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Data Performativity, Performing Health Work: Malaria and Labor in Senegal

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ABSTRACT

In this article, I investigate the ramifications of health data production in the health fight against malaria in and around Dakar, Senegal. Malaria health development funding at the community level is contingent on performativity; the Global Fund’s “performance-based funding,” for example, requires that local actors produce certain forms of evidence and that intermediaries synthesize this evidence into citable data. Analyzing the practices of diagnosis and approximation in health clinics and in global malaria documents, I argue that data production in Senegal is conditioned by and reifies preconceived notions of malaria as a problem addressable by the enumeration of technological fixes.

KEYWORDS

Senegal; data; global health; labor; malaria; performativity

In December 2013, as a part of a community-based intervention against malaria in peri-urban Dakar, Senegal, volunteers from Guédiawaye went door to door to learn about the malaria prevention tools that were available to the local population. Captured on each questionnaire they produced were the numbers of adults, children, beds, (un)used insecticidal mosquito nets, and men and women who had preexisting knowledge about malaria in each household. These numbers would be synthesized into data about how the local population was preventing malaria and into evidence of the community-based organization’s antimalarial work, producing a snapshot for the financer of this work—the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund). At heart, these questionnaires were meant to capture an image of malaria prevention through numbers about mosquito nets: were there enough nets for each household, how many people were actually using them, and had anyone received a message on how to use them properly? Yet, at the bottom of many of these questionnaires—in an open field marked “problems encountered during the home visit”—the data collector had written “flooded.” Many of those interviewed were living with standing water in their homes. While the Global Fund and other global health investors understand that flooding in peri-urban Dakar brings a large population in closer proximity to breeding sites of malaria-carrying *Anopheles* mosquitoes, and so to “higher peaks in transmission” of malaria and a “longer transmission season” (USAID-PMI 2015:9), this flooding is framed as an obstacle to overcome but not as a target for intervention to control malaria.¹ Flooding is not enumerated and synthesized into the Global Fund’s snapshot of malaria prevention in Senegal.

What work do these data do and what do these data obscure? Using the concept of *data performativity* and the science and technology studies literature that informs it, I examine the ways that the data production incorporated into the local fight against malaria in Senegal is conditioned by preconceived ideas of the public health problem of malaria and how these ways to understand malaria are reified. Science and technology studies borrows the concept of



“performativity” from Austin’s (1975) assertion that words do more than just describe the world—they enact realities—and Butler’s (2006) argument that gender categories are performed. Callon (2006:10) argued that the concept of “performativity” works best to describe the relationship between scientific theories and the world they attempt to represent by maintaining that scientific theories are “actively engaged in the constitution of the reality” they describe. Erikson (2012) adapts the concept of performativity from its linguistic, discursive, and economic frameworks to the realm of what she calls “global health business.” In Sierra Leone and Germany, the business of global health “is fortified when people enact statistical health scripts through acts and processes of data collection, analysis, storage, and disbursement” (Erikson 2012:373). That these numbers are “too disparate from people’s bodies, human complexities, or communities to be meaningful representations” does not change the work that the numbers do or the place they have in maintaining health systems in places that receive global health funding. Data performativity, then, indicates the ways that data collection and synthesis maintain the model that funding agencies construct, reifying both the definitions of health problems and the power relations embedded within global health glows of capital, technology, and knowledge.

The stakes of this data performativity are clear in the data the questionnaires, discussed above, produce and what they do not. The data that global health institutions demand as evidence of success in the fight against malaria exclude the disease’s sociopolitical and geographical proximities (Kelly and Beisel 2011), yet these proximities are centrally important to how malaria exists and to the obstacles to addressing it in Guédiawaye. As zones that have rapidly developed since the 1970s, Guédiawaye and its neighbor Pikine have become destinations for most migrants from rural Senegal and neighboring countries coming to Dakar. Densely populated and still reeling from a particularly intense rainy season in 2007, many areas of Guédiawaye were flooded and had insufficient access to municipal services. Data left out could have made clear the importance of strengthening municipal infrastructure in the fight against malaria: building better canals and improving housing, increasing the number of health structures available to the ever-growing population, and equipping those health structures with health workers and the appropriate materials to improve residents’ health. The questionnaires collected by the community-based organization in Guédiawaye take as their object the mosquito net and its enumeration, asserting that the problem of malaria can be addressed with mosquito nets and by tracking their usage, leaving outside the problem of malaria the complex reasons for those “problems encountered” and why it might be particularly difficult for a population living without sufficient access to municipal services to treat and deal with malaria. Data production, then, is central to the process of disentangling malaria from its context and producing an approximation of a disease addressable through the provision of the current front-line tools, such as artemisinin-based antimalarials (ACTs), rapid diagnostic tests (RDTs), and long-lasting insecticidal nets (LLINs).

