

**Network (dis)connections: Mobile health in Africa's
development imaginary**

By

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A thesis submitted in partial fulfillment of the requirements for the degree of
Master in Anthropology and Sociology of Development
at the
Graduate Institute of International and Development Studies

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2015

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Abstract

While the interface between health, development and technology is not new, mobile health, or ‘Mhealth’, has recently been put forward as a key solution toward narrowing health inequalities and increasing connectivity in the developing world, specifically in Africa. This dissertation combines eight months of ethnographic fieldwork at Dimagi South Africa, an Mhealth social enterprise, with an array of anthropological and sociological literature to explore the ways in which this mobile technology might bend the meaning, shape the ambitions, alter the means and affect the outcomes of development. In so doing, a number of network connections and disconnections arise in Africa’s development imaginary.

Network (dis)connections: Mobile health in Africa's development imaginary**Introduction**

“Not only are we trying to provide technology; it's increasingly that we're advocating to them [partners] to do development a little differently too because, the way you used to make decisions, if this all goes well, you'll be able to make them a different way. Both the technology should hopefully make the development more efficient and higher quality, but it's also, we're hoping, a different approach to development, a more progressive approach.”

-Lars, Dimagi South Africa Country Director

“What can be studied is always a relationship or an infinite regress of relationships. Never a ‘thing’.”

-Gregory Bateson 1978: 249

This is a dissertation about mobile health, or ‘Mhealth’, and Africa's development. It concentrates on how mobile phones and their applications are used in health programs and with frontline workers (FLWs). Unlike a policy brief or white paper, however, the questions raised in this dissertation do not speculate about the *normative* uses of Mhealth in Africa's future health development. Rather, this dissertation draws on anthropological and sociological literature to inquire about the ways in which this mobile technology might bend the meaning, shape the ambitions, alter the means and affect the outcomes of development. Put more simply, it explores what Mhealth *does* to how we think about health and development in Africa.

Furthermore, this dissertation draws from discussions of networks, both the concepts and the theories. Actor-network theory reminds us to consider non-human actors in the global development network, technologies such as the mobile phone on which an Mhealth application might operate or the infrastructure that brings the phone its charge. A glimpse into social networks calls attention to all human agents who interact with mobile health, from software designers and program managers to international non-governmental agencies (NGOs) and FLWs.

By understanding the network underlying Mhealth and development in Africa's development imaginary¹, both connections and disconnections emerge, an amalgamation of interdependencies where power circulates. States, alongside new governing non-state actors, exert new forms of power over their populations by deploying technologies that engage with the transforming vital, social and normative functions of Michel Foucault's (2007) biopower and the participation that ensues. Mhealth in particular sheds light on how vital qualities of life can be monitored through mobile applications and the storage of data. The speed at which information can be stored in a database has increased tenfold, offering better ways of logging patient details and connecting the patient with development efforts, but this data, at the same time, may be insufficient, a threat to privacy or poorly quantified. Concurrently, infrastructure is built to support development in Africa, but resources are scarce and states are sometimes too political and ill prepared to reach its entire people. Mhealth becomes a micro-infrastructural tool of these populations, connecting areas where connections have been lost or neglected and blurring development and humanitarian imaginaries. Neoliberalism, also changing in Africa's development imaginary, accommodates initiatives like Mhealth that aim to profit while also extending a hand to the people in the form of social capital. Simultaneously, a moral economy creates ties between anyone who engages in the business of Mhealth. In so doing, relations of empowerment and relations of power are articulated. Finally, in this engagement with Mhealth in Africa's development imaginary, we turn to the actor who is most displaced from this network: the end-user, the patient, the beneficiary. Mhealth hopes to further connect the global and national powers that be to its population, but the people most targeted for these efforts are the voices unheard. Thus, in this dissertation, while we will see that Mhealth does bend the meaning, shape the ambitions, alter the means and affect the outcomes of development, this creates network (dis)connections that must be explored.

These (dis)connections are considered within the development imaginary onto which they are projected, and the network of imaginaries with which they are intertwined—biopolitical, humanitarian and otherwise. In so doing, Mhealth becomes not a single object, but instead a 'keyhole' (Pieterse 2014) through which to unlock recent insights into myriad nodes of

¹ While certainly not trying to overuse the notion of imaginaries, this trope calls attention to the socially constructed world in which development, technology and their critiques engage. It reminds the reader that, while development and technologies offer representational ways of understanding the world around us, they exist only as one possible, and socially imagined, 'certitude', thus emphasizing its sense of realness and its limitations.

development. For, you cannot introduce one thing without “unexpected interconnections and implications” to follow (Fischer 2005: 55). To begin, I will introduce Dimagi, my entry into the field and the methodology that followed. I will then turn to a wider overview of literature on mobile phones in Africa, mobility and Mhealth before leaning into an anthropological critique of development and networks in a globalizing world.

Fieldwork and methodology

Any specific examples in this text are taken from my eight months of work as an intern in the mobile health field with Dimagi South Africa (DSA), a privately held social enterprise designing and deploying open and innovative technology under the name of global development. Founded in 2002, Dimagi has official headquarters in Cambridge, Massachusetts, United States and regional offices in New Delhi, India; Cape Town, South Africa; and, most recently, Dakar, Senegal, with satellite offices throughout the developing world. On their website, Dimagi states, “The developing world stands to massively benefit from the technological advances that have been made in recent years, and Dimagi wants to bring those benefits to fruition” (Dimagi, “About us”). Dimagi’s contribution to the development space will be considered alongside further document analysis and literature review in this dissertation. It is also important to note that, while I worked predominantly out of one office, DSA served as the regional hub for much of Eastern and Southern Africa, with boots on the ground in a few West African countries as well. Thus, the field experiences, interviews, document analysis and literature review move between local and global imaginings to understand how Mhealth is variously appropriated and situated, neither universal nor particular.

The fieldwork for this dissertation began at the start of 2014. I was on a plane from Queenstown, New Zealand to Melbourne, Australia and found myself seated next to a couple in their 70s, happily retired and splitting their time between Queenstown, Martha’s Vineyard, MA and the south of France. The woman had dedicated her career to public health and we spent ample time in the air discussing the subject and our own pursuits—what she wished she had done and what I hoped to do. In hearing that I had a background in communication and a lust for global health development, she offered to put me in touch with a friend of hers whose daughter was working in the Mhealth space from Boston.

Once off the plane and on the ground, I went to their website, Dimagi.com, and learned there was an office in Cape Town, an area I was drawn to for its health work. In those early months of correspondence with product manager Amy², it became clear that having an intern go abroad was something Dimagi had never done before. Visa processes and lack of time stood in the way as barriers. So, in March I chose a different route to the same destination. I applied for an exchange at Stellenbosch University, and wrote back to Dimagi letting them know there would be no visa concerns anymore, and that I would arrive in July. I began telecommuting to work in May, and so began my first entry into the field of Mhealth.

Dimagi was one of a number of social enterprises that seized the opportunity to work on programming and distributing Mhealth in the developing world over a decade ago. The three services they offer are CommCare, CommConnect and CommTrack, all applications that operate on Nokia and Android devices and store data wirelessly on the Dimagi web platform. CommCare is the application used to assist FLWs in their case management and data collection by maintaining and updating patient files, performing quick calculations (age based on date of birth, for example) and offering audio and visual simulations to help illiterate beneficiaries understand the care they're receiving. Dimagi employees emphasize that, most importantly, it is a tool for *decision-making*, in that it presents different courses of action to FLWs based on the information they input. It is this tool that we will focus on in this dissertation, as I received the greatest exposure to it during my internship. CommConnect, on the other hand, is a passive SMS reminder and message application directly from the program service provider to the mobile phone user and CommTrack is a tool for logistics and supply chain management (i.e. an application to track and measure the distribution and stock levels of medical supplies). Together, these applications are intended to aid in the efficacy, quality and immediacy of healthcare.

In addition to their software development, Dimagi plays an equally important *capacity building* role with its partners. According to senior technical manager Brian,

It is usually the capacity of those organizations to use the technology that is lagging behind what the technology is capable of...I don't think the founders of Dimagi envisioned that it would be 60 field managers going out and coaching people, but in a lot of cases, I think that's the more important role right now—bringing the community's general aptitude for technology up to utilize it best.

² All names have been changed to respect the privacy, experiences and opinions of Dimagi employees.

Dimagi's technology goes hand in hand with its employees and the partners that later hire, use and distribute this technology to FLWs. Thus, as we consider Mhealth, we will do so by grasping both the human and non-human actors that comprise the subject.

As intern, my task was to develop an impact evaluation package, and one that especially looked at the multiple influences Dimagi technology and staff were having on the operations of partners and FLWs. I developed a baseline assessment that outlined the basic goals for the partner's use of CommCare, as well as a three-month check-in partner survey to assess the partner's progress in reaching his or her goals. I also developed a post-training feedback survey for FLWs on their cell phone comprehension and usage expectations, as well as a three-month check in for FLWs that gauged their use of and need for CommCare after time with it in the field. For on-site evaluations, I worked on a FLW interview guide and a visit observation sheet to be used on-site to score FLWs use of the app and to measure their experience with it. The goal was originally to have these prepared for a field site visit but, when funding fell through, I was put on a second task for the remainder of my time there: A Dimagi metric assessment to be used first with a World Vision child malnutrition program in West Africa. This assessment asked the partner to pinpoint top caseload, FLW performance and outcome indicators and targets that World Vision and Dimagi could monitor routinely. World Vision hoped to roll out the relatively nascent program in the thousands and Dimagi wanted to make sure some form of impact was being measured. Finally, in addition to doing this work, I was granted permission to base my dissertation off my time there and began speaking with employees and observing other work streams. In the end, my intern work remained relatively separate from my dissertation work and instead provided the connection through which I could engage with Dimagi staff and projects. This is because, during the time I was there, there were not many resources available to dedicate to or apply to the work I was producing. Admittedly, the internship itself was not fulfilling and met limitations due to unclear supervision and lack of field-testing.

Meanwhile, the directions these work streams went in led to a consideration of two methodologies under George Marcus (1995; 2000). First is the idea that ethnography is no longer rooted to one site, whether this is a particular geographic location or a particular line of inquiry. For instance, Dimagi's work spanned many countries within Sub-Saharan and West Africa. Following these mobile applications—or "follow[ing] the thing"—not only to a multi-sited ethnography, but also introduced many trains of thoughts worth pursuing (Marcus 1995: 106).

By thinking about Mhealth as being dispersed beyond a single-site of observation and interaction that “cross-cut dichotomies of the ‘local’ and the ‘global’,” I was better able to adapt my dissertation to the premise of networks and development within Africa, and to follow the paths Mhealth took, both geographically and via different literature (Marcus 1995: 95). Engaging in this, as intern and anthropologist, also corresponds to what Marcus introduced as the activist anthropologist, in the sense that, as I explored these multi-sites and cross-sections of Mhealth, I confronted academic quandaries and competing personal commitments (Marcus 1995: 113). I wanted both to find and foster support for the value of Mhealth while still engaging with an insightful development critique, placing me “at the frontiers” of my subject matter (Fassin 2012: 246).

Building from a multi-sited ethnography is the notion of considering ethnographic work from the perspective of the ‘para-site’, neither the powerful development institution nor the socially marginalized. A para-site is the site beside the main ethnographic site, indicating the “flexibility, resistance, subversion, and creativity” that stems from this position (Marcus 2000: 6). While still ‘following the thing’, it is not the main thing, but a relation to the thing, with relations and a system of its own (Marcus 2000: 8). Such is Dimagi and Mhealth. It is an organization complicit with powerful development partners while simultaneously aiming to connect and communicate with more marginalized FLWs and beneficiaries, in neither a position of opposition or resistance; it is not the ‘other’, but the ‘counterpart’. Dimagi has “modest power and privilege” compared to the systems it serves and forges a critical perspective and keyhole of its own (Marcus 2000: 2). This perspective facilitates “alternative thinking by subjects who are deeply complicit with and implicated in powerful institutional processes in times of heightened consciousness of great social transformations” (Marcus 2000: 5). Thus, this dissertation is based on multi-sited, para-sitic ethnographic work that, from its unusual perspective, explores the network (dis)connections in Africa’s development imaginary. This dissertation also relies on the work of many before me, and it is their literature we will turn to now.

Literature Overview: Mobile phones, development and networks

It is high tide for mobile phones, and had been for two decades. By 1995, approximately 600,000 mobile phones were in use in sub-Saharan Africa, predominantly in South Africa (Grosskurth 2010: 40; Castells et al. 2007: 23). Fourteen years later, in 2009, the number rose higher than 300

million units, a 51,300 percent increase (Grosskurth 2010: 40). Today, one in three Africans has access to a mobile phone (de Bruijn, Nyamnjoh and Brinkman 2009: 11). The growth in South Africa was due in part to the African National Congress (ANC)-endorsed equity in telecommunications service delivery post-Apartheid, which stipulated that service providers such as Vodacom and MTN also provide connection to more marginalized communities (Skuse and Cousins 2007: 185; Skuse and Cousins 2008: 8). As this mobile tide reached the shore of more and more areas, Mhealth became a viable resource for monitoring last-mile patients in rural, low-connectivity areas.

In addition to the growing ubiquity of mobile phones, they were unique in that they were devices that were nearly always on the person, and with which people had deeply personal relationships. Their technical capabilities were a platform for applications that could detail a number of things about the person (Klasnja and Pratt 2012: 185). They had the abilities to track health information, involve a healthcare team, leverage social influence, increase accessibility and engage with different environments (Klasnja and Pratt 2012: 186, 188, 190, 192, 193). Research shows that it is an empowering technology, “putting communicative power into the hands of the individual,” and, as a consequence of its mobility, it introduces informal, individualized channels and networks of communication (Geser 2006: 8). Julia Pfaff expanded on this by examining “different ways of relating to, using, disposing of and acquiring mobile phones” and incorporating them into ways of life (2010: 341). Mobile phones have led to global ‘intensifications’ through their transnationality, mobility and connectivity; the “local cannot be considered without the global in Africa today and local realities are being shaped and reshaped in view of global connections” (de Bruijn and van Dijk 2012: 5). Andrew Skuse and Thomas Cousins discussed how, despite the critical role mobile phones might play in connecting and maintaining social networks in Africa, this connectivity and mobility may be limited in as many ways as its facilitated (2007; 2008). Phones have been a catalyst for change in the way they engage with information and influence markets (Pfaff 2010: 344). However, very little work has looked at mobile phone use in developing countries, and there is a specific lack of ethnographic work on mobile phone use and Mhealth in Sub-Saharan Africa (Pfaff 2010: 343).

On the other hand, attention has been paid to the ‘mobility turn’ and the way that connections have been “dematerialized,” allowing freer travel through space and existing beyond “private bodies” (Sheller and Urry 2006: 221, 222). No longer is social science rooted in a

“sedentarist notion”; this mobility turn signifies fluidity across places that “create zones of connectivity, centrality, and empowerment in some cases, and of disconnection, social exclusions and inaudibility in other cases” (Sheller and Urry 2006: 210). While the introduction of technology into health and development is not new, mobile phone technology and its mobility is striking people anew; it is “ubiquitous, threatening, enabling, empowering, an omen of a new era” (Strathern 1996: 519).

These technologies are shaping and being shaped by society (Castells et al. 2007; Latour 1983). For instance, since the announcement of the Millennium Development Goals (MDGs), mobile infrastructure and non-state health actors have grown side-by-side. Recently, we have seen them come together as Mhealth. In January 2015 of this year, Bill and Melinda Gates announced “the lives of people in poor countries will improve faster in the next 15 years than at any other time in history” due to four big breakthroughs. Two of these breakthroughs are tied directly to mobile phones—digital banking and online education—thus decreasing inequality and, indirectly, improving health and development (Gates and Gates 2015).

