create a ‘codex of media art’ or an ‘encyclopaedia’, made of diaries created during the workshops.

Vanegas, in the project *MinkaLab* (<http://minkalab.org/en/>), also shows how the idea of relations as a process is materialised in the collaboration between indigenous groups, farmers, afro-Colombians, artists and activists, who worked together to create sustainable ideas for the future of the Risaralda region in Colombia. Based on ‘tolerance and equality of different forms of knowledge’, this laboratory *for* the community and *in* the community tries to link ancestral techniques, modern technologies and art practices to fight against land exploitation and the loss of biodiversity.

## **Participation**

As I have described, Bourriaud’s relational aesthetics is an important concept for my work. It offers a particular way of seeing experience and relationality in terms of a ‘negotiation’ of intersubjectivities, which are key parts of my research. However, there are other possible ways to understand the concept of participation around art theory. For example, Grant H. Kester represents a perspective in which participation is seen as dialogical practices (participation as conversation) and ‘empathetic identification between artists and their collaborators and among the collaborators themselves’ (Kester, 2004: 150). Such engagement in conversation ‘facilitates a reciprocal exchange that allows us to think outside our own lived experience and

establish a more compassionate relationship with others' (Kester, 2004: 150).<sup>107</sup> Although for both Kester and Bourriaud participation implies the development of a work of art linking intersubjective experiences, the former privileges the idea of social, political or cultural activism (Kester, 2004: 9; 2011: 37), and the latter describes such 'revolutionary hopes' as 'futile', privileging the intersubjective exchange within micro communities in an open-ended process, without 'social utopias' and political referents (Bourriaud, 2002: 31). The key point for Bourriaud is that such activist perspectives should be replaced by 'everyday micro-utopias' and 'imitative strategies' (2002: 31) because 'any 'direct' critique of society is pointless if it is based upon the illusion of a marginality that is now impossible, if not regressive' (1998: 163).

An example to locate Kester's approach is *Crochet coral reef* (<http://crochetcoralreef.org/>), which is a project about participation, marine biology, feminine handicraft, physics, and mathematics, that not only reflects on environmental activism and the effects of climate change in coral reefs, but also on the value of embodied knowledge (Wertheim, 2009). Margaret Wertheim and her sister Christine deal with the aesthetic and artistic appropriation of very abstract scientific concepts, such as the problem modelling hyperbolic spaces which arises when the parallel postulate in a two-dimensional (non-Euclidean) geometry does not hold. A coral reef is an example of such space: although a reef is very difficult to recreate, it can be modelled using crochet techniques. The idea of making crochet coral models got a lot of attention, and thanks to the participation of thousands of people all around the world, in 2007 Wertheim sisters were able to fill a 3,000-square-foot gallery in Chicago.

Claire Bishop advocates a different idea of participation and relationality, neglecting the recognition of 'art' for those practices that are based on collaborations with social

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<sup>107</sup> Although historically the notion of participation is highly related to Dada, Surrealism and avant-garde art in the sense that they were the first to embrace a collective creativity by provoking the public to be part of the creation of works of art (Bishop, 2006: 9-10), Kester questions such practices because they shock, disrupt or create discomfort in the audience, or they generate frustration when the artwork is difficult to understand (Kester, 2004: 27; 2011: 58-59).

movements and that represent political resistance (Bishop, 2004, 2005, 2006b). Bishop's and Bourriaud's approach are similar at a theoretical level (Bishop, 2012: 2), but differ in practice as Bishop privileges the notion of participation as 'relational antagonism', or a model for understanding art practices that produce 'discomfort', 'friction', or 'awkwardness' in the audience (Bishop, 2004: 79).<sup>108</sup> For Bishop, all the interactive, dialogic or socially-engaged works are 'automatically assumed to be democratic and therefore good' (2005: 34), which implies that community-based art has prompted 'an ethical turn in art criticism' (2006b: 180). When political tasks are perceived as artistic expressions of resistance, 'there can be no failed, unsuccessful, unresolved, or boring works of collaborative art because all are equally essential to the task of strengthening the social bond' (2006b: 180). So the point for Bishop (2006b, 2004) is that when artists locate themselves within an activist lineage, they are implicitly making the 'correct' ethical choice, and therefore avoiding a critical aesthetic judgement in favour of producing social change.<sup>109</sup> These artists thus do not need to answer questions such as 'what is the quality of the relationships being produced?' and 'for whom and why are they produced?' Following Ernesto Laclau and Chantal Mouffe, Bishop holds that a truly 'democratic society' only exists when relations of conflict exist and when antagonism and friction have not disappeared (2004: 65-66). When the audience is confronted, people start *thinking*, and this is the most important response to any artwork. Every provocative action is, in turn, more political than the ones produced by socially engaged public art projects (2005: 35), without compromising the aesthetic judgement in favour of the correct ethico-political choice.

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<sup>108</sup> Bishop supports the work of Santiago Sierra, Thomas Hirschhorn, Phil Collins and Lars von Trier, all of whom provide artistic experience as relational antagonism. She considers their work to be 'participatory', even when their artwork is not directly activating relations among people. For example, in the installation *Tarpaulin suspended from the façade of a building* (2002), Sierra covered the frontage of the modern art museum La Tertulia (Cali, Colombia), with a 20 by 15 metre US flag. In the fifth day of the installation, someone tried to burn the flag. Following this the flag was removed to avoid damage to the building.

<sup>109</sup> In this scenario, there is 'tacit analogy between anticapitalism and the Christian 'good soul'' (Bishop, 2006b: 183): by erasing relations of conflict and sacrificing authorship in favour of 'true' collaborations, artists choose what is thought to be 'politically correct' and ethically acceptable (Bishop, 2004, 2005, 2006b). This argument is very similar to the one presented by Sagan and Margulis (1993: 351) against the salvationist discourses around biodiversity.



Finally, it is important to note that as some of my interventions were developed in the style of theatre and/or participatory performance (e.g. *Serotype*), another key point of theoretical reference is the ideas of ‘theatre of the oppressed’ and ‘invisible theatre’ of the Brazilian director Augusto Boal (Babbage, 2004; Bishop, 2012: 122–128; Boal, 2015). This is the case in the sense that the interventions were developed without explicit pre-advertisement of them, and that they aimed to ‘provoke spontaneous reactions and stimulate debate among members of the public’ (Babbage, 2004: 21). However, I did not aim for them to be ‘politically useful’ by connecting them with community activism. Rather, I wanted to ‘insinuate a moment of doubt and suspicion in the viewer’s habitual experiences of city life’ (see Bishop, 2012: 224–225, commenting on the work of the Spanish artist Dora García).

### **Appropriation**

According to Marcus and Myers (1995), appropriation is the process of using ‘ideology, discursive practices, or microtechnologies for assimilating difference (other cultural materials) in varying ways’ in a process that is ‘generally accomplished by stripping cultural materials of original context; or using representations of an original context in such a way as to allow for an embedding of this influence within the activities and interests of producing art’ (Marcus and Myers, 1995: 33). By appropriating information, artists produce other forms of knowledge that can work in an interesting way to question the ‘objective’ authority that science holds in society (Wertheim, 2009). This is the case in experimental documentary storytelling, a form of film making in which artists appropriate the structure of scientific documentaries to question the idea of ‘objective’ reality (Mayeri, 2008).

Rachel Mayeri holds that ‘scientists are the sagacious narrators of their own documentaries, whether presented as journal articles, conference presentations, lectures, or grant applications’ (Mayeri, 2008: 65). By using simple language and third person explanatory voices, academics ‘teach’ certain facts to the public.<sup>110</sup> But

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<sup>110</sup> This is particularly evident after the end of the 1940s (post-war period), in which the wildlife genre began to be very popular as a nonfiction filmmaking practice (Chris, 2006)

what happens when someone re-works the idea of ‘scientific documentary’ by changing the third person omniscient voice? This is precisely what the artist Jim Trainor does by using a first person narration to appropriate scientific facts from an animal point of view. In animated films like *The bats* (1998), *The moschops* (1999) and *Harmony* (2004), Trainor reveals the unseemly, meanness and cruelty of animals, in what he describes as the ‘Darwinian struggle for survival’ (Art Institute of Chicago – SAIC, 2013). His most recent project, *The pink egg* (2015), is a live-action feature film, in which actors imitate insect behaviour. The idea is that audience members use their imaginations to construct a meaning out of the films. Like Trainor, Nancy Andrews (<http://nancyandrews.net/>) also reflects on scientific knowledge production. For example, *Behind the eyes are the ears* (2010) and *The strange eyes of Dr. Myers* (2014) are science fiction and magical realism films in which Andrews explores human consciousness, brain science and the idea of multi-sensorial perception by hybridising humans and animals.

In the Colombian context, Gabriel Zea (*The random lab* project: <http://zea.randomlab.net/>), Hamilton Mestizo (*Librepensante* project: <http://librepensante.org/>) and Alejandro Tamayo (<http://www.thepopshop.org/>) offer good examples for understanding what this appropriation means and why it is relevant. They have created experimental laboratories to explore the appropriation of bio-art and biotechnology from social and artistic domains. In cooperation with academic institutions, they have created digital games, moveable stations for real-time interactions, installations with elements that measure air pollution or use energy from green algae, and workshops for experimentations with electricity. Their interventions, in galleries or public spaces, engage audiences with a critical idea of what ‘science’ means.

### **Ethnography as a design process**

The relationship between art and anthropology has been widely acknowledged (Schneider, 2006; Schneider and Wright, 2010; Irving, 2007, 2009; Schneider and Pasqualino, 2014). They both work ‘as discursive arenas for comprehending or evaluating cultural activity, both situated in a critical stance toward the *modernity*’ (Marcus and Myers, 1995: 5–6). Both art and anthropology are implicated in the

production of cultural knowledge<sup>111</sup> through the creation of ‘hybrid contact zones’ (Schneider and Wright, 2010: 5). Art is a ‘continuous [non-static] working model of culture’ (Kosuth, 1999: 339). By reflecting back on these ideas, George Marcus (1995: 95) has introduced the notion of *multi-sited ethnography* as a particular kind of work that ‘moves from its conventional single-site location, contextualised by macro-constructions of a larger social order, to multiple sites of observation and participation that cross-cut dichotomies such as the “local” and the “global”, the “lifeworld” and the “system”’. With this concept, Marcus challenges the limits of ethnographic research in a systemic world where the anthropologist can equally follow people or things, ideas and concepts, in a network of relations that is not necessarily fixed to a single space. Such context implies having anthropology engaged with science, media, and technology studies in order to deal with contemporary issues and produce systemic narratives. Thus, Marcus argues, ethnographic research should follow relationships and associations as a trans- and cross-disciplinary production (1995: 97). Marcus further develops these ideas with the notion of *ethnography by design* (Rabinow and Marcus, 2008; UCI, 2014). This implies re-thinking ethnography as a design process, so that just as a design reveals the structure of an object,<sup>112</sup> an ‘ethnography by design’ will create a space for revealing ‘unseen’ structures around complex relationships of partnership and collaboration in contemporary projects (Marcus, 2010). The questions such ethnography asks include: *how might design processes inform the way anthropologists are trained to conduct ethnographic research? Could design practices inform contemporary problems of ethnographic research involving*

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<sup>111</sup> Although anthropologists used to analyse art production in light of the art market, asking questions about power and money, Marcus and Myers (1995) argue this is a simplistic approach, merely linked with the circulation of works of art as objects (1995: 26). Such objects have their own realm of meaning, linked to culture values in local contexts. As ‘objects’ are circulated through the art market, they began to have implications in nationalism, commercial expansion, and even politics (Marcus and Myers, 1995). All this means that art not only produces objects, but also a set of relations. For example, the fact of having Native American artefacts circulating around the world as ‘art’, raises questions of how the ‘primitive’ became part of the ‘modern’, which leads us to think about nation-building and identity (Marcus and Myers, 1995: 34-35).

<sup>112</sup> By drawing, designers represent the structure of 3-dimensional objects.

*different kinds of outcomes, partnerships, and collaborations?* (Marcus, 2010; UCI, 2014).

When ethnographers work in knowledge-production projects, Marcus (2010) holds that it is very relevant to design events that blur the boundaries between the ethnographic fieldwork, the seminar room, the academic conference and the journal publication. Such events would allow the encounter of academic and non-academic communities, which will be gathering together as partners, subjects and objects of the research at the same time. Marcus names these kinds of events as ‘para-sites’ (Marcus, 2000, 2010). A *para-site* is defined as the overlapping of the academic and fieldwork space in contemporary ethnographic projects (Marcus, 2010: 28’15’’). This is a site where interpretation occurs within a dialogic model, where experimentation is the key element (Marcus, 2000: 5–6; Rabinow and Marcus, 2008: 80–81). Thus, by allowing the hybridisation of ‘research outcomes’ and ‘the research itself’, a para-site would work against the conventional notions of the ‘field’ and the ‘fieldwork’ creating new relationships between the participants, something that is a core issue in the intellectual and conceptual work around knowledge-production projects (Marcus, 2000, 2010). Both the ethnography by design and the para-sites idea are particularly relevant in projects that have educational, pedagogical, or artistic functions (Marcus, 2000, 2010; Rabinow and Marcus, 2008).

When we think about ethnography as a design process we also find the concept of *ethnographic conceptualism*, which is understood as ‘the use of conceptual art as an anthropological research tool’, aiming to produce an ethnography that does things (Ssorin-Chaikov, 2013: 5–8). The concept of ethnographic conceptualism arose out of the curatorial work that Olga Sosnina and Ssorin-Chaikov developed for the exhibition *Gifts to Soviet leaders* (Kremlin Museum, Moscow, 2006). This was an exhibition about ‘public gifts that Soviet leaders received from Soviet citizens and international leaders and movements’, which revealed the ways museum objects could articulate post-Soviet identity (Ssorin-Chaikov, 2013: 6). *Gifts to Soviet leaders* was at the same time an *end*, in the sense that it was a way of presenting research results on Soviet history, but also a *means* of doing such research, or what Ssorin-Chaikov (2013) describes as a ‘a post-Soviet artefact and a tool in ethnography of post-Soviet Moscow’ (2013: 6). A key point to illustrate the

anthropological relevance of this exhibition is that one of the main components of analysis was the comments people made on the visitors' book, which became a 'site of heated polemic about Soviet history' (2013: 7). Both the exhibition and its visitors' book blurred the boundaries between objects and visitors, and between academia, politics, and social memory, for creating a series of ethnographic situations that revealed a multiplicity of unexpected relations about Soviet history.

The idea of ethnographic conceptualism is implicitly a way of 'manufacturing' or 'designing' exhibitions that recreate a social reality, with the objective of understanding 'social and aesthetic potentialities, new responses and reactions, and unforeseen figurations' (Ssorin-Chaikov, 2013: 15). In other words, the notion of ethnographic conceptualism suggests that there is a symmetry between conceptual art and anthropology, meaning that for both, investigation and reflexivity are open-ended processes dealing with complexity and multiplicity, and that they both offer an articulation of 'lived social spaces' consisting of relations between people (Kosuth, 1991; Bourriaud, 1998, 2000; Schneider and Wright, 2010; Ssorin-Chaikov, 2013). Ethnographic conceptualism is a mutually constitutive method between art and anthropology that ethnographers can use to look for new results and explore the unexpected (Ssorin-Chaikov, 2013: 16).

Why is all this important? Because ethnographic research is primarily acknowledged as an individualist exercise – especially in the academic context (Lewontin, 2008; Marcus, 2010). As a result, the standard practices for carrying out such research do not necessarily take into account the complexity of the epistemic network made of collaborations, where many people with different backgrounds become strategically incorporated in the production of the work (Marcus, 2010). Hence, these ideas are particularly interesting for me as I was addressing a knowledge-production system around dengue fever, in which virologists, entomologists, physicians and those who had the disease intervened. This complex set of relations responded to Marcus's notion of multi-sited ethnography as they created a 'network' of biological, physical and social relation that are materialised in control programmes that impact the city. As Reidpath et al. (2011: 1) state, 'vector borne diseases represent a rich and dynamic interplay between the vector, the host, and the pathogen; but it is an interaction that occurs within a social and cultural context as much as it is one that

occurs within a physical and biological context'. The problem is that, even though this multiplicity of understanding exists, health campaigns are only privileging some facts around the entomological understandings, leaving aside the other actors. So the 'traditional ethnography' would only help me to deal with one particular knowledge – for example, the way a virologist understands and deals with the virus, or the experience of the people who suffered from dengue – but would not help me to understand the network as such. Hence, the only way for me to address the nature of these relations, and to then present a different approach for understanding health campaigns was by privileging a dialogue between the participants of my work through para-sites events. These relations were then materialised by designing public interventions in different places across the city (the public experiments), which in turn implied thinking about conceptual art as a research method in 'ethnographic conceptualism' (see Chapter 5).

### **Imagination: Art-science as an exploration across time and space**

In this section I briefly describe the imaginative dimensions of my works of art in the anthropological and biological science domain. Hastrup (2004) argues that the idea of imagination is dependent upon the construction of social and historical relations across time and space. The objective of the anthropological narrative, Hastrup argues, is to 'provide a mode of imagining how individual actions and collective illusions are interlinked, and how they are framed by an implicit sense of a common good' (Hastrup, 2004: 469). The following examples share the idea of 'imagination' as a common point. They imagine a series of narratives in which time becomes human (see Ricoeur, 1984<sup>113</sup>: 52 in Hastrup, 2004: 462). The meaning of this within my ethnography is that the idea of imagination helped me to integrate what the specialists and the non-experts thought. The scientific forms of thinking and the non-professional and institutional values became part of a collective imagination as to what dengue campaigns are and what they should or should not be (see Greco, 2013: 233–237).

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<sup>113</sup> Regarding time and narrative, Paul Ricoeur (1984: 3) comments: 'time becomes human time to the extent that it is organised after the manner of a narrative; narrative, in turn, is meaningful to the extent that it portrays the features of temporal experience'.

In Colombia, relations across time and space among art and science are clearly identifiable in *Fractal* (<http://encuentrofractal.com/>), *Elniuton* (<http://www.elniuton.com/>), and *LabSurLab* (MAMM, 2012). *Fractal* is an annual international event that brings together art, science, technology, and science fiction. In 2012 and 2013 they invited well-known academic figures to dialogue with artists, designers, musicians, writers and non-academic communities to ‘programme reality’ through a variety of workshops that focused on transdisciplinary approaches. In 2014, under the slogan ‘*What if we create dragons?*’ *Fractal* asked people to imagine the future based on the idea of synthetic biology. One of the key participants of the *Fractal* event was Keiichi Matsuda, a filmmaker and designer who is currently producing a new film series thinking critically about the idea of what everyday life would look like in the future of Medellín (<http://hyper-reality.co>)<sup>114</sup>. Thinking about architecture not merely in relation to the physical space, but also to time and digital information, Matsuda’s films are a good example of *altermodernity*<sup>115</sup>: a hypertextuality that connects multiple forms of communication, materialised in cultural landscapes saturated with signs, and characterised by translation (Bourriaud, 2008b).

Led by Gabriel Vanegas, *Elniuton* was a collective of artist, hackers, designers, and academics in science that until 2011 produced an e-Journal – supported by *Leonardo* at MIT<sup>116</sup> – that covered topics in science, art, and technology. They also made installations and interventions in the different cities of Colombia, trying to bring a message of a ‘sustainable protoscience’. Although the collective was disintegrated, all the members are still linked to transdisciplinary and transmedial experimentation. *LabSurLab Medellín* was an initiative hosted by the Museum of Modern Art of Medellín (MAMM) in 2011 where public and private universities and many

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<sup>114</sup> This work is based on these films: *Domestic robocop* (<https://vimeo.com/14533403>) and *Augmented city 3D* (<https://vimeo.com/14294054>).

<sup>115</sup> Bourriaud describes the concept of altermodern as the multiplicity after postmodernism. This means that postmodernism is finished and we, as human beings, should be looking for a new definition of ‘the modernity of today’ (Bourriaud, 2008a).

<sup>116</sup> *Leonardo* is the leading international peer-reviewed journal about contemporary science, technology, arts and music.

independent art/scientific collectives explored the idea of ‘innovation’ and the concept of ‘technology’ in the context of Medellín (MAMM, 2012). The main goal was to appropriate knowledge to develop innovative ideas that did not necessarily require large economic investments. This project brought together non-official initiatives with public and private organisations to conceptualise laboratories for knowledge creation. These forms of art-science relations in Medellín are products of the collective imagination, allowing people to find different questions and answers among interdisciplinary collaborations.