In this article, I illustrate this argument by moving through three stages of the practice of approximation. First, I show how diagnostic practices within the public health system in Senegal are required to account for malaria even as they cannot disentangle the entangled meanings of malaria. The problem of malaria is always more than the parasitic infection—this theoretically disentangled meaning of malaria—that global malaria governance targets. As global health interventions on the disease seek to pinpoint the problem as addressable in this way, the evidence that the disease exists as such slips away in encounters between *malades* (“those who are sick”)² and health workers, between *malades* and their communities. I then elaborate on how these diagnostic data are the skeleton upon which a representation of malaria in Senegal is estimated. The data that stand in for Senegal from the global malaria perspective are based on approximate diagnoses performed by nurses, physicians, and laboratory technicians. This involves a process of “filling out” data and raises questions about data ownership, utility, and representativeness.

Finally, in investigating the 2010–2013 health worker data retention strike in Senegal, I show how ruptures in data production did little to disrupt the model of the malaria problem, even though the strike threatened Senegal’s ability to qualify for global health funding because of the Global Fund’s framework of performance-based funding. Health workers’ healing labor—so central to the

management of malaria and health problems in general—is perceived as outside the problem of malaria by global health entities. However, health workers' data production labor was key to gaining access to global health funds: Performance-based funding required Senegal to demonstrate that the health system was working toward a success determined by indicators tied to the Millennium Development Goals. By striking, health workers in Senegal made visible the dangers of data performativity: The practices of approximation produce a model of malaria that cannot incorporate the unruly, unquantifiable data that health workers labor within, thus limiting the kinds of interventions possible for the global health fight against malaria.

The analysis presented here emerges from an ethnographic study of the fight against malaria in Dakar, Senegal conducted between 2011 and 2014. This included a six-month internship with the National Malaria Control Program (NMCP) and a two-month internship with a community-based organization in peri-urban Dakar. Diagnostic practices were researched during a month-long internship in a public health clinic in northwestern Dakar, and methods there included formal interviews and shadowing nurses and laboratory technicians. The process of data synthesis was analyzed through document analysis and formal interviews with intermediary nongovernmental organizations and public health officials working on projects funded by the Global Fund. To research the strike, along with popular media analysis, I interviewed members of the international donor community, health worker union leadership, and public health workers in the Dakar region.

Making data: Counting plasmodia, performing malaria

Creating malaria morbidity data begins with the process of diagnosis, conducted through microscopy and rapid diagnostic tests (RDTs) in Senegal's public health clinics. These diagnoses are marked into the registers that health workers keep about the patients they see and treat, and they serve as a starting point for the enumerated problem of malaria in Senegal. Taking a closer look at diagnostic practices can elucidate the layers of approximation at the base of this problem of enumeration.

I first visited the microscopy laboratory at a public health center in northwestern Dakar in the spring of 2013. There, I was greeted by a laboratory technician excited to show me around and tell me about the kind of work performed there. She took me step by step through the process of finding a clear positive diagnosis of malaria through microscopy. In a smaller room to the side of the main laboratory, which served part-time duty as a storage room and was full of extra and outdated equipment, laboratory workers would sit patients down on a stool to extract a blood sample. They swabbed the end of the patient's finger with alcohol and pricked it, and they placed the drop of blood on a glass slide. A laboratory technician then created a blood smear by pulling a plastic, clear spreader at a 45-degree angle across the drop of blood. They let the slide sit with the stain for several hours, thus making it easier to distinguish the plasmodia from blood cells under the microscope. The laboratory technician told me to return later in the day so that she could show me what the process was like in the search for plasmodia.

When I returned, she told me that the sample they had was remarkably good.

"*C'est tellement jolie,*" she said. It was "truly beautiful"—without a doubt a positive diagnosis. She ushered me to the microscope and told me to look for myself. Through the lens, I could see a large number of much smaller, purplish "grains of sand" next to the larger blobs of blood cells. She directed me to the fine focus knob on the microscope and told me to shift around the slide to see if I could spot more grains. She explained that while the purplish grains were necessary for a positive diagnosis, there must also be a "blue shadow" behind the grains. Sure enough, I could spot a faint bluish tinge to the back of the grains.