In this way, the mobility and connectivity of global health and development are being “creatively redeployed” (Appadurai 2001: 24). When mobile health is introduced as a material tool, the assumptions behind it and its position in the development imaginary must be questioned. How do programmers and users of Mhealth perceive sickness and wellness? How do they define a person, a patient, and a user of technology? What are their concepts of the individual and of social relationships? What politics and economics influence the trajectory of mobile health and development? Seeing as these devices are often used by FLWs, could mobile phone applications actually provide an opportunity for two-way dialogue about development and needs between the people on the ground and the international humanitarian partners, rather than a perceived linear, top-down distribution of resources and information? Or might mobile intervention fall into the same trap as so many development initiatives before it, acting as Western surveyor of ‘third-world’ localities in the name of global health and equality?

Whether dead, or as Elísio Macamo (2005: 5) puts it, “circular in nature,” development is wrought with contention. Western dominance has kept an eye on and a hand in the social movements of nation-states (Shrestha 1995: 266). In so doing, and often in the name of equality, international aid and development has actually introduced “previously non-existent wants and... scarcities,” thus undermining country and local self-sufficiency, reproducing power relations,

and aggravating poverty (Shrestha 1995: 272, 274; Gardner and Lewis 2005: 353). In James Ferguson's words, planned interventions "may produce unintended outcomes that end up... incorporated into anonymous constellations of control... that turn out in the end to have a kind of political intelligibility" (2002: 401). Development may not affect poverty but could lead to a number of other effects, sometimes expanding state and economic power "under cover of a neutral, technical mission to which no one can object" (Ferguson 2002: 407).

Nevertheless, to the degree that it is criticized, no substitute has displaced development from global agendas and needs discourses. Development remains. This invites anthropologists to contribute, albeit still critically and analytically, to "the reimagining of anthropology itself, as local political realities are moved center-stage" and as development tries again (Gardner and Lewis 2005: 358).

Networks are an interesting way to view development in that they describe links and disparities without assuming hierarchy and without measuring by proximity (Strathern 1996; Mol and Law 1994). According to Marilyn Strathern, the network is a "neutral phrase for interconnectedness" (1996: 522). It has no center and is comprised of nodes whose responsibility it is to contribute to the network's goals. Network strength is in its "flexibility, adaptability, and self-reconfiguring capacity" (Castells 2004: 5); it has the ability to stand for itself and its relations (Knox, Savage and Harvey 2006: 132). Moreover, the spread of communication technologies alongside globalization and development has also mobilized concepts of networks to explain ways of being in and making sense of the world, making it a unique subject of inquiry on its own (Knox et al. 2006: 125). Science and Technology Studies (STS) is one such new inquiry. It explores the role of 'nonhumans' in social life and builds upon actor-network theory. STS "suggests that social relations should not be seen in isolation, but as always existing in relations with all kinds of extra-social networks between humans and nonhumans" (Nimmo 2011: 109). For actor-network theory and STS, subject and object become indistinguishable "inventions of modernity" (Nimmo 2011: 110). Today, we live in a 'network society', a coalescence of technical networks, social networks, actor-network theory and the like; networks are as ubiquitous as Mhealth (Knox et al. 2006: 113).

Meanwhile, African states face a quickly growing population that is expected to double by 2050, while still being on the "periphery in world economics" (Pieterse 2014: 90). Weak infrastructure, government gaps and market failures threaten Africa's development

(Pieterse 2014: 90). According to Edgar Pieterse, “the mobile phone is merely the surface reminder...of much more powerful currents of technological remodeling that will produce new categories of reality, life, materiality, communication, experience, interpretation, and most importantly, imagination” (2014: 92). This “disruptive technological change is the only keyhole available to us to both imagine and instantiate more just, resilient and inclusive futures” (Pieterse 2014: 92). For the purposes of this dissertation, mobile health specifically serves as a keyhole into Africa’s network (dis)connections and imaginaries, and to the new discoveries about biopower and the biopolitical, data and infrastructure, neoliberal and moral economies, human-centered design and the construction of the patient.

In this dissertation’s first chapter, we will turn to Foucault’s transforming notion of biopower and the biopolitical, as well as the new forms of participation that have occurred with the introduction of new actors to the development imaginary. As a concept that once grappled with the ‘new historical reality’ of the state as protector of its people, biopower has since unfolded differently in the globalizing today. It is for this reason that I substantiate the biopower inquiry with Ferguson’s vertical topography of power. Devices, such as Mhealth, that offer new arts of governance allow populations to be managed and measured in new ways, circulating power while still struggling against a top-down current. International organizations, private firms and grassroots citizens complicate the state’s vertical distribution of power and illustrate a non-linear network. Concerns of quality of life have complicated the normative assumption that the cause is to govern life itself. Mhealth allows us to confront some of these new layers of biopower today and, simultaneously, biopower serves as a framework to understand later chapters.

Chapter two will consider biopower through the way Mhealth interacts with data for development and health infrastructure, two widely discussed features of global health development today. Mhealth is once again the keyhole to exploring how data and infrastructure both mediate and aggravate healthcare, and how they are used by citizens to make everyday life easier when the state or NGOs are not providing enough support. This interplay of human and nonhuman actors, and the possibilities and pitfalls they encounter when incorporating Mhealth into data collection and basic infrastructure, further illustrates network (dis)connections within Africa’s development imaginary.

In chapter three, an exploration of Mhealth’s neoliberal markets and moral economies shines light on further connections and disconnections, in how relationships are

formed and how power is disbursed. I introduce the term ‘canny neoliberalism’ to consider how neoliberalism is changing alongside biopower to include ethical concerns for consumers, while at the same time enrolling the local participants in filling a position and in seeking a social capital that does not necessarily narrow inequalities. Moral economies, as a growing consequence of ethical concerns in the market, encourage new relationships that are facilitated or supported by Mhealth in some instances. At the same time, however, the existing relationship dynamics are critical to these interactions and influence outcome. Once again, through the keyhole that is Mhealth, we see that development actors, both human and technological, face new promises and old challenges in Africa’s development imaginary.

Finally, chapter four takes a deeper dive into a significant network disconnection in Africa’s development imaginary. To the degree that the FLW and, especially, the patient or beneficiary is alluded to as the main targets of Mhealth and its human-centered approach, these actors often remain the node most unreached. When the patient is an abstraction, whom does Mhealth serve? Again, as both activist and anthropologist, I faced particular difficulty with this. This chapter reflects on how Dimagi employees approached their colleagues, partners, FLWs and, finally, the patient or beneficiary. It considers the extent to which social encounters are real or imagined, as well as how Dimagi staff conceptualize sickness and wellness in the making of their Mhealth applications.

Ch. 1 Mhealth and biopower: Networks of participation between states, citizens and NGOs

"We're not coming in as white saviors. No. I've definitely worked for some good NGOs. I think we do good things but, at the same time, there are always side effects of the things you're doing. If you focus on one thing, which is good, it might also be bad in other ways. People start to depend on you, for example."

-Bonnie, DSA Field Manager

As state-endorsed cellular infrastructure spread further across South Africa in the nineties and as service providers furthered network access, the ground was prepared for a new actor of the millennium: Mhealth. Meanwhile, during his time at United Nations Children's Fund in the 2000s, Lars, now country director of DSA, came across founder of Dimagi, Jonathan Jackson, and thought leader in the Mhealth space, Neal Lesh. Together, in 2011, they agreed to open a small office in Cape Town. Lars said, "We didn't really know if it was going to work out, because there were already four really large Mhealth players in South Africa... It was a bit of an experiment." However, by the end of the first year, Lars's doubts were resolved: There were continuously changing problems to be worked on and there was a large demand for Mhealth, not only in South Africa, but also across the continent.

During my time at DSA, our team was working on projects in Burundi, Chad, Ethiopia, Kenya, Lesotho, Malawi, Mali, Mozambique, Niger, Sierra Leone, South Africa, Tanzania, Zimbabwe and Zambia with public and private actors like Care International, Catholic Relief Services, ColaLife, Médecines Sans Frontières, Global Solutions for Infectious Diseases, Institute for Health Improvement, Path, UNICEF, Wits University, World Food Program, World Vision and a number of small NGOs and individual users within their rural communities. Indeed, there was work for DSA, and it was already shaping thinking around health and development.

Mhealth introduced a new form of participation between the state and civil society and was, at once, a node connecting state infrastructure, private service providers, NGOs, communities and citizens. Before looking forward to the multiple ways in which Mhealth might create network connections and disconnections within Africa's development imaginary, we will first turn back to nod at Foucault, and to consider his transforming notion of biopower and the biopolitical as a framework for later chapters.

Foucault's biopower and the biopolitical

Between 1974 and 1979, Foucault pioneered the concept of 'biopower', which made its first appearances in his October 1974 lectures in Rio de Janeiro, entitled "The Crisis of Medicine or the Crisis of Antimedicine," "The Birth of Social Medicine," and "The Incorporation of the Hospital into Modern Technology" (Rees and Caduff 2011: 2). According to Foucault (1978: 142-143), "Power would no longer be dealing simply with legal subjects over whom the ultimate domination was death, but with living beings, and the mastery it would be able to exercise over them would have to be applied at the level of life itself." Biopower involved life and the living as "referent object[s]" requiring "knowledge of the processes of circulation, exchange and transformation that make up life" (Anderson 2012: 30). Moreover, the idea was based around arts of intervention that would optimize valued life against any threat: "a productive relation of 'making life live'" (Anderson 2012: 30)³. 'Society', during a time in which the notion was interchangeable with 'race' and 'nation', introduced a "new historical reality" that emphasized the living as a key truth of the modern nation state (Rees and Caduff 2011: 2).

Through acknowledgement of the living, or the population, as the makeup of the modern state, Foucault also developed the 'biopolitical' as a replacement to the "juridical conception of politics" (Rees and Caduff 2011: 2). The crowning of biopower meant the end of sovereign power as we knew it. As occupants of the state, the people were to be sheltered and attended to; the state had emerged as "a new regulatory apparatus for the administration of life" (Rees and Caduff 2011: 3). Life was the reason to lead; presiding over life was a greater purpose of the modern state than presiding over death. Foucault's biopolitical imaginary meant monitoring the conditions of life and addressing threats to its balance (Anderson 2012: 32). In short, it was the "raison d'être of the modern nation state to serve, foster, and modernize 'society'" (Rees and Caduff 2011: 2).

In the few years during which Foucault developed this concept, it became more specific, toward an analysis of invented 'technologies' of governance that were established to confront palpable problems, whether it was addressing famine, security or the 'art of governing' (Rees and Caduff 2011: 3; Foucault 2002). The real power—the biopower—existed in state service, in the objects designed for shepherding the flock, civil society in sheep's clothing (Foucault 2007;

³ It is important to note, however, that the state presides over 'making life live' and, as if often the case, 'letting die', which is why NGOs and development and humanitarian specialists have remained so busy.

128; Redfield 2012a: 160). However, what remained the same were his reformulated understanding of power in relation to population, and the role of the state and its technologies in governing and regulating life.

Today, biopower is transforming once again, as a way in which to explore the “multiple effects of the life sciences on human and non-human life” (Rees and Caduff 2011: 4). Civil society has decoupled from the nation-state and no longer behaves as the obedient sheep. Biopower has come to exist in the vital, the social and the normative in new ways. Biology, or the biological, is no longer found solely within the living beings of the state’s population, and instead thrives within both the corporeal and the informational form (Rees and Caduff 2011: 6). With the rise of NGOs, research groups, social enterprises and public private partnerships (PPPs), a “domain of practice is unfolding beyond the immediate reach of the state,” especially through market reforms modeled after neoliberalism (Rees and Caduff 2011: 6). Finally, the normative is transfigured as ethical value rises in importance; quality of life has become as measurably important as life itself (Rees and Caduff 2011: 7). It is with this in mind that I have chosen to use Foucault’s evolving notions of biopower and the biopolitical as gateways into understanding Mhealth as it interacts with contemporary states, the politics of life and the *newer* historical reality within which we live—one where states and citizens are joined on stage by non-state, international actors and unbridled citizens; one where more and more points of connection are made to govern the living and nearly dead or dying, and foster the development of modern society.

Introducing the newer historical reality

Many development initiatives around the globe introduce international actors, complicating state services while simultaneously providing partial ‘therapeutic sovereignty’ for those who claim an entrepreneurial role in development and engage directly with these new players (Nguyen 2010: 6; McKay 2012: 547). For instance, at Dimagi, large partner organizations operating inside an international or regional office work hand-in-hand with FLWs using Dimagi mobile applications. Because CommCare is open source and available for free for a limited number of users per application, individual users can build their own application and use it at no cost in smaller settings. This was the case in Malawi in 2014, when Dimagi hosted a free three-day workshop for individuals who had built their own app and were seeking hands-on help. Bonnie, field

manager at the workshop, said each user went through an application process in order to participate in this workshop, and were eager to take into their own hands a tool that would help them support their community. Vinh-Kim Nguyen might say that this therapeutic citizenship has “heralded a novel form of political power” for individuals, while perhaps suspending national sovereignty (2010: 6, 12). The latter issue scratches a development itch by further supporting a Western partnership between global help and local hands, while distancing the power of the state itself (Macamo 2005: 5). As ‘national’ and ‘global’ “continue to rub up against each other, ...they produce new tensions and compromises within a changing sense of modernity” (Steger and James 2013: 37). At the same time, however, “the desire for statehood continues to be intense in many parts of the world, in spite, or perhaps because of, the hollowed-out character of the state” and its sense of community, real or imagined (Aretxaga 2003: 394; Anderson 2006: 13).

In understanding the more complex relationship between the state and the citizen, especially in light of the mediating role of NGOs that has brightened since the MDGs, “the common-sense mapping of political and social space that the state-civil society opposition takes for granted” must be examined (Ferguson 2006: 90). It is important to note that these NGOs, and Dimagi, are not states, but are “statelike” in some ways yet they do not fit into the “nation-building logic of the old developmentalist state”; they instead “build on the rapid, deterritorialized point-to-point forms of connection (and disconnection) that are central to both the new communication technologies and the new, neoliberal practices of capital mobility” (Ferguson and Gupta 2002: 994). Ferguson and Akhil Gupta suggest that these new organizations are not “challengers pressing up against the state...but...horizontal contemporaries of the organs of the state—sometimes rivals; sometimes servants; sometimes watchdogs; sometimes parasites...” (2002: 994; Ferguson 2006: 103). Globalization is not incompatible with statehood, but can instead fuel a desire for it, “whether to have access to resources and power experienced, imagined or glimpsed” (Aretxaga 2003: 395).

The ‘levels’ of local, national and global must be reconsidered when thinking about this state-civil society opposition, as it rests on a “vertical topography of power” that does not acknowledge the ‘grassroots’ politics of life, the role of non-state actors and the “transnational character of both ‘state’ and ‘civil society’” in the development imaginary (2006: 90; Ferguson and Gupta 2002: 981, 994). To expand, ‘verticality’ is the somewhat biopowerful notion that, as

an institution, it sits ‘above’ its population. State planning is thus ‘top down’, with plans made from ‘above’ and any grassroots planning on the part of the citizen is made from ‘below’ (Ferguson and Gupta 2002: 982). Ferguson and Gupta also introduce ‘encompassment’, where the state network is located within a “series of circles” that move outward from the family to regional to state to global community, all the time increasing in scale (Ferguson and Gupta 2002: 982). While this creates a sense of inclusion, it still permeates from the outside in, leaving very little in the hands of the civil society.

According to Ferguson, ‘civil society’ has been cast similarly to ‘development’; it has been universalized and is “one of those things... that no reasonable person can be against”—no one knows better about citizens than civil society itself—thus obscuring far more than it reveals (Ferguson 2006: 91). Civil society within the development imaginary is a “dynamic, emerging, bustling assemblage of progressive civic organizations that could bring about democracy and development if only the state would get out of the way” (Ferguson 2006: 96). Appadurai goes on to say that groups on the ground are “internationalizing themselves, creating networks of globalization from below” that are more productive in reducing poverty than their ‘higher-ups’ (2001: 23). They are agents of “deep democracy, rooted in local context and able to mediate globalizing forces” (Appadurai 2001: 23).