### **Studying the world from a ‘sympoietic’ point of view**

Donna Haraway (2008, 2014) argues that in biological, anthropological, and in artistic domains ‘human exceptionalism’ and ‘methodological individualism’ are unthinkable in the best contemporary scientific practices. For her, it is not possible to say that humans are different than other living animals.<sup>117</sup> This does not mean we should stop paying attention to people, but rather to raise ethical questions in a process of ‘co-becoming’, or having a multispecies-based understanding of the (Haraway, 2003, 2008). Now, the key problem is that the biological and social understanding of the world has mostly been addressed in terms of systems as bounded units, and not as connected networks (Dempster, 1998; Haraway, 2014). A theoretical approach to this, Haraway (2014) argues, is the differentiation between *autopoietic* and *sympoietic* systems. Where an autopoietic understanding implies ‘self-producing systems with clearly defined boundaries’, sympoietic systems are self-producing units ‘without clearly defined spatial or temporal boundaries’ (Dempster, 1998: 6). Beth Dempster holds that complex self-organising systems lack boundaries, and therefore ‘they have cooperative synergistic characteristics and must be identified by the continuing interactions among components’ (Dempster, 1998: 3). The point Haraway and Dempster try to raise is that systems (social or biological) are the product of the factors that generate them, not the boundaries between their units. So it is not possible to understand problems if someone is thinking in terms of bounded organisms and environments, and therefore, it is mandatory to think in a

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<sup>117</sup> For Sagan and Margulis (1993: 351), this goes against the Christian notion of ‘people being one step above the beast and two steps (after the angels) below God’.



sympoietic way, without rigid boundaries in ecosystems (Sagan and Margulis, 1993: 358; Haraway, 2014).

There are commonalities between my ethnography and the practical examples that Haraway (2014) presents for illustrating this theoretical approach on sympoietic systems. For example, the interdisciplinary German artist Beatriz da Costa (<http://www.beatrizdacosta.net/>) was very influential in the representation of interspecies investigations. In *A memorial for the still living* (2010–2011) da Costa made an installation with museum specimens, sound, and images to confront visitors with various British species threatened with extinction (Horniman Museum, 2010). She also encouraged people to use the mobile application *Endangered species finder* to ‘encounter’ other endangered species. With this, da Costa suggested that to be more effective in raising awareness regarding environmental issues, it was mandatory to go beyond policy and regulations, and instead develop spaces where people could experience inter-species relationships in different ways so as to be more effective in raising awareness regarding environmental issues (Arts Catalyst, 2010). Interestingly, the exhibition was hosted by the *Horniman Museum* in London, the same institution that supported the *Mosquito kite project*<sup>118</sup> (see Chapter 5) and that keeps the kite in its collection.

The other connection with Haraway comes from Preston Singletary (<http://prestonsingletary.com/>), a Native American glass artist who works with Tlingit<sup>119</sup> cultural heritage. In the works of art entitled *The origin of mosquitoes* (2009), *Mosquito* (2012) and *Mosquito rising from the flames* (2014), Singletary reflects on a story of ‘how mosquitoes came to be’ (Schantz Galleries, 2010). These pieces are based on the Tlingit legend according to which mosquitoes came from the ashes of the burned body of a giant who fed on human beings (see figure 36). Tlingit people wanted to get rid of this giant who was killing them, and to do so, a brave man attacked him by plunging a knife into his heart. While the giant was falling, he said: ‘though I’m dead, though you killed me, I’m going to keep on eating you and all the humans in the world forever’ (Schantz Galleries, 2010: 2). To make sure this

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<sup>118</sup> [http://www.horniman.ac.uk/get\\_involved/blog/art-attacks-with-a-mosquito-kite](http://www.horniman.ac.uk/get_involved/blog/art-attacks-with-a-mosquito-kite)

<sup>119</sup> Indigenous community of the Pacific Northwest Coast in North America.

did not happen, the brave man burned the giant's body, and then scattered the ashes into the air. However, the ashes became a cloud of mosquitoes, which began to suck the man's blood, while he heard the giant's voice saying 'I will eat you people until the end of time' (Schantz Galleries, 2010: 1–3).



Figure 36. From left to right: *The origin of mosquitoes* (2009), *Mosquito* (2012) and *Mosquito rising from the flames* (2014). Source: <http://prestonsingletary.com/>  
 'In each dead body there was a hole through which blood had been stolen' (Galeano, 1985: 27).

Haraway (2014) describes Singletary's work as a remarkable re-constitution of art practices in figurative and metaphorical forms that engages with the world in a multispecies way. These kinds of works not only talk about fictional stories, but about the world we are living in as a network with multiple points of connection. Like Singletary, the Uruguayan writer Eduardo Galeano also talks about multispecies muddles, linking historical facts, cultural practices myths and legends. In *Memory of fire* (1985) he talks about the genesis of various elements around living beings – honey, clouds, wind, rain, snow – as well as the origins of a multiplicity of animals and plants (Galeano, 1985: 3–42). By making reference to the Nootka people – another indigenous community of the Pacific Northwest Coast of North America – he also holds that mosquitoes come from the ashes scattered through the air, after burning the body of a murderer who was taking blood from the Nootka villagers (Galeano, 1985: 27). Similarly, in *Bocas del tiempo* (2004) Galeano comments that when the French burned alive the Haitian Maroon rebel François Mackandal, 'drums announced that he had escaped, transformed into a mosquito, from the fire' (2004: 163). Galeano further states that by playing drums, people called the secret gods, the Devil himself, and told the banned news (Galeano, 2004: 163).

The key point for Haraway (2014) is to highlight a new emerging transdisciplinary field that she names *eco-evo-devo-histo-psycho-techno*, which stands for a science that equally embraces ecological, evolutionary, developmental, historical, psychoanalytical and technological dimensions. This means to enact ‘the fruit of becoming with others’ (Haraway, 2008: 17), as biological, social and artistic issues that are about addressing relationships and linkages in a multi-sensorial and multi-species modality, rather than about understanding isolated units (Dempster, 1998; da Costa and Philip, 2008; Wertheim, 2009; Arts Catalyst, 2009; Scott et al., 2012; Haraway, 2008, 2014).

### **Reading multispecies relations from a historical point of view**

Even though I extensively use the theory behind multispecies ethnography, I think there are some gaps in it, mainly related to anthropological understanding of biological concepts or the history of the discipline. For example, Raffles openly speaks about spiders as insects, which is, in the eyes of any biologist, a clear mistake (see Raffles, 2010a and 2010b). According to Anna Tsing, there is a ‘new’ multispecies research field that is characterised by a ‘passionate immersion in the lives of the nonhumans being studied’ (Tsing, 2011: 19), but maybe if we take into consideration the work of those who meticulously illustrated insects during the 16th and 17th centuries (Hendrix and Vignau-Wilberg, 1992; Hendrix, 1995; Ogilvie, 2008, 2012); the writers who tell stories about multispecies muddles (Galeano, 1985, 2004); or contemporary artists that raise ecological and ethical questions about human-insect interaction (Hesse-Honegger, 2002; Hesse-Honegger and Wallimann, 2008), we could suggest that this ‘new’ multispecies study is not new. It is just relatively ‘new’ in terms of anthropological debate. My point in the subsequent paragraphs is to highlight that the so-called nonhuman turn is the product of a historical process, and the idea of *living with*, understood as the deep engagement with other animals (Kirksey and Helmreich, 2010: 552) has been clearly enacted throughout the history of art and science.<sup>120</sup> What is required, however, is the recognition of that history in biological and artistic terms because, as Barbara Maria

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<sup>120</sup> Raffles (2010a) is one of the few anthropologists who has made clear statements about the historical relevance of the art-science books.

Stafford (2004: 348) argues, ‘our entire structure of thought is based on a conception of space in which objects with a past as well as a present are arrayed’.

Alan Richardson holds that the relative failure to address the conception of ‘the natural’ in literary and cultural studies, is partially a result of the poor engagement with ‘the natural’ as a category with its own history (Richardson, 2002: 3). ‘Interdisciplinary formations’, as Kirksey and Helmreich call them (2010: 550), did not only emerge after the 19th century. Although they go back to the work of Lewis Henry Morgan (1868) to argue why ‘multispecies ethnographers have found inspiration in the work of scholars who helped found the discipline’ (2010: 549), there is plenty of evidence in art and science to show that a more historical view is needed to contextualise human-animal studies. For example, Joris Hoefnagel and his artistic illustrations – many of which include insects – give us a great idea of the knowledge centred not on human figures but on the world of nature, around the 16th century (Hendrix and Vignau-Wilberg, 1992: 42; Hendrix, 1995).<sup>121</sup> Gyrgy Darvas talks about how cultural and historical interactions between art and science can be analysed by following the concept of symmetry, or the embodiment of the belief in perfection in both natural and man-made environments (Darvas, 2007).<sup>122</sup> Likewise, Barbara Maria Stafford (1994, 1999) clearly shows how by learning from the rational entertainments (collection and display of natural objects, mathematical recreations, public performance of experiments) enacted in the Enlightenment we can develop a better sensory-based comprehension of the world, or how the historical analysis of images can influence contemporary thought in disciplines such as art, biology, and social sciences.

Ethnographic investigation requires a permanent reflexive examination, a process that is materialised ‘when anthropologists speak with biologists, nature lovers, or land managers – and for the species that these agents, along with anthropologists, represent’ (Kirksey and Helmreich, 2010: 554). However, in some publications

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<sup>121</sup> His work was also very important for developing the ‘still life’ movement (Hendrix and Vignau-Wilberg, 1992: 369).

<sup>122</sup> The concept of symmetry as a relationship between human and nonhuman others has largely been explored by the tattoo artist Valentin Hirsch (2015).

anthropologists neglect the historical understanding of ‘multispecies theory’ linked to other disciplines. An example of this comes with Anna Tsing (2011) and the wild mushroom economy that she describes as ‘social-natural ecology’ around *matsutake*<sup>123</sup> mushrooms. This is closely related to theories in agroecology, although never referred to by Tsing. Agroecology is a discipline that applies ecological and social concepts to manage sustainable agroecosystems (Gliessman, 2000). Francis et al. (2003: 107), argue that ‘agroecology is suggested as the logical discipline to integrate across disciplines and different levels of scale. Natural science methods can be used to describe the decision-support tools that will inform the design of ecologically sound agriculture, while social science methods can be used to integrate human dimensions and help us better understand the total system’. In essence, the biological discourse already has a set of theories reflecting on the connection and ‘interdependency with a plurality of other mortals’ (McVay, 1993: 5<sup>124</sup>). So there is a somewhat myopic reading of the history of biology when Tsing asserts that ‘there is a new science studies afoot, and its key characteristic is multispecies love’ (2011: 19).

I argue that multispecies ethnography should be understood as a space for dialogue, and above all, for *intermittence*. According to the Oxford Dictionary (2015), something is ‘intermittent’ when it occurs at irregular intervals, or it is not continuous or steady. Multispecies ethnography should not only be a tool for ‘blurring’ the boundaries between disciplines, but for acknowledging the relevance of other views. It privileges the dialogue because the same issue could be explored from different perspectives, without a need for getting a unified result – in fact, there could be opposite results. In other words, although the idea is to question pre-established paradigms in human-nonhuman relationships, I do not consider multispecies ethnography to be a way of unifying disciplines. It should instead be seen as a way to develop a better understanding of their possible historical

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<sup>123</sup> These are a group of mushrooms that cannot be cultivated; therefore, environmental remediation and accessibility to knowledge about these species are fundamental to preserve them.

<sup>124</sup> McVay is referring here to the novel *Moby-Dick; or, The Whale* by Herman Melville.

relationships. As Stafford (1994: 3) holds, ‘today, we need to go backwards in order to move forward’.

### **Symbiosis**

The biological understanding of the world has mostly been based on the study of individuals by isolated living entities (Margulis and Sagan, 2002; Sagan, 2011; Gilbert et al., 2012; Haraway, 2014).<sup>125</sup> This individual-based conception of life sciences only changed after the second half of the 19th century, when the ecological understandings introduced the idea of ‘organic systems’ to the biological discourse (Gilbert et al., 2012: 326). Afterwards, new technologies allow a more precise study of the microbial world, which revealed a complex set of relationships between different forms of life, or symbiosis<sup>126</sup> (Margulis and Sagan, 2002; Gilbert et al., 2012). Lynn Margulis was one of the key figures in studying the implications of symbiosis in biological evolution. Her work offers a unique insight into the ecology of protozoa and bacteria, and the lesson we learn from her work is that ‘the world of life not only consists of independent species, but every individual of most species is actually a consortium of several species’ (Mayer, 2002: xiv). This is why Gilbert et al., 2012, hold that ‘symbiosis is becoming a core principle of contemporary biology, and it is replacing an essentialist conception of ‘individuality’ with a conception congruent with the larger systems approach now pushing the life sciences in diverse directions’ (Gilbert et al., 2012: 326). Symbiosis is evident, for example, in lichens, sponges, corals, mice, and even cows – which have a well-studied community of cellulose-digesting bacteria (Margulis and Sagan, 2002; Gilbert et al., 2012: 327–328).

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<sup>125</sup> Edward O. Wilson and the *biophilia hypothesis* – the human bond with other species – is poorly taken into account in this discussion. In 1984 Biophilia was defined as ‘the innate tendency to focus on life and lifelike processes’ (Wilson, 1984: 1). Later on, he explains it is ‘the emotional affiliation of human beings to other living organisms’ (Wilson, 1993: 31). For Sagan and Margulis (1993), the problem with this theory is that it was used to encourage humans to ‘save’ the world’s biodiversity – mainly plants and animals – and by doing so it created a kind of ‘salvationists hyperbole’ in which humans were ‘better’ than other species – raising up human self-centeredness (or what Haraway, 2008, calls ‘human exceptionalism’).

<sup>126</sup> Symbiosis is defined as ‘the intimate association of distantly related organisms’ (Cavalier-Smith, 2015: 2).

Although the relationships between organisms is a fact acknowledged in contemporary biology, the partial use of Margulis's theories can generate some problems around the concept of 'multispecies ethnography'. Social sciences tend to read the interaction between organisms from a kind of 'romanticised' point of view, privileging the 'stability' in the relationship. This is not always the case though: carnivory, parasitism and herbivory are some examples of 'unstable' relationships that Ernst Mayer reminds us of (2002: xii). In fact, Margulis also talked about 'cruelty' in animals – negative feelings, or non-positive connections to other life-forms (Sagan and Margulis, 1993). Equally, Roger S. Ulrich (1993) argues that psychological and biological research suggest that humans can be biologically prepared not to 'forget' fear/avoidance responses – biophobia – to natural stimuli that implied survival-related risks (1993: 85). In the artistic domain, the work Catherine Chalmers (<http://catherinechalmers.com/>) and Jim Trainor (see *Harmony*, 2004) invite us to think about the encounter between predators and prey and insect-human interactions in a less 'idealised' approach. In short, 'multispecies', 'symbiosis' and 'relationship', should not become catchwords for generalising 'good' associations. Having set up the theoretical basis for understanding the relation between anthropology, art and science, in the following chapter I will introduce the ethnographic material of Phase III.

## Chapter 5

### PUBLIC EXPERIMENTS: INVITING OTHER KINDS OF KNOWLEDGE

#### Introduction

Anthropological analysis is mostly disseminated in textual forms. But what if we go beyond that and produce *public experiments* to share and shape knowledge? The idea of creating spaces that ‘inform’, ‘entertain’ and generate the possibility for new forms and ways of seeing things is not new. Throughout this text I have referred to many publications that reflect on different forms of relations between humans and the natural world. Beyond the idea of ‘interdisciplinary’, a historical understanding is needed. The work of Barbara Maria Stafford (1994) is key, for instance, in understanding why we need to look at the period between the Baroque and Romantic eras to find a balance between the aesthetics and intellectual rigors enacted in illustrated books, playful illusions, public experiments, cabinets of curiosities and museum exhibitions. Beyond disseminating knowledge in textual forms, she argues, ‘surprisingly little attention has been paid to the subtle sensory forms of knowing in the birth of popular education as amusement’ (Stafford, 1994: xxiii). Health authorities are urged to change how they design health campaigns because, as Stafford holds, ‘there is no learning without desire, no education without enjoyment’ (1994: xxvii).

Although postmodernism is a text-based experience (Jameson, 1991),<sup>127</sup> it is possible to think about designing multi-sensory spaces that allow us to talk together about what dengue fever is. With the ethnographic material obtained during the first two phases of my fieldwork, I started the collective creation of non-conventional public

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<sup>127</sup> Fredric Jameson (1991: 31) describes ‘postmodernist experience’ with the slogan ‘difference relates’, meaning that postmodernism implies a new mode of relationship, thinking and perceiving through difference – an aesthetics of difference. These new modes exclude organic and monumental forms, and he argues that ‘everything can now be a text’ or a juxtaposition of signifiers (1991: 77, 96). He writes: ‘objects that were formerly “works” can now be reread as immense ensembles or systems of texts of various kinds, superimposed on each other by way of the various intertextualities, successions of fragments, or, yet again, sheer process (henceforth called textual production or textualization)’ (Jameson, 1991: 77)



health campaigns (named here as ‘public experiments’) that were set up in public places of the city, such as art galleries and city parks.

I invited the subjects of the first and second phases of my ethnographic research to work with local artists and academics to collectively explore and re-think concepts such as *dengue*, *mosquito*, and *virus*. It could be argued that the innovation here, when compared with projects led by public health institutions, is the collaborative development of site-specific interventions. Although this is partially true, the key point is more nuanced and precise than this: this project links the critical insights from scientific and public understandings (Chapter 2 and 3) to the idea of experiment and to the idea of public art, ideas that are not just coherent in their own terms, but also make sense in terms of the local setting (in this case, Colombia and Medellín).

### **My public experiments’ design rationale**

So far I have tried to show how I aimed to extend anthropological insights into the modelling of the vector-borne disease both in academic and public domains so that they were approached conceptually through the matter of relational art. In Chapters 2 and 3, I showed how, in the different understandings of dengue fever, there is a key question about the idea of ‘participation’. Through applying this idea as an artistic method, I have carried out my research and presented its findings. So although the work I am proposing could have been deployed in many ways as artworks or educational tools, I decided to use the theories of ethnographic conceptualism, relational aesthetics and multispecies ethnography to frame the my public experiments.

The virologists and entomologists wanted to be involved in these public interventions because they identified a practical public health benefit and, above all, they were also tired of the standard templates used in health campaigns. For example, when I was talking with Carolina about the quality of the information and the designs used in such programmes, she commented ‘Alejo, is this true? I cannot believe they still doing the same things! ... As I told you before, the idea of dengue as a “virus” has been relegated, and it is a huge gap we should cover in the public experiments we decide to create’. While we were conversing about this matter,

Carolina described an experience she had some years ago during a science fair – these are events usually held at public universities, engaging high school students in scientific research – where she gave an unconventional presentation. She commented:

During science fairs many students from public schools come to attend lectures about different matters in science. When we talk with the students in contexts like this, we try to reduce the technical language to facilitate communication between both. However, based on my experience in previous years I knew students don't normally pay attention to what we say. Because of this situation my research group decided to create a kind of exhibition that was not focused on explaining things, but on generating questions among the students.

By using polystyrene balls, they created figures that imitated structures of the cell and the virus, and different stages of the dengue infection. Each group member created and painted the figures. The figures were then placed into a dark room with some lights directed onto the objects. 'Even though it implied a lot of work, this activity generated many questions for the students. Most of them wanted to know what the difference between a cell and a virus is, or how the virus enters the host cell. At the end of the day, they said our experience was the one they liked the most', Carolina continued. Carolina's anecdote (and many others by other participants) serves as a critique of the existing public health approach I presented in Chapters 1, 2 and 3. In many ways, the design of my public experiments was also directed towards asking questions. This ethnographic approach revealed not only the scientific practices and their epistemic models, but also the ways in which non-expert citizens perceive public health campaigns, and fundamentally the illness narratives of those who suffered the disease, illuminating rich possibilities for designing new approaches. In the following sections I present the material from the public experiments *Vampires*, the *Mosquito Kite* and *Serotype*.

**Vampires: Your love hurts down to my bones**

<http://alejandrovalenciat.com/alejandrov/vampiros.html>

*Vampires* was the name of the first series of interventions in public and private spaces of the city. The concept of these events was to radically intervene and deliberately break the frame of reference of these spaces to create a third space, a new space of interaction. The activities linked to the *Vampires* events engaged people in different ways with illness narratives and with scientific understandings. The participants and I were expecting to reach the community in a very innovative way, far from the typical approaches usually taken by health authorities.