She was so happy that I had a chance to see a case that was "*fortement positif*"—"definitely positive." When there were fewer plasmodia, malaria was more difficult to diagnose. The laboratory technicians would sit over the microscope, sometimes for hours on end, they told me, moving the slide slowly under the lens of the microscope, searching for something that fit the exact description



of the plasmodia. If it was particularly difficult to find enough grains, then the laboratory technicians would at times ask the patient to return so that they could take another blood sample. However, it rarely would happen that the patient came back. Still the laboratory technician was required to provide certainty—a certainty that was impossible to provide. More often, she must approximate.

Funding agencies and regulatory bodies for the fight against malaria engage in practices of certainty making, strictly labeling as correct or incorrect procedure actions and treatments for addressing endemic malaria. As fear of artemisinin resistance emerged and began to spread in Southeast Asia (Noedl et al. 2008; Dondorp et al. 2009), global malaria institutions mapped a similar trajectory for artemisinin resistance as occurred with chloroquine, the previous frontline treatment for uncomplicated malaria. Urgency, then, has framed much of the regulation of pharmaceutical distribution and usage. The World Health Organization (WHO) has produced strong recommendations for the diagnosis of malaria via microscopy or rapid diagnostic tests as a prerequisite to prescribing antimalarials to forestall resistance. Senegal implemented these recommendations as strict protocols in 2008. The WHO and the Senegalese NMCP apply labels of correct and incorrect practices of diagnosis and treatment in the public sector via these protocols. In private and community-based sectors, they are enforced by granting or withholding funding. Meanwhile, malaria diagnosis, treatment, and research exist resolutely in a landscape of ambiguities. Beyond the clinical and research context, in many communities in and around Dakar—as elsewhere in Sub-Saharan Africa (Granado 2007; Langwick 2008)—“malaria,” “fever,” the French “*palu*,” and the Wolof “*sibiru*” circulate and inhabit many different meanings and spaces. This complicates a neat image of tracking positive diagnoses of the disease.

At the public health center where I was working, data collection took many forms. When a patient arrived, she would pass by the security booth at the gate in order to pay a consulting fee and receive a receipt to provide the nurse or doctor that would see her. After waiting minutes or hours in the open-air breezeways that connected the different buildings of the clinic, depending on the time of arrival, the *malade* was seen by a nurse or a doctor in one of the clinic’s main consultation rooms. The *malade* or her companion passed the health worker the receipt, and the health worker began recording information into a register. Here the patient’s name was recorded, along with her symptoms, how long she had felt them, the health worker’s diagnosis, the required tests, and the treatment that the health worker prescribed. If test results were available, whether from the microscopy laboratory or from a rapid diagnostic test, then laboratory workers would also provide these data to nurses and doctors to record into the register. At this health center, there was also a pediatrician and a group of midwives, and these health workers had their own registers where they recorded similar information about malaria for each patient they saw. These registers were the starting point for public health workers to produce representative data about malaria rates in Senegal. Officially, health workers in public health structures were required to report this data on a quarterly basis to their health district directors, who then provided a synthesis of the data of their districts as a whole for the central Ministry of Health. Before analyzing how the data retention strike did—or did not—impact malaria data production, I will now look closer at the process of approximation that is required for representing the malaria problem on the national and global levels.

Filling out routine patient data: Representing Senegal and defining solutions

Producing a representation of Senegal’s malaria landscape over time requires building a world from these diagnostic approximations. WHO does this by comparing these data against representative surveys of the Senegalese population, and the timeline is disrupted by the fact that the definition of malaria changed in 2008 when the Senegalese Ministry of Health incorporated WHO’s recommendation that malaria be defined only by microscopic or rapid diagnostic test diagnosis rather than clinical diagnosis. If certain symptoms are present—particularly a cycle between fever (*un corps chaud*) and chills—malaria is assumed during the rainy season in Senegal, both outside the biomedical world and inside it. Before 2008, a clinical definition of malaria—the health worker’s

diagnosis based on symptoms—constituted the disease for global health organizations. Thus, the switch to attention to the *Plasmodia* parasite is relatively recent. As we will see here, this narrow focus was conditioned by the MDGs, and data production cut into the malaria problem to create something manageable with the tools that global malarial institutions have available.