However, it is this pitting of the state against civil society that leads to “claims of vertical encompassment that naturalize the authority of the state over ‘the local’” (Ferguson 2006: 92). This is done by bringing together three notions: “superior special scope, ...a hierarchy of power, and superior generality of interest, knowledge and moral purpose,” thereby elevating the state above the local in a vertical topography of power (Ferguson 2006: 92). In this scenario, Ferguson might suggest that the Dimagi and partner FLWs exist in between the ‘up there’ players and patients ‘on the ground’, between global and local imaginations: a para-site indeed (2006: 93; Pink 1998: 9; Marcus 2000).

Through assessment of the vertical topography of power, it becomes clear that, perhaps, something else is at play—a transnational topography of power that looks at the horizontal ‘apparatuses of governmentality’ existing within contemporary Africa’s development imaginary and offers an understanding of “both ends of vertical polarity” (Ferguson 2006: 93, 99; Appadurai 2001: 25; Piot 2010: 9). We are experiencing a shift “from verticality to horizontality, from pasts to futures, from transcendence to immanence, from meaning to affect, from a world

with borders and outsiders have been forever banished from the gift to the commodity form” and we must understand the development imaginary in which this shift exists (Piot 2010: 9). Otherwise, there is nothing but nostalgia for an elusive future of development (Piot 2010: 20).

Ferguson turns to progressive arts of governance since disentangled from the state. The ‘state’, in many ways, covers like ‘culture’, or even, it can be argued, ‘neoliberalism’ or ‘human’ (Ferguson 2009: 171). What does it mean today anyway? At mention of the state, one typically imagines a particular kind of state: “well-financed, bureaucratically capable, poverty-fighting states that resemble nothing so much as twentieth century European welfare states” (Ferguson 2009: 169), defined by centers and where “sovereignties faded imperceptibly into one another” (Anderson 2006: 19). When this infrastructure is not present, when the state is, perhaps, weak, financially limited or completely removed from its biopower—its service to protect—when the power of the state is blindsided by emerging NGOs, PPPs and activist groups, what progressive politics transpire? Ferguson goes on to ask, “can we imagine new ‘arts of government’ that might take advantage of (rather than simply denouncing or resisting) recent transformations in the spatial organization of government and social assistance” (2009: 169)? With the changing normative role of biopower in mind, we see “ethical expectations about human existence” taking new material forms (Redfield 2012a: 178). A new moral- and market-driven expectation of valuing human life and health exceeds state sovereignty and newly tackles social, biopolitical and biopowerful problems “along the cracks of the global economy” (Redfield 2012a: 178).

Sarah Pink asserts “anthropologists and development workers... themselves become instrumental in the elaboration of transnational imaginations, and in the construction of transnational connections and flows” (1998: 14). So it is with caution that I stand with my eye pressed to the keyhole mobile health creates to view the development imaginary and its connections, not yet daring to step inside. Perhaps, the shift from vertical to horizontal is swiftly underway. On the other hand, it could be the case that “criticism and debate, horizontal exchange and learning, and vertical collaborations and partnerships with more powerful persons and organizations together form a mutually sustaining cycle of processes” (Appadurai 2001: 42-43).

Because mobile health applications are often a third-party extension of various state and non-state health development projects, Mhealth provides an interesting lens through which to view and understand the transnational topography of power within the latest development imaginary, connecting the “hydra-headed transnational apparatus of banks, international

agencies, and market institutions through which contemporary capitalist domination functions” and Foucault’s transforming biopower, which continues to circulate and distribute power across all actors (Ferguson 2006: 107; Foucault 2007). An example is as follows: As I mentioned in the introduction, World Vision has requested that Dimagi roll out child malnutrition Mhealth applications in West Africa at a faster rate so as to meet the quotas of their donors. Meanwhile, Dimagi is hesitant to move at such a rapid pace without understanding the impact of their application with FLWs and patients on the ground. Already, a somewhat controversial transnational topography of power has taken shape. There are many moving parts in this example, including international funders, humanitarian agencies, an Mhealth social enterprise, FLWs, and the patients themselves. Can mobile health be “positioned as the nervous system of a whole body of broader technical, institutional and representational practices” (Appadurai 2001: 34)? How does mobile health, its network and the connections it promises to make allow us to better understand and reconsider the ‘levels’ of local and global, above and below, vertical and horizontal? Could the participatory use of mobile health applications serve as a “boundary object” where all players in the transnational topography of power can meet (Green 2010: 1240)? It is the participation suggested by the latest question that we will expand on now.

Networks of participation

As an example, in post-apartheid South Africa, the relationship between institutions of the state and the citizens subject to these institutions was foundational to the possibility for democratic citizenship (Wafer and Oldfield 2015: 1). Communities develop arts of *self*-governance when they are frustrated by or excluded from promises of democracy; thus, a growing disconnect forms in this post-colonial society between “(formal) institutions for and (popular) expectations of democracy” (Wafer and Oldfield 2015: 1). At the same time, however, the political aspirations that motivated the anti-apartheid movement “continue to animate social and potential agency” (Wafer and Oldfield 2015: 2). In this way, “the state as an idea maintains political and cultural valence even in contexts where the state appears absent or elusive” (Wafer and Oldfield 2015: 3; Ferguson 1999; Taussig 1997).

Through analysis of the participatory forms, Maia Green posits that participation “operates as a boundary object enabling diverse stakeholders to temporarily align themselves around a common project for the purpose of development implementation” (2010: 1240). Rather

than a black and white state-civil society opposition, participation could serve as a developmental good that embodies nation building (Green 2010: 1241). Fixed practices and delineated political positions could unite various players and politics (Green 2012: 1257). Experience shows that participatory approaches in deploying development interventions by state and non-state actors have been established as a “preferred means through which communities can be brought practically and representationally into the development process,” to the degree that the normative expectations are that development and participation go hand in hand (Green 2010: 1241). However, it is not yet evident that this participation has “translated into increased commitment to the investment and maintenance of public infrastructure, let alone the reduction of poverty” (Green 2010: 1241). Participatory methods, such as inviting FLWs to operate mobile health applications in their communities, do not necessarily improve development. Yet, it does have important representational effects, like presenting an image of community engagement in the development imaginary through electronically completed forms that demarcate the relationship between community and state (Green 2010: 1241). Other effects could include the “association of communities with poverty and hence as constraints on national development and their relation to time which situates development in a future unattainable through communities’ failure to act” (Green 2010: 1241). In short, participatory methods lead to the “consolidation of hierarchical relationships between central and local governments, between ordinary citizens and the administrative elite and between the poor and the national project of development,” bringing to the forefront, once again, Ferguson’s vertical topography of power (Green 2010: 1241).

In this way, participation could act as a boundary object, otherwise known as a practice, representation or technology that is shared across two or more communities, in both the vertical and horizontal topography of power (Star and Griesemer 1989: 393). The object has a “semi-autonomous existence, outside and apart from the institutions of formal politics, bureaucracy and everyday associational life, although...threaded through with preoccupations and positions formed in them” (2007: 2); it exists in a ‘participatory sphere’ that “lies at the interface of the public sphere and the state, composed of hybrid institutions” that have a partial relationship with the state and the public (Piper and Nadvi 2010: 214). It is made to work as a boundary object because “stakeholders committed to development require a common object which can be ‘bought into’, literally in the form of financial transfers and conceptually in terms of the kinds of interventions which can be legitimately, that is morally, supported” (Green 2010: 1242). This can

be participation taking place in either a top-down or neoliberal program, with anything pertaining to freedom and cooperation as its flagship, giving it strength no matter how it's used by any actor within the development imaginary.

Another effect of participatory approaches to which attention must be paid is the role of the “hidden hand” of creative community development (Hirschmann 1967: 35). With the global health community setting its sights on the nuance of local participatory practice, there could be adverse effects to the unanticipated, spontaneous development work of a community. According to Green, “routinization of participatory methods may inhibit innovative approaches to problem solving” and “impose a strict interpretive grid on what is collected as data” (2010: 1243, 1255). Rebecca Marsland illustrates the limits of local contributions by detailing the many obstacles a neighborhood support group faced in trying to claim their voice amongst outside NGOs (2012: 479). Systemic protocols stood in their way over and over again. Local innovation, or therapeutic sovereignty, was lost to the predominant development imaginary; NGOs met only the needs required for people to survive, never to thrive. If participation is to be the boundary object, shouldn't the practices and interventions designed in the name of development be made available to all implementers and participants for discussion (Green 2010: 1244)? To what degree is the boundary object of participation shared by all involved communities, ‘global’ and ‘local’? How might this play on the transforming notion of normative biopower and the ethical values that have since arisen?

Again, according to Green, participation as a boundary object creates, true to its name, as many boundaries as it does bridges between everyone concerned. This is illustrated in the following excerpt:

Facilitators, assistant facilitators and key informants work through a sequence of analytical and data-gathering stages in collaboration with representatives from beneficiary groups. The aim is the production of information about a people and place, which can be accorded the status of local knowledge, and hence as generative of local ownership and implied sustainability of an investment which is perceived to be based on local realities. Where local knowledge is deemed too general to be immediately useful, these techniques are used to narrow down so as to be amenable to incorporation into the programmatical interventions of project forms (Green 2010: 1244).

Thus, participatory development solutions are ambiguous, operating as “management technologies, and hence as modalities for governance, and as potentially transformative institutions through which participants could confront and challenge existing systems of knowledge and organization” (Green 2010: 1245).

Likewise, Laurence Piper and Lubna Nadvi agree that the participatory sphere in which these boundary objects exist are “spaces of contestation, but also of collaboration and cooperation” (2010: 214). From this mix, there is what Legg (2007) refers to as ‘messy actuality’—both the state and citizen are “emergent empirical objects” with an unknown end point (Wafer and Oldfield 2015: 2). There is not necessarily an encounter between state and citizen, but “only a mutual imagination that takes shape through particular space-time techniques of [bio]power” (Secor 2007: 49). Perhaps, then, state and citizen do not “just share in an act of participation, but actually imagine one another into being” (Wafer and Oldfield 2015: 7).

Green goes on to ask what happens when participatory approaches are actually applied to “real people in real places” (2010: 1245). This comes up often in discussion with Dimagi on a number of levels. For instance, with the example of child malnutrition programs to be deployed in West Africa, how might this application be run differently in Chad, Niger, or Mali? Are all participants in each country addressed? Furthermore, when these forms are standardized for use, are individual FLWs given any freedom in the data they input or in the indicators they measure? How do these locally applied programs fit within the larger development imaginary, with its far-reaching “nexus of influences” (Green 2010: 1252)? As mentioned previously, mobile phone applications are offered as a simple solution but producing participatory knowledge is not simple. In order to simplify things, a process must be implemented to reach “facilitated consensus and...progressively edit out complexity” (Green 2010: 1253). Findings and preferences must be fully considered and all parties must be present, not just representations of ‘the villager’ or ‘the vulnerable’, but real people at a real table (Green 2010: 1255).

Biopower today can only be better negotiated if the status of all participants in projects of development becomes clearer and if imaginations of one another align. Originally a concept about state protection of its population, biopower faces new challenges as it encounters different actors, a widespread network, new arts of governing life and ethical dilemmas about quality of life. To offer life to its population remains a cause of the state, but international NGOs and citizens alike now share this cause. Biopower is transfigured, transformed and remodeled each time a new actor takes on this cause and, in so doing, both connections and disconnections form between state, citizen, NGOs and the technology.

Mhealth is a particularly interesting way to view biopower, as it captures the spread of new actors and serves as an art of governance in itself. In the next chapter, we will consider data

and infrastructure as two ways of monitoring and accessing citizens, and how this information is being woven into biopower and Africa's development imaginary today. Once again, Mhealth, as a tool to gather information and one that relies on an ever-expanding cellular and human infrastructure, is the keyhole to explore network connections and disconnections in Africa's health development.

Ch. 2 Mhealth, data and infrastructure: Monitoring and refurbishing Africa's development imaginary

“I think Dimagi is very much a leader in the field. At this point, Information and Communication Technologies (ICT) for development is a 10-12 year old field, but it still feels very young in a lot of cases... What we're learning more and more is that the role Dimagi needs to also play is that capacity building role... Dimagi's role is to be a leader of the community that's trying to do these things, to foster more and more technology in development. I think the other bit is to really be the knowledge experts, like how do you build it, how do you use it, how do you actually implement the technology.”

-Brian, DSA Technical Project Manager

At the same time that new technologies like Mhealth are being deployed in the name of sustainable and global health development, other health buzzwords and trends have garnered attention. Two such trends are data for sustainable development (Giovannini et al. 2014; “The SDG Process” 2014) and health infrastructure (Street 2014). Both data and infrastructure are considered resources that are fundamental to improving connection and access to more people, while at the same time accounting for and reducing inequalities. Likewise, in many ways, data and infrastructure go together, as the “study of information systems implicitly involves the study of infrastructure” (Star 1999: 378). However, a closer look at these two trends introduces as many connections as there are disconnections, or what Stephen Graham and Simon Marvin call ‘networked paradoxes’, simultaneously creating global connections and local (dis)connections (2001: 13). What, then, are the consequences of Mhealth, as a data collection tool and as an infrastructural bolt, in Africa's development imaginary? How might Mhealth further bend the meaning, shape the ambitions, alter the means and affect the outcomes of development? And how can biopower today be observed in these processes?

This chapter seeks to explore the network (dis)connections Mhealth establishes in Africa's development imaginary through its interaction with data and infrastructure. We will turn to data and then build upon infrastructure, with notions of fluidity, networks and people in mind, in addition to the testimonies of Dimagi staff. In this way, we explore not only Mhealth technology in its interaction with data and infrastructure, but the “peopling” of this technology (Fischer 2005: 57). First, however, we must situate these trends in African countries today,

where technologies such as Mhealth are being used to support citizens and humanitarianism when traditional state data mechanisms and infrastructure are lacking.

Meeting everyday needs

Perhaps, as suggested by Manfred Clynes and Nathan Kline, it is not as important to insist that the environment adapt to man as it is that man adapt to the environment, as a “significant step forward in man’s scientific progress,” as well as to “provide a new and larger dimension for man’s spirit” (1960: 76). In Africa’s diverse and changing environment, Elísio Macamo encourages policies to aim “essentially at making everyday life more predictable,” relying on “the material and intellectual resources which people have at their disposal” (2005: 5, 7). This may thwart the cyclical claim that “development is desirable in Africa because the continent lacks development” and instead encourages man to take more initiative with what he does not lack (Macamo 2005: 5).

Pieterse asserts that, as straightforward as Macamo’s suggestion is, there is a “profound tension between the need to pronounce on the how of achieving urban change and well-being versus a determined patience to simply elucidate ordinary practices in the now” (2014: 89). Here, Pieterse brings to our attention a gap between development and humanitarianism imaginaries. The former “holds to the belief that intentional action can improve life and aspiration for urban majorities despite profound structural and cultural barriers,” while the latter seeks “intimacy, microscopic social textures, psychic dispositions, aesthetic adventures and agency amidst constraints into the research frame” (Pieterse 2014: 89).

At this time, it might be worthwhile to expand on a distinction that Peter Redfield observes between humanitarianism and development. As state and civil society become further delinked, and as new markets begin to fill this space, humanitarianism has also begun to create distance from development. No longer focused solely on longer-term, grid-level improvement, humanitarianism extends efforts toward a “second best world” (Terry 2002: 216), responding with short-lived, emergency aid in times of crisis (Redfield 2012a: 159). Exhausted by the stagnancy of development efforts, new technologies are being deployed to offer basic needs for bare life. A common value of life is these technologies’ “primary preoccupation” (Redfield 2012a: 159). This is a distinction that often occupies my thoughts; it’s not at all straightforward. How should things be? How does one distinguish between providing life and empowering

living? Must humanitarianism and development operate separately, running perpendicular to one another and intersecting only from time to time, one offering the ability to survive, the other aspiring to create a world in which all people thrive? And should these exist distinctly, where does mobile health live in this system?