The idea of these public experiments was first developed while I was talking with Daniel Ronderos about the findings of the fieldwork I conducted with Luis Fernando, Sara, Juanita, Juan David and Carolina. As I showed in Chapter 2, Daniel was very critical of the way health campaigns were designed, so he suggested that I think about how vampires, which were part of the public imaginary, could offer a unique entree to talking about dengue from an unexplored point of view. Later on, I contacted Hernán Marín and Maribel Flórez, two local artists and part of the art collective 3B Espacio (based in Laureles neighbourhood) who offered me gallery space, to collaboratively design the intervention. Over the course of four months we had weekly meetings in which we meticulously discussed different ideas about how to produce visual and aural representations of dengue fever and the main disease components (the virus, the mosquito, the symptoms). Using the theory about the creation of designs as a mode of ethnography (see Chapter 4), there were three activities linked to *Vampires*: a central event in 3B Espacio, interventions in public spaces via posters and QR codes, and large-format video installations. All these activities were advertised by using posters, a website and social networks.

The main goal was to generate questions related to the mosquito, the virus, and the disease, not only in a way that might be more appealing to people, but also that fundamentally that reflected back on why a new relationality with dengue fever was needed. For example, after hearing Sara and Juanita's experience with the disease, Hernán and Maribel commented that the *Vampires* experiment could be developed in terms of 'simulating the idea of being sick, or mimicking the symptoms of the

disease’. Juanita pointed out in another meeting: ‘It is possible that after the *Vampires* event, we will get responses like “Oh! I haven’t thought about this before”, or “Ah! is this the way it works?” It’s like putting everybody in someone else’s shoes. Once they feel themselves as actors, they may be part of the solution; they might feel more commitment to the campaign. We all can learn based on our own reflections’.

By producing something that can replicate the experience, the observer becomes the main actor, and that could, we reasoned, generate questions about the experience of being unwell and the disease in general. In such a context, we were not only appealing to more active participation, but also we were thinking about privileging relations and stimulating debate. All those activities were documented and published on this site: [http://alejandrovalenciat.com/alejandrovt/vampiros\\_.html](http://alejandrovalenciat.com/alejandrovt/vampiros_.html)

### **Vampires in the Colombian imaginary**



Figure 37. Vampires in the Colombian imaginary. Photo by Mario H. Valencia and Susana Valencia

When we started thinking about how ‘vampires’ were part of the public imaginary in Colombia, we immediately thought about Paleta Dracula (<http://dracula.com.co/>). This is an ice cream bar produced by the company Crem Helado

([http://goo.gl/SM4HMsThesis\\_final.doc](http://goo.gl/SM4HMsThesis_final.doc)) that uses Dracula, Nosferatu and other kinds of ‘monsters’ to establish playful games between people of all ages. Crem Helado invites people to laugh about fear. The ice cream is covered with chocolate and has red strawberry sauce, evoking blood (figure 38).



Figure 38. Paleta Dracula. Photos by Juan Camilo Vélez

Along with the ice cream bar, each customer get a ‘surprise’ that can be fangs, adhesives toys, rings, or temporary tattoos (figure 39). More than 25 years on the market, Paleta Dracula is one of the brands with a great degree of customer *remembrance* in Colombia: there is a deep emotional attachment to the brand and people of different ages easily remember it. Paleta Dracula is highly advertised during the month of October because of Halloween.



Figure 39. Surprise inside a Paleta Drácula. Photos by Mario H. Valencia and Susana Valencia

### **Vampire: Sucking blood and eating people alive**

Blood-sucking creatures have long been the themes of dark tales of bloodthirsty human-animal interactions (Jones, 2012). Painlevé in *The Vampire* film (1945) argues that by thinking on how blood-sucking insects spread diseases to humans, ‘it is easy to see how the vampire came to be imagined in human form, drinking blood from the wound it inflicts on a human throat, like Nosferatu in Murnau’s film’. These representations reveal a particular aesthetic engagement with the hematophagic behaviour of mosquitoes, fleas, bedbugs, leeches, lice, vampire bats and finches. On the one hand, humans associate them with disease and danger, real or unfounded (Ulrich, 1993; Jones, 2012); on the other there ‘must be an innate resistance to being eaten alive’ (Jones, 2012: 37). Such ‘innate resistance’ has been described as the

generalised tendency of organisms to react to others in distinct ways (positive or negative), creating multispecies muddles.<sup>128</sup>

As blood is culturally associated with life, Jones (2012: 38–39) comments that it should not be surprising that humans are wary of any blood-sucking animal because by taking blood they are also taking part of people’s life. In rock music, Pearl Jam’s ‘Red Mosquito’ (1996) and Queens of the Stone Age’s ‘Mosquito Song’ (2002) use the same metaphor for describing mosquitoes as reminders of the devil’s presence, showing how vulnerable humans are when they are being eaten alive. This blood-sucking metaphor can also be seen as an allegory to dictatorial political regimes. For example, in *The Vampire* (Painlevé, 1945), after showing how bats can transmit diseases, we see the scene ‘the salute of the vampire’, where Painlevé metaphorically associates the blood-feeding animal *Desmodus rotundus* with the Nazis (MacDonald, 2009: 17). Painlevé comments: ‘when I was finishing the film, I noticed how the vampire bat extends its wings before going to sleep. I thought it looked like the Nazi ‘Heil Hitler’ salute’ (Painlevé cited in Bellows et al., 2000: 33).<sup>129</sup>

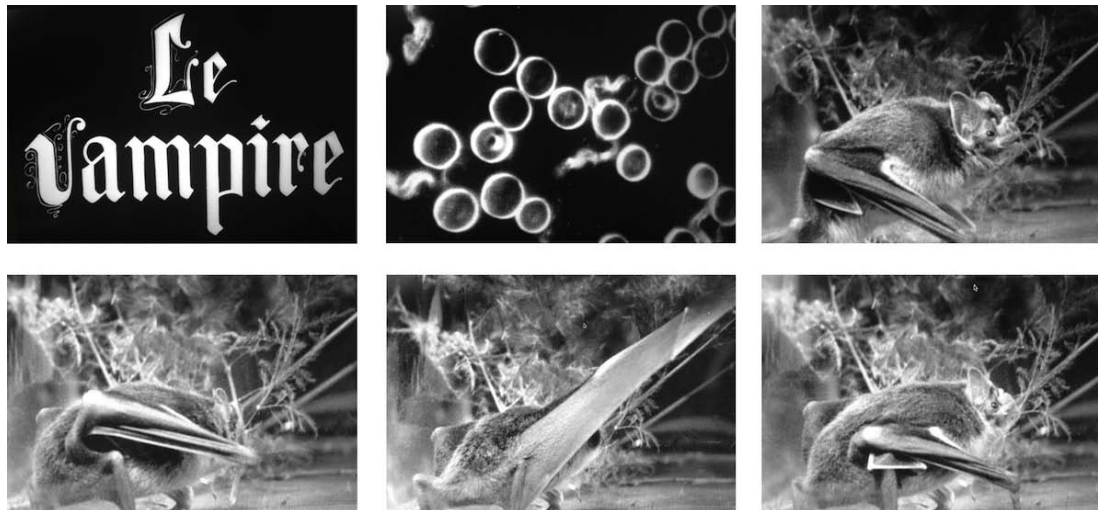


Figure 40. Screenshots from *The Vampire* (1945). From left to right you see the microscopic Trypanosoma parasite magnified among blood globules, which can be

<sup>128</sup> Some academics name this ‘biophobia’ and others ‘prototaxis’ (see Sagan and Margulis, 1993; Kellert and Wilson, 1993).

<sup>129</sup> During the late 1930s, Painlevé helped immigrants fleeing from Nazism. After 1940 he went into hiding to escape the German military administration in France (Bellows et al., 2000: 33; MacDonald, 2009: 17).

transmitted by the vampire's bite. The last four images show the 'salute of the vampire'. Source: Painlevé, 1945.

For the *Vampires* events, each element was designed to engage critically with questions about knowledge and to engage creatively with the public. Apart from being an active observer during the experiment, all the participants (virologist, entomologist, and the people who had dengue) were creating new relationships with the audience, being partners, subjects and objects of the research. In this 'para-site' event, happening in the form of a multispecies ethnography (replicating what was done in the 'multispecies salon'), the participants were blurring the boundaries between ethnographic fieldwork, the academic conference and the art exhibition. This process was not only about doing art, but about creating a space for discussing with the audience the material they were looking at.

### **Designing and advertising the central event**

The central event of *Vampires* took at the 3B Espacio gallery space, with more than 60 people taking part. As we wanted to stimulate both critical and creative engagement, we decided to produce a multi-sensorial art intervention made of drawings, video and sound installations, photograph displays and tactile experiences. There were also a lot of discussions about possible ways for reappropriating the pieces of work, the kind of emotions that the intervention produced and critiques of the work we produced together. They all were registered with a microphone that was recording all the time, and a GoPro camera that was filming from above the event. Likewise, there were two professional DSLR cameras, and iPad and an iPhone that were used to manually record different experiences during the public experiment.

To advertise the event, we first needed to design a poster (figures 41 and 42) that summarised the ideas behind the symptoms of the disease, and specifically the idea of pain (see Chapter 3). By knowing that there was a meaning of vampires in the Colombian context, Hernán and Maribel suggested that I start the process by picking out some famous scenes from *Nosferatu* (F. W. Murnau, 1922) and *Dracula* (Tod Browning, 1931) and appropriate them as a way of advertising the event. We were looking for an image that could be strong enough to call the attention of the people in



public places, and cafes or bars. After many discussions, we finally decided that a scene (figure 42) from *Dracula* (1931) in combination with the sentence ‘Your love hurts down to my bones’ met these criteria.



Figure 41. Designing the poster for the *Vampires* event.



Figure 42. Final design of the *Vampires* poster. Design and layout by Hernán Marín

Hernán and Maribel proposed the phrase for the poster. For them it summarised the ways Sara, Luis Fernando, Juan David and Juanita described the disease symptoms and their experiences of being unwell. This was, in turn, a critical insight into how the design was informed directly by the ethnographic results and was itself a form of analysis. In fact, during the creative process of the *Vampires* experiment, Sara also expressed that in some way, recalling her illness process was like watching ‘the

movie of her experience with the disease' from outside. Once we got the printed copies of the poster (figure 43), Sara commented: 'This poster is very strong, it drives emotions. It recalls my experience, and not merely the idea of disease symptoms. What I mean with this is that in Medellín, health campaigns only provide information. They don't generate emotions in the public because they just train and give instructions that should be memorised. This poster is something very different'. Similarly, while Luis Fernando was looking at the posters, he commented:

I experienced that scene – I lived it, so I feel very touched by this poster. It has a subliminal message. I personally like it a lot because at first you see it as normal, but when you look in closer detail you realise that you are getting a lot of content, related with the way I experienced the disease, and that's when the mosquito catches my attention. It is a very intelligent construction that emotionally touches me. Why? Well, because I am imagining that I am the one who is lying in that bed, and that the mosquito in the poster was the enemy that was biting me.

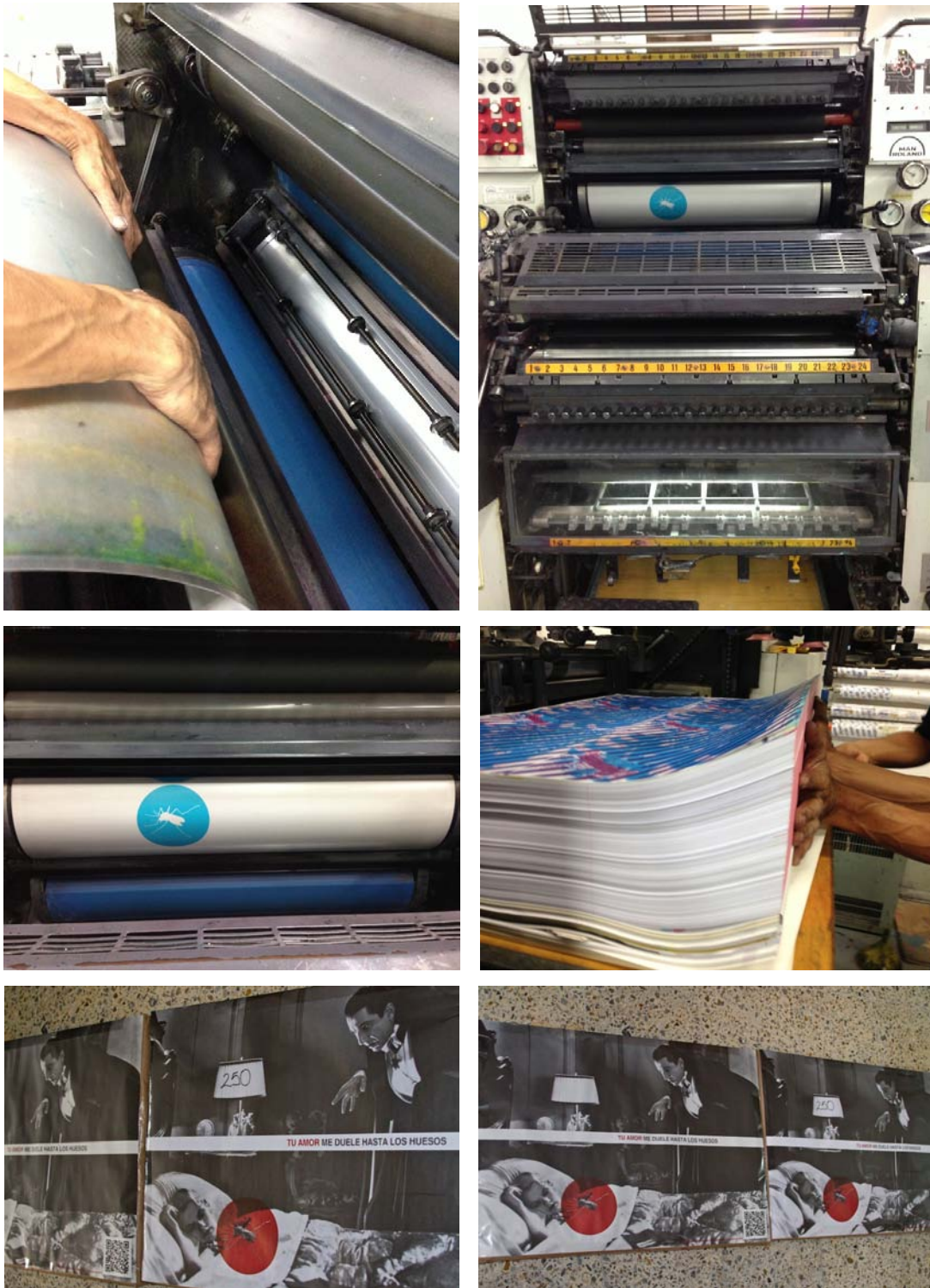


Figure 43. Printing copies of the *Vampires* poster.

With this poster we were not working to ‘train’ people by providing information that should be memorised – as health authorities normally do – but instead appealing to a kind of playful interaction with different audiences. Sara, Hernán and I discussed the poster in relation to the rationality suggested by traditional health campaigns:

Sara: I really like the sentence about love, the one that says, ‘Your love hurts down to my bones’. I feel identified with it. Even considering that you can associate it with a lot of things, it seems very emotionally straightforward. I think this is the greatest difference between this poster and what we have seen in the health campaign. What I mean is that we have been trained to think in certain ways about mosquitoes, and health campaigns have been based on giving information, but I think that it’s really clear that decision making has little to do with the rational domain. It is instead very emotional. For example, you can see the relation between emotion, or feeling and decision making by using somatic markers. The experiment we are creating here is something very emotional. This poster may not only generate doubts for people, it might also produce a lot of identification because of its relation to Dracula and the vampire movies, and the memories that Paleta Drácula brings to mind. It is even very beautiful the kind of wild kiss that it recreates.

Hernán: Yes, and the thing is that behind the poster there is a love story rather than a horror story.

Sara: And you know, mosquitoes love us as well – they love our blood.

Hernán: Right, and there is also a relation between the idea of ‘love’ and the disease. What I mean is that the person is behaving in a weird way precisely because he is madly in love, while the others think he is ill.

Alejandro: There is another important thing, and it is that horror films or this kind of story appears as a way of explaining diseases for which science has no explanation. Likewise, the art design and image composition of horror films are supported by the different elements we find in nature, either animals or plants. Almost every texture you see is related to something that already exists in the natural world.

Hernán: This is something very clear in *Nosferatu* when the main character wrote to his beloved saying that he was far away and that when he woke up, he had two marks on the neck. He believed there was a mosquito pest near where he was.

As vampires are a kind of metaphor to talk about dengue fever, the idea of ‘love’ is deeply associated with the conception of blood as the very liquor of life. In this

respect, Jones (2012: 38) comments that ‘terms like blood brother, blood relative, bloodline, blood money and bloodthirsty carry weight well beyond the biological measure of a red bodily fluid’. It is as if there is a mosquito that is madly in love, an idea that the American musician Iggy Pop sings of in the 1980 song Loco Mosquito: ‘Like a loco mosquito / ‘Round and ‘round and ‘round I go / And when I’m hungry / Down I go / And here I go / In love again’.

To advertise the event, we started pasting posters on telephone poles and other public spots (figure 44).<sup>130</sup> Each poster had also a QR code (figure 45) as an external link to detailed information about the event.

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<sup>130</sup> As we were looking for an opportunity to interact with various kinds of communities and people from different socioeconomic backgrounds, we visited low-, middle- and upper-class areas of the city.

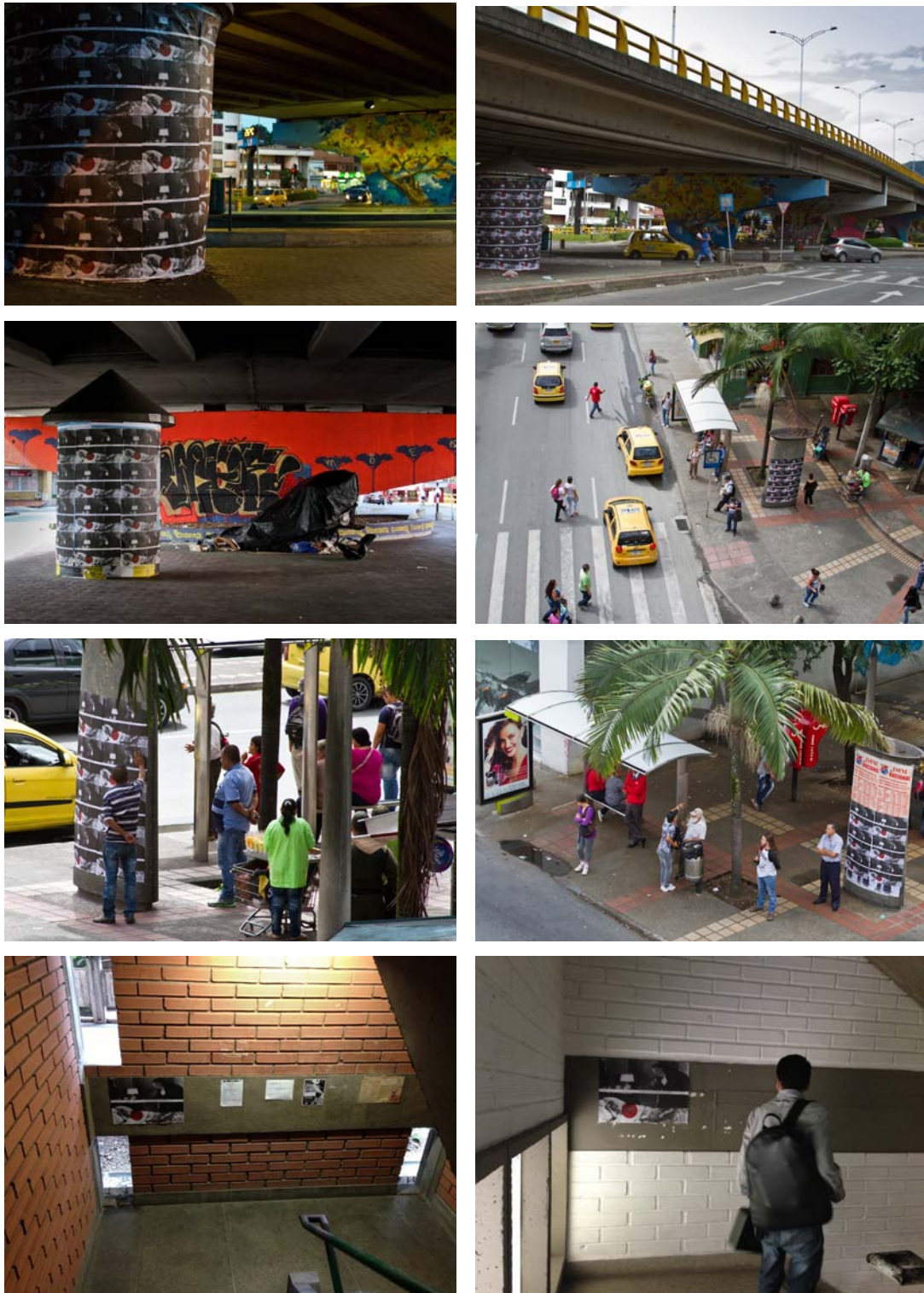


Figure 44. Pasting posters on public spots (also see these animations: <http://goo.gl/eENnTa> ; <http://goo.gl/mg8Luh> ; <http://goo.gl/j7Ug6e>)