The contemporary global health fight against malaria can be read as a kind of anti-politics machine (Ferguson 1994; Lakoff 2010) that targets individual sufferers and explicitly places beyond its purview the political, social, and economic conditions of that individual. Since October 2007, when Bill Gates and Margaret Chan³ declared that we can and should eradicate malaria, global health development has returned to dreams of eradication. After the collapse of WHO's 1955–1969 Global Malaria Eradication Program in Africa, Latin America, and Southeast Asia, malaria was largely neglected in international health development schemes until the early 1990s, when morbidity and mortality rates in these regions rose steeply.⁴ The revamped global malaria control programs of the 1990s were crowded by an increasing number of private institutions invested in the effort as suspicion was cast on governments' ability to efficiently determine global health objectives in the era of global postsocialism. The role of "global partnerships" in determining health development goals increased exponentially, as "some 70 'global health partnerships'" were created at the turn of the century (Brown et al. 2006). The increased influence of public-private partnerships (PPPs) has contributed to the rule of economically focused performance-based funding models in global health management, and to the demand for short-term, "efficient" solutions to complex health problems. As many have argued (Packard 2007; Cueto 2013), this return to a large-scale approach to malaria has resulted in a return to technological fixes to health problems, despite critiques of the individual disease eradication campaigns of the 1980s (Nájera et al. 2011).

The official malaria advocacy discourse—as endorsed by WHO, the US Agency for International Development's President's Malaria Initiative (USAID-PMI), and the Gates Foundation—rides the line between promoting a "silver revolver" technological approach⁵ and reiterating that innovative tools must be accompanied by "strengthening health systems" if we are to learn from past attempts to tame the disease. As the global development community assessed whether certain Millennium Development Goals (MDGs) had been reached by their deadline in 2015, WHO and UNICEF (2015) released a document asserting that as a global community, we have reached our targets for malaria. The increased political will for control and, now, the eradication of malaria, which predominantly impacts vulnerable populations in the Global South, is impressive. However, these documents asserting global malaria success leverage health data in a way that obscures the ambiguities around infection and promotes a vision of global health development that overlooks the ways that malaria is entangled in local physical, economic, and political conditions.

Data performativity is at work in these estimates of the global health problem of malaria and progress in these goals. Success in reaching the MDGs was structured by the following indicators: 6.6 Incidence and death rates associated with malaria; 6.7 Proportion of children under 5 sleeping under insecticide-treated mosquito nets; and 6.8 Proportion of children under 5 with fever who are treated with appropriate antimalarial drugs (WHO and UNICEF 2015). This success is celebrated in WHO and UNICEF's tellingly named "Achieving the Malaria MDG Target." The document's focus on a decrease in global malaria infections from 2000–2015—an estimated 37 percent—obscures many ambiguities at the heart of the data. First, in the document's methodology section, the authors state that they have two methods of determining malaria rates, one for African countries with high transmission rates⁶ and one for countries outside of Africa and for African countries with low transmission rates, like Senegal. For countries like Senegal,

estimates of the number of cases were made by adjusting the number of reported malaria cases for completeness of reporting, the likelihood that cases are parasite positive and the extent of health-service use. The procedure ... combines data reported by national malaria control programs (NMCPs) (reported cases, reporting completeness, likelihood that cases are parasite positive) with those obtained from nationally representative household surveys on health-service use (WHO and UNICEF 2015).



In this way, Senegal's malaria data are made global by "filling out" the data that nurses, physicians, and laboratory technicians record—produced by the diagnostic practices described in the section above—by comparing it to the representative sampling compiled through USAID-funded Demographic and Health Surveys.

Second, WHO and UNICEF's estimation of malaria cases that were avoided due to global health intervention obscures the fact that the definition of a case of malaria changed in many endemic countries from 2000 to 2015. In 2008, for instance, Senegal mandated that only laboratory-tested cases of malaria be reported through the public health data system and reported malaria cases consequently dropped dramatically from 1.5 million in 2006 to 174,000 in 2009; the Global Fund (2012) attributed this dramatic drop mainly to this change in case definition. Beyond the question of morbidity and mortality rates whose hidden messiness we saw in the microscopy laboratory above, other indicators shape a very particular problem defining malaria, as anthropologist René Gerrets (2015) carefully explored for Tanzania. Focusing on children and their use of antimalarials and mosquito nets, these indicators cut out experiences of different malarias and focus on the distribution of simple tools as the means to measure the health system's ability to fight malaria. As global malaria morbidity and mortality data are produced in multiple ways, the assertion of a 37 percent decrease success obscured the "obstacles" to effective health care that remained.

