

Dartmouth College

Dartmouth Digital Commons

---

Dartmouth Scholarship

Faculty Work

---

5-13-2015

## Internal Ecologies and the Limits of Local Biologies: A Political Ecology of Tuberculosis in the Time of AIDS

Abigail H. Neely  
*Dartmouth College*

Follow this and additional works at: <https://digitalcommons.dartmouth.edu/facoa>



Part of the [Human Geography Commons](#), and the [Nature and Society Relations Commons](#)

---

### Dartmouth Digital Commons Citation

Neely, Abigail H., "Internal Ecologies and the Limits of Local Biologies: A Political Ecology of Tuberculosis in the Time of AIDS" (2015). *Dartmouth Scholarship*. 59.  
<https://digitalcommons.dartmouth.edu/facoa/59>

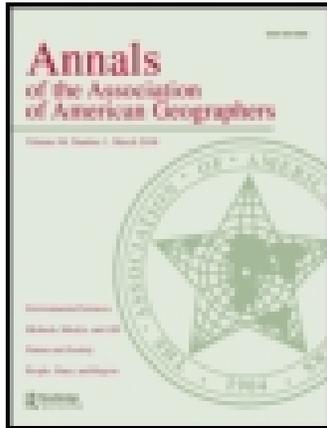
This Article is brought to you for free and open access by the Faculty Work at Dartmouth Digital Commons. It has been accepted for inclusion in Dartmouth Scholarship by an authorized administrator of Dartmouth Digital Commons. For more information, please contact [dartmouthdigitalcommons@groups.dartmouth.edu](mailto:dartmouthdigitalcommons@groups.dartmouth.edu).

This article was downloaded by: [Dartmouth College Library]

On: 13 May 2015, At: 10:27

Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



## Annals of the Association of American Geographers

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/raag20>

### Internal Ecologies and the Limits of Local Biologies: A Political Ecology of Tuberculosis in the Time of AIDS

Abigail H. Neely<sup>a</sup>

<sup>a</sup> Department of Geography, Dartmouth College

Published online: 13 May 2015.



CrossMark

[Click for updates](#)

To cite this article: Abigail H. Neely (2015): Internal Ecologies and the Limits of Local Biologies: A Political Ecology of Tuberculosis in the Time of AIDS, *Annals of the Association of American Geographers*

To link to this article: <http://dx.doi.org/10.1080/00045608.2015.1015097>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms & Conditions of access and use can be found at <http://www.tandfonline.com/page/terms-and-conditions>

# Internal Ecologies and the Limits of Local Biologies: A Political Ecology of Tuberculosis in the Time of AIDS

Abigail H. Neely

*Department of Geography, Dartmouth College*

South Africa is known for its high rates of HIV and tuberculosis (TB), where HIV has provided fertile ground for the transmission of TB. Indeed, HIV–TB coinfection is widely understood as one of the, if not the, biggest health problems in the country. In practice, doctors and nurses understand that unusual cases of tuberculosis indicate HIV and they make diagnosis and treatment plans accordingly. International treatment standards and protocols inform this practice as doctors pay little attention to individual people and the political–economic, cultural, social, and environmental contexts in which they live. Political ecology, with its nested, place-based analysis, provides an excellent framework for understanding health in South Africa in the context of poverty; local understandings; and global policies, protocols, and priorities. To develop a political ecology of health, this article builds on the concept of local biologies, which understands health at the community scale as simultaneously biological, cultural, and social. Illustrated with the story of one HIV-negative woman's case of miliary TB, this article incorporates local biologies into a political ecology of health that mobilizes scales from the global to the “internal ecologies” of individual bodies. Centering its analysis on the place of the body, this article offers surprising insights into the HIV/AIDS epidemic. By examining the science of miliary tuberculosis alongside population-scale understandings of HIV–TB coinfection in a specific context, this article challenges the way we understand the health impacts of HIV/AIDS, suggesting that the epidemic has negative health implications even for those who are HIV negative. *Key Words:* HIV/AIDS, local biologies, political ecology, South Africa, tuberculosis.