[www.alejandrovalenciat.com/alejandrov/vampiros.html](http://www.alejandrovalenciat.com/alejandrov/vampiros.html)

[www.AnthropologyArtScience.blogspot.com](http://www.AnthropologyArtScience.blogspot.com)

Figure 45. QR code for the *Vampires* event

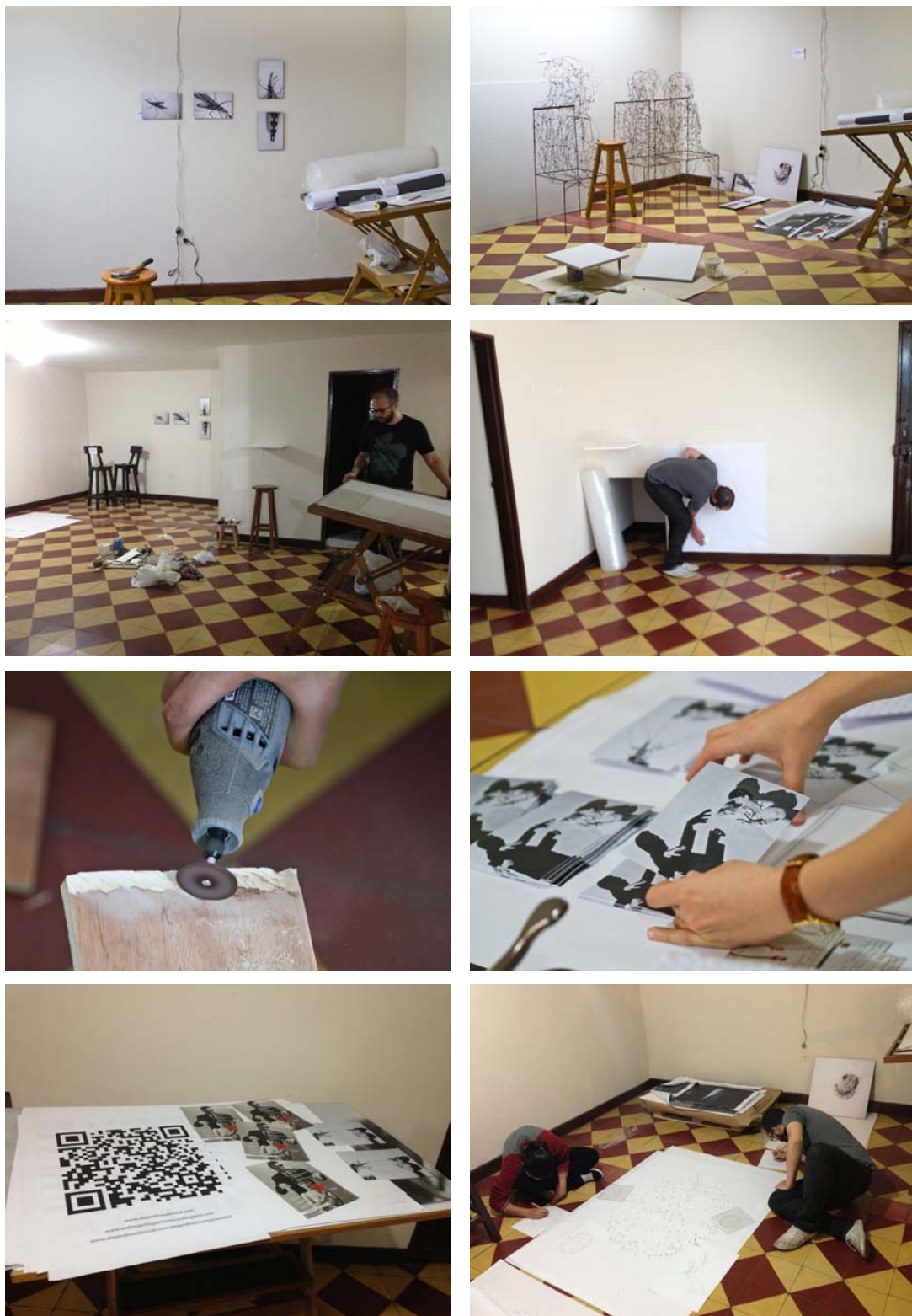


Figure 46. Setting up the main exhibition



**Connect-the-dots puzzles: linking virological and entomological understandings**

After designing the poster, we produced drawings by using a dot-to-dot technique (figure 47).<sup>131</sup> We selected this technique because it allowed us to generate images that seem to be puzzles and, therefore, the images were not clear to the audience until they connected the dots. As we used photographs of the mosquito and scientific models of the virus to create the pieces (see Chapter 3), the puzzles were specifically linked to the practices that are at issue in the entomological and virological constructions of the idea of dengue. These drawings also offer a dramatically different approach to the graphics that public health campaigns normally use.

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<sup>131</sup> The dot-to-dot vector graphics were designed using Photoshop and Illustrator.

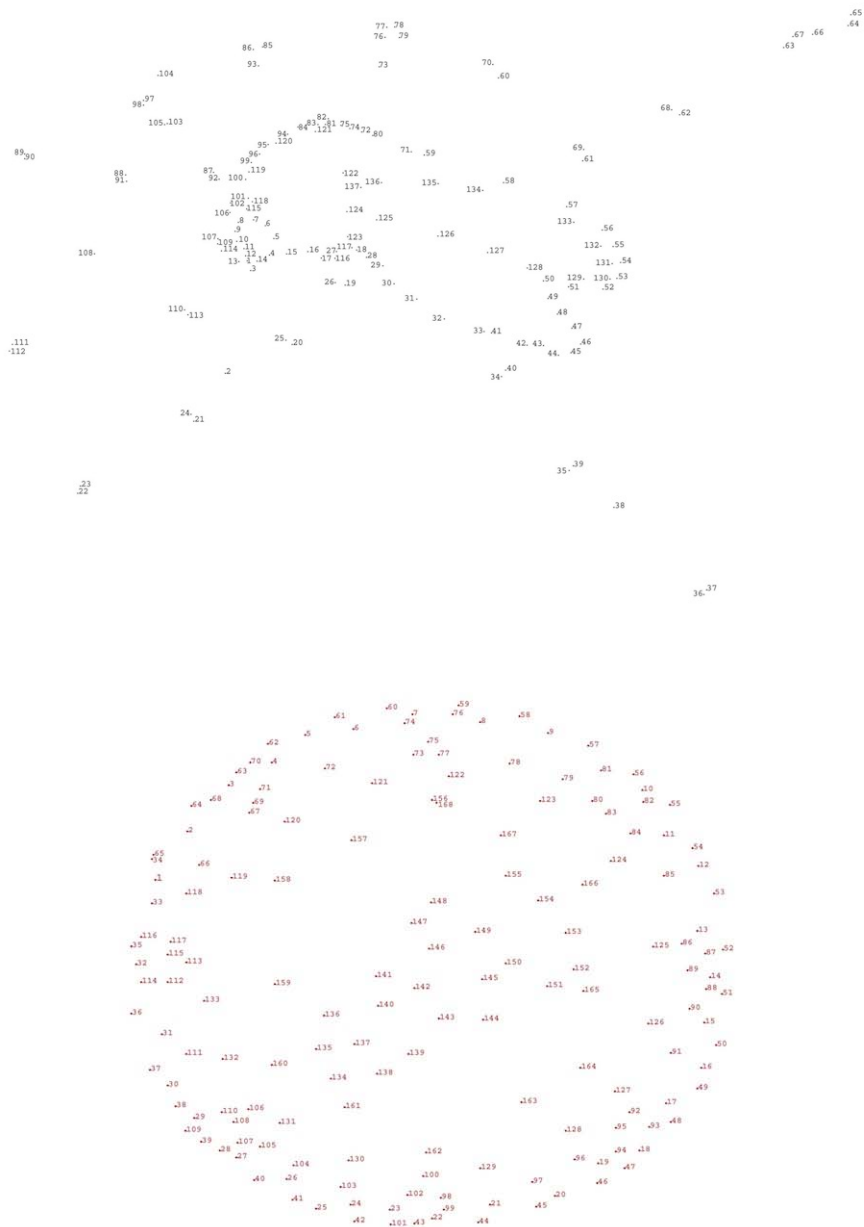


Figure 47. Dot-to-dot drawings: mosquito and virus

In order to generate an association between the virus and the mosquito, we decided to integrate the dot-to-dot drawings by producing three different kinds of puzzles (figure 48). Two of them were printed on A1 size, and were then attached to the wall.

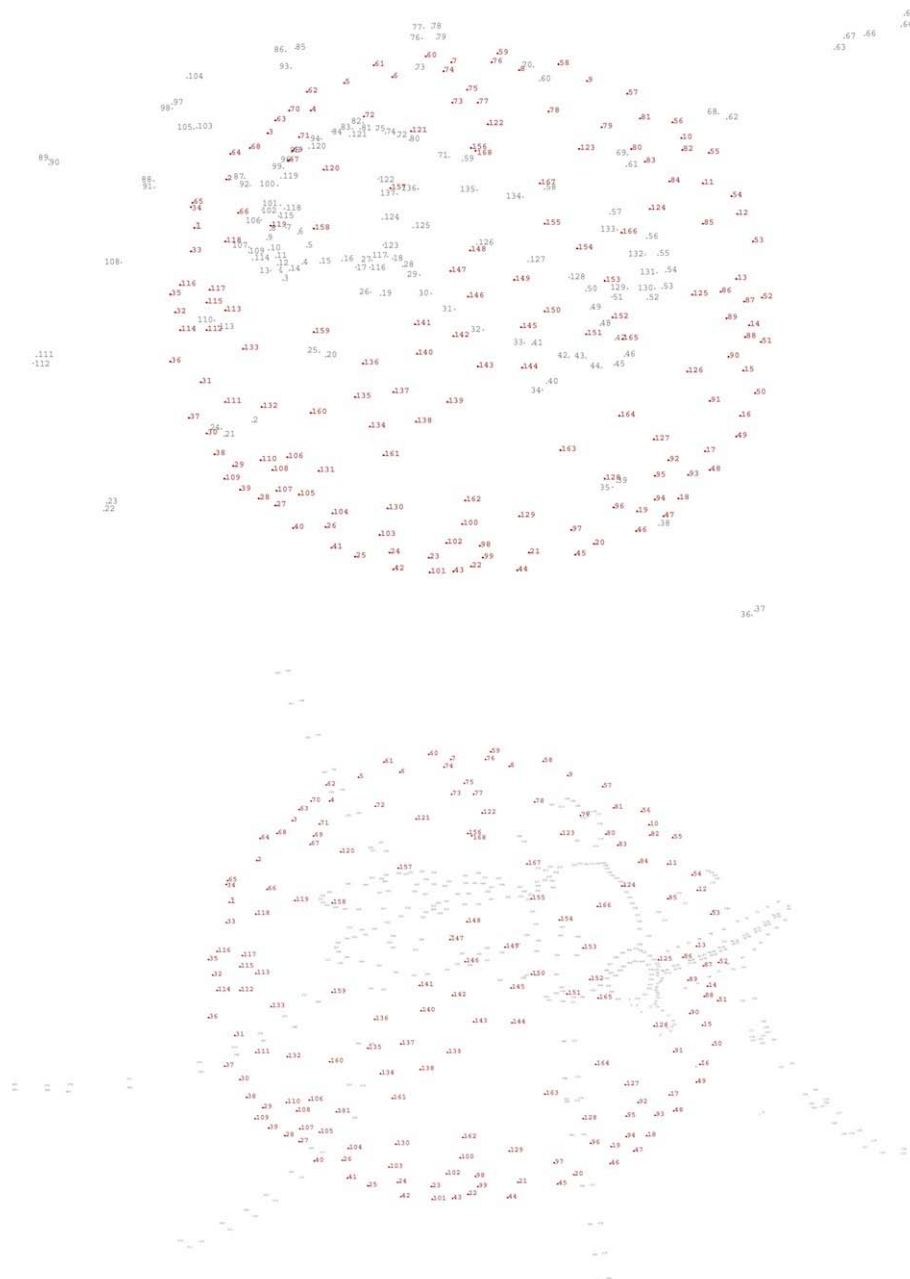


Figure 48. Integrated dot-to-dot drawings

As the dot-to-dot patterns were printed in two different colours, the resulting image clearly differentiated each of the components (figure 49). By overlapping the images we created a set of complex patterns that were collaboratively developed by all the participants. This, likewise, reflected on the idea of collective participation around relational art.



Figure 49. Vampires: Dot-to-dot drawings. Photos by Daniel Ronderos

It was possible to produce these pieces because of the collaborative work between all the participants of the *Vampires* event. This exercise also helped to establish a dialog between them, raising many questions while they were tried to identify what the idea was behind the exercise of joining seemingly random dots. These puzzles also offered a visual representation of the idea of creating a network of information composed of nodes that are interlaced in a non-hierarchical system. Each puzzle was, therefore, a metaphor for the kind of knowledge that is produced through the contributions and help of many people.

We also decided to integrate the dot-to-dot drawings into a three-layer package that people would take home (figure 50). Each of the puzzles was printed on vellum

paper. Once people finished connecting the dots, they could overlap them to see the final result as a single-piece structure where the drawings became one. This exercise helped us to generate a dialog about the way dengue virus enters the mosquito, and how the mosquito becomes an actual vector of the disease.

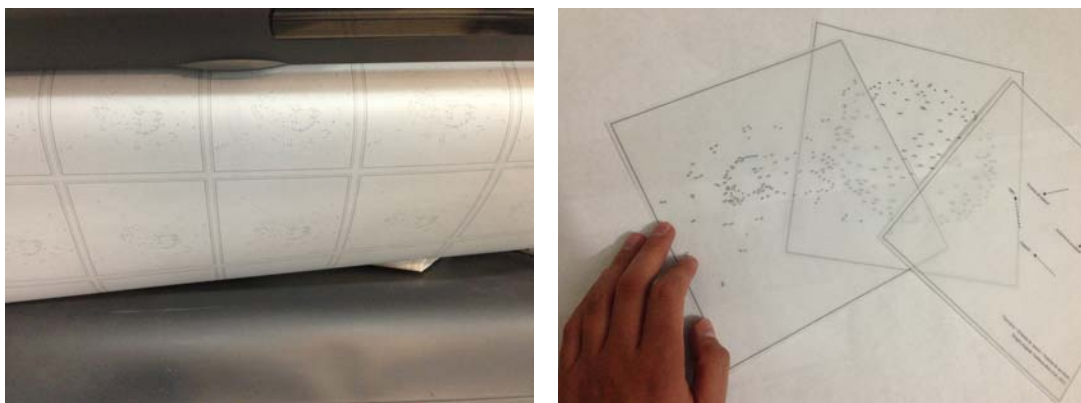


Figure 50. Dot-to-dot drawings on vellum paper

### **Cocktails: A sensorial approach to the idea of ‘serotype’**

The concept of ‘serotype’ refers to one of the four forms or variations that dengue virus may have. After describing the ‘virus structure’ in the dot-to-dot drawings, we decided to produce a sensorial experience to talk about the idea of a serotype. The way we did this was by making cocktails that reproduced both the virological information and the experience of being unwell described by the subjects of my ethnography. Each cocktail, with the ‘virus’ in it, was also a way of reflecting on the idea of breeding sites as disease containers – the classic public-health understanding of the disease.

Liquors have differences in taste, colour, texture and smell. We used these characteristics to emulate the embodied experience that Luis Fernando, Juan David, Juanita and Sara described (see Chapter 3). We invited them to develop this idea in collaboration with Carolina, the virologist. Based on the intensity and the amount of alcohol, each cocktail was associated with each of the serotypes and disease symptoms. For example, by adding stronger spirits and some acidic or spicy notes, we invited people to think about the high temperatures dengue produces. This sensorial experience was also intended to reflect on the epidemiological and

virological information about dengue virus serotypes (DENV-1, DENV-2, etc., see Chapter 3). By taking into account that DENV-2 is better adapted to mosquito transmission, can generate stronger symptoms, and that *Ae. aegypti* mosquitoes tend to be more susceptible to DENV-2 infection, we decided that the serotype 2 cocktail would look and taste significantly different from the others. It had a greenish colour and significantly more alcohol, representing the most ‘severe’ infection. The other three serotype cocktails had a reddish colour, linked to the idea of the virus attacking blood cells (figure 51). These were the components of the serotype cocktails:

- Serotype 1: tequila, Triple sec, Jamaican flower, orange slices, and honey
- Serotype 2: white rum, aged rum, blue Curaçao, amaretto and lemon
- Serotype 3: whisky, grenadine, orange juice, and angostura bitters
- Serotype 4: gin, lemon juice, cherries, and tonic water

After deciding on the colour, taste and smell of the cocktails, we also needed to decide how many of them to make. This was, in other words, an issue related to the distribution of the four serotypes in Colombia. However, as the distribution of the dengue virus depends on several variables (see Chapter 3), we decided to simplify the problem of the cocktails’ proportions by using a hypothetical case. Assuming we had 100 samples of the virus, we asked Carolina to divide them into the four different serotypes. She replied: ‘based on my research experience, and considering what I have read, I would say that 40% of the virus samples should be DENV-2, and the other three serotypes should be 20% each’. We applied this proportion to the cocktails made for the *Vampires* event. Lastly, since each participant could take more than one cocktail, they could become ‘infected’ with dengue or severe dengue. With this we wanted people to think about antibody-dependent enhancement of dengue infection.

Carolina and Luis Fernando strongly emphasised the need for having material reflecting on the absence of the virological information. Carolina, as a virologist, had clear reasons for doing so. Luis Fernando, without previous knowledge about this matter, told me that he learned all about the different serotypes because after getting dengue he wanted to know more about the disease. He commented:

There are four known dengue strains. If you get one of the four, you can still get the other three, and you will not get the one you got first again. But the other three could be more complicated causing hemorrhagic dengue. When you get dengue for the second time, it is supposed to be caused by a different strain than the first one, and you will be at higher risk to get severe or hemorrhagic dengue. So, where is that information? Why is it not part of the campaigns? After having dengue, I can help other people avoid getting infected by speaking about the knowledge and experience I have had.

After having dengue, Luis Fernando become deeply moved by his experience and began to look for ways to transmit the knowledge he had acquired. The quality of the artworks we produced together is directly informed by his experience, and would be incomplete without it. As Andrew Irving (2009: 309) argues in his analysis of artworks produced by people diagnosed with HIV, it is highly possible that none of these pieces could have been produced without the experience of having the disease.



Figure 51. Serotype cocktails. Photos by Daniel Ronderos

### Videos: Bloodlust and break-bone fever

Participants talked about a range of symptoms, including lethargy, pain behind the eyes, fever, joint pain, rashes and haemorrhage. Sara remembers dengue as one of



the worst experiences in her life. Taking into account the ways in which Juanita, Sara, Luis Fernando, and Juan David perceived mosquitoes and experienced the disease, we collaboratively produced two short films. Both videos were presented in a continuous loop that was played during the event.

During conversations with participants, one commented that ‘humans were like big supermarkets for mosquitoes’. This metaphoric mode of description reminded me of a poem by John Updike (1960: 32), entitled ‘Mosquito’: ‘I was to him a fragrant lake of blood...’.