As mentioned previously, mobile health is not a single entity in a single environment. An international headquarters might have a regional office. That regional office might employ a small research group. There, in that research group's expenses, one might find the name of a mobile health social enterprise. One actor, within a much larger system, has hired a mobile health application company to create a targeted program to meet that project's needs. Software programmers write the code, fun audio and visual explanations are included, and the project's team is trained on how to use the mobile phone device and its application, all in an effort to facilitate care and collect data, and often to substantiate the higher-level funding received by the project's regional or international office.

These projects could have either humanitarian or development aims. Perhaps an application is created to meet a more immediate need. In fact, we could move forward with one of Redfield's examples, Plumpy'nut. According to Redfield, Plumpy'nut "anticipates real events and provides a ready-made response to them" (2012a: 170). A similar ready-to-use therapeutic food (RUTF) in the form of a peanut butter-like substance is being distributed in World Vision child malnutrition programs in West Africa. Dimagi has created an application to track these cases of child malnutrition, noting whether the child is deemed of an appropriate weight, or whether they are categorized as needing this RUTF or full-on hospital care. The application then tracks whether or not the child has to reenter the program upon his or her first round of categorization and treatment.

This, for the time being, is not a structural change; this program addresses basic needs in weak states without touching on more 'sustainable' development. However, what if the data pertaining to child malnutrition and cases of readmission were then used to substantiate government initiatives to improve child health in the country at large? Could mobile health serve as a bridge between the newly separating humanitarianism and development? Could it be the point of intersection for these perpendicular lines?

Lars and I discussed the role of Mhealth in strong and weak African state infrastructures. In his personal opinion (not the opinion of Dimagi), he told me he believes the value might be

higher in countries with a weaker infrastructure, like post-conflict nations such as Lesotho or Malawi. Expanding on this, he said,

We've seen that in the richer, more diverse countries like South Africa, Nigeria and India, it's a really complicated problem to roll a piece of technology out there. Here, I think South Africa could probably fix its own problem eventually--it's more of a human, organizational, political sort of thing, which is in some ways a little bit harder than a small country like Niger or Chad or something like that. There, they are like, we want to train health workers and we want to roll out basic infrastructure.

An interesting point made by Lars here is that people, organizational and political problems, weight down stronger countries instead. Whereas weaker countries eagerly take it into their own hands to 'roll out' basic infrastructure, this is sometimes more difficult in a country like South Africa where basic infrastructure is already assumed.

Again, the state and its biopolitical code of rule is not necessarily what we once narrowly thought it to be. Ordinary life within national boundaries, according to Redfield, has become "taken for granted as the political form of nation-state or the condition of citizenship itself" (2012a: 157). "Constitutional utopianism" and state commitment to justice and development "routinely run up against limits and barriers that result from a lack of financial resources and institutional capacity" (Robins 2014: 498). The state is no longer hero to its people if it does not protect life (Redfield 2012a: 157). New vigilantes take the state's place, as a "shadow of such service capacity amid its evident absence, in settings where even basic health infrastructure constitutes a rare exception" (Redfield 2012a: 158). The development, the biopolitical and the humanitarian imaginaries are all changing, in the way they operate and in the technologies they deploy. The very design of these objects, writes Redfield, exposes cracks in the state's veneer—an agent that can no longer safeguard its population (2012a: 158).

South Africa presents an interesting case. It operates "from a different base in terms of the size of the economy, resources at the disposal of the state, and the degree of access to basic services and opportunity" (Pieterse 2014: 91). However, driving along the N2 between Cape Town and Stellenbosch, one cannot ignore the struggle living between cities of abundance, as more than half the population lives in urban townships, fighting against any number of devastatingly limited opportunities. Bare life is left utterly exposed—the population's needs so readily visible—and yet it is expected that the population in South Africa will only grow, their

needs growing with it. South Africa, despite its great progress, is “too small to go it alone, and too large to be left alone to its own devices” (Pieterse 2014: 91).

More generally, if more attention is not paid to understanding the cost and size of the infrastructural deficit in Africa, “large-scale poverty rooted in structural economic exclusion and economic under-performance will persist” (Pieterse 2014: 90). A flaw in pursuing such an infrastructural fix, however, is that there is no universal coverage or “grid of modernity” (Ferguson 1999: 137) to “reticulate power, water, waste, data and the like,” but rather the current network follows “a strange, patchy geography along the contours of where the middle-classes and formal firms are embedded in the territory” (Pieterse 2014: 90). Further,

The net effect is an uneven geography reproducing splintered urban territories of connections and disconnections; a material metaphor of deep and enduring urban inequalities. To be sure, fault lines follow social lines of distinction, discrimination and oppression, predictably encoded by ethnic, racial and class bases of power (Pieterse 2014: 90).

This description ties in directly with Graham and Marvin’s networked paradoxes, in that infrastructure and data are deemed tools to account for global economic and social exclusion at the same time as they create local fault lines and disconnections. The universal grid is “contrasted against today’s tendency to fragmentation and privatization” (Ferguson 1999: 137).

These local disconnections sometimes exacerbate inequalities and lead to abjection. Ferguson describes this as the “process of being thrown aside, expelled, or discarded... but also debasement and humiliation... a sense that promises of modernization had been betrayed...” (1999: 140). Just as in his example of the Zambian copper belt mineworkers, ‘global’ technological innovations might connect the modern world ‘out there’ while simultaneously leading to acute experiences of disconnection (Ferguson 1999: 140). Of importance especially here is the word ‘disconnection’ as opposed to the phrase ‘a lack of connection’, as this experience of disconnection, like connection, “implies a relation and not the absence of a relation.” (Ferguson 1999: 141). Being unconnected is an “original condition,” whereas being disconnected is “the historical result of active process of disconnection” (Ferguson 1999: 141). Despite efforts to put forward a “new world order that insistently presents itself as a phenomenon of pure connection,” abjection and disconnection emphasize that this is simply not so (Ferguson 1999: 141).

As pessimistic as this sounds, Pieterse offers hope. The settlement system may be the “key to both the reproduction and potential dismantling of the contemporary dysfunctional development ‘model’” (Pieterse 2014: 91). For example, South Africa, like the rest of the world, is not a country free of inequality. Pieterse suggests we “make peace with the sociological dynamics and power logics at play when people with few resources, limited political reach and relative power... are endowed with the political and moral responsibility to be the harbingers of all that is good and true in our futures” (2014: 92). Those who are reading this are used to certain environments, comfortable with the support of a particular infrastructure, but “we need to stop projecting our own desires for virtuous heroes in order to make sense of how people survive amidst torrential oppression and continue to fail to rise up and seize their fair shares” (Pieterse 2014: 92).

With settlements as the key and mobile health technology as the keyhole, what could this mean in South Africa and beyond? It is no longer a rarity for poor African urbanites to pocket a mobile phone, or, at the very least, to have access to one. Mobile health’s nature might allow us to better understand this “deeply inter-penetrated and multiple distanced” continent (Pieterse 2014: 92).

Whether electrification or Mhealth is a symbol of the modern African nation-state, hooked into a new global society, connections and disconnections are revealed at every node in the networked development imaginary. Technologies are intertwined with both “ethical and political assemblages in historically specific ways that may or may not ‘travel’ elsewhere” (von Schnitzler 2013: 675). They are “unstable objects” that “mediate a diversity of competing ethical projects, political disagreements, and subterranean conflicts that often concern central political questions of civic virtue, basic needs, and the rights and obligations of citizenship” (Larkin 2008; von Schnitzler 2013: 673). The technologies fill the gap between ‘modern’ and ‘not quite modern’ to “pressure the state to meet its obligations with regard to health... sanitation and so on” (Robins 2014: 498). Mhealth as it supports, distorts and temporarily stands in place of more foundational data and infrastructure makes it an interesting interface through which to investigate the ordinary life and everyday needs of citizens, while also remembering Foucault’s transforming biopower and the global and national nodes to which Mhealth is (dis)connected.

Mobilizing data and documentary practices

Data is generally being used, regardless of what people say, to justify aid funding. It is not used for decision making... They just want to know how many babies did you see, how many pregnant mothers and, at the time, maybe that was right because maybe a lot of development wasn't quantitative... What we say to our partners is, let's build a decision support tool. And in the process of making those decisions, you can generate a lot of data that will allow you to monitor your program. So we're separating decision making from program monitoring. Decision-making is for health workers, patients, and supervisors... 'Which kids need to be followed up today? What actions do I need to take?' Whereas program monitoring is like, 'Wow, are our TB patients defaulting or are they completing treatment'?

-Lars, DSA Country Director

At the precipice of the SDGs, the era of a data revolution has emerged, with the belief that data will transform global health and serve as a revolution for equality (Giovannini et al. 2014: 8; Levin 2015: 1). Monitoring and evaluating global development must be done with high-quality and timely information. However, access to data and information is not always widespread. People are “excluded from the new world of data and information by language, poverty, lack of education, lack of technology infrastructure, remoteness or prejudice and discrimination” (Giovannini et al. 2014: 7). Moreover, existing data often goes unused or is not substantial enough for decision-making; other barriers are poor-quality data, late arrival, poor coverage and data mechanisms that are deemed unfriendly for the user (Giovannini et al. 2014: 2, 11, 14; Ash, Berg and Coiera 2004).

To bridge these gaps and achieve the goals of the data revolution, some authors enroll participation as a boundary object, as discussed in chapter one, putting forward that new institutions, actors, ideas and partnerships can come together around the data revolution, leaving no one behind (Giovannini et al. 2014: 4, 9). New technologies, and the speed and detail they provide, are creating a world of “faster, more networked and more comprehensive data” (Giovannini et al. 2014: 5). In making data more widespread, a public trust must also be built, as well as an expanded ability to use data collection tools, like Mhealth. Human rights and privacy must be safeguarded—the rights of individuals and the benefits to the population must be weighed fairly (Giovannini 2014: 6; Breckenridge 2005: 282). Of course, in order to do this, there must be a trust in governments to play this role, an exertion of their biopower (Giovannini 2014: 8). However, when governments cannot enforce this power, the revolution falls into the

hands of other actors, like NGOs and citizens themselves. In this way, data is sometimes concurrently a “material artifact constructed by people,” “a trace or record of activities,” and “a vertical representation of the world” (Star 1999: 387-388).

Still, can biopower be observed in creation and deployment of mobile health applications? Take, for instance, the vital power of the concept. Mobile health applications are a tool for data collection. The weight of a baby, the results of a tuberculosis breath-exam, the T-cell count of an HIV-positive person are all measured and input, the biological material gathered and stored as information. Mobile health connects a number of social players, in both state and non-state supervised programs, living and operating within and between state macro-infrastructure and community micro-infrastructure to monitor bare life. As the importance of data in development garners more normative attention, ethical risks are assessed. How might the availability of health data risk the human right to privacy and instead serve as another tool for surveillance and subjectification? How might access to so much data also become an obstacle in the way of state and society trust, once again putting state in the position of presiding over ‘docile bodies’ instead of engaging with and providing for its population?

Open-source data is one particular way in which all actors are trying to make data more transparent and to “foster equality, widen participation, and increase innovation and productivity” (Levin 2015: 1). Open source implies that the software, including the design, code and blueprints, is free and available to any user (Woodard, Weinstock and Lesher 2014: 15). In this way, communities can “build from, modify, and reuse the original” (Woodard et al. 2014: 15). Dimagi is a proponent of open-source technology and endorses it within their own enterprise. According to Brian, DSA technical project manager, the point of being open source is to “keep everything open.” They have recently created a CommCare Exchange, what Brian calls an “app store for CommCare,” that plays a key role in sharing knowledge and creating global connections. Brian is also working on user configurable reporting, a platform that allows reports to be viewed online without having to first download them. Furthermore, to address coverage and lack of infrastructure in the countries Dimagi works in, Lars says Dimagi designs with the most rural places in mind.

Dimagi makes efforts to tackle accessibility, transparency and coverage in these ways. However, user-friendliness remains a challenge based on the complexity built into the system. According to Dimagi Software Developer Kenneth, there is a fine balance between making the

Mhealth application simple to build and use, while also enabling it to do complicated things. In his own words, “we’re left with this underlying soul... this complex bare bones system that allows you to do a lot of things, but can at times be difficult to accomplish what you want to, or to understand how to accomplish what you want to because it’s so flexible.” Building off this, Bonnie discusses this tentative balance in another way. Paraphrased, the more complicated the app, the more complicated the workflow. This becomes less user-friendly and, yet, there might be more impact if there is more thorough data collection. Oppositely, the simpler it is, oftentimes, the more you can see the win or value of the application.

Moving away now from the barriers to the data revolution and the possible bridges Dimagi builds, we will consider the documentary practice itself. CommCare, for instance, opens a virtual patient file that allows information to be collected and decisions to be made, similar to that of a paper interface, but with the additional help of calculation, storage and immediacy. However, in this way, medical documents may sometimes be made multiple while also multiplying medical authority itself (McKay 2012: 545). This enunciates “a range of ethical, bureaucratic, and knowledge-producing activities,” while producing both opportunities and challenges for the NGO staff, states, FLWs and patients who “navigate this varied documentary terrain” (McKay 2012: 545; Mol 2002). For example, while increased documentation can contribute to “the multiplication of regulatory authority and to the scale and scope of transnational intervention” and complicate the “relations of authority and citizenship enacted by these forms,” it can also create new opportunities for these networked actors to better navigate this multiplicity and to mutually enact and construct social and medical relations to deliver or receive the desired care (McKay 2012: 547, 551, 552, 556). In addition to this, patient forms can be treated as “ethnographic artifacts” as well as “discursive practices” (McKay 2012: 549; Marsland 2012: 476). The material collected can become the storyline of each patient’s health history, and allows patient and care provider to interact in new ways, especially when considering the audio and video tools incorporated into Dimagi’s technology. The social life to these intake forms allows treatment to be shaped in new ways.

Knowledge production through this type of patient data is of particular importance in the study of mobile health in development. Do electronic forms capture the impact of development projects and the stories of the patients affected? Might this type of data collection also “complicate, constrain, and facilitate care” as exhibited in McKay’s work at a Mozambican

clinic (2012: 558)? Dimagi is often called in to assist with a project because information from the FLW is not being delivered efficiently, making supervision and treatment more difficult. Could online patient forms lead to greater capacity and transparency, connectivity and response? One thing that might be improved is locating patient forms, but I am still asking questions as to whether bringing documents online actually leads to a faster response in all cases. From what I've seen, forms are submitted through the mobile application and often go untouched in the database from there.

Bonnie, in her interview, divulged that many partners do not look at the data. Or, when they do, they do not factor in Mhealth or distinguish between paper and mobile information. One way that Dimagi is trying to address this is through a new program called Impact 123, where each partner is asked to give three indicators that might best measure the impact the project has or might have. This is only in its beginning phases, so I cannot provide more information at this time. However, Lars gave another example of how measurements are being used. In partnership with the Institute for Health Improvement, Boston, MA, USA, Dimagi worked in Malawi on Quality Improvements (QI), which is a quantitative approach to improving the adoption of new healthcare practices in a clinic or in a hospital. In his words,

I think they invented it in Boston because they kept, like, chopping off the wrong arm in a surgery or something. And they were like, 'Well, if we have this checklist, do we chop off less wrong arms?' That group is really interesting and has a cool approach to going into a clinic and then quantitatively show them how to manage their own progress and improvements. Instead of macro-type indicators, they're trying to use data to see on a micro level. 'Did you improve your understanding of childhood illness?' or whatever it is. In Malawi, they've got a project around pregnancy danger signs and day-to-day post-birth, like survival of these infants and stuff. Our component of that project is to digitize their workflows.

Mhealth data is playing a role in shaping how projects are being approached and performed, yet it is still finding its own space within the development system. Perhaps, much like its predecessor The Paper Document, both hard and soft copy forms disable and produce health care (McKay 2012: 558; Chandrasekhar and Ghosh 2001; Breckenridge 2005: 267).