南非以高比例的 HIV 和结核病 (TB) 著称, 而 HIV 则提供了 TB 传染的繁殖基础。HIV–TB 的共同感染, 的确被广泛地理解为该国最重要的健康问题之一 (若不是唯一的话)。在实际情况中, 医生及护士了解到, 不寻常的结核病案例, 意味着 HIV, 并依此作出诊断与提供治疗方案。由于医生鲜少关注病人个人及其所生活的政经、文化、社会及环境脉络, 因此国际治疗标准与规章, 便为此般实践提供了信息。政治生态学, 随着它相互套叠、根据地方的分析, 提供了理解南非在贫穷脉络中的健康问题、在地理解, 以及全球政策、规章与优先顺位的绝佳框架。为了建立有关健康的政治生态学, 本文以地方生物学的概念为基础, 该概念将社区尺度的健康问题, 理解为同步的生态、文化与社会问题。本文描绘一位患有粟粒状 TB、HIV 呈现阴性的女性案例故事, 以此将地方生物学整合进动员从全球尺度到个人身体 “内在生物” 尺度的健康政治生态学。本文将分析聚焦于身体的地方, 对 HIV/AIDS 的传染病, 提出意料之外的洞见。本文透过检视粟粒状结核病科学, 随着特定脉络中对 HIV–TB 共同感染的人口—尺度之理解, 挑战我们理解 HIV/AIDS 对健康所产生的影响之方式, 主张该传染病即便对 HIV 阴性患者而言, 亦带有负面的健康意涵。 **关键词:** 人类免疫缺陷病毒 / 爱滋病 (HIV/AIDS), 地方生物学, 政治生态学, 南非, 结核病。

Sudáfrica es reconocida por sus altas tasas de VIH y tuberculosis (TB), caso en que el VIH ha provisto un campo fértil para la transmisión de la TB. Ciertamente, la coinfección VIH–TB es ampliamente aceptada como uno de los más grandes problemas de salud del país, si no el mayor de todos. En la práctica, los médicos y enfermeras entienden que los casos poco usuales de tuberculosis sugieren también infección con VIH, y de acuerdo con tal supuesto formulan diagnóstico y planes de tratamiento. Los estándares y protocolos internacionales de tratamiento informan esta práctica en cuanto que los médicos ponen poca atención a la gente como individuos y a los contextos político-económicos, culturales, sociales y ambientales en los que ellos viven. La ecología política, con su análisis anidado y basado en lugar, provee un excelente marco para entender la salud en África del Sur en el contexto de pobreza; entendimientos locales; y políticas globales, protocolos y prioridades. Para desarrollar una ecología política de la salud, este artículo trabaja a partir del concepto de biología local, que entiende la salud a escala de comunidad como simultáneamente biológica, cultural y social. Ilustrado con la historia del caso de una mujer con TB miliar pero VIH-negativa, este artículo incorpora las biología local dentro de una ecología política de la salud que moviliza escalas desde lo global hasta las “ecologías internas” de cuerpos

individuales. Centrando su análisis en el lugar que corresponde al cuerpo, este artículo presenta sorprendentes contribuciones sobre la epidemia del VIH/SIDA. Examinando la ciencia de la tuberculosis miliar en conjunto con el entendimiento de la relación población-escala en la coinfección VIH-TB, en un contexto específico, este artículo reta la manera como entendemos los impactos del VIH/SIDA sobre la salud, sugiriendo que la epidemia tiene implicaciones negativas de salud, incluso para quienes son VIH-negativos. *Palabras clave:* VIH/SIDA, *biologías locales, ecología política, Sudáfrica, tuberculosis.*

On a Tuesday in April 2008 I was sitting in the HIV/AIDS clinic at the Pholela Community Health Center (PCHC) in rural KwaZulu-Natal, South Africa.<sup>1</sup> Nestled in the foothills of the southern Drakensberg Mountains, Pholela is a rural area where dozens of homesteads cluster on mountain slopes and valley floors. These homesteads consist of a few buildings, a space for a small garden, and the graves of family members who have passed on. Often surrounded by a makeshift fence, they house the oldest and the youngest members of extended families, as most of the working-age men and women are away in the cities studying, working, and looking for work or are buried in the family's garden.

On this particular April day, the hills were lush and green thanks to summer rains, and the crisp morning air held a reminder of the approaching winter. The health center was abuzz as patients waited in separate clusters of red plastic chairs spread throughout the otherwise muted green and beige hallways. These clusters arrange patients by ward (general medicine, maternity, tuberculosis [TB], and HIV/AIDS), offering a visible lesson in clinic organization. On Tuesdays, Dr. Smith, a very experienced doctor, would spend the day in the health center's HIV clinic meeting with patients, enrolling them onto antiretroviral therapy (ART), and monitoring their progress.<sup>2</sup>