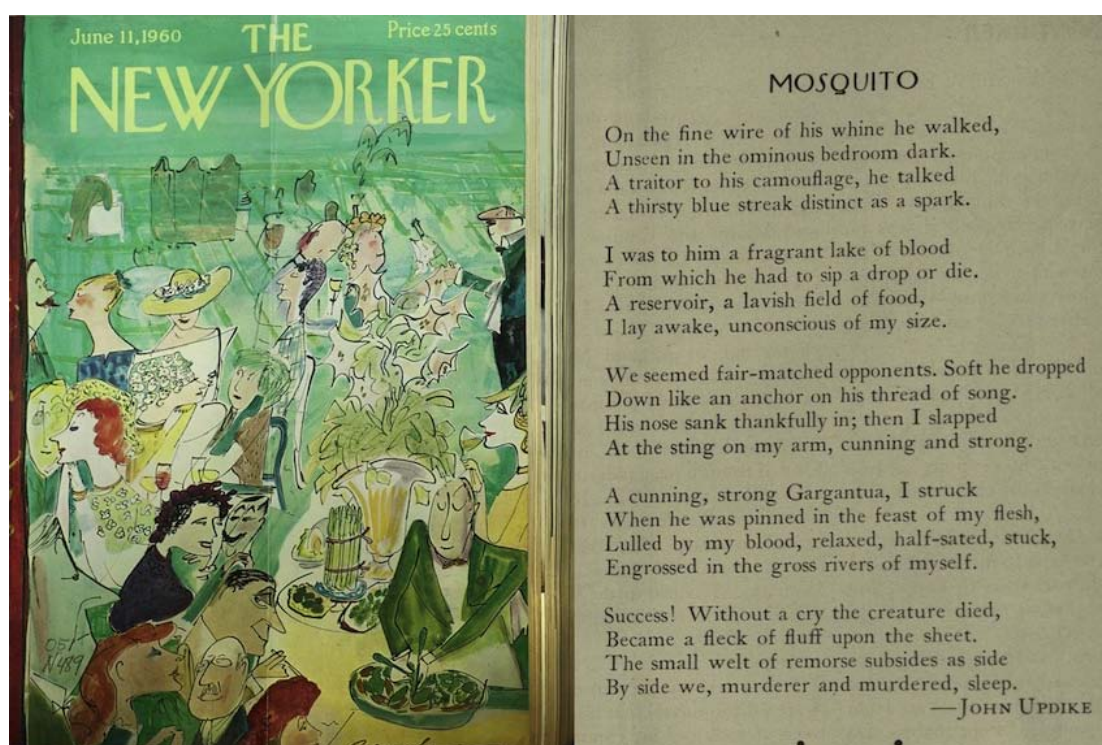


Figure 52. Mosquito poem. Source: John Updike, 1960: 32

When I shared this piece with the other participants, we thought it would be important to represent the blood-feeding process with a video and show it to the public.<sup>132</sup> To do so, I contacted Felipe Villegas, a biologist and photographer who

<sup>132</sup> When we checked the history of cinema, we also found an animation that inspired us. *How a Mosquito Operates* is a piece by Winsor McCay (1912) that playfully illustrates the blood-feeding process of mosquitoes. Although this material somehow disappeared from the public health discourse, authors such as Richard Jones (2012) have shown the relevance of historical facts in the design of health campaigns.

had helped me in previous projects (Valencia-Tobón, 2012b, 2015). Drawing on their significant experience in environmental and visual communication, Felipe and videographer Amanda Hunter produced the video *Bloodlust* representing the mosquito's blood-feeding process (figure 53). I was totally surprised at the result they could achieve in a wildlife environment.

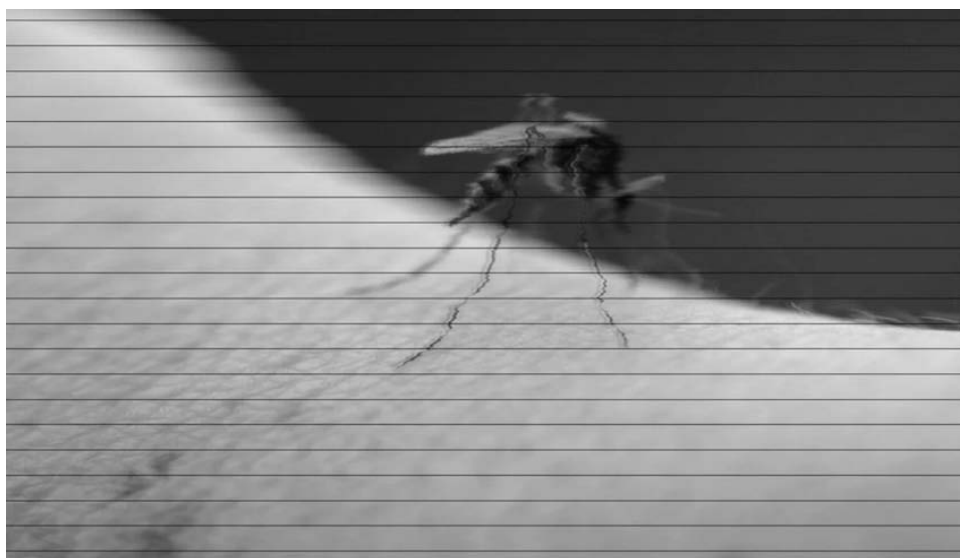


Figure 53. *Bloodlust* (see the video here <https://vimeo.com/76887960>)

Hernán and I then contacted the musician Pedro Mau, who provided us with the music for the video. I edited the video, did the colour correction and arranged the sound design by taking into account all the comments from my participants. I paid special attention to the pitch and intensity of sound in the editing process. The lines and the visual effects represent the pain in the head, hands and feet as described by Juanita, Luis Fernando and Sara. Even though we are used to getting bitten by mosquitoes, we do not normally think about how much blood they suck and we are not aware of how much time they need to get a full meal. One of the participants commented: 'This mosquito is cheeky; besides sucking out blood it cleans her mouth. I have never seen this blood-feeding process before. It impressed me a lot'.

The other video was called *Break-bone Fever* (*Queiebra huesos*) (figure 54). The process of making this video started with a careful analysis of the material obtained during my fieldwork with Sara and Juanita. I invited them to visually recreate the sensation of having broken bones, thinking about how something as small as a

mosquito can produce so much suffering. Once we finished with the video, Sara commented:

This video generates a lot of emotions for me. While the photographs are changing, I see the mosquito suffering like I did after it infected me. I wish it was dead. It produces anger. Damn! I suffered a lot because of him. I also recall my experience as a very tragic moment. It hurt me a lot. So when I see this mosquito, I always think about my experience. I would not like to feel that break-bone sensation again.

Juanita also talked about the process of making the video in similar ways: ‘The pain and the break-bone experience are represented when you see the mosquito with its legs folded. It’s a very clear image’, she said.

After we finished editing the visual material, I shared it with Susana, a musician in the city, who was responsible for creating the music for the piece. Susana had met with Sara and she also read the illness narratives of the other participants, and the music was thus composed based on these experiences of being unwell. During the recording and editing process, we again paid special attention to the pitch and intensity of sound, so it is worth using headphones while listening to the piece.



Figure 54. Break-bone fever (see the video here <https://vimeo.com/77564874>)

## Sound installations

Sound is a means to enact the ways in which the public perceives the relationship between mosquitoes and dengue, and we explored this relationship through two sound installations. During the design of these artworks, Sara, Juanita, Hernán and Maribel and two entomologists were deeply involved.

Imagine you are entering a bathroom. What would be your reaction if a constant buzz started when you entered? This was the premise of the first sound installation during the *Vampires* experiment (figure 55). Starting with the acknowledgement that the buzzing whine of a mosquito is something that any person can recognise, we wanted to reproduce the kind of experience that entomologists have while working inside a mosquito colony (figure 56). We placed a couple of speakers inside the shower area of the place where *Vampires* was held. This was a successful means to generate emotional responses among the public, and because of it many people began to comment about the role of mosquitoes in their everyday life, and the perception they had about public health campaigns.



Figure 55. Sound installation inside a bathroom



Figure 56. Sound recordings inside a mosquito colony

Sound offers a way to explore the idea of knowledge in the scientific domain because it is a constituent element of laboratory work, affecting different experimental activities and hence articulating scientific knowledge. For example, in his ethnographic study on engineers who work on materials and surface science, Cyrus Mody (2005: 179) argues that when researchers are using transmission electron microscopes, they must be aware of their movements and position, their tone of voice and the way they address co-workers in order to avoid producing sounds or vibrations that might disturb the instrument and interfere with experiments. Mody (2005: 183) also reports that scanning probe microscopes are affected by acoustic noises caused by ventilation systems and airflow. This not only shows that sound and hearing are embedded in laboratory work and scientific experimentation, but also that ‘by being aware of the sound environment, science studies can gain new insights into the ways experimental spaces are constituted’ (Mody, 2005: 177). In the case of dengue studies, mosquito colonies are a constitutive element of the soundscape of the laboratory. Mosquitoes are maintained for hundreds of generations over time and their buzzing exemplifies what Mody (2005: 186) calls ‘sound-as-experimental-cue’, in the sense that in this context sounds are not a ‘contaminant’, but rather ‘entities of interest’. Maintaining a mosquito colony exposes the researcher to a particular soundscape, an immersive buzzing that resounds constantly in the head. Mosquito buzzing represents tacit knowledge: depending how much sound is heard, one might be able to tell how many adult mosquitoes the colony has. And this is precisely the ultimate goal of a colony: the more mosquitoes it has, the more experiments can be executed. Entomologists can, for example, test insecticide resistance, develop new biocontrol strategies or model the repellent activity of a novel compound. Equally, using mosquito colonies, virologists can infect mosquitoes with DENV strains and

track the evolution of infection, aiming to understand, for example, immunological responses, or to differentiate infection susceptibility in various mosquito populations.

But the perception of sound is not only a human capability. Mosquitoes also listen to each other and distinguish between different sound sources. They are ‘more sensitive to sound than any other insect’ (Gibson et al., 2010: 527). Physiological and behavioural studies show, for example, that listening to wing beats is an important cue prior to mating in flight (Arthur et al., 2010; Diabate and Tripet, 2015). Mosquitoes’ active hearing process has been mathematically modelled (Avitabile et al., 2010) and there are even ‘love songs’ among dengue mosquitoes (Cator et al., 2009).<sup>133</sup> Sound has also been used in the design of traps for capturing mosquitoes; Johnson and Ritchie (2015) report the attraction of male *Ae. aegypti* to female flight tones, suggesting that a tone of 484 Hz is more attractive to free-flying males.

Arthur et al. (2010: 1384) have also argued that mosquitoes could use sound localisation cues to distinguish among multiple sound sources and therefore ‘differentiate self from conspecific’. Such differentiation between sound signals is also present in humans. For example, when we are in a noisy environment, we distinguish among different sound sources and respond to them in different ways, identifying which of those come from a human or a non-human source (Schubotz, 2007; Maes et al., 2014). We can even predict and respond to noises without seeing their source, like when lying in bed, we can perceive a mosquito buzzing and respond to it by estimating when and where such mosquito has landed (Schubotz, 2007: 211). All these examples prove that mosquitoes’ buzzing sound powerfully conveys a multisensorial and multispecies world deeply implicated in the acquisition of different forms of knowledge.

As Jones (2012: 54) comments, ‘the high-pitched whine of a mosquito is something that most people will recognise, even without a detailed knowledge of dipteran structure of physiology’. In a way, the buzzing sound creates a particular soundscape of everyday life, not only in the laboratory but also in the tropics. In fact, the inside

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<sup>133</sup> Listen to the song here <https://goo.gl/Bv7vWr>.

of a lab-based mosquito colony resembles a rainforest: humidity and temperature are kept very high because these are the conditions that favour mosquito reproduction (hence the idea of using the bathroom for this installation). This sound has also inspired musicians, like the punk-rock band Yeah Yeah Yeahs (2013) that sings about how mosquitoes sing, cry and scream. Mosquitoes' sound is also associated with sleeplessness and nightmares (Valencia-Tobón, 2012b, 2015), or, as Chuengsatiansup (1999: 287) puts it, 'sleepless nights amidst voracious armies of mosquitoes'. In short, the mosquito's buzz is a sonic icon that cannot only be associated with scientific knowledge production, but that it is also endowed with cultural meanings.

Komatra Chuengsatiansup (1999) argues, in his analysis of everyday experience of ill women in the Kui communities,<sup>134</sup> that there are sonic icons that provoke somatopsychic responses. In Chuengsatiansup's ethnographic study, the loud noises of motorcycle engines, quarrelling neighbours and machines that destroy the forest are perceived as terrifying elements that shatter the silence and evoke a bodily response – including loss of appetite, chronic fatigue, anxiety neurosis, panic attacks and depressive disorders. Biomedicine does not have answers to these problems. Some of the Kui people 'had never gotten a medical diagnosis' for these complaints; they were simply prescribed injections without any doctor asking about their illness experience (1999: 285). As in Chuengsatiansup's work, mosquitoes and their buzzing also produce emotional-physiological responses that are poorly taken into account in the biomedical system. However, we can use them to link everyday experience, scientific knowledge and art practices.

Reflecting on how sound can be intrinsically related to the production of knowledge, we created the installation *We are born, we grow up, we infect you* (figure 57). With it, we invited people to think about how sound can help us identify something that cannot be visually recognised. Most of the health campaigns show mosquitoes in their adult stage, but they do not normally provide images showing how they look in the earlier larval and pupal life stages. While people are not familiar with these

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<sup>134</sup> Indigenous people residing in the southern part of northeast Thailand.

particular stages, they do, however, recognise the buzzing sound. By integrating these two facets, we wanted to suggest a way for ‘seeing’ the ‘unseen’.

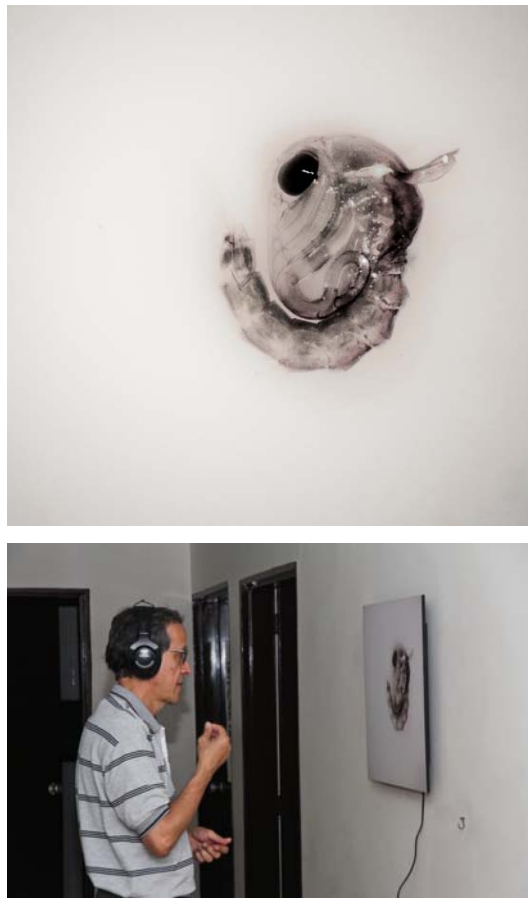


Figure 57. We are born, we grow up, we infect you

In the production of this installation, I first took macro photographs and then manipulated them to generate a different texture and colour. Afterwards, Hernán, Maribel, Sara and I decided to use an edited version of the buzzing sound that would be played through headphones. Looking at the photos, most people asked ‘What is this figure?’ However, they found the answer by themselves when they put on the headphones. People asked questions about the differences they found in other mosquito stages, wanting to know more about the mosquito’s morphology and its ecological behaviour (places where mosquitoes dwell, times in which they are more active). They could also find answers to these questions by following a series of photographs that were taken of inside some of the participants’ houses. With these



images, we invited people to move from the laboratory to the social context of the places where mosquitoes dwell (figure 58).<sup>135</sup>



Figure 58. Photos of mosquitoes in the houses of my participants

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<sup>135</sup> *Ae. aegypti* is normally found in dark places, such as inside desks, behind the bed, in closets, or even sometimes in the bathroom.

### Tactile experience: Sucking and squashing

For the *Vampires* event, we also produced three types of ice cream treats that were aimed to reflect on epidemiological understandings of dengue. With them, we wanted to establish a game in which each of the participants felt like they were the mosquitoes that were sucking the blood of some people – ‘victims’ (see figures 59). The ice cream treats were named ‘white victim’ (vanilla ice cream), ‘brown victim’ (caramel ice cream) and ‘black victim’ (chocolate ice cream). With these names we wanted to generate an association with the colour of the skin. Inside each treat people would find liquid blackberry ice cream, representing blood. The audience of the *Vampires* experiment became mosquitoes to be fed, and the ice cream treats became humans to be eaten. With this exercise and with the serotype cocktails, we wanted to exemplify the disease cycle and the way infections happen in reality.



Figure 59. Tactile experience: Sucking. Photos by Daniel Ronderos and Alejandro Valencia-Tobón

We also designed an interactive experience by thinking about the tactile relationship with mosquitoes, especially how they are squashed (figure 60), in everyday life as

well as the tactility involved in the entomological work when they are collected and turned into scientific specimens.

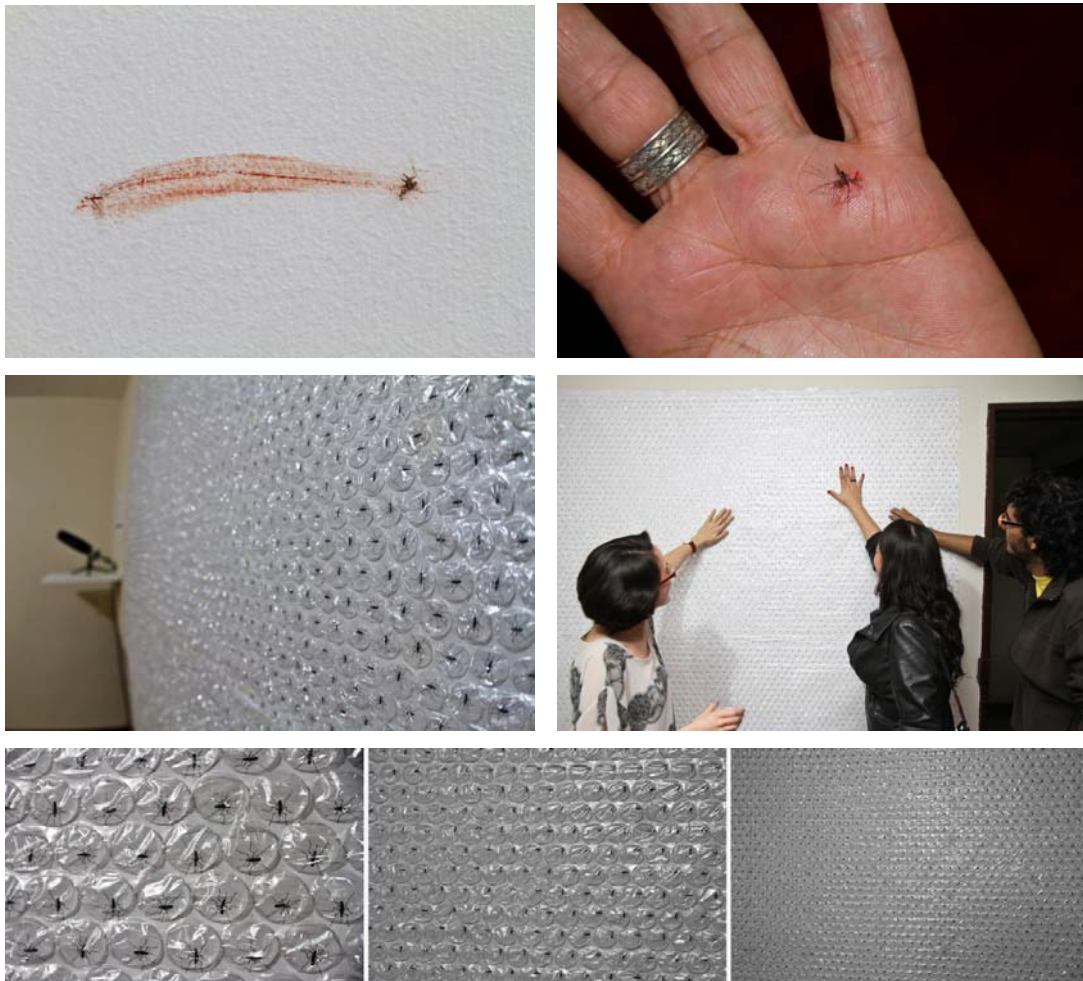


Figure 60. Tactile experiences: Squashing. Photos by Daniel Ronderos and Alejandro Valencia-Tobón

This tactile experience was created by using big-format impressions and bubble paper attached to the surface of a wall. We used two pictures taken in the houses of my participants as a reference to generate a pattern of mosquitoes that were printed on A1 size paper. They were then aligned with the bubbles. The idea was that each of the participants could squash mosquitoes that were ‘resting’ on the wall.