Again, remembering the many actors and agencies involved in health development, different documentary practices illustrate the many nodes and relations of Africa's development imaginary and the ways in which different forms of data collection can confuse and support healthcare. In McKay's work on Mozambique,

Although the forms appeared to solicit standardized information, to record data in ways routinized and commensurable across national and clinical spaces, and to enact regular forms of patient protection and care, in practice they produced a more varied terrain of data in which the relationship between patients, medicine, and authority was complicated by the multiplicity of the form and its blind spots. In addition to their triple functions as psychotherapeutic tools, clinical evaluations, and bureaucratic obstacles, the intake forms also enacted a variety of knowledge-gathering goals, such as collecting data for research, performing project management functions, and serving as scripts for medical instruction (2012: 553).

Furthermore, should these forms lead to medical instruction and diagnosis, a particular label is then quickly entered into the system, a classification based on certain symptoms. This label itself “has power to organize experiences, determine future courses of action, open access to needed resources, and provide identities around which to mobilize politically” (Whooley 2015: 2). Diagnoses, as captured by documentary practices, are “concepts that bind the biological, the technological, the social, the political, and the lived” (Jutel 2011: 13).

In this way, data collection, diagnoses and decision making by NGOs, states and FLWs alike once again produces ‘state-like’ practices, exerting this transformed biopower and the participation within “public-private spaces of research, care, and treatment” (McKay 2012: 554). Forms and documents are multiple, “representing diverse modes of relation, serving multiple ends, and enacting simultaneous practices of registration, audit, knowledge production, care, discipline, and exclusion” (McKay 2012: 557-558). Despite the global and national norms that inform these documentary practices, however, they are enacted through local and social relationships (McKay 2012: 555). This is especially true in Mhealth, where partners are connected to their patients through FLWs wielding mobile phones. This network is integral to communicating data at the national and global level.

However, another type of knowledge production to be considered is the data collection being done by those affected ‘on the ground’, such as the Shack/Slum Dwellers (SDI) who are increasing the visibility of their local context through “first-hand data” (Beukes 2014: 4). Government data collection of informal settlements was not adequate and, thus, slum dwellers were often left further marginalized and excluded from city planning and development programs; lack of information was put forward as the defense against an unequal distribution of basic services (Beukes 2014: 1). Therefore, civil society took it into its own hands to collect data in an effort to improve the areas in which people live and to collaborate more horizontally in the development topography of power (Beukes 2014: 1; Appadurai 2001: 39). According to

Appadurai, in “rendering them statistically visible to themselves,” citizens found power in the knowledge they possessed when dealing with local and national state organizations (2001: 34).

What might mobile health do to this type of ‘bottom-up’ development, or ‘horizontal’ exchange? If SDI was to equip people with a mobile phone application for their data collection, what might this do to the still existing topography of power within the development imaginary? Could this type of information collection be perceived as an “effective tool for mobilization” at the settlement level (Beukes 2014: 2)? How might this technology further shape this initiative’s ambitions and affect its outcomes?

This example articulates the ways in which citizens take data under their control when state structures do not deliver on their promise of monitoring life. The same can be said for infrastructure; when state reach does not expand into all areas within its boundaries, the flow of goods is stilted and people react. To the degree that people react, people are also infrastructural themselves. It is for this reason that Susan Leigh Star said that the study of information couldn’t neglect “its standards, wires, and setting” or else miss “equally essential aspects of aesthetics, justices, and change” (1999: 379). Hence, it is infrastructure that we will consider now.

Infrastructure: Through wires and on foot

According to Brian Larkin, infrastructures are “built networks that facilitate the flow of goods, people, or ideas and allow for their exchange over space.” (2013: 328). They physically “shape the nature of a network, the speed and direction of its movements, its temporalities, and its vulnerability to breakdown” (Larkin 2013: 328). They are the grid of societies and construct the environment of everyday life (Larkin 2013: 328), while also creating a conceptual space to study the “shifting boundaries between material and immaterial structures” and the “shifting networks between assemblages of human and nonhuman actors” (Lockrem and Lugo n.d.: 1; Street 2014: 2). Thus, infrastructure is a relational concept and cannot be routinized (Star 1999: 380; Star and Ruhleder 1996; Street 2014: 3).

Developments in infrastructure emphasize the growth in connections in Africa. Roads, railways, bridges, electricity, cellular coverage and international exposure and interaction with NGOs all point to this expansion (de Bruijn and van Dijk 2012: 6). Even in more destitute and war-torn areas, “the arrival of the mobile phone and the required infrastructure has not gone unnoticed” (de Bruijn and van Dijk 2012: 6). Synchronously, infrastructure reveals political

terrains underneath technological projects and supports arts of governance and an apparatus of governmentality (Foucault 2010: 70, Larkin 2013: 328; von Schnitzler 2013: 671, 673). In this way, the “political circulates and becomes manifest in different material forms,” whether they be meters, wires or cellular towers (von Schnitzler 2013: 673). Infrastructural projects may simultaneously represent state power to citizens, technical function and “complicated emotional investments...and....ephemeral sensibilities” (Larkin 2013: 334). It is due to this last factor that “roads disappear, factories are built but never operated, and bridges go to nowhere” (Larkin 2013: 334). Not at all neutral, infrastructure becomes the grounds on which practices of government are unveiled and citizenship is contested (Larkin 2013: 331). Similarly to politics then, infrastructure cannot be so easily separated from its history and the belief that infrastructure symbolizes progress and modernity (Larkin 2013: 332; Ferguson 1999). African infrastructure is the base of the “postcolonial state’s imaginative investment in technology” (Larkin 2013: 333).

Generally, infrastructure acts as the foundation on which other objects operate, translates uncertainties into credibilities and constitutes larger systems (Larkin 2013: 329; Penders and Flipse 2014: 6). The act of defining infrastructure, however, is a “categorizing moment” that “highlights the epistemological and political commitments involved in selecting what one sees as infrastructural (and thus causal) and what one leaves out” (Larkin 2013: 330). Great care must be taken to observe the potential value of ‘health infrastructure’ for improving healthcare and reducing inequalities (Street 2014: 2). Bringing the entire networked system to the forefront of analysis thus takes attention away from solely the technology and calls attention to the nontechnological elements as well, elucidating movement and adaptation (Larkin 2013: 330).

Consider the infrastructure of the ‘mobile ecosystem’. Mobile network operators build cell towers in the areas to which they are providing service, in addition to the back-end systems required to support the networks of cell towers (Woodard et al. 2014: 31). Agent and distribution networks are then developed and harnessed in order to sell SIM cards and airtime (Woodard et al. 2014: 31). These networks are all reliant on electricity. There is further reliance on hardware and software. Finally, there is the network of communities, and the awareness, acceptability, affordability, and user ability that these communities have with cellular devices (Woodard et al. 2014: 32). One infrastructural technology relies on, and is relied upon by, many different networks, plugged into even larger systems themselves.

With this in mind, then, Brenda Chalfin asks how infrastructure “enables the ‘public’ as social formation, realm of interaction, and collective consciousness” (2014: 106)? And “how do these iterations of ‘publicness’ augment, reject, or replace state authority” (Chalfin 2014: 106)? When the state is no longer the “prime container of the political,” what might infrastructure come to look like (Chalfin 2014: 106)?

The state is still, undeniably, a spatialized locus of authority amidst multiple, mutable matrixes of relations (Simone 2013: 247, 248). While the state’s policies of inclusion typically center on its already existing bureaucratic institutions, urban growth calls for a new, more expansive spatialization to be “put together for the different kinds and needs of mobility” (Simone 2013: 258). These new intersections are multiple, contradictory and exploratory, much like one’s interpretation of infrastructure. In the changing role of state and structure, then, Mhealth may serve as a humanitarian good and micro-infrastructural tool, equally resting on an infrastructural foundation and acting as one itself.

Redfield draws attention to the “expanding array of objects that engage the world in the name of improving human welfare” (2012: 1b). Earlier in this chapter, we discussed how Mhealth might act as a meeting point or joint in the dividing humanitarian and development imaginary. This suggests a certain sense of *fluidity* built into its technology. Like Marianne de Laet and Annemarie Mol’s Zimbabwe Bush Pump Type B, for example, mobile health applications are not solid characters; they too may be “fluid without losing their agency” (2000: 227). Also like the Bush Pump, this innovation does not exist separately from a larger network of state and non-state actors. The pump relies on its original designer, its manufacturer and on the creativity of its community; it is held together by bolts, rods and sometimes, simply, gravity and a number of human and nonhuman actors are on stage with the Bush Pump (de Laet and Mol 2000: 227). Additionally, these authors put forward that “parts may break, users may not cooperate,” but the bush pump can undergo repairs; the pump may “constitute a community, but it also depends on the functioning of one, without maintenance it will fail” (de Laet and Mol 2000: 241; Redfield 2012b: 6). Likewise, while the cell phone might break, the program might have errors or the users might not cooperate, the mobile health device can be fixed, the program altered, and the user trained. The phone and its program may be created to improve community health, but it relies solely on the functioning of such a community to work properly.

Mobile health, following this logic, has similar fluid boundaries as the beloved Zimbabwe Bush Pump (de Laet and Mol 2000: 247, 253). What is yet to be surely concluded is whether mobile health, like the Bush Pump, is “variable over time” or whether it too could build the nation (de Laet and Mol 2000: 228, 235). Might it boost only the health of the community in which it is deployed, or, again, could the data it preserves hint at larger implications?

With fluidity, places are not necessarily divided by boundaries or linked by relations, and are sometimes both together and separate based on “different locations within fluid space” (Mol and Law 1994: 641). In this way, “fluidity generates the possibility of invariant transformation”; certain nodes of development, even those seemingly infrastructural, can disappear or transform without the development imaginary itself collapsing (Mol and Law 1994: 658, 659). This flexibility allows these technologies to respond to global challenges (von Schnitzler 2013: 684).

Redfield, however, argues that there are frictions and complexities that are not taken into account (2012b: 17). Reconsidering the Bush Pump, it is “a partial gift” and hardly a selfless enterprise (Redfield 2012b: 20). Furthermore, “if eminently mobile and focused on survival needs, it also displays ambitions to function as a substitute infrastructure” or “survival beyond infrastructure” (Redfield 2012b: 22, 24). These devices “embody, convey and manipulate moral affect, often in the idiom of humanitarian concern” (Redfield 2012b: 1). Mobile health may not create an intersection between humanitarianism and development, but instead a disjuncture.

What’s more, clean water, food substitutes, medication and portable, biodegradable plastic toilets are all tangible short-term solutions. On the other hand, mobile health applications operating on mobile devices do not dispense sanitation, antiretroviral treatment, condoms or food aid. They are interface tools used to collect data but do not provide healthcare themselves, and they rely on the expectation that their users are literate. At the same time, they may also act as interactive, educational devices, teaching mothers about protecting their children against malaria as they are guided through an application’s forms. Could mobile health be one of Redfield’s humanitarian goods? And could they be guilty of Redfield’s critique?

Instead of disjuncture, perhaps intersections do not imply that things fit together, but that they “generate motion and volatility,” propelling this array of objects into new, experimental relations (2013: 245). Infrastructure, real or substitute, “exerts a force—not simply in the materials and energies it avails, but also the way it attracts people, draws them in, coalesces and expends their capacities” (Simone 2013: 243). These humanitarian goods have a “capacity to

construct elastic relationships with what is available to residents at any particular time and use these relationships as platforms to access new experiences and networks” (Simone 2013: 244). While issues of inequality and hierarchy may be active, “the performance of intersection of assemblage can always potentially exceed those constraints, setting up the conditions for new alignments” (Simone 2013: 245).

While considering and relocating the “tools and possibilities of urban development... in diverse assemblages of scale, subjectification, history and place” (Simone 2013: 260), he writes:

In the space between the applications of political technologies as territories, frameworks of administration, control and pre-motion, and more inventive applications of political technologies as ways of enhancing mobility by exposing residents to new trajectories of relationship-building, there are many provocative questions: Is territorial proximity necessarily an important condition to produce relations of intimacy and finely attuned collaboration (Simone 2013: 259)?

This unveils another thought-provoking moment in mobile health. Could this potential technology of governance offer a new corridor of proximity and access, reconnecting state and civil society, reinvigorating Foucault’s biopower and reshaping politics? Or would this new corridor instead provide a more direct route for state to survey and subjectify its people?

Here we return to networked paradoxes, and the notion that global connections can be made and that ‘territorial proximity’ does not necessarily mean local connections are in place. Many technologies and actors are a part of networked infrastructures; thus, “infrastructure networks...are vast collectivities of social and technical actors blended together as sociotechnical hybrids that support the construction of multiple materialities and space-times” (Graham and Marvin 2001: 185). Actor-network theory demonstrates how ‘far’ and ‘close’ are taken for granted; elements that seem far away may be more connected than initially thought, and elements nearby may not be connected at all (Latour 1997: 3).

Actor-network theory also reminds us of the human relations often overlooked when discussing infrastructure. Physical infrastructure also enables or disables, inspires or interferes with the individual energies and how these energies are deployed and accounted for (Simone 2004: 407). When human actors come together to build cellular towers, invest in Mhealth devices for FLWs or check Mhealth data from abroad by using the iCloud database, global interactions drawing on multiple social positions are formed. Oppositely, when data and infrastructure are lacking, citizens may take it into their own hands to construct short-term data monitoring or infrastructural adjustments, surviving “largely through a conjunction of

heterogeneous activities brought to bear on and elaborated through flexibly configured landscapes” (Simone 2004: 409). This conjunction is what may be referred to as ‘people as infrastructure’, and alludes to the way in which human actors will “derive maximal outcomes from a minimal set of elements” (Simone 2004: 411; Lawhon, Ernstson and Silver 2014: 498).

The reliance on people as infrastructural actors was an essential point made and remade during my time at Dimagi. Technology is not so easily adopted, and to incorporate this into the structure, organizations must focus on their human processes and capacity building so to, as Project Manager Florence put it, “effectively utilize the technology.” In each project that was discussed as being most successful, the first reason was because of the person operating the program on the ground. Florence provides an example of a project coordinated with Wits University, South Africa,

We spent one week on site and didn’t do a lot of prep before. There was no application before I went on site either. The key thing was it was a good example of design under the mango tree, which is one of our principles, because we went there and we were literally sitting there developing the application with the partner and just building enough so we could do the field testing and then immediately include their feedback into the app and build for another day, just enough so we could start training them...I think the one thing that happened there is that they had a really strong person they trusted internally who was very capable, energetic, a hard worker, and smart enough to figure things out.

This example highlights the necessity of the human element in making this technology work. There is a “power in human-environment interactions” (Lawhon et al. 2014: 499). Brian expanded even more on this topic, saying that the highest correlate of project success is whether their partner has a strong person on the ground. In his words, “We’re bringing the same kind of technology to everywhere in some sense. We deliver a similar package everywhere we go. The highest correlation [to success] is when someone is highly motivated or excited to push it forward.” Kenneth stressed this human element time and time again as well. He said, “A system could succeed incredibly well in one instance and fail in another and the difference, assuming the system was the same, would be the human element.” Finally, Lars ended his interview by emphasizing two points: that the attitude toward development and data must change, and that the relationship with people, and their investment in the system, must be better understood.

When local disconnections are made apparent, especially in African inner cities, connections to the world at large must be rewoven by limited means (Simone 2004: 411). Infrastructure is especially complex in these instances because these areas may or may not rest

on the larger urban area's infrastructure, resources within reach but still, as Bruno Latour might say, completely out of reach. In his words, "It may be that the telephone has spread everywhere, but we still know that we can die right next to a phone line if we aren't plugged into an outlet and a receiver" (Latour 1993: 115). In such cases, people may rely on social collaboration and innovation to deal with their "half-built environments," and some have even turned to Mhealth as a tool (Simone 2004: 425). According to Simone, "with limited institutional anchorage and financial capital, the majority of African urban residents have to make what they can out of their bare lives" (2004: 428).