Dr. Smith was in his mid-sixties and had spent his entire career working in rural, Zulu-speaking areas of South Africa. He was respected and admired by health center staff, patients, and area residents alike. Relatively new to Pholela, he was a government employee hired to implement this early (government) ART roll-out program at three sites in the region. His job was to treat and manage HIV-positive patients; all other patients were to be seen by other health center personnel. On this particular day, however, the TB ward had sent over a number of chest X-rays for Dr. Smith to look at. These were complicated cases, beyond the expertise of the nurses who staffed the TB clinic. In what I had come to recognize as a typical performance, Dr. Smith was loudly complaining about the fact that there was no other doctor to read TB X-rays. At this particular moment, he was holding the X-ray of a

patient who was complaining of a terrible cough, sore chest, and night sweats—all the typical symptoms of TB. As the doctor held the film up toward the fluorescent light in the ceiling (there was no functioning light box in the HIV clinic), we could see a rare form of TB called miliary TB diffused throughout this pair of lungs. Even I, with an untrained set of geographer's eyes, could see that there was something most definitely wrong. In many of the other X-rays we looked at, TB would be concentrated in the upper lungs and appeared cloudy. I found these pictures difficult to read because there was little contrast with the healthy lung tissue, which already appeared cloudy in contrast with the black of the X-ray. (The doctor, of course, had no problem telling the two apart.) In the case before us, however, there were hundreds or even thousands of small, oval spots that looked like grains of millet in both the upper and lower lobes of the lungs. On the otherwise gray picture, these spots appeared bright white; they were clear and striking indicators of something wrong.

As Dr. Smith raised this X-ray to the light, illuminating these tiny millet grain-like spots, he immediately asked if the patient had had an HIV test.

The nurse answered, "Yes."

"And the result?" Dr. Smith asked.

"Negative," the nurse responded.

"I don't believe it," Dr. Smith said. "When was she tested?"

"Six months ago," replied the nurse.

"Not good enough," said Dr. Smith. "She needs to be tested today."

The nurse went back to the TB ward next door to talk with the patient. The patient refused to be tested, stating that she was certain that she was HIV negative. As the nurse returned, some back and forth ensued and Dr. Smith became more and more irritated, reminding everyone that he was there to work with HIV patients, not TB patients.

After some time passed, the nurse put the X-ray back in the doctor's hand as the patient walked over. Staring intently up at the X-ray and facing away from the patient who was standing at the door, Dr. Smith

spoke with an authority that bordered on aggression. Through the nurse (Dr. Smith's Zulu was poor, as was the patient's English), he asked the woman if she had been tested for HIV. She said, "Yes." And he asked about her result. She told him she was HIV negative.

Looking up at this terrible case of diffuse miliary tuberculosis, he said, "I'm sorry, but I just don't believe it. You simply must be tested again."

There was more back and forth with the nurse doing her best to keep up and with the doctor intently studying the X-ray and holding firm in his opinion. It began to seem as though we had reached an impasse when the patient finally said, in English, "Doctor, look at me. I cannot have HIV. I am too old."

At that instant, Dr. Smith put down the X-ray and turned to look at this *gogo* (*gogo* is the Zulu word for granny) for the first time. And then the most amazing thing happened. Dr. Smith began to laugh, Gogo Mtembu joined in the laughter, and then the nurses, and then me. Soon we were all laughing as the doctor made plans to treat Gogo's miliary TB.

How do we make sense of this story? Of Dr. Smith's reaction to the X-ray, of Gogo Mtembu's reaction to Dr. Smith, and of Dr. Smith's reaction to Gogo Mtembu? It is a complicated story and unpacking it promises to teach us much about both TB and HIV in rural South Africa. How we unpack this story is, however, another question. To best understand Gogo Mtembu's miliary TB and its diagnosis at the PCHC, this article offers a political ecology of health that borrows a concept from medical anthropology—*local biologies*—that articulates health as simultaneously biological, cultural, and social. Placing the local biology of health in Pholela in a broader political-economic context, this article uses a nested place-based analysis that begins at the scale of the cellular processes at work inside the body and goes all the way to the global. In so doing, it puts into practice a political ecology of health and the body by combining a Pholela-specific framework or cultural context for health—"these diseases"—with the materiality of miliary TB (read through biomedical science) and an attention to the broader political-economic context of life, livelihoods, health, and health care in Pholela. It is my contention that expanding the multiscale approach of political ecology to include an analysis of the interactions of cells inside a person's body (her internal ecology) alongside the health of her neighbors, local livelihoods, and global health care protocols will help to challenge the way practitioners, policymakers, and scholars have framed the health impacts of HIV/AIDS and enhance the way health is understood and

investigated in geography. In putting into practice a political ecology of Gogo Mtembu's miliary TB, this article reveals that HIV in Pholela is as important for the extrapulmonary TB in an old, HIV-negative woman as it is for TB in an HIV-positive twenty-something.