### **Shadows of death**

As I have already mentioned, the main idea of the *Vampires* experiment was to produce relations between different kinds of understandings. We can see ‘relations’

as processes: the art-science methodology was thus a set of processes between the participants of my research. To illustrate this we can consider the work of Mark Dion and Morgan Puett. In the *Ladies' Field Club of York* (1999), they reproduce a series of images taken of 19th-century natural scientists by following the exact photographic processes for portraits of that period. The final product is a counterfeit as close to the original as possible (Renfrew, 1999), raising questions about the past and the present. Using the same approach, we decided to reproduce one of the scenes from the movie *Dracula* (Tod Browning, 1931) but replacing Count Dracula (Bela Lugosi) with the mosquito and Mina Harker (Helen Chandler) with each of the participants of the *Vampires* event. We first took pictures of a mosquito, trying to highlight the shadows instead of its body, as *Dracula* focuses on the management of light, and the shadow is what actually 'terrifies' Mina Harker. Afterwards, we digitally manipulated the image to replace Count Dracula with the mosquito image. We then re-composed the image. Finally, we printed the image in a large format and attached them to one of the walls of building where the main *Vampires* event was held. With the help of photographer Daniel Ronderos we produced a series of portraits of many of the people who took part in the *Vampires* event (figure 61).



Figure 61. Shadows of death. Photos by Daniel Ronderos and Alejandro Valencia-Tobón

The last phase of the *Vampires* public experiment placed large-scale video installations in different public places. The idea was to project short videos (such as

*Break-bone Fever* and *Bloodlust*) and to show some of the outcomes of the public participation (figure 62).

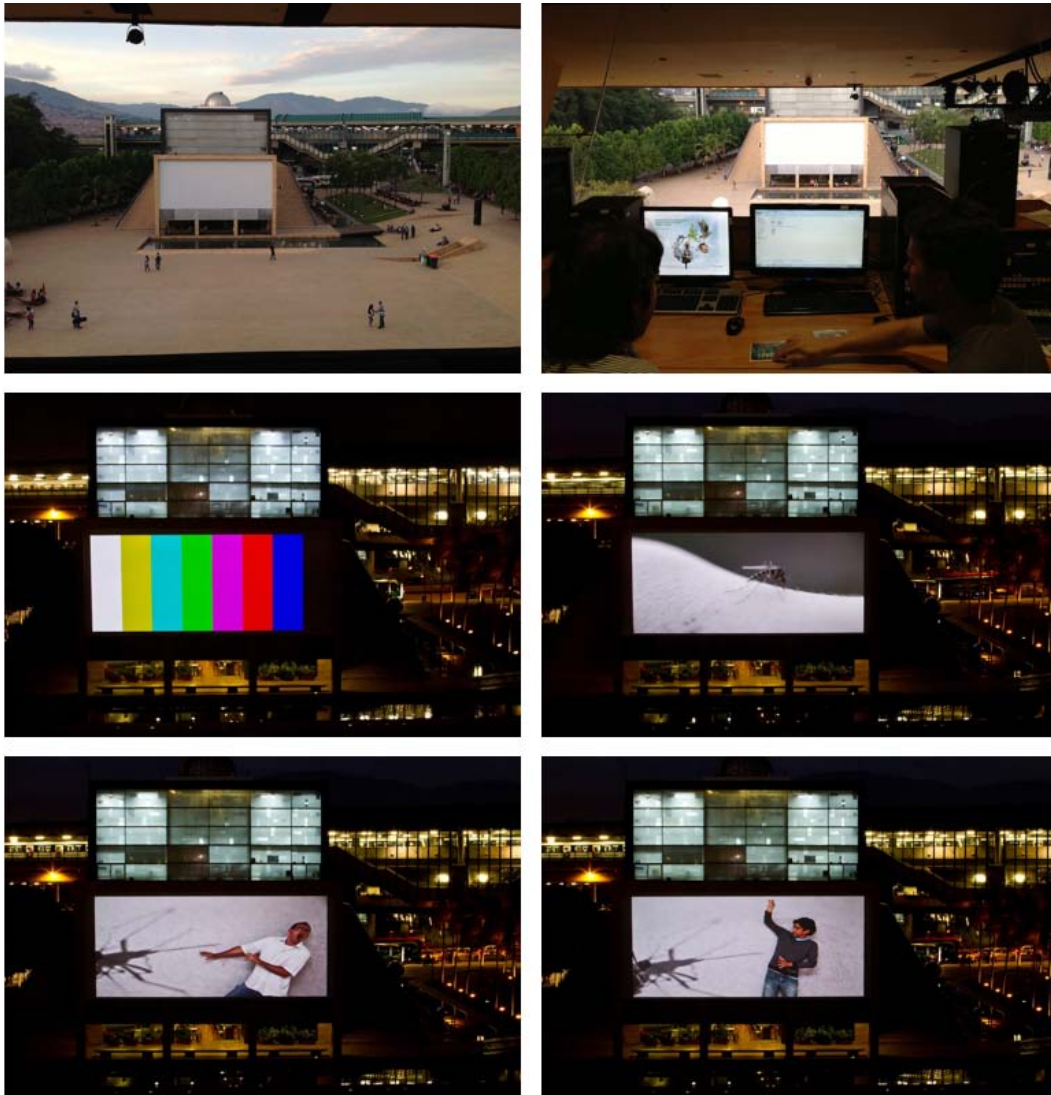


Figure 62. Large-scale video installations (also see this animation: <http://goo.gl/1kFNFs>)<sup>136</sup>

### The Mosquito Kite Project

[http://alejandrovalenciat.com/alejandrovt/mosquito\\_art\\_attacks.html](http://alejandrovalenciat.com/alejandrovt/mosquito_art_attacks.html)

The second public experiment was based on the production of a kite designed to look like a mosquito, which would stimulate reflection on the entomological constructions

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<sup>136</sup> Thanks to Andrés Ruiz and Andrés Ramírez for helping me with this intervention.

of the idea of dengue. This project was designed in collaboration with Andrés Ramírez, a kite flyer and engineer who has worked with me for the last five years. Based on the experiences we had during 2010 and 2011 when we designed the first mosquito-kite prototype (Valencia-Tobón and Ramírez, 2011), in 2013 this idea received the support of the Royal Anthropological Institute of Great Britain and Ireland and the Horniman Museum through the Horniman Collecting Initiative (see <http://goo.gl/pbAODM>). By taking into account all the ethnographic material obtained during the first phases of my fieldwork, Andrés and I began the design of the new mosquito-kite and with it we produced a series of ‘mosquito art attacks’ in different places across the city.<sup>137</sup>

As previously discussed in Chapter 1, the geographical distribution of dengue has widened. According to the WHO (2012a: v), dengue is the ‘most rapidly spreading mosquito-borne viral disease’ in the world, and thanks to increased human movement, the global extinction of diseases like dengue fever is less likely (Adams and Kapan, 2009; Reiner et al., 2014). The mosquito is spreading again to areas where it was previously eradicated, generating periodic outbreaks (Wilcox and Colwell, 2005; San Martín et al., 2010; WHO, 2012a). It *moves* in cycles, similar to the wave-like movement of a kite in the wind. As mosquitoes move, entomologists also move with them: they ‘map the city’ looking for breeding places, counting the number of pupae/larvae per person, and calculating the vector density and likelihood of disease transmission (Kelly, 2011; Adams and Kapan, 2009; Anders and Hay, 2012). Even though people may not have breeding sites in their homes, dengue infections can occur in places they visit frequently but briefly (e.g. places of employment or education), meaning that human travel patterns – small or large scale – are relevant to disease dynamics (Adams and Kapan, 2009). In a broader sense, the

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<sup>137</sup> We appropriated the idea of ‘art attacks’ from the British artist Filthy Luker (<http://www.filthyluker.org/>), who metaphorically uses this phrase to name uncommon artworks meant to unexpectedly intervene in public space and to invite people to look at the world in a new way. Andrés and I are committed to art practices as a medium for rethinking social relations and imagining a different world. The notion of ‘art attacks’ was also appropriate because of the fact that we were not allowed to fly the kite in some public places of the city. Sometimes, when we took the kite into public parks, private security officers identified our mosquito-kite as a ‘dangerous weapon’, and forbade us to fly the kite. Even in these cases, we thought we had achieved our aims: authorities felt attacked by our kite, thus making literal the ‘art attack’ metaphor.

models for increasing ‘participation’ (Chapter 2) responded to a general objective of stopping the *mobility* of dengue and the infections or deaths caused by it. With the idea of mobility clearly an important issue in the understanding of dengue, we decided to use a kite as an object that by its own nature would allow us to move all around the city. With the mosquito-kite, we proposed an ontological change in the object under scientific study – the mosquito – and by doing so, a change into the nature of dengue control. In other words, we designed an ethnographic artefact that invited people to think about the different meanings given to mosquitoes.

The mosquito-kite was not only a unique element for reproducing the form and movement of mosquitoes, but it was also the perfect tool to collect stories by walking all around the city. For example, while we were intervening in different spaces, we also launched kite-workshops where we not only taught people how to design kites but also asked people to make a drawing about what dengue, health campaigns or mosquitoes meant for them. Kites, then, were objects that embodied these experiences and could break down cultural and linguistic barriers. Given that mosquitoes have been widely seen as symbols of disease for thousands of years, the mosquito-kite allowed us to establish dialogues between people from different backgrounds and to think about dengue in different sociocultural contexts.

### **Kite designs**

We began this project by making drawings and translating the morphology of the mosquito onto a flying structure. Although it was a big challenge because of the kite’s irregular geometry, we wanted to retain as much morphological information as possible, in order to produce an aesthetically attractive kite. During this process, Manuela and Jovany, two entomologists, helped us to improve the design by ensuring that we retained all the relevant morphological characteristics of a mosquito.



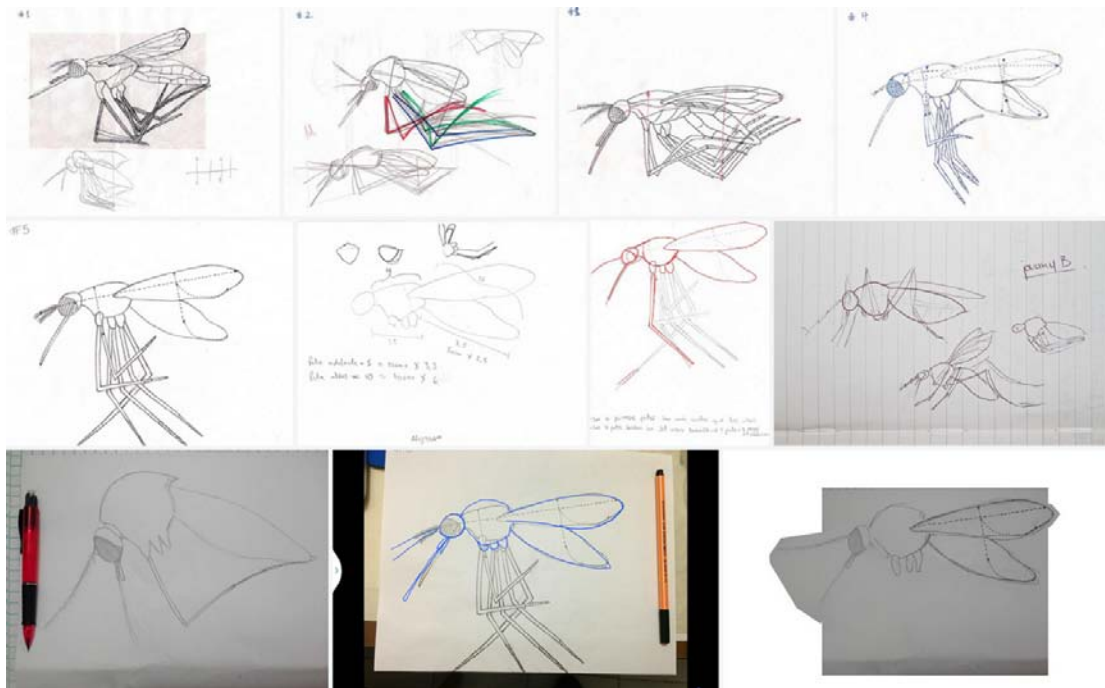


Figure 63. First kite designs

After the final design (figure 64), we used ripstop nylon to build the kite, integrating black, red, white and gray for the different parts of the structure:

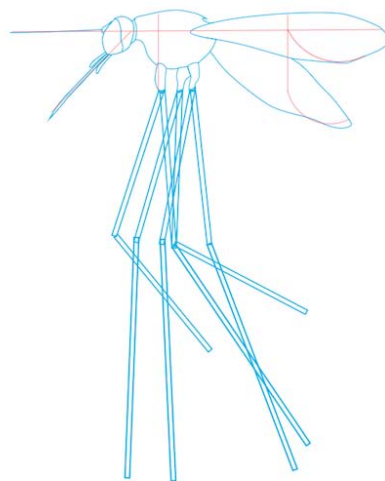


Figure 64. Final design of the mosquito kite

### Art attacks around the city

Although health campaigns mainly target poor areas, dengue is a problem for the whole city, not only lower-class neighbourhoods. Thus, we flew the mosquito-kite in more than 10 places all around the city. Some of them, like the Museum of Modern Art and Ciudadela del Río (figure 65), are upper-class areas. Other places like El Volador hill (figure 66), Pies Descalzos Park (figure 67) or Los Deseos Park (figure 68) are lower-class areas.



Figure 65. Art attack at Ciudadela del Río



Figure 66. Art attack at El Volador hill



Figure 67. Art attack at Pies Descalzos Park

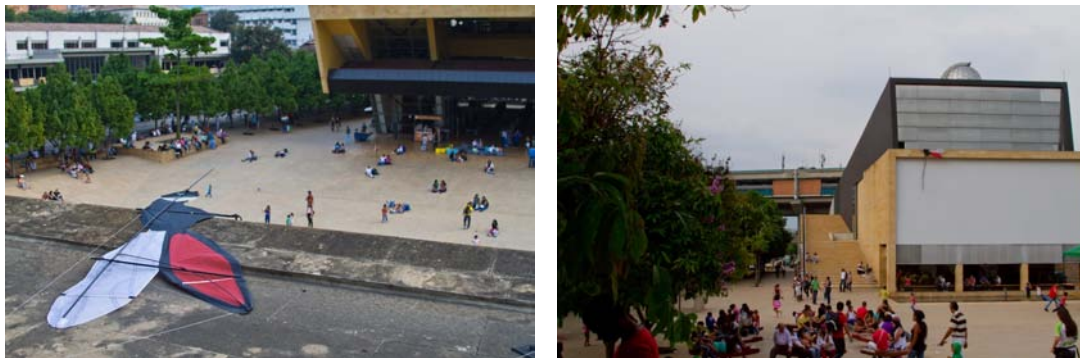


Figure 68. Art attack at Los Deseos Park

We also went to a cemetery located in the north of the city (figure 69). Besides its symbolic and literal connection to death, the cemetery was a key space for us because of the amount of flowers, vases and water containers there. As we have seen before, these objects have long been depicted by public health campaigns as the main mosquito-breeding sites. After flying the kite for some minutes, taxi drivers, children and even mourners approached us to play with the kite. They also made comments about mosquitoes, dengue and the poorly designed campaigns that health authorities have produced in the past.



Figure 69. Art attack at a cemetery

### Collecting stories in form of drawings

During our interventions we asked people to create drawings about what the dengue vector looks like and what dengue means for them (figures 70). Like the entomological-sampling process in the entomological research, this was a way of ‘thinking through things’ (Henare et al., 2007).



Figure 70. Collecting stories in form of drawings

Finally, as a strategy for involving children in our art attacks, we also designed small kites on acetate (figure 71).

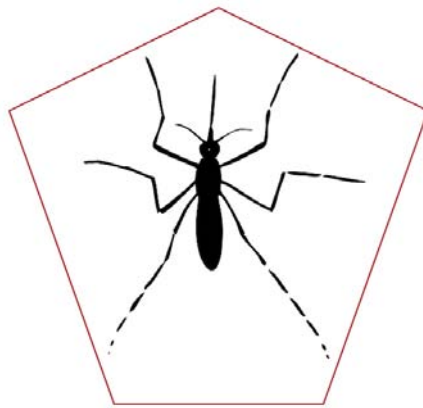


Figure 71. Small kite on acetate

The mosquito-kite, some of the smaller acetate kites and the drawings made by the people during the workshops are now part of the Horniman Museum in London.

### **Serotype: dengue as an embodied experience**

<http://alejandrovalenciat.com/alejandrov/serotipo.html>

Serotype is a fictional character, a comic anti-hero, who embodies the experience of having dengue fever. This was the third big public experiment of my project. By looking at participants' narratives (Chapter 3), it became evident that their experiences and understandings were not connected to the way health campaigns

were designed. The Serotype public experiment was designed to represent the subjective embodied experience of those who had had the disease.

Paying particular attention to the different ways in which those who have had dengue described their experience of being unwell, I decided to collaboratively rework all the ethnographic data gathered and create elements that reflected how dengue fever was understood as a subjective experience of pain. Therefore the broader question this third experiment addressed was: what it is like to have dengue?

### **What is it like to have dengue?**

Thomas Nagel (1974) addresses the mind-body problem in relation to the way we perceive and experience the external world. He asks ‘what is it like to be a bat?’ in order to argue that we will not be able to understand someone’s experience if we do not approach it from their particular point of view. The brains of echolocating animals, like bats, are designed to perceive high-frequency sounds and process information in forms of pulses and echoes. If I – as a human being without sonar – imagine having such properties, this will only be imagining ‘what it would be like for *me* to behave as a bat behaves’; my imagination will not bear the idea of ‘what it is like for a *bat* to be a bat’ (Nagel, 1974: 439). This is an argument against explaining consciousness from a reductionist point of view, as to do so the subjective component of experience would not be taken into account. Nagel (1974: 443) argues that a Martian scientist who has no understanding of visual perception can study the light properties of a rainbow – as objective physical phenomena – but would not be able to understand the human concepts of a rainbow or the place it occupies in the human phenomenal world. This is to say, in other words, that objectivity is ‘a direction in which the understanding can travel’, but in the understanding of any phenomenon, ‘it is legitimate to go as far away as one can from a strictly human viewpoint’ (Nagel, 1974: 443). The ‘objective perspective’ of what it is like to be a bat, or a mosquito, or a person with dengue, is always limited by our human subjective experience, which means that we can never achieve a non-subjective state.

The point to take from this is that dengue fever cannot be explained from a reductionist point of view, such as the discourse about mosquito-breeding sites. By



not including the patient's point of view, we arrive at only a partial and rough conception of the disease. Nagel's insight raises the problem of embodied knowledge, which I have also raised in the foregoing chapters: it is mainly through experience that we understand the world. Following his argument, I can ask: what would be left of what it is like to have dengue fever if one removed the viewpoint of the person who has had dengue fever? Because only those who have experienced the disease can speak about the experience of having dengue, not including them in the design of health campaigns leaves a big gap in the understanding of the disease. (See also the case of HIV/AIDS as an embodied experience in Irving, 2007.)

### **Starting with the design**

In order to collaboratively create an intervention that reproduces the way Luis Fernando and Sara experienced the disease, I asked Alejandro Uribe, Sarita Álvarez and Juan Camilo Ortega for their help. They are part of Bimana Producciones (<http://bimanaproducciones.com/>), a collective of artists who design a variety of large-scale interventions and performances, using various objects such as a solar balloon, plastic bags, kites, makeup, prosthetics and special effects. The idea was to create a fictional character or comic anti-hero who would appear in the public spaces of the city and start a dialogue with people.

With the objective of situating our public experiment within the context of Colombian popular culture and 'everyday life', we also invited Emilio Arango. He is a well-known actor who has represented many characters in educational campaigns that involve public-space artistic interventions. The most famous of these is 'El cazapichurrias', a fictional character who promotes the idea of public mobility across the city. In establishing a playful interaction with pedestrians, car drivers and motorcyclists, El cazapichurrias speaks to civic norms and respect for public space. Because of this playful interaction all around the city, El cazapichurrias has become an icon, or a representative symbol, in the imaginary of Medellín's inhabitants. It has reached the point where words such as '*pichurriada*', the word he uses for violations of the rules, has become part of the way people talk in the city. Emilio was also very important because his body easily resembled that of Nosferatu – and even an insect.

As you can see in figure 72, while we were conceptualising the idea, he was able to produce very dramatic movements.