In this chapter, we considered mobile health alongside data for development and health infrastructure. With the mission of making everyday life easier, more transparent and more actionable, data and sufficient infrastructure are brought to the forefront of health and development brainstorming time and time again. However, one cannot ignore the networked paradoxes of these 'solutions', especially as exhibited in their interaction with Mhealth. Data can both reveal or distort medical care, sometimes creating medical plurality or contributing to piles of overlooked information, in both paper and electronic form. Tactfully selected indicators, however, point to more promising measures of impact; impact that, for the time being, remains outside this dissertation's scope. Infrastructure, macro- and micro-, developmental and humanitarian, goes beyond its materials to represent political relationships and the people themselves. When data and infrastructure interact with Mhealth, technological determinism must be avoided, or else we risk "the depletion of those very [relational] health infrastructures that we hope to strengthen in the first place" (Street 2014: 4). As we read in this chapter, innovative technologies, including Mhealth, that seek to address—or are used to address—trends like data and infrastructure, do not exist singularly. They show signs of fluidity and disjuncture, exert and contest biopower, and simultaneously create global connections and local (dis)connections.

The next chapter will further explore Mhealth and the human relations it creates within the networked development imaginary. However, this approach will turn toward the economical, and a reworked neoliberalism and moral economics by considering the social capital of mobile phones in an informal economy, and the value of social relations in the Mhealth network.

Ch. 3 Mhealth, canny neoliberalism and moral economies: Global human and market (dis)connections

“Dimagi plays a role often to connect different people together through its systems. So, different organizations might work together that might not work together otherwise and different people talked to each other around the use of the system and the similarities they find in their organizations and the work that they’re doing. On another level, I guess, you could say that we’re involved in connecting the mobile workers to their clients as it were, though that would happen without us as well, so I’m not sure if that’s really relevant.”

-Kenneth, DSA Software Developer

Essential to the spread of Mhealth technology in Africa, and to the infrastructure that supports it, is the economy. Neoliberal efforts to introduce competitive products in the name of development and outside of the state have introduced a number of ‘innovations’, ‘tools’ and ‘solutions’ that enter into a global economic pipeline. These tools may be introduced to FLWs at the local level who are paid a small stipend to use them with the end user or beneficiary. Additionally, some such innovations, like Dimagi’s CommCare platform, make their products free in small numbers, so that local community actors may utilize Mhealth on a small scale for their own knowledge production and data collection. This results in biopower further removed from the state, and what I call ‘canny neoliberalism’ in that it offers a substitutive technical fix for governing life. At the same time that these technologies are introduced, they draw connections between human actors at the global, national, regional and international level, creating a moral economy operating under the values of globalization, development and equality. In this way, the ethical tinkering of canny neoliberalism engages directly with the moral economy this Mhealth technology facilitates.

Such things were considered time and time again during my time at Dimagi. My supervisor, Mandy, Program Manager at DSA, told me in our first face-to-face sit down in August, “the technology connects us,” as she described how CommCare is operationalized by Dimagi staff, organizational and state partners and FLWs. Dimagi, a for-profit mobile health social enterprise based on neoliberal ideals, believed in its product’s capacity to build relationships and share knowledge across different channels of this global development network. However, as introduced in the previous chapter, this relationship and capacity building went far beyond the technology and often fell on the shoulders of project and field managers—the people

themselves whose responsibility it was to train the multiple users of this technology and its service to different projects. The infrastructural role they play in these relations reminds us of importance of human actors in their encounters with nonhuman actors. People and technology are inexplicably linked. At the same time, however, their relationships were not always strong, recognized or real. FLW and patient were sometimes most removed from this participatory economy, and the partners sometimes did not have the time necessary to build and sustain their relationship with Dimagi. As such, this neoliberal venture, Mhealth, while based on moral values and collaboration, faces as many disconnections as it does connections.

This chapter will introduce canny neoliberalism in Africa's development imaginary and with today's transforming biopower in mind before looking at the human connections and disconnections being formed and shaped in the wake of this post-modern era. Mhealth, as it further bends and alters development's trajectory, will once again be at the forefront of these inquiries.

Neoliberalism's new name/What's in a name?

As mentioned in chapter one, a new moral- and market-driven, normative and ethical value of human life has transformed biopower and bypassed the power and sovereignty of the state. In lieu of the state, a new market manifests that "focuses expressly on populations in need and thus values its commodities through an ethical as well as an economic calculus" (Redfield 2012a: 158). Does this new market look like a state, run as a business? Or is it simply biopolitics without the state? How is neoliberalism present in this market? Redfield argues that glossing over this new market as neoliberalism "risks overlooking specificities involved and the manner in which actors foreground moral and medical rather than market values (Redfield 2012a: 158-159). However, a look at Ferguson's work suggests that, perhaps, neoliberalism is also changing.

In his work, Ferguson explores possible new 'neoliberal' arts of governance, suggesting that neoliberalism does not need to be approached so conservatively. Perhaps the development and humanitarian imaginaries discussed in chapter two are taking new shapes, but concepts within these imaginaries are reconfiguring themselves as well. 'Neoliberal', like 'biopower', does not need to be understood in the same way that it once was. Neoliberalism may very well be participating in the progressive and "worldwide shift in thinking about poverty and social and humanitarian assistance" (Ferguson 2009: 179). He goes on to write,

If we can go beyond seeing in 'neoliberalism' an evil essence or an automatic unity, and instead learn to see a field of specific governmental techniques, we may be surprised to find that some of them can be repurposed, and put to work in the service of political projects very different from those usually associated with the word (2009: 183).

What was once a word connected with a very particular political and economic agenda may be put to new, social and developmental uses. While imposing a negative force in the past, and perhaps doing the same on occasions today, neoliberalism has encountered and influenced development efforts, linking state, non-state and subject in new ways in the name of service and global growth.

Furthermore, Aihwa Ong introduces neoliberalism as a mobile technology, a "migratory set of practices" that participates in "mutating configurations of possibility" (2007: 4). This neoliberalism suggests new, pliable relations between "governing, the self-governed and the space of administration" based on varied circumstances, political will and motivation (Ong 2007: 4). It changes shape to suit the needs of whoever uses the term to justify a certain kind of state, citizen and market engagement. When it comes to neoliberalism for global growth, as mentioned above, this mobile, malleable neoliberalism brings attention to how some initiatives offer a real or substitutive technical fix for governing life. With Ferguson and Ong's mobile and repurposed notions of neoliberalism in mind, I put forward canny neoliberalism.

Canny neoliberalism takes into account the rise of NGOs and other international actors and partnerships in Africa's development imaginary, all with a reach that goes beyond the state and extends its, often, neoliberal market to local citizens. Through stronger connections between the state and private sector, and with more market influence in the public sector, canny neoliberalism assumes both economic development and service delivery to citizens and patients. The individual's role in his or her community and resources form that person's 'social capital' in this new economy that looks beyond public and private sector means.

Social capital can be understood as social relations taking place within "meaning-giving practices and discourses" (du Toit et al. 2007: 521). Further, it has gained 'currency' at the international level as "a measurable, benign 'stock' possessed by communities that fosters their 'good governance' and economic development" (Miraftab 2004: 242). Thus, neoliberalism has grown to include a narrative that links notions of social capital and community, grassroots participation with empowerment (Miraftab 2004: 239; Skuse and Cousins 2008: 5).

The value of this social capital, both tangible and intangible, was present in Dimagi's rare interface with FLWs. Brian discussed with me how the phone, even without the app, was both an incentive and a tool for community health workers to communicate and gain ground with one another. In Sierra Leone, he told me, they tested whether quality of care was different if the FLW was given a cell phone with CommCare on it or simply a cell phone. Already, simply the ability to call one another and communicate strengthened FLW networks and enrolled them in meaningful conversation about their work. The hand-held cell phone created wireless connections between workers and provided them with a communicative and knowledge-sharing advantage in the field. Once these social networks were formed, FLWs were encouraged to check in monthly and review and compare their data. Dimagi's neoliberal venture took on this additional capacity, with a hand in building a community and a network where FLWs knew they were not alone. Brian went on to say,

I think Dimagi and the technology we have goes a long way in just connecting people—connecting people to the outside world is important to the higher ups and the program—but I think that you're able to connect each other at the community level really goes a long way. They're so much better at solving their own problems than some solution we have if they can chat about it and figure out the best way to do it...It's always a great experience when you meet them [FLWs] and they know there are phones out there and they know other FLWs have these phones and are successful with it and it's making their lives easier. They come to you and sought us out saying, 'When do we get our phones, we want to use it too, we've been talking to our friends'.

Thus, the mobile device itself had value beyond being a material resource. It helped shape a connection, and encouraged community engagement and delivery of care.

Lars also mentioned this social capital in his interview. In one project, an SMS channel was set up and FLWs began texting about "work stuff." Lars said, "You can imagine that just deploying WhatsApp groups between workers and supervisors would help community health workers." The positive consequences of creating this communication network were acknowledged—"there were definitely opportunities for it"—but it had never been the priority product of Dimagi, or an often-repeated thing.

To the degree that the social capital consequences of Dimagi's neoliberal enterprise can lead to stronger relationships and meaningful interaction, both social capital and canny neoliberalism can be "used, transformed, created, made and remade," underlying power relations within the political economy and development imaginary (du Toit et al. 2007: 521). Social capital is "marked by ambiguous potential" (du Toit et al. 2007: 524). It does not necessarily

exist as a “shared asset” of the community, but instead may describe the “coercive and conflict-ridden set of relationships where in individuals are positioned” (Miraftab 2004: 242). There are distinct political, social and economic relations that offer different levels of access to ‘capitals’ (symbolic, social, and economic) that plot them within a social hierarchy (Miraftab 2004: 242). A canny form of neoliberalism that links itself with social capital and empowerment may be doing so to “rationalize the nature, means, and ends of its governing” (Miraftab 2004: 239).

Here, again, we see opportunities for both connection and disconnection. This, according to Faranak Miraftab, accentuates the paradox of canny neoliberalism: it stresses “the processes of symbolic inclusion” while continuing to lean on “processes of material exclusion” (2004: 239). Miraftab goes on to write that the concepts of community engagement, social capital and empowerment under canny neoliberalism “has been depoliticized by an interpretation by the development industry and by governments that have stripped away its implications for dominance, ...while at the same time its use by such organizations of neoliberal governance to rationalize their actions is extremely political” (2004: 239). In this way, inclusion based on social, symbolic capital runs parallel with material exclusion.

To illustrate this point, Miraftab uses the example of underpaid or unpaid labor of the men and women within townships, who are enrolled to work under the sentiment of empowerment and participation while simultaneously serving the “state’s cost-cutting agenda” (2004: 240). This agenda is a product of the recent past and is a reminder of today’s transforming biopower. Neoliberalism and structural adjustment programs have reduced government budget for public expenditure and altered the state’s responsibility to its population (Miraftab 2004: 240). That role shifted to private firms with market-led strategies to provide public services, including health, and infrastructure (Miraftab 2004: 240). With these competing markets for public development, both international agencies and state governments have turned to local communities and civil society organizations to support their initiatives and act as their agents on the ground (Miraftab 2004: 240).

This is a reminder of the social changes within biopower. Multiple non-state actors have arrived on the globalized scene, invigorating thoughts of human rights, community participation and empowerment and romanticizing the local. Coercion as the primary form of power has now veered toward symbolic power (Miraftab 2004: 254). These notions, however, are not “independent of the structures of oppression” (Miraftab 2004: 242). Former Chief Economist of

the World Bank, Joseph Stiglitz, said as much when he acknowledged the negative effects of imposed neoliberalism that relied on the ‘myth of the self-regulating economy’ (Ferguson 2005: 44). He wrote,

We tell developing countries about the importance of democracy, but then, when it comes to the issues that they are most concerned with, those that affect their livelihoods, the economy, they are told: the iron laws of economics give you little or no choice; and since you (through your democratic political process) are likely to mess things up, you must cede key economic decisions, say concerning macroeconomic policy, to an independent central bank, almost always dominated by representatives of the financial community (...) In short, as we seemingly empower individuals in the former colonies through democracy with one hand, we take it away with the other (Stiglitz 1944: vii; Ferguson 2005: 44).

Domination goes beyond state power and is “exercised by entities other than the state,” even under the promise of democratization (Ferguson and Gupta 2002: 992). We must struggle with the fact that power is exerted over citizens in this way, at the same time that citizens might be finding ways to participate and rise in this neoliberal economy, or circumvent this power through their own innovation.

One way in which this power may be circumvented is through an ‘informal economy’, or a “social space in which objects, services, and money are exchanged according to the rules of the game other than those sanctioned by the state” (Elyachar 2002: 496). Cell phones increase “the reach and capacity of de-centralized, informal systems based on inter-individual interactions” (Geser 2006: 15). As mentioned above, NGOs often collectively represent and invest in civil society. Economically, according to Julia Elyachar, they represent this informal economy as well (2002: 497). The poorer populations, such as ones that are used for labor in townships, are both NGO clients and beneficiaries (Elyachar 2002: 503). This civil society engagement has been embraced by neoliberal advocates, but it cannot be fully disentangled from the encompassment discussed in chapter one, where we are reminded that the NGO sits “‘above’ an ‘on the ground’ entity called ‘society’” (Ferguson and Gupta 2002: 982).

This arose often in my work in and observation of Mhealth with Dimagi. On the level of the individual, those with access to mobile phones would develop an application of their own using Dimagi software for personal gain and community growth. Again, this is because CommCare is open source and is available online for people to start building their own apps. Those who took this initiative were acknowledged within Dimagi. One example of this is a workshop that was hosted in Malawi in fall 2014. Approximately 20 Mhealth entrepreneurs were invited to participate in a free three-day workshop. Candidates were selected based on an

approval process, by which each person introduced how he or she had operated the Dimagi application platform. This technical acumen and social capital allowed them entry into the workshop, where they were taught about how to expand their project and engage with more complexities within the system. Dimagi encouragement and training gave them more currency in the informal economy, and singled them out from their community for this skill and innovation. Dimagi also took this opportunity to learn from the participants, asking them how they started using CommCare and the challenges faced. According to Bonnie, “We were learning from them just as they were learning from us.” Other times, Dimagi is not directly involved with the community-level users but works with partners, who themselves employ or inspire FLWs to use Dimagi technologies. Once again, NGOs incentivize local groups to participate in development, giving them a form of social and economic power within their community while still using these local people to support the national or international development program.

In chapter one, Mhealth was introduced as a new form of participatory development. According to Uma Kothari, “the more participation there is, the more the power structure of local communities is masked, and the more disempowering the process can be (2002: 143). Because social capital is a resource of each individual, and not the community itself, it may sometimes aid in the rise of particular individuals, not for community development itself, but to support the agenda and flex the muscles of state and NGO alike. Returning to Foucault and power, Kothari expands on this consequence of participatory development. Under empowerment, power is not localized to a certain ‘here’ or ‘there’. This binary understanding of power runs counter to the heart of empowering processes. Kothari cites Foucault: “Power must be analyzed as something which circulates, or rather as something which only functions in the form of a chain... Power is employed and exercised through a net-like organization” (1980: 98). Discourse around community participation and empowerment ignores the power still exerted by global and state actors. With this, we see both high levels of economic growth and a still growing gap between rich and poor (Spierenburg et al. 2012: 177).