## Methods

In 2008 and 2009, I spent twenty months in South Africa conducting archival, ethnographic, and oral history research, with the majority of that time in three of Pholela's communities.<sup>3</sup> For the first two months of my stay, I worked as an observer and participant observer in the PCHC. During that time, I spent every Tuesday in the HIV/AIDS ward (as well as a few Tuesdays in the months after I had left for the communities). I sat with Dr. Smith and the nurses as they enrolled patients onto treatment and monitored those who were already receiving antiretroviral medication. During these visits, Dr. Smith and I had ample opportunity for conversation about his work and mine, and what I learned in those conversations and from my time in the clinic infuses every word I write here.

My understanding of the Pholela-specific context for health comes from interviews, observations, and conversations in the communities where I spent the bulk of my time. In these communities, I conducted research with my research assistant and collaborator, Thokozile Nguse. Although there was much overlap with the health center, community understandings of health differed in key ways. This ethnographic work at multiple sites was important because, as Lock (1993a) contends, "ethnographic analyses and narrative accounts reveal an intimate relationship between illness and politics" (144). Politics (alongside culture, economics, and biology) is key to articulating a political ecology of health. That said, this community-based research approach has some disadvantages. Because I focused my broader research project on three communities, my time in the clinic observing the doctors and nurses and meeting patients was always something "extra." As a result, I rarely got to know the patients I met in their homes or communities; Gogo Mtembu was no exception. Therefore, to piece together this political ecology of health and the body, I borrow from the experiences and understandings of people other than Gogo Mtembu. In addition to my work in Pholela, I collected scholarly papers on miliary TB to understand how biomedicine understands the disease and to explain how it works on a cellular level. I also gathered information on treatment protocols for HIV/AIDS from the PCHC and other

sources in South Africa and beyond. This mix of methods and sources—a hallmark of political ecology—is key to understanding the story of Gogo Mtembu’s military TB and health more broadly in South Africa today.

## Political Ecology

Political ecology, an interdisciplinary subfield of geography and related disciplines, offers a particularly robust framework for making sense of surprising health-related events like the one here. At the most basic level, political ecologists study the biophysical, social, and cultural features of human–environment interactions, paying attention to both human and nonhuman actors. In this framework, small-scale, everyday interactions between people and their environments, located in particular places, come to the fore, as scholars nest their analysis in larger, national, and often global political–economic contexts (Swyngedouw and Heynen 2003). The scholarship that results from this approach has shown how decisions to transform the natural environment are often produced by political and economic systems operating across multiple scales (King 2010); it has generated alternative readings of environmental change that challenge conventional ideas devised by the politically powerful (Bassett and Zuéli 2000; Robbins 2012); and it has provided insights into the social production of nature (Castree and Braun 2001). Political ecologists use a place-based analysis where place is not simply location but is “constructed and reconstructed out of a particular set of social relations, experiences, and understandings” (King 2010, 43) in a specific biophysical environment. For the most part, political ecologists have focused their analysis on places like forests (e.g., McCarthy 2006), parks (e.g., Neumann 1998), grazing areas (e.g., Turner 2011), villages, and cities (e.g., Heynen 2006); here, the environment—the park or the pasture—delimits the place. If we follow this logic, the place or “environment” of study for a political ecology of health is the body.

Recently, a number of scholars have begun to call for and do a political ecology of health and the body (e.g., Guthman 2011; Jackson and Neely 2015). These scholars set out to understand how environmental, sociocultural, and political–economic contexts, as well as the materiality of life, shape health, health care delivery, and the experience of both good health and illness. For many, this offers much potential for enhancing understandings of health and the body. For

example, mirroring the insights of political ecology more generally, King (2010) argued that a political ecology of health “would generate new insights into the political economy of disease, interrogate health discourses produced by actors and institutions, and show how health is shaped through the relationships between social and environmental systems” (47). Mansfield (2008) took this focus on health at the interface of social and environmental systems a step further to explicitly include the biology of the body (see also Guthman 2012; Guthman and Mansfield 2012). She wrote that health is a “biosocial” process and practice, which not only involves “interactions between people and ‘the environment,’ but . . . involves the physiology of the human body even as it [health] cannot be reduced to that physiological body” (Mansfield 2008, 1015).<sup>4</sup> In this work, Mansfield reminds us that the biological processes inside of the body are as important as the social context in which people understand and experience illness, the relationships that shape their care, the socionatural environment in which they live, and the larger political–economic structures that help to determine who gets sick and where, when, and through whom they access health care.