Figure 72. Conceptualising Serotype. Photos by Alejandro Uribe

With Emilio, we meticulously studied what Sara and Luis had told us about their experience with dengue fever and mosquitoes to characterise Serotype. We not only considered the symptoms of the disease (pain behind the eyes, aches, fever, joint pain and rash, lethargy or restlessness, abdominal pain, persistent vomiting, and mucosal bleeding), we also took into account ideas such as social isolation, break-bone sensation, severe headaches, insomnia and difficulty in articulating ideas. We carefully rehearsed every single movement and ways of acting to produce a lot of emotional responses among the public. Serotype also took morphological characteristics from the mosquito, becoming a hybrid of dengue symptoms, sufferers' experiences, and the insect (figures 73). This was possible thanks to the participation of two entomologists who informed and corrected the design.



Figure 73. Serotype: Final design

The terrible headaches and the idea of pain were represented, for example, through the largeness of the head and the blisters on the character's back and arms (figure 74). The mask also has big insect eyes, which dramatised retro-orbital pain (figure 75). With the help of the entomologists, and the close-up photographs of the mosquito, we imitated the insect's proboscis (long appendage used to suck blood) by using a plastic hose that was connected to a red balloon on which was printed the word 'dengue' in an old/gothic font (figure 75). Through his breathing, Emilio inflated and deflated the balloon when he was close to people. The idea of the balloon was suggested by Luis Fernando, who thought that it could be associated with the idea of a virus. He commented: 'when I hear the word "virus", I always think about something really small, so small that you cannot even see it, but that has an incredible power. I mean, although we do not see it, the power it has is completely overwhelming. So I would represent this as a small balloon that inflates and deflates'.



Figure 74. Serotype: Details in head and arms



Figure 75. Serotype: Face and insect eyes

Emilio dressed in clothes made of latex (figure 76). On the front and the back, the colours and textures imitated the black-and-white-striped body of the mosquito. The reddish colour on the sides was made with gel, and it was based on Carolina's photographs of the cytopathic effect in C6/36 HT cells after infection with the dengue virus. This also represented the idea of bleeding (figure 77). On the

shoulders, arms, hands and legs we applied body paint and used other special effects (figure 78), intended to emphasise the idea of pain, suffering, rash, and the break-bone sensation. The fever was characterised with yellow tones on the body. Emilio, with his movements and behaviour, clearly linked all these components and made evident the idea of representing dengue as an embodied experience (figures 79).



Figure 76. Serotype: Clothes made of latex



Figure 77. Representing the idea of bleeding



Figure 78. Serotype: Body paint



Figure 79. Serotype: Public intervention. Photos by Mario H. Valencia and Alejandro Valencia-Tobón

### Locating the public experiment

This public experiment took place in an area that included Explora Park, the Planetarium of Medellín, Los Deseos Park and the Botanical Garden. The Planetarium of Medellín and Explora Park are institutions that work to promote a ‘scientific culture’ through interactive exhibitions, and engage all kinds of groups in discussions of scientific knowledge in areas such as biology, astronomy, physics, and chemistry. By doing so, they invite non-expert citizens to play an active role in knowledge-production activities. Los Deseos Park and the Botanical Garden are popular locations, especially for families who have picnics there or take walks while

their children play in the fountains. This area is also full of artisans, street vendors and musicians. Located in a lower- and middle-class area of the city, they provided an amazing opportunity to interact with different kinds of people from different socioeconomic backgrounds.

In order to advertise the *Serotype* public experiment, we projected videos in the area where the event was to take place. The idea was to promote public participation without giving too many details about it. With Luis Fernando and Sara, we agreed to ‘announce’ the birth of a ‘monster’ by creating a stop-motion film based on photographs taken of the modelling process of the mask (figure 80).



Figure 80. Stop-motion film (see the video here <https://vimeo.com/88419289>)

According to Luis Fernando, a monster is a ‘fantastic creature that gives life to fear, with extraordinary qualities to carry out cruel and merciless tasks’.

After many months of work creating *Serotype*, this is what Luis Fernando stated when he finally encountered the fully formed character:

When I met *Serotype* it gave me the same sensation as when I described my experience with the disease, while Alejandro Uribe [the head of *Bimana*] sat there turning my words into drawings. I had chills at first. *Serotype* is disgusting, annoying, ugly and threatening. He reminded me of the terrible discomfort I had when I was ill. I wanted him to be more than 100 metres away from me. Then I had



a kind of vomiting sensation because I felt he was inside of me. It represented what I felt.

Serotype was part human, part mosquito and part virus, ‘something hovering between an art of nature and an art in nature’ (Taussig, 2003: 112).<sup>138</sup> In *The Language of Flowers* Michael Taussig (2003: 99) uses the work of the Colombian artist Juan Manuel Echavarría, who makes flowers out of human bones, to argue why the conversion of ‘art in nature’ into ‘art of nature’ is a good way to think about human conflict and what is ‘true but troubling’. Reacting against Colombian violence, Echavarría meticulously organises and displays human bones to make them look like botanical specimens. He then photographs such pieces so they resemble scientific illustrations. For Taussig (2003: 98) Echavarría gives a twist to the idea of ‘humanising’ animals/plants, causing us to reflect on the bloody violence and terror. Here we see how ‘engagement with the art in nature is followed by its conversion into an art of nature’ (Taussig, 2003: 108). This work mirrors the fluctuation between sleep and consciousness, good and evil, delight and disappointment, and the ‘somber face of death and its comic qualities’ (2003: 110). This is a ‘transgression’ of aesthetic laws that simultaneously heightens the fluctuation of these dualities.<sup>139</sup> Vector-borne diseases like dengue fever similarly produce forms of human conflict, collapsing the authority of science and biological explanations with the symbols of death, pain and suffering. As in Painlevé’s films, Serotype produced an ‘alternating rhythm of seduction and repulsion’ (Rugoff, 2000: 51), inviting people to identify themselves with different aspects surrounding the experience of having dengue fever.

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<sup>138</sup> This idea follows that of Karl Blossfeldt, who believed that ‘the best human art was modeled on forms preexisting in nature’ (cited in Taussig, 2003: 108). ‘Art in nature’ presumably implies the contemplation of forms existing in nature that are beautiful as such. However, when a botanist deliberately arranges the parts of a flower to create an aesthetic model that can provide visual information for the taxonomic work, the ‘art in nature’ turns into an ‘art of nature’ (Taussig, 2003: 108).

<sup>139</sup> Cornelia Hesse-Honegger (1996) suggests a similar analysis while reflecting on the morphological changes of insects exposed to radiation (either in laboratory conditions or non controlled contexts such as nuclear power stations).

As you can see in the pictures, hundreds of people got involved, many of whom took photos and played with Serotype (figure 81).



Figure 81. Public interventions with Serotype. Photos by Mario H. Valencia and Alejandro Valencia-Tobón

Finally, the mosquito-kite project was also part of the *Serotype* project. This element helped us to produce a better context for the intervention. Thus, while *Serotype* was happening, another member of the team was flying the mosquito-kite, and the rest of the team were flying and distributing mini-mosquito kites to children (figure 82).



Figure 82. Serotype and the Mosquito Kite Project

## Public responses to my work

During the course of each public intervention, I asked the audience in each experiment to interpret what they saw in the intervention. In response, they produced derivative works using other media, such as drawings, photographs, text, or audio recordings. This was an invitation to appropriate the work that the main research participants and I had created together, to open up a door to a dialogue to collaboratively design alternative ways for understanding dengue fever.

People sent audio recordings, others decided to write their thoughts, and a few even produced objects. For example, this is a text that one of the participants wrote after the *Vampires* intervention:

*Dengue: a human reality*

I understand anthropology as the study of human realities. I conceive the kind of work that you do in this way or, at least, it may have this variation:

Considering that dengue mortality is relatively low, we might think that an anthropological study can be based on showing this reality as part of a human reality. This is to say that your object of study is the paradox between the campaigns to prevent dengue, in relation to their pointless effect. Curiously, people's empirical knowledge talks about the 'innocuous' character of this disease, especially if you compare dengue with other tropical diseases. Likewise, because of the low incidence of dengue (or at least the poor epidemiological data), it tends to be confused with a normal flu.

This is how the indifference to these campaigns generates discredit, not only because of how ridiculous they are but also because of the level of ignorance around the disease (even from the health staff), reaching the point at which the phenomenon becomes a human reality.

Another person, after attending the *Vampires* event, began to ask me about mosquito morphology. She wanted to know more about the vector, so she asked me for some

macro photographs. I gave them to her and after a couple of days she gave me a mosquito made out of balloons (figures 83).

This gift really surprised me. I never thought that all the information would be used to create such a well-made mosquito. This was a lovely present that represented the multiplicity of possibilities this kind of work can produce. People clearly feel more motivated when they are reached in an unconventional way. I brought the mosquito balloon along to some art attacks with the mosquito kite before it went flat. I also took pictures of it to produce a GIF animation (<http://goo.gl/OcK6WN>) and invited people to play around with it.

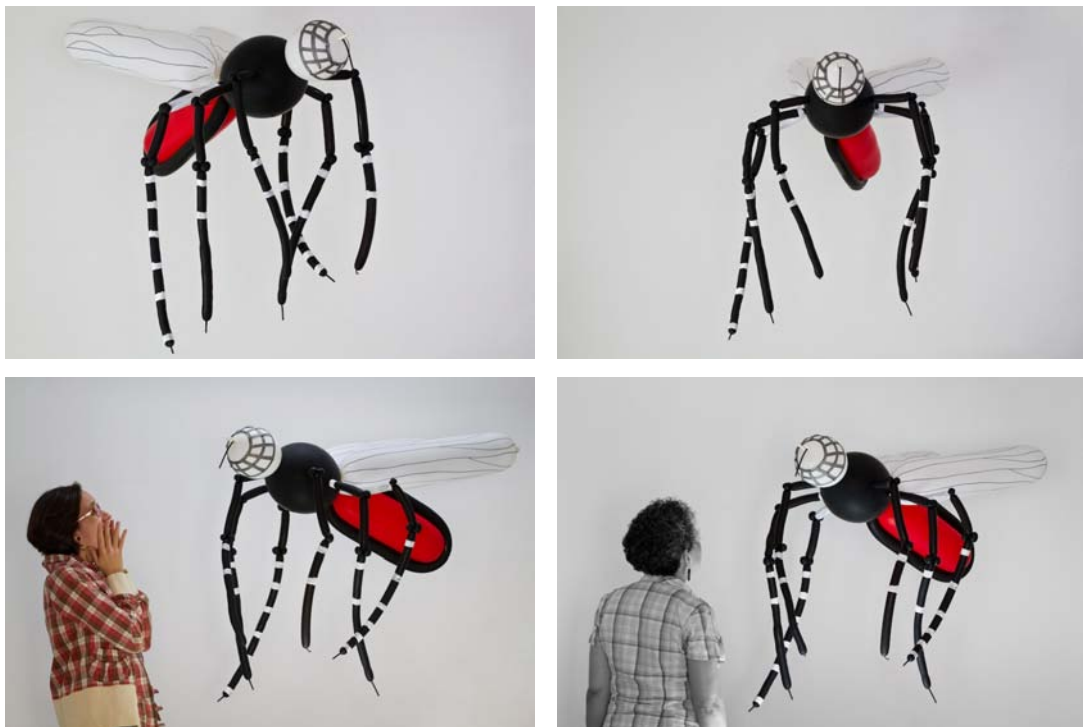


Figure 83. Mosquito balloon

I also played with the shadow this mosquito produced, extending the metaphor used during *Vampires* (figure 84).

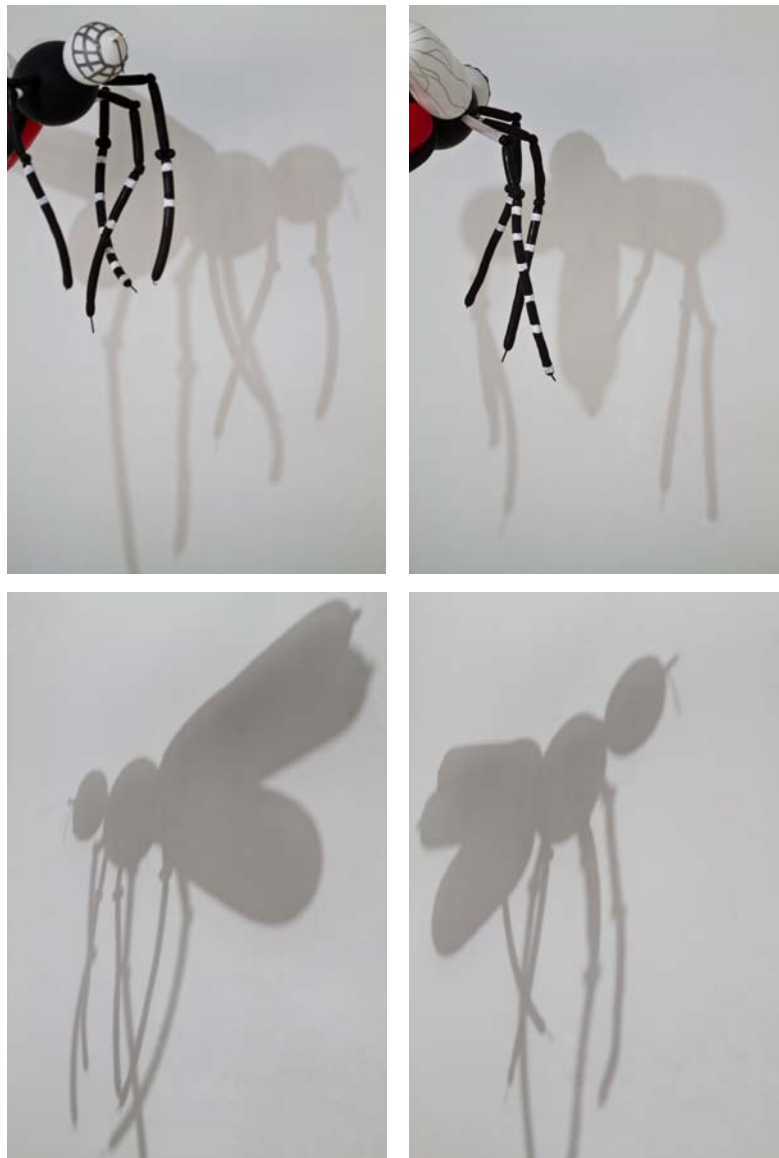


Figure 84. Mosquito balloon: Shadow

## Endings

I argue that these public experiments are alternative ways for seeing the entanglement of scientific and public practices and everyday experiences of dengue fever. They imply a different understanding of human-mosquito-virus relations, as a ‘multispecies muddle’. The current strategies for understanding such relations are based on an anthropocentric reign, where ‘everything has been made for Man and in the image of Man and can only be explained in the terms of Man, otherwise “What’s the use?”’ (Painlevé, 1935: 136). Anything beyond this ‘human exceptionalism’, and that does not clearly stand for an educational purpose, is treated as a ‘waste of time’ (Rugoff, 2000: 50–51; see also Richardson, 2006: 84). Following Buñuel and

Painlevé, I believe that it is possible to create thought-provoking projects, such as the ones presented here, that can equally be taken seriously in scientific and non-academic domains. The first step is not to think about the ‘animal kingdom’ as something separate from the human realm but, as surrealist artists suggest, to have ‘doubt about the human capacity to master the world [because this] is nothing but a sign of human arrogance’ (Richardson, 2006: 85). By inverting such anthropocentrism through the creation of *Vampires*, the *Mosquito Kike* and *Serotype*, I suggest that the simplistic understanding of dengue fever focused on the elimination of mosquito-breeding sites only leads us to have inaccurate, imprecise or incomplete observations of the human-mosquito-virus relationship.

## Chapter 6

### RESPONSES TO MY WORK

#### Hunting dragons

I am usually seen as a ‘biologist’ who decided to move to anthropological studies. I am a ‘strange’ species. During my fieldwork, someone asked me:

— So now you are studying anthropology, right?

— Yes, visual anthropology.

— Is it useful? What kind of knowledge might you produce? Is it relevant? I think that what you do is only relevant to the academic environment, and it has no relation to the actual issues in tropical diseases. What you are doing is like the guy that wanted to be a dragon hunter, and to do so he began to study with the Master of dragon hunters. Once he finished his studies, he went back to his village to try out his knowledge. However, he soon realised that there were no dragons in this world, so he decided to found an academy to teach how to hunt dragons.



Figure 85. Hunting dragons. Illustration by Tobías Arboleda (see the video here <https://vimeo.com/alejandrov/t/cazandodragones>)<sup>140</sup>

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<sup>140</sup> Catalina Pino ([www.menteaudiovisual.com](http://www.menteaudiovisual.com)) did the animation of the video. Music by Susana Valencia. Tobías Arboleda: <https://www.behance.net/tobiasarboleda>



After listening to those words, I felt sure that I have always been a sort of dragon hunter. I am a biologist who became an anthropologist, interested in combining those disciplines with art practices through this study. In doing so I asked for whom and in what ways the labels ‘biologist’, ‘artist’, and ‘anthropologist’ really mattered, or, to put it another way, even if dragons do not exist, should we create them?

I have been looking for that re-enchantment and revitalisation of the disease, following the power of imagination, in the sense that ‘[w]hat the imagination seizes as Beauty must be truth – whether it existed before or not’ (Keats, 1817a: 54).<sup>141</sup> My thesis can be seen as a way of presenting and combining different modes of enquiry and practice for creating dragons in a world facing fundamental future challenges in disease management. As I mentioned in Chapter 1, there is now a recognised risk of having tropical disease epidemics in Britain (McKie, 2015), driven by global climate change. In an interview with *The Guardian* published on 14 November 2015, Jeremy Farrar – director of the Wellcome Trust – argued that although one might think that malaria was the most obvious problem to accompany temperature warming and the increase in the mosquito population, dengue is actually a major global health threat that can affect Britain in the upcoming decade. This stark warning connects my dragon hunter figure to the challenges of the future that we face through climate change, and which require the development of novel responses. Indulging in ‘abstract’ and ‘useless’ ideas, of which my interlocutor accused me, became tangible through the creation of *Vampires*, the *Mosquito Kite Project* and *Serotype*. With those experiments, I not only realised that it was possible to create dragons, but, more interestingly, I found out that many different people affected by dengue were also interested in doing so, suggesting to me that after all dragons could exist and be productive. So having described the different forms of knowing dengue fever, and presented the ways in which anthropology, in collaboration with ideas and practices drawn from science and art, can transform public understandings of the disease, I would like to conclude this thesis by reflecting on the ways in which different people have responded to my work.

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<sup>141</sup> This is a form of negative capability, ‘when man is capable of being in uncertainties, Mysteries, doubts, without any irritable reaching after fact and reason’ (Keats, 1817b: 60).

All the public experiments and the multiplicity of experiences I have presented are, in the end, a way of applying what Eduardo Galeano (1999, 2001) calls the ‘right to dream’. In his words, this is ‘an invitation to flight [because] we have the right to imagine the future we want’ (Galeano, 1999: 109). Galeano holds that although the United Nations has proclaimed a long list of human rights, we must also think about ‘the never-proclaimed right to dream’, in the sense that we all can ‘set our sights beyond the abominations of today, to divine another possible world’ (Galeano, 1999: 109). Thinking on this right to dream, we might ask: what effect will this project have in Colombia? Would it be actually possible to change the different models enacted in health campaigns and give value to the intersubjective exchange of experiences? Would a new relationality and corresponding modes of participation be accepted in Colombia?

### **Mosquitoes: The stuff of dreams and nightmares**

On 10 October 2014, while writing this thesis, I received an email from the Colombian Association for the Advancement of Science (Asociación Colombiana para el Avance de la Ciencia – ACAC), asking about the cost for a photograph of an *Ae. aegypti* mosquito I took during my fieldwork. This is what they wrote:

We are contacting you from the Colombian Association for the Advancement of Science. We would like to use a photograph you posted on Flickr on the cover of the next volume of the journal *Innovation and Science* [Innovación y Ciencia]. As we have an article about chikungunya, it would be very relevant to have a picture like the one you took.