Thus, we are reminded once again of the ‘ambiguous potential’ of social capital and participatory engagement. The ability to understand one’s engagement with state and non-state actors and operate within and outside of their bureaucracy “has a strong orientation to the social capital that one has and which manifests itself in social mobility and certain literacies and competencies, such as how to... capitalize on an economic opportunity” (du Toit et al. 2007:

536). The effects of community engagement in programs are not set in stone. According to Miraftab, “while it may indeed be a form of ‘subjection’, it may also launch the eventual opening of new spaces for political action” (2004: 243). Bottom-up concepts meet and mingle with top-down approaches and create opportunities for multiple (dis)connections, where local participation might either support and internalize the power of the oppressor or empower the oppressed (Miraftab 2004: 244, 250). Studies have shown that community participation in development projects “is no easy feat but is still a necessary and integral part of the implementation phase” (Spierenburg et al. 2012: 178). There must be critical investigation “into the detailed structure and dynamics” of these relationships, paradoxes and processes that encourage engagement and subject citizens while also enabling people “to contest these relations and therein attempt to change their own histories” (du Toit et al. 2007: 524, 537). There is the potential for a “quiet encroachment of the ordinary,” or “everyday resistance” that may not cost the fellow poor, but instead the state, and its state-like counterparts (Bayat 2013: 2).

These points of new promise and old power emphasize how concepts within neoliberalism, even in a changing, canny neoliberalism, are polyvalent mechanisms within today’s development imaginary (Ferguson 2009: 166). Canny neoliberalism is a complex art of government that both engages with transformations in economics, biopower and development today while also perpetuating vertical topographies of power, just as economics, biopower and development do. Each has morphed to include social transformation, but none is untethered from its previous use and history. Either way, investigating this is necessary as we seek “new and better ways of understanding practices of government and how they might be linked in new ways to the aspirations and demands of the economically and socially marginalized people who constitute the majority of the population in most African countries” (Ferguson 2005: 45). The same mixture of promise and power is evident in the moral economy that we will turn to now.

Moral economies and human resources

Just as we have seen biopower transform beyond the normative, from life to quality of life, we have seen economies go beyond financial wealth to human resources. Population data in numbers, like outcomes, impacts and indicators, met limitations when it came to representing the well being of the nation (Nguyen 2010: 22). Alas, beneath this quantitative material was a breath—“the outlines of a moral economy” (Nguyen 2010: 22).

Introduced by Historian Edward P. Thompson (1971), a moral economy first described the social tensions that rose to the surface between different value systems during the birth of the market economy in seventeenth-century England. This word has since been used in many ways, but I prefer the same interpretations as Nguyen (2010: 23): that of Sasha Newell (2006). According to Newell,

By moral economy, I denote a system in which people often exchange for the purpose of maintaining and accumulating social relations, rather than merely for the purpose of maximizing their profits. Of course, in some more abstract sense, people profit from their social relationships, but the point is that the social relationships take priority, or rather, that the maintenance and accumulation of these relationships is its own kind of profit (2006: 180).

In my research, mobile health once again offered a keyhole in which to view a resonating and complex outcome of development. Beyond the sharing of information and tracking of patients, mobile devices and applications were connecting, in different or new ways, patient to FLW, FLW to partner organization, and partner organization to Dimagi. Dimagi, operating off a device that, in so many ways, symbolizes connectivity, was elucidating these instant connections.

Manuel Castells, Mireia Fernández-Ardèvol, Jack Linchuan Oiu and Araba Sey use the expression ‘the mobile network society’ to call attention to the transfer of network logic to social life due to wireless communications (2007: 6). Wireless connectivity has become a technological replacement for fixed lines in countries with weak infrastructure and an economic substitute for fixed lines because of the competitive price of airtime (Castells et al. 2007: 38). Data is transferred, stored and seen with less delay because of mobile devices and this has, undoubtedly, affected social organization (Castells et al. 2007: 178). An example of this is how Dimagi applications update patient forms or other data directly on the iCloud when in contact with a wireless network. This speed of technological change has political, economic and social ramifications that must be explored (Castells et al. 2007: 2). It can be a tool for those who “seek to influence politics and the political process without being constrained by the powers that be”; it can give voice to those who suddenly have a way to participate in mass-communication; or it can bring developing countries closer to the speed at which the developed world operates (Castells et al. 2007: 212, 213, 216). It can also, perhaps, shed light on the moral economy operating in Africa’s development imaginary.

Without going into too much detail, I also want to mention another spin on economy that has been discussed loosely by Jane Guyer. According to Guyer, “anything one wants to innovate around must first be seen as a ‘market’” (2011: 1). Communication technologies, a field that draws innovators from all corners of the world, presents the possibility of ‘platform economies’. She quotes Wikipedia, Sept. 30th 2011 in the following way: “In IT, a platform is defined as ‘a term for technology that enables the creation of products and processes that support present or future development. It establishes the long-term capabilities of research and development institutes” (Guyer 2011: 2). Cell phones and their hardware are platforms for operating systems, which are thus platforms for applications. Each application is unique, based on the software designers, the environment in which the applications operate, and the users who handle the application. And yet, they are connected. This complex platform economy is somehow rooted to the ground, and acts as a linkage itself, drawing and shaping connections in the mobile network society and setting up a foundation on which the moral economy runs.

Similar to the wireless network or platform economy in which mobile health devices operate, the linkages between people have “transformative powers” (de Bruijn and van Dijk 2012: 3). These links connect actors near and far, allowing a “new constellation to emerge” and transfigure how we map relations across space (de Bruijn and van Dijk 2012: 4; Radcliffe-Brown 1940: 4). While material connections are easier to think with, these human connections shed light on different relations and economic resources (de Bruijn and van Dijk 2012: 8). A “network of ties” is a currency of its own, a form of social capital (Knox et al. 2006: 118).

A number of ties arose in my observations at Dimagi, whether it was between Dimagi staff, Dimagi and partners, or FLWs and their patients. Most often mentioned were the connections that were formed within the office. Staff members were friends and emphasized the importance of this friendship in the office as they worked toward impact. Brian said, “It’s super focused on people enjoying their job and having fun doing it, and we’re also having a whole lot of impact as we do it as well.” Dimagi places this impact and satisfaction above profit when listening its organization’s goals, and seems to have created this environment. Bonnie told me that, because the wages are not very high, the motivation for working at Dimagi comes not from money but from the team. She said, “There’s a trust that you’re a team and you want to move forward and get as much out of it... How we work together is more important than what we do actually.” Lars reiterated this by saying that employees might come to work, first, to achieve

impact, then, to hang out with each other and then, maybe third, fourth or fifth, to get paid. Further, he said, “Mostly, it’s the really high quality folks that they’ve got on board that are all mission-aligned. We might not win, we might not change the way people make decisions, but if we’re going to try, this is the right group of people to try it with.”

In addition to internal staff relations, Dimagi is sometimes the liaison or knowledge repository between different partners and projects. Brian gave the example of a similar child malnutrition and agriculture protocol being worked on by World Vision and Care International in 2014. While they were operating off of a similar premise, there was not a lot of conversation taking place between the two organizations. They spoke on occasion to one another, but they spoke to Dimagi more. In this way, Dimagi became an armory of knowledge, and could shift and tweak the CommCare applications based on the lessons learned between these organizations. These relations contributed an added value across organizations that trickled down to the project recipients, producing a profit of its own.

Another example of this is in face-to-face encounters between Dimagi employees and partners. In the Lesotho project Florence worked on with Wits University, Johannesburg, despite the low budget, there were huge returns. This was because Wits University paid for only an injection of Florence’s time “just to see what would happen, just for the relationship.” According to Lars, the impact was huge and continued to expand. The relationship that was formed and the careful training that stemmed from it meant that the Wits partner on the ground was able to maintain the work, and, with very little monetary investment, their CommCare application has grown to accommodate over 200 users.

Most complicated are the relationships between FLW and patient, and the role mobile phones and CommCare have played in this interface. According to Lars, while Dimagi would like to claim some responsibility in improving these interconnections, “the success of most programs rides on the back of the existing social interaction.” For instance, he said,

Where health workers have really good interactions with the beneficiaries then, yeah, the tool helps. But the terrible ones... the tool really can’t change that. Similarly, actually, now that you brought it up, even internally in those organizations that run these programs, it’s probably the ones where they’ve already got a good social interaction, so where supervisors are going to the field every Friday and saying, ‘Okay, guys, let’s chat, what’s happening with you guys...Where they’re already doing things like that, the technology adds to it, but where the supervisors have no interest in health workers and frontline guys, I don’t know if we’ve cracked the nut on improving those.

This serves as a reminder that the CommCare tool may help, but it does not act as a solution on its own. In a way, Dimagi and partners profit from the already existing relationships between FLW and his or her patients. A moral economy grows from a strong relational foundation, and cannot necessarily lead to great impact without it. However, it can still improve the connections between FLW and patient by changing the way they interact. Software developer Kenneth told me that,

CommCare has the ability to improve the interaction by making it easier for the mobile field worker to focus on the client, instead of on the form...It also then provides the decision support and the workflow support that the paper form doesn't really provide, so there's the potential for the client to receive a better service.

Whether the relationships that are already existing support the moral economy Dimagi is enrolled in, or whether Dimagi furthers these social relationships and this moral economy, there is still an interesting takeaway from looking at how the operations of this social enterprise, its people and its technology encourage, complicate or build off of social relationships while simultaneously partaking in this moral economy and the mobile network society.

While acknowledging that mobile networks do link people in new ways, how this translates into connection and disconnection is important. According to Mirjam de Bruijn and Rijk van Dijk, “the wealth of connections is...related to how far social life is made possible, furthered, or terminated” but “it is also from this perspective that disconnections become a matter for emic representation too” (2012: 10). While individuals and institutions may work together and establish connection, leading to transformation and new power relations, just as we read of neoliberalism, these links could prop up old power relations through unequal accessibility and relative affordability (de Bruijn and van Dijk 2012: 8, 12).

In other cases, the connections being shaped might be ignored, or go unappreciated. At Dimagi, this came up as a frustrating topic time and time again, especially between Dimagi employees and the partners with whom they worked. Dimagi took great effort to enroll the organizations using their services in a partnership. Brian said, “As much as we can, we call them partners, not clients, because it is like a partnership.” Staff of Dimagi hope that responsibilities will be shared and that, after playing a capacity building role, Dimagi can hand off the operations primarily to the partnered organization and act as the supportive function. Building this technological expertise is as important to the work as building the app, because this ensures that the technology is used effectively for its purposes. Lars described to me how often organizations

pay for a system on the ground, but that when the system developer leaves, only the “bones of the system” remain. Dimagi, in being partners on the project, hopes to “present this more modern approach of productized, repeatable structures” with the commitment that, even if the partner’s developer leaves, Dimagi will be around to support the products. This is because, “if you buy our product once, we will support that thing.”

Unfortunately, Dimagi’s effort is often undervalued. Bonnie said, “We think we have a partner relationship but, at the same time, some of the NGOs think we’re coming there, implementing everything and then leaving. It’s hard to work as partners on a project.” Demanding partners make a lot of requests and then may change their mind, leaving Dimagi staff exhausted. In addition to this, partners are often very busy and, even when Dimagi staff are on sight, they haven’t set aside proper time to interact as partners on the project. Again, Bonnie said, “A stressful project versus a good project usually involves how engaged a partner is and how much they are demanding.” Client level of motivation is also a factor. Florence told me, “Often we work with low motivated, health blind engagement and that can be frustrating because sometimes you’re putting your heart and soul into a project and the client isn’t doing anything or isn’t playing their part.” This is often the circumstance with bigger organizations, Lars said. While Dimagi tries to treat all its partners the same, a difference in treatment is “probably how much money they have.” Lars has found that larger organizations are more inefficient and waste more of Dimagi employee’s time. To counteract this loss, Dimagi has to charge more money.

With this growing knowledge at Dimagi about how partner relations may sometimes operate, they have introduced a Maturity Model to their structure. How mature are partnering organizations with respect to their ability to use a tool like CommCare? How are they managing their mobile field workers? Do they have people in place to do the training, who are able to build the application, or to change it, or to understand how it works? Dimagi tries to gauge their maturity and determine how Dimagi should approach them. Kenneth described this in more detail,

Do we need to spend a lot of time capacity building and focus really on that and try to get a really simple application working and sort of build it over time for them, or can we start with a much more complicated application and a bigger pilot and know that they are going to be able to take on a lot more of the responsibility of training and roll out that we would otherwise have to do? That’s one of the aspects that we try to engage on the partners with and that’s kind of a tricky balance, because mostly partners see us as purely a technical consultant but, in fact, because there is such a human component, internally, we see ourselves often as business consultants, or process consultants, or system

consultants because, in fact, the technical part that we are quite capable of doing and able to do... but we need to often guide the organization from a process and human point of view to a place where we feel the project is going to be a success.

Here, the moral commitment Dimagi has toward its partners, and to the project's purpose, is stronger than the commitment the partner has to the technology and to the training required to introduce the technology as a good practice into the project. This misalignment creates disconnections and weakness in the moral economy.

In addition to the biopower it may exert, and the political terrain its data and infrastructure covers, Mhealth in Africa's development imaginary is woven into a canny neoliberal market that seeks to support morally driven health and development business initiatives. Mhealth engages with new and old constraints of neoliberalism, underscoring the cooperation between public and private sector with citizens and simultaneously bolstering old power dynamics, while also being used as a grassroots tool to challenge the neoliberal world order and to act as social capital in an informal economy when other resources are out of reach for certain populations. Mhealth also highlights and affects the interactions developing in Africa's moral economy, engaging a multitude of players in the changing relations of the mobile network society. Canny neoliberalism and a moral economy, in their meeting with Mhealth, encourage connections and relations between different global, national and local actors through improved social capital and profitable interactions while also introducing complexities and disconnections in who earns and draws power from this social capital and how relationships are maintained. Despite an ethical, relational purpose, canny neoliberal and moral economies face a reoccurring development critique: inequality in the disbursement of power, action and communication.

In the final chapter, we will look at one more challenge of development: the impact on the end-user and the beneficiary. Mhealth once again serves as an interesting keyhole through which to view how the end-user and beneficiary are considered in the design of CommCare applications, and their positions in Africa's development imaginary and in the Mhealth network.

Ch. 4 Human-centered design and the construction of the patient: Mhealth, its users and its beneficiaries

“I think what I would like to see Dimagi doing is the ability to develop a range of tools to improve the performance of a low literate, mobile work force in changing, rural areas. That has a lot of power, just being able to improve the performance of a mobile work force. It’s a partner’s role to decide what they do, but that ability to increase their performance is pretty cool, and that’s something we can contribute.”

-Florence, DSA Project Manager

Upon finishing my time with the DSA team in December 2014, I returned to Geneva and began supply chain work with a large global immunization organization. A contact of mine from Medic Mobile wrote and suggested we Skype about some of the findings I had or conclusions I’d drawn since my research in the field. One evening, we spoke for about an hour on many of the ideas already covered in this dissertation. However, it was in this conversation that my last chapter came to fruition.

I explained to her my thoughts on Mhealth as a possible tool for different data collection, and as something that can be used on-the-ground as a micro-infrastructure device when the state’s support is too weak. I discussed the relationships and the political and economical terrain that I saw being shaped and altered by Mhealth applications. I conveyed my optimism despite the many obstacles Mhealth would still encounter in the development space. In response to my comments, this contact said, ‘So, what you’re suggesting, then, is human-centered design?’

In conversation, I believe my response was something like, “Well, yeah, maybe,” but as I mulled over this term I was confronted with something I had asked myself again and again during my time at Dimagi. What ‘human’ was this really centered on? Where was the patient in this network? Did he or she exist beyond the electronic footprint left in the database? Was the patient aware of Dimagi, or of how the cell phone might be used to mediate their healthcare? Who was the real user of CommCare? Who was the beneficiary? How were sickness and wellness perceived within Dimagi, and how was this revealed in their technology?

To the degree that Dimagi’s application sought to center itself on the human, this was challenged by technological determinism and an abstraction of the patient himself. This chapter explores these complications within Africa’s development imaginary, and the limits that

Mhealth's network faces. Once again, for as many connections as there are, the disconnections cannot go without acknowledgement.

Human-centered design

When I heard the term 'human-centered design', I hadn't yet read up on the actual 'shop talk' about this design model. Instead, I thought of what the words meant, and how I perceived the phrase. For me, it was simple; it emphasized design that put the person first. It was with this basic definition in mind that I developed my thoughts on this final chapter. However, a brief introduction of how human-centered design is being approached scientifically is necessary.