I seek to extend the work of these scholars, arguing for a nested place-based framework that begins with the body—Gogo Mtembu’s body—and includes the intricacies of life, livelihoods, and health in Pholela (and its environment), its role in South Africa’s ART program, and its place in the global political economy of HIV/AIDS treatment and prevention programs. In a sense, incorporating the body into the place-based research approach of political ecology represents a scaling down, in this case from the community to the body, rather than a radical shift in approach. As we will see, using the body—an individual body with its shared and specific characteristics—as a starting point for a political ecology of health, and then locating it in a richly articulated, yet broader, community, national, and global context, yields surprising insights into health and health care in sub-Saharan Africa. Simply starting with the body, however, is not sufficient. To successfully enact a political ecology of health, we need to look inside bodies at the interactions among viruses, bacteria, and healthy cells to account for the physiology or biology of the human body. In so doing, we must expand our understanding of ecology from forest, field, village, and park ecosystems to the ecosystems inside of the body.<sup>5</sup> Once we come to understand the interaction between cells and

among bacteria as ecology and the body as place, a political ecological framework can be employed to yield novel insights into the way we understand illnesses like TB in sub-Saharan Africa.

## Local Biologies

Thanks to its path-breaking work on health and the body, critical medical anthropology offers a model for incorporating health into political ecology. In her book on menopause, Lock (1993b) developed a particularly useful concept for thinking about health as simultaneously material, social, and cultural: local biologies. For Lock, “biology and culture [are] in a continuous feedback relationship of ongoing exchange, in which *both* are subject to variation” (Lock and Kaufert 2001, 503). As is the case with the ecology and culture that political ecologists study, it is the combinations of biology and culture that vary from place to place and time to time that are key to local biologies and, by extension, to health. In her work, Lock found that women in Japan and North America had very different experiences with menopause. She argued that this difference was the result of the combination of diet (the biological), cultural expectations, and the social relationships and meanings surrounding health and aging. In taking a combined approach, Lock highlighted the fact that nature and culture in human health cannot be separated and, further, that the biology of the body is embedded in the biology, culture, and social relationships of the place and environment in which a person lives, eats, and accesses health care (see also Koch 2011; Guthman and Mansfield 2012; Brotherton and Nguyen 2013).

To connect local biologies to individual bodies, Lock focused on the concept of embodiment, arguing that local biologies are always, everywhere experienced in the body (see also Moss and Dyck 1999; Hall 2000). She wrote, “[T]he biological and the social are coproduced and dialectically reproduced, and the primary site where this engagement takes place is the subjectively-experienced, socialized body” (Lock 2001, 484). Although Lock makes the scale of the body central to her analysis, her focus on local biologies ensures that she is not limited to the individual. For Lock, the body is deeply social. Writing with Schepers-Hughes, Lock argued for the importance of understanding health through three bodies: the individual body, the social body, and the body politic (Schepers-Hughes and Lock 1987). They argued that because health is

intimately tied to the body—it is *embodied*—it must be understood as a complex biological, social, cultural, and political phenomenon across the three bodies (roughly correlating to scales in political ecology).

Returning to Lock again, she argued that embodiment (and therefore health) happens through physical sensation (it is not simply social and political) and is articulated through “local categories of knowledge and experience” (Lock 2001, 483). Echoing the lessons of political ecology, for Lock, “the material and the social are *both* contingent—both local” (Lock 2001, 484). Individual bodies themselves are inextricably bound to the local social, cultural, political, and environmental context in which people live and die; individuals embody that local context. As a result, as Schepers-Hughes and Lock (1987, 7) wrote, the body is “a natural symbol with which to think about nature, society, and culture” in particular contexts. This relational approach is reminiscent of the work of political ecologists who have shown us that nature is always relationally produced and reproduced (Moore 1993; Castree and Braun 2001) in specific places.

Although embodiment is important, because of the focus on the local and on community practices, local biologies remains a concept best suited for understanding health at the community scale; it is most closely related to the social body. But political ecology has long shown us that a local, community focus is insufficient; the “local” is always produced in conversation with the “global” (Swyngedouw and Heynen 2003). As a result, the broader context in which health concerns are produced (in this case, worldwide concern about the HIV/AIDS epidemic) and health care is accessed and carried out (in this case, national and international HIV/AIDS protocols at the PCHC) shapes the local context of health and health care as well as individual experiences with illnesses like military TB. In short, political ecology forces us to think more critically about the concept of the “local” in local biologies, recognizing it as inextricably linked to the global. Therefore, to do a political ecology of health, we must scale up local biologies. Simultaneously, when thinking through the case of Gogo Mtembu, we must scale down local biologies to take into account the specifics of this rare form of TB in an old woman living in Pholela; we must take account of Gogo Mtembu’s biology, of her internal ecology. Combining an analysis of the individual body, the social body, and the body politic while attending to the biology of the body and the environmental, sociocultural, and political-economic contexts in which bodies are

produced provides the nested place-based approach that is a hallmark of political ecology.