As suggested above, defining malaria—even simply in the clinic and the laboratory—is complicated. This ambiguity in diagnosis presents a tension for health workers who must report on morbidity and mortality rates to their health district heads in Senegal—a process that requires them to round out the edges of their data to fit the categories for reporting. This quest for certainty is complicated by epidemiology. Roucher and her colleagues (2012) discuss the implications of changing levels of endemicity in Senegal on the methods and accuracy of diagnosing a malaria attack due to *Plasmodium falciparum*, the most prevalent parasite in the country. Because asymptomatic infections of malaria are prevalent in areas where the disease is endemic, "the detection of malaria parasites in persons with fever is not sufficient criteria for distinguishing malaria from other causes of fever" (Roucher et al. 2012:1). Laboratory workers—who provide the microscopy test results that are the gold standard for diagnosis—struggle with finding "clear positives" in this context, while nurses and doctors often rely on clinical symptoms and other factors to diagnose malaria and prescribe antimalarials. What gets reported in the national system—"clear positives" either from microscopy or rapid diagnostic tests—does not represent the ways that public clinics practice positive malaria diagnoses.

Global malaria governance creates proximate definitions of malaria through the trope of a single, unified "malaria" (Kelly and Beisel 2011). As the examples of data production about malaria prevention and diagnosis show, health data production is a key component of this process of approximation. Global funding organizations map the boundaries of malaria "from a distance" (Erikson 2012:375) through the collection, synthesis, and distribution of data. These boundaries also delineate possible action on the part of the major funders of malaria interventions in Senegal, that is, the Global Fund, USAID-PMI, WHO, and UNICEF. In 2015, half of the Senegalese annual budget to fight malaria, provided by these international organizations, was allocated to purchasing commodities like long-lasting insecticidal nets (LLINs), injectable artesunate for severe cases of malaria, rapid diagnostic tests (RDTs), and artemisinin-based combinational therapies (ACTs) (PNLP 2015). The other half of the budget was allotted to fund interventions largely focused on distributing these commodities to different regions of the country. For example, funding for vector control efforts was mostly earmarked for LLIN distribution and indoor residual spraying (IRS) operations.⁷

This is where the concept of *data performativity* becomes particularly useful for thinking about how global malaria governance maps with its institutions and discourse. The short-term efforts to control the *Anopheles* mosquito—primarily indoor residual spraying, larval control in water sources, and the use of insecticidal nets—do not adequately address the proximities that situate malaria. Indoor residual spraying—that is, spraying insecticide inside homes—must be regularly applied to be

effective as vector control, and when it is not routinely reapplied, malaria has historically resurged in epidemic form (Cohen et al. 2012).⁸ Keeping malaria at bay in this way serves as a necessary short-term solution, but it is not effective as a means of achieving global malaria governance's goal of eradication. Many malariologists assert that the disease is environmentally defined (Hackett 1937; Greenwood 1997; Trape et al. 2014), and many historians of the disease (Cueto 2007; Packard 2007; Snowden 2006) have been adamant that past successful campaigns against the disease have addressed the social, economic, and political conditions that drive malaria's prevalence. Short-term solutions drive down malaria morbidity rates but distract from the larger socioeconomic development that must accompany malaria interventions. Historically, successful elimination campaigns of malaria—like the Tennessee Valley Authority project of the 1930s and the elimination of malaria from southern Italy in 1962—required parallel economic development, sanitation projects, and the fortification of public health infrastructure (Carter 2014; Snowden 2006). One key component of historic methods of eliminating malaria was bolstering healthcare infrastructure. The infrastructure needed for accessible health care—useable roads, trained health workers, adequate medical equipment—was seen as outside the boundaries of malaria. Yet, data performativity is tied to the nature of performance-based funding, and the work that these numbers do at times becomes more central to the functioning of the health system than the work of health workers themselves, as we see in the next section.

Striking data: Labor and performing health work

The stakes of these tensions produced by malaria data performativity were particularly visible in the data retention strike in Senegal which commenced in 2010. Two health worker unions—the *Syndicat Unique des Travailleurs de la Santé et de l'Action Sociale* (SUTSAS) and the *Syndicat Autonome de la Santé* (SAS)—called for their union members to strike by withholding from the Senegalese Ministry of Health routine data they collected about their patients. Because other forms of health labor and medical care continued, health structures were not immediately impacted. Thus, the strike lasted for almost three years. From July 2010 until March 2013, the Senegalese Ministry of Health and those agencies and organizations that worked with the Ministry in health development had no access to complete national data and functioned with speculative data. When the strike ended, the Ministry of Health and its partners re-established the national information reporting system and recouped data for 2013; data for 2010 through 2012 are understood to be unreliable (USAID-PMI 2015:10).