Recently, product design has been more about the user experience than about the hardware and technology (Zhang and Dong 2008: 1; Steen 2011). This user experience and user friendliness can only be achieved "when attention shifts from objects to processes of human involvement" (Krippendorff 2004: 48). Human-centered design seeks to "satisfy higher levels of needs" and focuses on understanding people holistically, using a multi-disciplinary approach and involving users throughout the design process to make products and services more "useful, useable and desirable" (Zhang and Dong 2008: 3, 5). It follows the "premise that human understanding and behavior goes hand-in-glove" and focuses less on whether the product is used as intended and more on encouraging "uninterrupted interface" between person and technology (Krippendorff 2004: 48).

An interesting aspect of human-centered design concentrates on how artifacts are "language into being" (Krippendorff 2004: 50). Design is a consultative process that brings in clients, users, designers, competitors, researchers, and stakeholders. All actors want to play a part in designing the technology, to have a say in how it's programmed and deployed. In this way, "all technologies require negotiated commitments to create them, disseminate them, use them and maintain them" (Krippendorff 2004: 50). What emerges from these conversations is thus intertwined with "how an artifact comes to be, what it means to various stakeholders and how it could be used and by whom" (Krippendorff 2004: 50).

This languaging occurs in the design of Dimagi applications. Audio messages are customized for certain programs, from decisions to choose a male or female voice or to incorporate a familiar voice into the program for FLWs. Brian discussed how, depending on the area and the 'culture' of the environment, a male voice might be required to make it more

authoritative. Other times, when the message is directly health related, the voice of an older sounding woman might be required because listeners are more responsive to what sounds like a nurse. Message delivery can be just as varied and important as message content. Bonnie told me that audio messages for some programs include the voice of a supervisor from the project office. This creates a lot of excitement between FLWs and influences how audio messages are perceived and followed in the field.

Another term for human-centered design is user-centered design (Zhang and Dong 2008: 2). At Dimagi, this is key because they do not see themselves as the producer of a tool for data collection or the warden of electronic patients; their phone is for decision-making and FLWs. In my interviews, I asked each Dimagi employee I spoke with who the users of Dimagi applications were. One common response was the FLW, who use it as a “job aid” and act as the “bridge between the clinic and the beneficiary.” There are either rural workers in the last mile and within the “informal-based community system,” or there are a select few in the formal health system. FLWs, whether they were an agriculture officer, small business owner or healthcare worker, often were discussed as the most visible, most ‘real’ user. However, they are only one user “in the chain.” Brian went on to say,

All of the data they’re collecting and everything they’re doing does get sent to program officers and supervisors and things like that. Everyone in an organization and NGO or a group working with FLWs in some way is going to be a user of CommCare, from someone supervising the field-level workers to the program officer monitoring the outcomes and making sure they’re being effective, to donors receiving M&E reports and all those things as well.

Thus, in addition to the FLWs, there are the supervisors, monitoring and evaluation officers, program managers and donors who may also have access to and use Dimagi technologies, either through the phone, by building the application or retrieving the data from the web platforms.

Knowing the variety of users who encounter their devices, Dimagi staff does their best to accommodate this in the design. The users change how they approach the programming of the application and Dimagi staff is motivated to make these changes because it’s most important that the user is able to use the technology, as opposed to the technology being the most advanced. According to Brian, “with each group, the approach is to get something in people’s hands so they can see if it fits with what they’re trying to do.” This is complicated by the fact that people at

different places in this network of relations within Africa's development imaginary have different ideas about what is required of the CommCare application.

Despite the many users of this technology and the mobile network society that has emerged, we discovered in chapter three that there are still disconnections. Dimagi employees try to address some of these disconnections by speaking with users in the project headquarters and in the field. At the office level, Dimagi designers and program managers might be told that the application must collect data on a handful of specific indicators. This application is V1 (version one). The application is then introduced to workers and beneficiaries on the ground for input. According to Brian, "Almost every time, there are three or four questions [in the application] that come up where they're [FLWs] laughing and like, 'Are you kidding me?' This either makes no sense or this is really offensive. You can't put this in the app'." Only once the design has been used in a clinic is the application locked in place. Lars described this as 'design under the mango tree', which means that the application is not real or complete until it's been tested in a clinic with the FLW or the doctor. "Verify, always verify," he told me.

Again, this understanding of people and the training and capacity building required is not a task that Dimagi thought would be at the forefront of their work. Yet, it is a responsibility that field managers have taken on, and it has been integral to the success of projects. According to software designer Kenneth, he said that one of the field manager's main skills "is to work with the partner and try and figure out what they want, what they need, what the mobile workers are expecting or hoping for, and what's actually going to work at the end of the day." Dimagi is not solely about building the application; it concentrates on people. At the same time, balancing what the partner wants and what will work is a challenge, because endeavored complexity must weigh itself against the usability.

Even with these complexities, there are some wonderful stories that have come out of interactions with the users. One such story involved a FLW in Malawi named Kennedy. Lars told me about him: There were a group of FLWs on a project, each paid about \$10 a week. While Dimagi staff was off-site, they continued to hear about a specific FLW named Kennedy as the one the rest of the workers deferred to and nominated for leaderships positions. He was literate, but only at a basic level. However, he was known for his commitment to the work and the community, what Lars described as a commitment that was "inversely proportional to the amount of investment anyone had ever done." After training, he maintained exceptional use of

the CommCare app and the mobile phone, submitting more data than any other user. In order to understand why, Lars and another team member decided to go see him, and spent two days to reach his village in one of the most rural parts of Malawai. The answer they got was straightforward: He had been told that the work he was doing would provide care to the kids in his village and that the data he submitted would be used by the government to improve health outcomes. Lars admitted some distaste for how development workers at higher levels may lose this kind of motivation. Kennedy was a man that should be appointed “‘District Department Head of Health’ or something” because he resembled the development Lars could admire. “When you meet that guy,” Lars told me, “You’re like, wow, it’s really about people.”

In so many ways, Dimagi was an organization that seemed really about people. Interactions with partners and FLWs in the office, in the clinic and on the ground were the foundation of Dimagi design and this was something employees felt great pride in. Yet, so rarely were the patients a part of this story. Even the FLWs, I came to learn, had limited say in how the program performed and the information it collected and, more and more, Dimagi was interacting primarily with the partner. I struggled with this. Donors funded these projects to help ‘the pregnant woman’ or the ‘HIV-positive person’, yet these people were out of reach. The mobile applications were collecting information on these people—the vital biopower of the state’s population—but no one knew their faces. Despite Dimagi’s approach to human-centered design, one of the most important human actors was missing. Confronting human-centered design, then, was the fact that, so often, the patients were constructed and abstract.

The construction of the patient

When asked who the beneficiary of CommCare was, the response from Dimagi staff was usually the patient, or the person who was to benefit most from the technology. The end target was the patient and this is where Dimagi hoped to see impact, whether it’s helping “a pregnant mother or a sick and malnourished child, or someone with malaria.” Dimagi developed its software with the most rural area in mind to help the FLWs reach the poorest, most remote areas where healthcare was lacking.

However, when we discussed the patient, the conversation usually grew quite thin. There was talk about how the phone might be perceived by the beneficiary. According to Brian, the beneficiary might see the phone and know that the technology is being used to help them, but

they likely wouldn't know the name CommCare. He said, "At the end of the day, everything we're doing is to benefit them, but the relationship we have is through... They have this relationship with the technology. I think they know that, but they don't understand Dimagi specifically, or that we're doing it." Bonnie reiterated this by saying, "They don't know us probably; they only know the NGO we partner with." For instance, Dimagi has sent SMS reminders to CommCare phones in the past, but even when they are sent directly to the FLW or beneficiary, they may be on behalf of someone else. Lars told me, "All the communication would be branded, like, 'Your friendly clinic sends you this message', so... it's almost never a direct relationship."

In addition to the indirect relationship between Dimagi and patient, even the quantitative indicators give little insight into the impact the technology was having on improved care delivery. Brian admitted that one of the things Dimagi struggled with was tracking the outcomes of the patients interacting with the application. He said, "It's easy to track if the FLW is submitting the forms they're supposed to submit, but it's harder to track if we're registering more sick people and discharging more healthy people... That's what all of this is about, but it's the hardest bit to capture in a lot of cases. It's the elusive goal." Bonnie also said, "I can see the value from implementing these projects and how the tool helps the FLWs, but it's hard managing the impact of the tool on the beneficiaries, which is what it's actually designed for. I think that's a step ahead that we're not at right now."

Dimagi, at its current maturity, is a social enterprise building technological products that seek to improve international development through their use by partners and rural FLWs. It digitizes workflows and brings paper forms onto cell phones. In so doing, Dimagi hopes that this will indirectly benefit the citizens and the countries they work in. Admittedly, this is not always the case, nor is it always something they can explore through the information they collect.

It was also fascinating that, while Dimagi staff members were open about discussing the impact they hoped to have on patients, notions of sickness and wellness were vague. In response to how Dimagi, its staff and its technology perceive sickness and wellness, Florence said, "I have no idea how to answer that. It hasn't made any impression on me." Bonnie said, "It's hard to say, because we don't interact much with the beneficiaries." Kenneth expanded on this with more detail. Dimagi takes up an interesting space in healthcare, he told me. They do not provide primary care, nor are they curing diseases. They are, however, acting as a preventative measure.

With pregnant mothers, CommCare has programs that educate patients on sanitation and preventing disease. They serve as a tool to navigate between ‘good’ and ‘bad’ Tuberculosis patients, by which Kenneth means that some patients take their medicines and go to check-ups while others do not. Some CommCare programs support the patients that do not by sending reminders and routes toward counseling, while also reminding FLWs to follow-up with these patients. The data CommCare collects aims to provide better data so patients don’t get “lost in the system.”

But, somehow, lost in the system is exactly where they are. This is the phenomenon in development that confronts me the most, and the most apparent disconnection in Mhealth. Donors, partners, programmers, FLWs, citizens mobilize around the patient, the ultimate benefactor of these health programs. A cell phone, symbolizing connectivity, is the hardware on which CommCare operates and yet the patient remains the least connected.

Even in my own research, this was the case, and the biggest obstacle. During my internship, I was told that I would go into the field, a project with Path in South Africa focusing on HIV/AIDS education and micro-financing. The program manager in the rural area of Limpopo, South Africa had given permission for me to come for up to two weeks and follow the FLWs around, using the feedback and impact packages I’d created for Dimagi. Days before booking my flight, this partner pulled out. They had suddenly been fully scheduled for those days. The disappointment I experienced after this news was not because I could not go to the field, but because I had lost my opportunity to interact with the actors whose voice I most wanted to hear: the patients. Later, when I redirected my studies from the field to the goings-on in the DSA office, I hoped instead to hear about the patients through the staff’s experiences. Once, again, their voices were weak when it came to these interactions. The patients were still out of reach. They were a primary motivator of Dimagi, partners and stakeholder investors but they were absent from the research. Dimagi operated with human-centered design in mind, connected their technology to partners, partners to FLWs, and FLWs to each other, but one disconnection remained: the end recipient, the constructed patient.

Biopower in this instance met its match. It flowed so seemingly into dialogue about data, infrastructure, neoliberalism and moral economies, but it had little impact on giving voice to patient testimonies about quality of life improving. This impact remains a question. State and ‘state-like’ hands cannot puppet, make powerless or empower what they cannot reach. This was

the subject to which Mhealth did not yet provide a keyhole; in Africa's development imaginary, the patient is still very much imagined.

Conclusion

This dissertation engaged with a number of anthropological and sociological scholarship to look through the keyhole into the ways in which Mhealth might bend the meaning, shape the ambitions, alter the means and affect the outcomes of development. It asked what does Mhealth do to how we think about health and development in Africa's development imaginary? From the beginning, for me, the answer was that it did a number of things and, in so doing, it magnified connections and disconnections.

These connections and disconnections were, to no surprise, rooted in power. This power, while dispersed and circulating between many of the actors in this development network, still remained vertical in various ways. Biopower proved to be a particularly interesting framework to consider the issues covered in this dissertation. As state is challenged and becomes complicit with NGOs and non-state actors, governance of national populations has changed, as well as its vital, social and normative qualities. Mhealth, in interacting with these qualities, allowed us to consider this transforming biopower alongside innovative technology in Africa's development space. Both a participatory object and a reminder of the vertical topography of power, Mhealth elucidated still persisting power dimensions and new forms of power sharing. This was true in its encounters with data and infrastructure. While data still represented a way to surveil state populations and infrastructure still affected access to resource, Mhealth crossed this political terrain, blurring development and humanitarian imaginaries, to plant a seed in some interesting future developments: mobilizing data for SDGs and supporting citizen ownership of perhaps fluid micro-infrastructural tools for development. Following this, we discussed how private sector engagement from businesses and NGOs introduced canny neoliberal practices into nation-building, providing social capital in lieu of financial resources and underlying an informal economy while still privileging those with more access and other means. Moral economies have also grown, as varying degrees of relating, if recognized, act as a form of currency on behalf of a greater good. Finally, we turned to the person least benefitting from this moral economy, despite Dimagi's focus on human-centered design: the constructed patient.

I would like to end this dissertation with a last excerpt from Dimagi employee Lars, who said to me,

Have you seen that Gartner Hype Curve? So Gartner has this technology curve. So, there's some new technology that enters the market and it goes through this really high

spike of what they call inflated expectations and so, like, social media or whatever. They're like, 'It's going to change the way we do everything', and then all these companies get invested and then it kind of doesn't do any of those things. Like the dotcom boom, you know what I mean? It dips and then it kind of comes back again and you're like, okay, it can deliver value, just not ridiculous value. In the olden days, when I worked at Cell Life, in the late 2000s, you could get funding just by saying SMS and HIV in a proposal. It was really easy to get funding because people were like, 'Wow, you can send SMSs to patients, that's amazing!' Now, everyone can do that, right? So there was all this excitement about being able to SMS people, but it's not going to save anyone's life that easily. It's possible to do something, but these patients still have to go to places where there are drugs in the clinic and you still have to get that distance and all those kind of human things. I think it's followed that curve of super hype, and then it's kind of come back down again, and now it's kind of mainstreamed. That's what we would think anyway. It's kind of an established thing that only after we've gone through the whole thing, we realized 'Oh, we're just doing what happens every time'.

And in many ways, we *are* just doing what happens every time. Michael Hobbes wrote about this in a recent email, where he argued that we must throw out the 'Big Idea' (2014: 7). When one thing is improved, another thing might change or adapt in unpredictable ways (Hobbes 2014: 13); when Mhealth bends the trajectory of development, a number of consequences and (dis)connections occur. Removed from the hype, Mhealth will continue to face the same development critique as the 'interventions', 'solutions', 'innovations' and 'tools' before it. This is because, following the Garner Hype Curve, our expectations of development are broken, disjoined and disconnected (Hobbes 2014: 14).

Despite this, the choice to phrase disconnections as (dis)connections rather than disconnections is deliberate. (Dis)connections implies that the emphasis remains on connections. As activist anthropologist, at the frontiers of my multi-sited, para-sitic ethnographic work and the dissertation that has since come after, I remain optimistic about Mhealth in Africa's development imaginary.

Naturally, this dissertation is incomplete and inherently partial. There are always networks within networks and competing imaginaries. According to Strathern, "this is the fractal logic that renders any length a multiple of other lengths, or a link in a chain of further links" (1996: 523). But inquiries, like this one into what Mhealth does to development in Africa, must have a point that punctuates a stopping place.

In short, network (dis)connections exist within Africa's development imaginary. This is my stopping place for now, but I will continue to remain active in noting further connections and disconnections. Larger questions of biopower, data, infrastructure, neoliberalism, moral

economies and the presence of the patient must still be asked and addressed. Mhealth was the keyhole to unlock the imagination of what is possible; its materiality is only just beginning.

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