Putting into practice a political ecology of health is a difficult proposition and one for which this article makes a first attempt. Because my interactions with Gogo Mtembu were limited to the HIV clinic, I have had to piece together a best approximation of her internal ecology, her family's livelihood, and the cultural context through which she articulates her experience with health from my work with other residents and from scientific sources produced in places close to and far from Pholela. With this caveat, this article offers a political ecology of health and the body by adding the scales of the individual body (and the cellular processes within it) and global political economy to local biologies. In so doing, it shows how health care protocols have been shaped by political and economic systems operating at multiple scales; it offers an alternative reading of the health impacts of the HIV/AIDS epidemic; and it reminds us that the biology of the body is always produced in relation to its sociocultural context. In the remainder of the article, I use this nested political ecology approach to examine the ecology of miliary TB, the local discourse and context of health in Pholela, and the political economy of health and health care in South Africa to explain Gogo Mtembu's case of miliary TB and Dr. Smith's behavior.

### The Ecology of Miliary Tuberculosis or Health at a Bodily Scale

Biomedical science understands TB as an infectious disease caused by the *Mycobacterium tuberculosis* (colloquially known as the tuberculin bacillus), a bacterium that grows (multiplies) in an oxygenated environment. The most common form—pulmonary TB (TB in the lungs)—passes through the air (which, of course, contains oxygen) in infectious droplets when a person coughs, sneezes, speaks, sings, or spits. When someone close by inhales these droplets, the bacteria pass into his or her lungs. Once the bacteria enter a person's body, one of three things can happen: The immune system can fight it off, thereby eliminating the bacteria; the person can contract TB but it remains latent (i.e., he or she does not get sick but the bacteria remains in the body); or, after a time, he or she can develop active TB, which makes the person sick (Kumar, Abbas, and Aste 2013; World Health Organization [WHO] 2013) with symptoms including a terrible cough, a sore chest, night sweats, weight loss, and

severe fatigue. The passage of TB from person to person and its manifestation in one's body depends on a number of overlapping factors: the frequency of exposure, the proximity to others sick with active TB, the number of infected droplets inhaled, the virulence of the strain, and the power of the individual's immune system. Significant for our story here, a person like Gogo Mtembu, who is repeatedly exposed to a virulent strain and who has a weakened immune system, has a higher likelihood of getting active TB once it enters her lungs. Indeed, people who are repeatedly exposed to TB have a 22 percent higher infection rate than those who are less frequently exposed (Ahmed and Hasnain 2011).

Once the tuberculin bacillus enters a person's body—enters his or her internal ecosystem—it attaches to the pulmonary alveoli (the wall of the upper lobe of the lung). This is where the oxygen a person breathes—vital for life and for the tuberculin bacillus—passes into the bloodstream. Once the bacilli attach to the lung wall, they invade and replicate within a subset of white blood cells, damaging a person's immune system and making him or her sick (Kumar, Abbas, and Aste 2013. Healthy white blood cells are part of the immune system, which is crucial for fighting off infection and keeping a person healthy.) Miliary TB is particularly bad; it is hard to treat and difficult to live with. It is marked by a mass diffusion of clusters or clumps of the tuberculin bacilli (the bacteria) throughout the lung (or body). As the bacilli diffuse, immune cells surround the different collections of bacteria in an effort to keep them from further replicating and infecting the body. In so doing, they create a hard coating, which seals in the bacteria. Thanks to a set of complicated interactions between various immune cells and the tuberculin bacilli, infected cells “trick” the immune system cells to prevent their own destruction (Sharma et al. 2005). This process leads to a proliferation of hard cell clusters (generally between 1 mm and 5 mm) at the center of which lie the infecting bacteria. These cell clusters, which look like the grain millet (hence the name, miliary), remain uniformly distributed throughout the lung and lead to all of the common symptoms of TB. They are striking in an X-ray and are particularly difficult to treat, representing only 1 to 2 percent of all TB cases with a mortality rate of 25 to 30 percent (Hussain et al. 2004; Sharma et al. 2005).