For the second time,⁹ SUTSAS/SAS union members withheld routine patient data—like morbidity and mortality rates of malaria—in order to better the working conditions of health workers who would be contracted by the *statut de personnel hospitalière*, which the union convergence demanded that the Senegalese government recognize. This would provide more security for those employed by public hospitals, but it would have done little to change the working conditions of those working as “village malaria workers” and others working in health huts, health posts, and health centers. Health hut workers and “village malaria workers” are volunteers, and the health huts are not seen as a formal part of the health system. Yet, the 2162 health huts managed by local communities “cover approximately 50% of the country’s population” (USAID-PMI 2015). Thus, as I have argued elsewhere (Tichenor 2016), SUTSAS/SAS members also leveraged the power of the data they routinely collected in order to draw attention to labor and medical equipment distribution problems in the country at large. Because of the inherently global nature of the malaria fight in Senegal, the retention strike made visible the importance of the role of government health workers in the state’s ability to gain access to global malaria funding, as well as other global health funding.

In the context of contemporary unionism in Sub-Saharan Africa, the SUTSAS/SAS strike is a part the labor movement’s larger role in political advocacy not just for workers but also for the rights and duties of citizens in general (Floridi, Ngalane, and Thiam 2008). The union convergence wanted both to better the working conditions of health workers and to advocate for “health care financially and geographically accessible to all”—that is, the two unions were also using the strike to highlight

the lack of universal health coverage in Senegal. According to a union representative, this form of striking was a means to “humanize” their methods, because it allowed union members to uphold their Hippocratic Oath while making a political statement. Describing the health workers as the “sentinels of the health system,” this representative emphasized that a working health system requires a genuine exchange between the central Ministry of Health and the health workers who can actually see the impacts of national health interventions and identify what might be overlooked in these efforts. The public health system spends a lot on determining and tracking problems, he emphasized, but the government should use the knowledge that its own health workers gain by working within the public health system. To this representative, the strike lasted so long because the government refused to listen to the health workers, despite the fact that they had quite a bit to say.

Health worker accounts had a lot to do with the gaps in health infrastructure—material and human—in many parts of the country. Senegal’s implementation of the Bamako Initiative in 1992¹⁰ led to the rapid decentralization of the national public health infrastructure, and communities became financially responsible for building and maintaining health facilities and providing salaries for local health workers. The large part of this financial support was profit from pharmaceutical sales and the user fees *malades* pay to be seen by health workers, although community health systems also come to depend on foreign charities and remittances from community emigrants. A primary goal of the Bamako Initiative was to make health systems self-sustaining, but in situating sustainability in local responsibility and pharmaceutical sales, these attempts ultimately undermined the viability of health structures. In rural health districts, individuals trained as local health workers often use that training as leverage to gain access to better economic opportunities in one of Senegal’s *grandes villes* or even out of the country, and the community health committee that funded their training will have to find the means to train another individual or remain without health workers. Health posts outside of urban areas depend on a supply chain that must wend its way through many levels of health structures. Health workers must work within a context of “normal emergency” (Feierman 2010), experiencing frequent ruptures in essential medicines and limited access to equipment and sufficient training. Yet, demands for constant health accountability data remain.

In this context, health workers—volunteer or salaried—are required to produce particular forms of data for the national health system to exist. The data retention strike threatened Senegal’s ability to qualify for funding from the Global Fund, who temporarily put the country on its list of countries that were not eligible for grant applications mid-2013. This pressure from the international community seems to have been the main reason for the end of the strike. The media came to focus on the irresponsibility of health workers and how they were making it impossible for the country to reach the Millennium Development Goals by 2015,¹¹ thus undermining the moral arguments that framed the unions’ strike. However, the strike makes clear the ways that data production labor becomes more critical to the national health system than the work of providing health services to their patients.