In the subsequent emails we negotiated a price for the image and the rights of use associated with it. It was published in Volume XXI, no. 3, in November 2014:

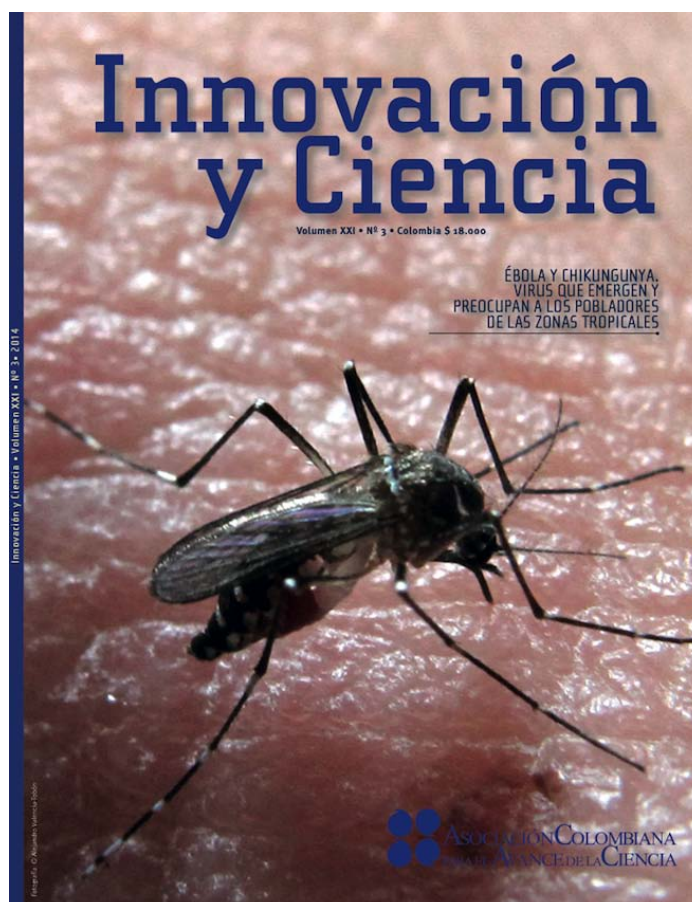


Figure 86. Cover photo for the journal *Innovation and Science* (vol. XXI, no. 3)

Afterwards, on 27 November 2015, Maria Gutierrez Fernandez, a virologist and the editor-in-chief of the same journal, invited me to write an article about my projects:

After looking up your website, I would like to invite you to write an article for us about the ideas surrounding your photos. There is great potential in the images you take, and there should be many stories behind your work.

The reason for this invitation is that we are working to engage the public with science. We consider photography an excellent medium to teach and disseminate science, and your work is an example of this. We are inviting one photographer for each volume of the journal, and we thought that you could be the one for the first number in 2015.

María clearly framed my work within the classic public engagement discourse described at the beginning of Chapter 4 (see also Nowotny et al., 2001). As such, photography was framed as a tool to make available the knowledge produced by

scientists. I explained to her that I did not consider my work to be directly aligned with the ‘public engagement’ concept, and that I was attempting, instead, to produce an interdisciplinary collaboration to support the idea that dengue and mosquitoes cannot be understood independently of the multiple ways in which they are known and experienced. In that sense, I suggested that I write an article developing a simple argument that would be based on my anthropological understanding of the relation between humans and mosquitoes, and the reasons for using art methods to create such interdisciplinary approaches – rather than simply writing an article based on the stories or anecdotes behind the photographic work. María accepted my proposal and we also agreed that the article would be written avoiding complex terms, as the journal was not specialised in anthropological theory.

I wrote the article during December 2014, and I submitted it on 13 January 2015. In it I presented an argument about the relationship between the idea of living with mosquitoes and the possibility for understanding the symbolic world that these insects generate through the sounds they make. Essentially, I developed the idea of how to have people engage with the insect itself – by recreating acoustic experiences through mosquito soundscapes, making drawings and using photographs – and thus encouraging them to think of the mosquito as a living being in all its forms, rather than simply as an object to be eliminated. I ended up commenting on the idea of how mosquitoes are seen as almost the devil himself, sucking blood and making their distinct high-pitch sound. This text was an invitation to imagine another possible world by exploring something beyond the biological dimension of mosquitoes and the discourse of eliminating their breeding sites.

At the end of the same week I got some comments back. María basically wanted me to structure my paper in a more ‘scientific’ way, presenting clear objectives, methodology, results, and analysis of the research outputs, and showing how my work help to advance science. In that way, she argued, we would avoid having the rest of the editorial board reject the article. I analysed the comments and decided to accept some of them. I also gave her the reasons why I did not incorporate the other suggestions. For example, I rejected the ‘scientific structure’ by explaining why the nature of ethnographic research is different from the pure science approach. As the former centres on everyday experiences through participant observation, and the

latter on the objectification of truth by applying the hypothetic-deductive method, the way in which both are presented is different. Hence, I argued that in order to gain insight into the everyday understandings of mosquitoes and the symbolic constructions they generate, it was necessary to approach the world as people live and experience it, not as a result of the scientific explanations based on an inductive rationalisation of it. On the other hand, I accepted that it was necessary to balance my anthropological and relational discourse so as to include some nuances of ‘public engagement’. To do so, I included a series of photographs at the end of the document where I presented the life cycle of mosquito – egg, larva, pupa and adult mosquito. In this way, I was presenting entomological knowledge.

Another comment was related to the political component of vector-borne diseases. In the first version of the paper, I mentioned how the attention to chikungunya illustrates how health campaigns can be subject to political debate. I said that chikungunya was a ‘trendy’ disease in the sense that it has become a political and social issue because of the way the disease has been discussed in the mass media. María changed my language. She suggested that mosquitoes were ‘trendy’ in the sense that now they were not only transmitting dengue but also chikungunya.<sup>142</sup> Although I decided to avoid the political component, I did not accept María’s revision. I explained to her why I concluded that vector-borne diseases are a political problem, and why health campaigns are overfamiliar and ineffective.

Overall, I decided to rework the ethnographic approach the text had at the beginning. To do so, I presented everyday experiences with mosquitoes using a literary narrative that took people into the world of these blood-sucking insects, whose buzzing sounds reminds humans how vulnerable and powerless they are. Without compromising my anthropological understanding, not following the standard template for the ‘public engagement with science’ narrative, I aimed to engage a wider audience of readers with an original structure for the paper. For me, this was about achieving a balance between the rationalised scientific structure and the original ethnographic insight that

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<sup>142</sup> This may not even be scientifically accurate because the historical analysis of illness narratives suggests that both diseases have maintained their life cycle across different human populations for many years (see Chapter 3).

the text had conveyed. María accepted the second version, and the text now needed to get the approval of the whole editorial board (four more people). I was, like María, very pleased with the result and the ‘negotiation’ process. In this respect, she commented:

I liked this second version. The document will be included in the material that is going to be submitted this week to the editorial board. As you said, the text does not follow the standard scheme of our journal, even considering that you made changes to it. But this does not matter. I throw myself behind this different and interesting proposal. Let’s see what the committee says. They will probably give us some suggestions (they always say something).

By the way, one of the good things about this work is that we find people like you. You listen to different opinions, respond to comments, and maintain your position in this friendly manner. Many thanks. I think we’ll have to attach headphones to the next issue of the magazine.

Some weeks afterwards I got the comments back from the committee. Overall they said they liked the text, and they asked for a change in the abstract length and the numeration of both drawings and photographs (including a copyright and authorship statement for each image). The paper was published two months after that, under the title *Mosquitoes: The stuff of dreams and nightmares* (Mosquitos: materia prima de sueños y pesadillas) in volume XXII, no. 1, 2015.

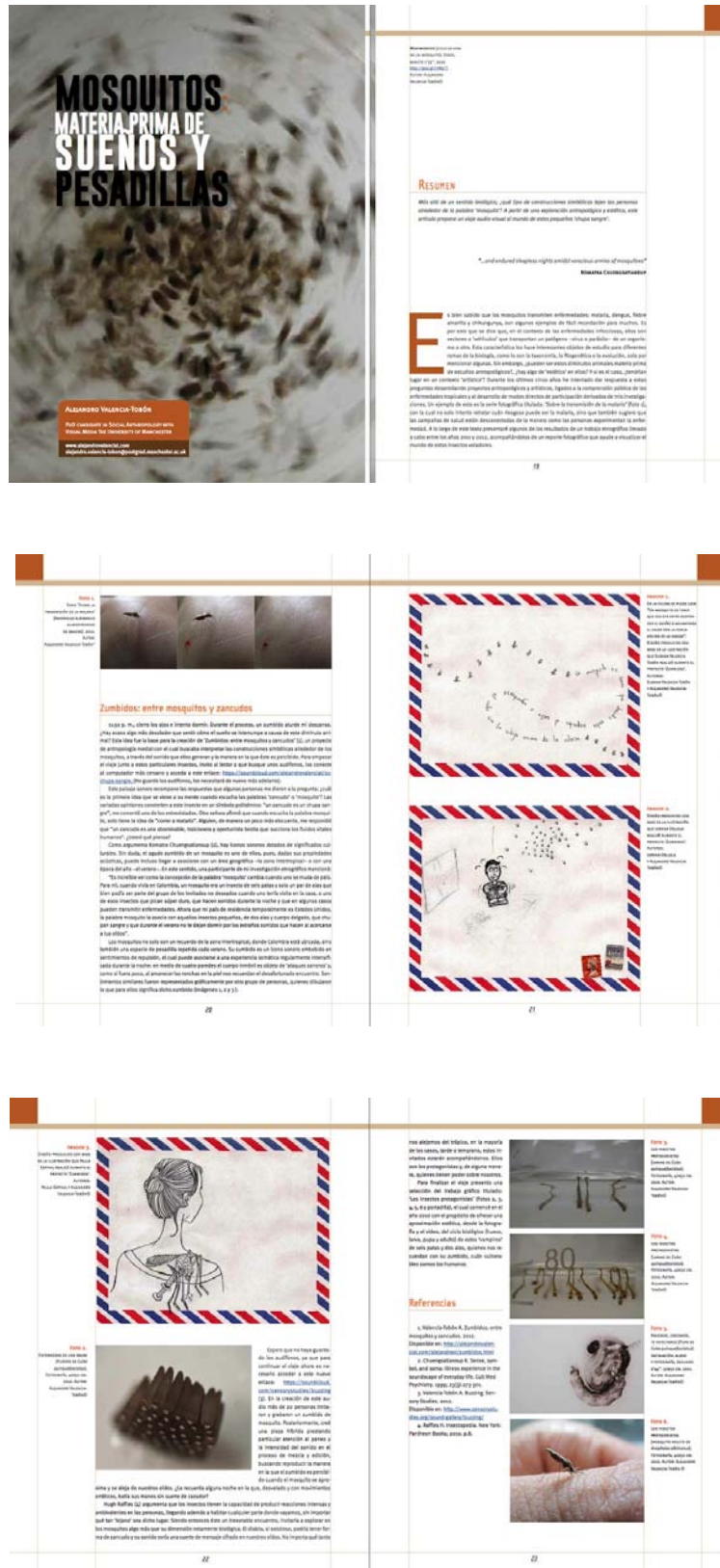


Figure 87. Images from the paper *Mosquitoes: The stuff of dreams and nightmares*.

Source: Valencia-Tobón, 2015

Once the paper was published, I received some emails from people whom I did not know, and who shared their thoughts with me. These are two of them:

I write you to comment on the article published in the journal *Innovation and Science*. I shall say that I enjoyed it a lot. It was nice to hear the sound recordings and I even imagined the mosquito in its entire journey. I agree with the thoughts of the people about mosquitoes. My perspective of the scientific and literary approach changed after reading the paper.

I really liked that the topic is presented from an uncommon perspective. I enjoyed the approach from the different senses (seeing and hearing), from the different artistic expressions (literature, music, drawing, video), and from the sentiments and thoughts of each person. It is as if it was a compound eye, like the one of the flies, looking from an unexpected point of view.

After seeing the paper published; after creating *Vampires*, the *Mosquito Kite Project* and *Serotype*; and after listening to the multiplicity of responses to my work, I concluded that it is worth trying to hunt dragons. The process – even as an imaginary exercise, if you will – pushed the boundaries further, not only for my own ethnographic experience, but also for the work of the people who were involved in this project. Such ‘boundary transgression’, in which the rules and pre-established ways of working were put aside, facilitated the emergence of a new process-based and participatory form of knowledge. Whenever people take different and unconventional routes, things enter an unpredictable zone, from which something valuable could potentially emerge. These novel responses in between anthropology, art and science can draw the attention of different people, in both the academy and in the public domain.

Taking all into consideration, it should be clear why I argue that health campaigns need to be re-designed, privileging relations and stimulating debate among the different actors who are part of the complex network of biological, physical and social relations generated by vector-borne diseases like dengue fever. In such a context, campaigns should value the experience of those who have had the disease and the multiplicity of understandings in the academic and public domain. It is



important to consider new forms of thought, facilitating an intersubjective exchange of experiences through experimental and interdisciplinary collaborations. It is also necessary, I argue, to bear in mind that in dealing with the kinds of issues about knowledge raised by this study of dengue that there is a place for dreams and for dragon hunters.

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## Appendices

### Appendix 1. Twitter: Álvaro Uribe Vélez



1. Álvaro Uribe Vélez. Source: <https://twitter.com/alvarouribebel>

## Appendix 2. Poster: Dengue symptoms



Dengue symptoms. Poster in the Metro of Medellín.

Translation:

Have you been diagnosed with dengue or do you think you may have it?

Pay attention to the warning symptoms: lethargy or restlessness, sudden reduction of fever, continuous abdominal pain, vomiting, intense cold.

You may be on the border of severe dengue, which can kill.

Consult your doctor immediately. Avoid self-medication.



### Appendix 3. Advertising dengue as laundry detergent



1. Challenge against dengue at school. Source: <https://goo.gl/dGn0ia>

Translation

The anti-dengue challenge...

After the rain, dengue vector mosquitoes appear. For them, a school is a real feast, unless students take measures and pass the anti-dengue challenge...

—Are you protected against dengue here?

—Yes, with cleaning brigades.

—And brushing water tanks weekly.

—Very good, because mosquitoes breed within 4 to 10 days.

This school has passed the anti-dengue challenge... has yours?

Don't leave clean standing water where mosquitoes can breed. Brush water tanks weekly.

The anti-dengue challenge at home: zero mosquito breeding sites, zero mosquitoes!

Minister of Health, Government of Colombia.



2. Challenge against dirt on clothing [*perjudido*]. Ace advertisement. Source: <https://goo.gl/wTfLKA>

Translation:

— Hey! Do you know Ace?

— I haven't tried it

— What do you use?

— xxx [muted answer]

— Why?

— Because my family has always used xxx [muted answer]

— Do you think that Ace or your product may clean this ball?

— No, we will need to scrub

— Bring your product

— We are going to wash... We are going to cut two pieces of cloth, and then we will wash one of them with Ace, and the other, with the other laundry detergent

— Incredible! This is a stunning whiteness. I was so wrong. I will choose Ace.

— It was tested that in Bogotá, only Ace makes the whitest whites without scrubbing



3. Challenge against dirt on clothing [*percurido*]. Ace advertisement. Source: <https://goo.gl/3kz6OM>

Translation:

- Ace has proved that it produces better whites in one wash, than other detergent in two. Now we are going to see the challenge against dirty clothes [*percurido*]
- You cannot clean up this *percurido*
- It looks too yellowed... impossible
- Ace was designed to eliminate more dirt on clothing than any other detergent. Look at this: The same cloth... we soaked, washed and rinsed it. Which one is whiter?
- The one on the left...
- It was tested that Ace removes more grime than the other detergent



4. Accept the challenge! Pasta sauce stains. Ace advertisement. Source: <https://goo.gl/DSjqd8>

Translation:

What's the biggest challenge for your detergent? Ariel, the P&G brand, accepts the challenge.

— ...The pasta sauce stains... when you eat it splashes...

— Did you know that Ariel even removes pasta sauce stains in one wash?

— We stained it, and then washed...

— It's incredible that this t-shirt doesn't have any red stains. There are no stains, there is whiteness.

— Ariel passed the challenge; it even removes hard stains in one wash.

## Appendix 4: Examples of anti-dengue campaigns



1. Student Committee Against Dengue in Medellín. Source: <https://goo.gl/zUJvX4>



2. We are starting activities again! Source: <https://goo.gl/zPOzFd>

Translation:

We are starting activities again!



### 3. Campaign in Buenos Aires, Argentina.

Translation:

We can eliminate the mosquito vector of dengue today.

Having standing water facilitates the development of the mosquito transmitter of dengue.

We can replace water with wet sand.

The water level should not exceed the sand.

Flowers will be maintained as they will have water.

**Dengue**  
todos podemos prevenirlo

El Dengue es una enfermedad transmitida por el mosquito *Aedes aegypti*.

Este mosquito sólo se reproduce si dispone de agua limpia estancada, donde se desarrollan sus larvas.

¡Cuidado! en nuestra propia casa podemos estar permitiendo que el mosquito transmisor del dengue se reproduzca.

Larvas del mosquito transmisor

Para prevenir el dengue, impidamos la reproducción del mosquito:  
**Evitemos tener en nuestra vivienda recipientes que contengan agua limpia estancada.**

Cambiamos periódicamente el agua de jarrones y floreros

Despejamos las canaletas

Evitemos la acumulación de agua en el interior de neumáticos

Impidamos que los recipientes en uso acumulen agua

Mantengamos boca abajo los recipientes en desuso

Desechemos todos los objetos inservibles capaces de acumular agua de lluvia.

Tapemos los recipientes utilizados para almacenar agua

Gobierno de la Provincia de Corrientes  
Ministerio de Gobierno y Justicia

**Usted puede ser el próximo infectado.**

### 4. Health campaign in Corrientes, Argentina. Source: <http://goo.gl/GrkVr6>

Translation:

Dengue: we all can prevent it. Dengue is a disease transmitted by the *Aedes aegypti* mosquito. This mosquito only breeds in clean and standing water, where its larvae develop. Take care! We may be having the mosquito breeding in our own houses.

To prevent dengue fever, we need to avoid the reproduction of the mosquito: we need to avoid standing water containers in our homes. Cover water tanks used for storing water

We need to change the water in vases.

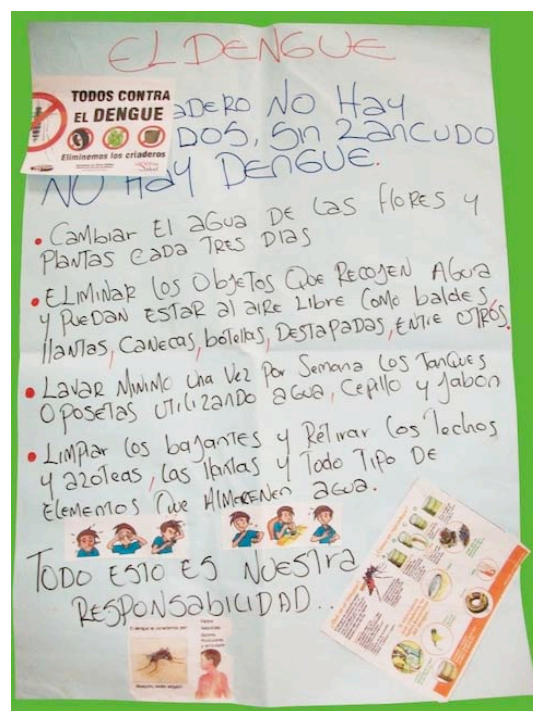
Clean roof gutters.

We need to avoid water accumulation in tyres.

The containers that we use should not have water in them.

We need to discard every old unused object that can hold water.

Keep containers upside down when we are not using them.



5. Dengue control is our responsibility. Source: <https://goo.gl/4pnA6q>

Translation.

Dengue. ‘Without mosquito breeding sites there are no mosquitoes, and without mosquitoes, there is no dengue.’

It is our responsibility to:

- Change the water in vases every three days
- Eliminate any water container outdoors—like tanks, tyres, bottles, among others
- Wash water tanks with water, brush and soap at least once a week.
- Clean roof gutters and remove tyres or any other water container from rooftops



6. Flyer distributed in Itagüí. Source: [www.itagui.gov.co/](http://www.itagui.gov.co/)

Translation:

Dengue control is everyone's responsibility.

Wanted:

Scientific name: *Aedes aegypti*

Nickname/alias: the one with long legs and white lines

Places he visits: clean and standing water

Crime: dengue transmission

Reward for capture: good health





7. Campesino mosquitoes: 'Póngase mosca con el dengue'. Source: <https://goo.gl/dPm1JG>

Translation:

- Get lost mate, there's no place here for you to breed
- Really, why is that?
- Everybody is being careful about to dengue?
- Yes, people cover everything that can hold water. They don't have anything, no plants, tyres or anything that accumulate water.
- OK love, we gotta fly now...
- We have bad luck...

Pay attention to dengue. If there is standing water, there are mosquitoes



8. World Health Day 2014: Small bite, big threat. Source: <https://goo.gl/bwJFdB>