In South Africa, miliary TB is most commonly associated with HIV/AIDS, largely because of the impact HIV has on people's immune systems (their white

blood cells) and therefore on their ability to fight off infection (Hosegood, Vanneste, and Timaeus 2004; Douek, Roederer, and Koup 2009). Indeed, infections like shingles, pneumonia, meningitis, and TB are now common in South Africa, with at least one third of all HIV-positive people coinfecting with TB (Corbett et al. 2003; Bekker and Wood 2010; WHO 2013). More important, HIV/AIDS is associated with high rates of rarer forms of non- and extrapulmonary TB (including miliary; Glynn et al. 2004; Martinson, Hoffman, and Chaisson 2011).<sup>6</sup> For advanced-stage AIDS patients, TB symptoms are often *constitutional*, meaning that they infect and affect the body as a whole, from the lungs to the lymph nodes to the central nervous system. In other words, extrapulmonary TB, including miliary TB, is a telltale sign of AIDS (Lee et al. 2013).

In 2008, KwaZulu-Natal, Pholela's province, had the highest rates of both HIV and TB in the country (Health 2010), and South Africa as a whole had the highest incidence of tuberculosis in the world, largely thanks to HIV (Republic of South Africa Department of Health 2008). In South Africa generally, and Pholela more specifically, the biology of extrapulmonary TB is intimately tied to the biology of HIV/AIDS, and this relationship has devastating consequences: TB is the country's leading killer (Health 2010). In South Africa, the internal ecologies of HIV-positive people, marked by immune system compromise and opportunistic infections, provide optimal conditions for TB to spread. That said, HIV is by no means a prerequisite for miliary (or any form of) TB. Studies in low-HIV areas have found that miliary TB is most commonly associated with middle-aged and elderly patients, particularly women (like Gogo Mtembu), who have a pre-existing medical condition that suppresses their immune systems (Hussain et al. 2004; Sharma et al. 2005). In short, Gogo Mtembu did not need to have HIV to have miliary TB.

### Local Articulations of Health or Health at a Community Scale

If this is how biomedicine understands miliary TB in the context of high levels of HIV, how do Pholela's residents understand TB (and HIV) in the context of day-to-day health? Pholela's residents refer to the massive epidemic of illness and death that has pervaded local life for over a decade as simply "these diseases" (*lexixifo zamanhlange*). Talked about in shadows, dismayed over,

discussed in moments of desperation, "these diseases" refers to the myriad different symptoms and illnesses that affect the working-age population. It is the articulation of Pholela's local biology. In countless conversations with community health workers, families, and community groups—anyone living in Pholela—when I asked what was specific or distinct about health in the early 2000s, people would say, "These diseases." And when I asked who was sickest, they would say, head in hands with a look of utter desperation, "The youth." Although HIV was clearly a factor—residents would often follow a comment about "these diseases" with specific mention of HIV—it was not sufficient to explain illness and health in Pholela. Indeed, in addition to the English term, there are a number of local expressions like "the three letters" (*amagama amathathu*) that refer specifically to HIV.<sup>7</sup> "These diseases" is something different; it is broader, a diagnosis of Scheper-Hughes and Lock's (2007) social body. By contrast, HIV is about a specific disease in an individual body. The notion of these diseases—its lack of specificity and its plurality—denotes the communal experience of health in the age of HIV. Illness blankets Pholela with uncertainty; it is everywhere, pervading all life. People are sick. The wrong people are sick, the people who should be healthiest. Moreover, they are sick with all sorts of things that were uncommon in the past, and they are dying in unimaginable numbers. The graves in Pholela's homestead gardens are testament to this. From the perspective of Pholela's residents, HIV is certainly important for its coincidence with "these diseases," but it is "these diseases"—diseases beyond HIV—that define ill health and health more generally.

Significantly, "these diseases" refers to illnesses of youth. Older people suffer from known, specific diseases like diabetes or cancer or even miliary TB; young people suffer from "these diseases." Similar in concept to illnesses of old age, "these diseases" refers as much to the age of those it affects as it does to the multiplicity of symptoms and illnesses that comprise it. It is in this age-related taxonomy that the youth become visible as the sickest people in Pholela. In this frame, miliary TB is one of any number of illnesses that a person could get, especially if he or she is in his or her twenties or thirties; specificity matters little. If one is older or younger, however, as was the case with Gogo Mtembu, the specifics of illness come to matter much more. In the first years of the twenty-first century, "these diseases" provides an opportunity to talk about what is ailing the community as a whole. In this context, "these diseases" is the most local expression of

health today; it is key to understanding Pholela's local biology and it is vital for understanding health and illness. For Pholela's residents, including Gogo Mtembu, this early twenty-first-century framework for social and individual health clearly shapes how they experience and understand their own illnesses. It also helps us understand the story with which we began: Gogo Mtembu and the nurses knew that she was sick with miliary TB, not with "these diseases"; she was the wrong age to suffer from this bundle of unspecified illnesses, just as she was the "wrong" age to suffer from HIV.<sup>8</sup>