Performance-based funding¹² has increasingly defined health work in Senegal, as contracts between the NMCP and civil society are conditioned by “performance.” Defined “by the transfer of money or material goods conditional on taking a measurable action” (Eichler et al. 2009), performance-based funding is, in practice, frequently obscure to grantees and an obstacle for countries to gain funding. Further, as Fan and her colleagues argue (2013), it often does not encourage the improvement of “performance,” however defined. In the case of malaria in Senegal, “performance” has been tied to those indicators outlined by the MDGs, as discussed above. For community-based organizations like the one mentioned in the introduction, performance is gauged by how many children under five and how many pregnant women are sleeping under mosquito nets, how many nets have been distributed, how many referrals to public health structures have been made, and how many community malaria awareness campaigns have been organized. In the public health structures, performance is measured by how many rounds of artemisinin-based combinational therapies (ACTs) have been prescribed, rapid diagnostic tests used, trainings health workers receive, pregnant women prescribed preventative therapies, and so on. This performance—and its

reporting—is tied to a very specific vision of how to treat and manage malaria. Health workers' and community workers' labors are conditioned by performing very specific practices of prevention, diagnosis, and treatment.

The strike can also be read as an attempt to rupture data performativity in the malaria sector. Malaria performance data feed into the model of what the malaria problem is in Senegal, which then structures the kinds of data requested. Health workers asserted that the data they provided did not encompass the problem as they saw it and that medical authorities would not listen to them. Some members of the global health community in Dakar were patronizing in their analysis of the strike,¹³ but many members of the unions understood its implications on the relationship between Senegal and the global health community. However, this disruption in the flow of data did not disrupt the model of the malaria problem in Senegal, and once the data reporting system was put back into place, the Global Fund removed the country from its unqualified list.

Conclusion: Approximating malaria

In March 2014, over lunch in his dining room, Mamadou (a pseudonym) and I discussed the data retention strike—completed by the time of our conversation—and its implications for local efforts against malaria. As a member of the SUTSAS/SAS convergence, Mamadou often adhered to the data retention strike but felt conflicted about withholding data, and so at times would provide it to medical authorities when he felt that the funding for certain programs at his urban public hospital were at risk. He argued that the Senegalese Ministry of Health was fragmented into different departments, with specific diseases or scopes of interest like malaria, and that these different departments communicated poorly with each other and were unable to coordinate the kinds of demands the Ministry and its partners placed on health workers in the public sector. As a result, it was often the responsibility of these front-line health workers, with limited resources and time, to decide which demands of the Ministry of Health were more important than others.

As the technical recommendations for diagnosing and treating malaria continue to change at the level of the World Health Organization, the Senegalese NMCP has been particularly quick about incorporating them into local malaria control activities. As a result, the data that the NMCP demands from health workers is constantly changing. This often means, Mamadou told me, that health workers would report the numbers they thought the NMCP wanted to hear, inflating numbers to receive more funding and altering data to make sure it reflects the newest protocols on how to diagnose and treat infection. They are constantly negotiating the problem of malaria as they encounter it among the *malades* they treat—understanding that it is seasonal and endemic, a lingering problem—and the problem of malaria as WHO and the NMCP frame it. As others have pointed out (Biruk 2012; Kingori and Gerrets 2016), the reasons for fabricating or “cooking” data are not straightforward for health workers or fieldworkers working in resource-poor countries. They function as intermediaries, negotiating a path between the reality within which they work and the demands of those requesting a “true” representation of that reality.

Health workers in Senegal are in a paradoxical position; they are given the responsibility for coordinating the different priorities of the Ministry of Health, but the Ministry of Health and its departments maintain a system that cannot hear the problems experienced by health workers. The data the Ministry demands from health workers do not represent, by design, the local realities. When health workers come together for national, regional, or district discussions of malaria, tuberculosis, or nutrition, there is no opportunity for actual dialogue. For Mamadou, there was no contradiction in the fact that withholding data was an obstacle for the Ministry of Health in its quest to promote accessible health care in Senegal and the fact that that data were not actually representative of local health realities. The data were the key to funding and supporting public health in Senegal, whether they represented problems as those closest to them understood them or not. I came to understand that the local health efforts to control malaria in Senegal—as extensions of global action—depends on the approximation of malaria. This global action against malaria creates a system that explicitly

and intentionally ignores the complexities of health workers and people infected with malaria in relation to the prevention, diagnosis, and treatment of the disease.

The examples of health data production and performance in the malaria sector, as described above, elucidate the role that health data have in producing both the way malaria is understood to exist and local prevention and control activities. In a previous analysis of the data retention strike (Tichenor 2016), I argued that data production labor did not guarantee a country's access to global health aid nor its ability to provide health care to its citizenry. Yet, data production labor is necessary for Senegal to have the chance to sit at the table to make decisions about healthcare infrastructure in its own country. Malaria, like all health problems in Senegal, is a labor problem and an infrastructural problem. Drawing attention to these problems was a primary goal of the SUTSAS/SAS data retention strike, and yet the ease with which the strike was dismantled in 2013, without addressing the demands of the unions, shows how difficult it is to disrupt the vision that global health problems can be addressed by the enumeration of short-term technological fixes.

Notes

1. The World Bank began a project, the “Stormwater Management and Climate Change Adaptation Project (P122841),” in 2012 to improve canals to address flooding in Guédiawaye and Pikine. Buried within the project material are cursory statements of the many health problems associated with a large population living in standing water. However, the project’s rhetoric frames flooding as an economic problem. This infrastructural attention from the World Bank helps maintain the boundaries that simplify and separate entangled conceptions of disease from conceptions of social, political, and economic well-being. Flooding is still conceived as outside of what defines the intervention target of malaria by global health organizations.
2. Following Tidiane Ndoye (2009), I prefer the French term *malades* (“those who are sick”) to generally describe those who suffer from malaria, rather than “patient,” which constitutes sickness within a specific kind of therapeutic relationship and renders the sick person a passive receiver of health care.
3. This is one of many examples of the influence of Microsoft co-founder Bill Gates on global malaria discourse, including on that of Margaret Chan, the current Director-General of the World Health Organization.
4. This was primarily due to the fact that the front-line treatment, chloroquine, became all but useless to the quickly evolving malarial parasite.
5. This term comes from an engineer invested in leveraging biological engineering for development problems in the Global South, who conceded that a “magic bullet” approach to solving global health problems is insufficient. He argued that, instead, there should be investment in creating an R&D infrastructure (a “silver revolver”) that can produce simple technological fixes to attack a problem from multiple angles and which will be prepared to produce the next technological fix as the older ones lose their effectiveness.
6. For high transmission African countries, WHO uses the University of Oxford’s Malaria Atlas Project (MAP) to estimate malaria rates based on “thousands of geolocated cross-sectional surveys measuring infection prevalence (termed *Plasmodium falciparum* parasite rate, PfPR)” (Bhatt et al. 2015). *Plasmodium falciparum* is the most fatal of the malaria species. There is no space in this article to carefully analyze MAP’s methodology.
7. For the projected budget between 2016–2020, the NMCP plans to devote US\$ 16,791,368 to LLIN distribution campaigns and US\$ 9,348,166 of its US\$ 28,543,392 vector control program to IRS (PNLP 2015).
8. A malaria epidemic in northern Uganda in 2015 was attributed to the recent lack of funding for IRS (Muso & Nassaka 2015). There was regular application of IRS from 2011 to 2014 and malaria cases dropped during that time. However, funding ran out for that particular program in October 2014, and there was a rapid increase of malaria cases when the rainy season arrived in spring 2015.
9. The 2010–2013 strike was the second health worker data retention strike in Senegal. The first, from 1998 until 2002, was inspired by an earlier teacher union strike. The teachers continued their work but withheld students’ grades from the Ministry of Education as a means to bring the government to the table to discuss their demands for better working conditions.
10. In 1987, African heads of state accepted the Bamako Initiative, which was a response to the fact that many countries receiving health development aid could not meet the goals of increasing quality and access to primary health care. These goals had themselves been accepted with the Declaration of Alma Ata in 1978. The Bamako Initiative aimed to increase access to suitable health care by supporting access to drugs and increased contact between communities and health care workers. It attempted to increase the effectiveness of health care, defined by these two goals, by leveraging user fees and drug costs and creating a local fund for community health centers (UNICEF 2007).

11. In March 2013, journalist Idrissa Sane argued that the strike was disrupting international health partnerships and destroying the country's ability to plan future health strategies (Sane 2013). "What is the impact of health data on the health system?" he asks his readers. Without the data, Senegal does not epidemiologically exist on a global scale.
12. The Global Fund and other funding agencies took the concept of "performance-based funding" from the education sector. The model emerged in the 1970s in the United States as a means to "improve the quality of education by funding results attained rather than funding according to the size of an institution or standard budgeting procedures" (Global Fund 2009).
13. According to one member of this community, the data retention strike showed a "lack of maturity" on the part of the union members, who definitely did not understand the global impact of their actions.

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