### The Political Economy of Health and Health Care or Health at National and Global Scales

Now that we have a sense of the biology of miliary TB and a grasp of local articulations of health, what is the political-economic context of health and health care in Pholela? Situated in rural South Africa, Pholela's residents live in relatively dense settlements of homesteads clustered on steep mountain slopes. Most families scrape by thanks to local employment, pensions and other government grants, and occasional visits and remittances from urban-based family. Because of the health center and other government offices, Pholela has more employment options than many rural areas. Even so, few households have enough money to purchase meat or fresh vegetables on a regular basis. As a result, household diets rely primarily on maize meal and other processed foods, which, although calorie rich, are nutrient poor. The lack of sufficient nutrients in people's diets then inhibits cellular development and function, leading to an internal ecology that is marked by a general baseline of ill health and immune compromise (Chandra 1997; Bendich and Deckelbaum 2005).

Moreover, the benefits of local and distant employment opportunities (and the more expensive and nutrient-rich food they provide for) are not equally divided among households, to say nothing of divisions within households. Like South Africa as a whole, which has one of the highest levels of wealth disparity in the world (World Bank 2013), in Pholela there are a few well-off households and a very large number whose livelihoods are precarious.<sup>9</sup> This poverty and precariousness has a deep impact on the bodies and health of residents like Gogo Mtembu. I was not able to collect the exact details of Gogo Mtembu's family's

economic status, but it is safe to assume that she lived in one of the many less well-off houses, because of sheer numbers, because the clinic staff and I knew most of the better-off families, and because if she had the money, she would have visited a private doctor for such a severe illness.

The vast majority of South Africa's citizens, especially the country's impoverished, receive health care from government-funded clinics and hospitals like the PCHC. These primary health care facilities are staffed by nurses and provide basic, first-line care (Steinberg 2008). At the PCHC, the main clientele are those who remain at their rural homes—the locally employed, elderly, children, and a small number of working-age women, few of whom have consistent work or access to enough cash to purchase much beyond the very basics. Larger health centers like the PCHC are divided into wards; different wards—TB, HIV/AIDS, primary care, and maternity—provide specialized care. As a result, a single individual who has multiple health problems might have to go to several different wards, visiting many different practitioners, just to get the care that he or she needs. This takes time and it requires that the patient, not the health care provider, coordinate care and ensure that all of his or her health concerns are addressed. This is, of course, a disadvantage for patients who have no training in medicine. Further, these rural health care facilities are chronically underfunded and understaffed, with a doctor-to-patient ratio of less than 3 to 10,000 and long lines for treatment (Breier 2008).

Significantly, patients and health care providers alike feel this lack of resources. In the story with which we began, the doctor's performance—the frustration at seeing patients other than those he was supposed to, his indignation at Gogo Mtembu's refusal to take another HIV test, and his eventual, laughing decision to see and take her on as a patient—was a clear reflection of the impoverished health care system and the complexity of health in rural South Africa. When Dr. Smith was complaining, he was performing his frustration at the tremendous burden of poverty and ill health in Pholela and the sheer lack of resources at the PCHC; he was teaching the nurses, patients, staff, and me that we could—and should—expect more.

In 2007, the South African government selected the PCHC as one of its first sites for the establishment of an HIV clinic and the rollout of ART. This designation was significant for a number of reasons. First, it acknowledged the seriousness of the pandemic in the area. This was an important step for a government

infamous for its AIDS denialism (Mbali 2013). Second, as an ART rollout site, the PCHC was guaranteed a doctor—in this case Dr. Smith—on a consistent basis. Although the doctor was only supposed to see HIV cases, he ended up seeing particularly complicated non-HIV cases like that of Gogo Mtembu. Third, in compliance with national and international guidelines and ART rollout policies and practices, the PCHC created a separate HIV ward within the health center. This, in combination with the preexisting maternity and TB wards, furthered a vertical model for the treatment of disease. Perhaps this is more efficient for accounting, planning, and implementing purposes, but from an individual's perspective, and from the perspective of the ecology inside of his or her body, this division made little sense. Fourth, designation as a government rollout site led to both an influx of funding and a diversion of internal financial and personnel resources to the new ward. Although this meant a new guaranteed stream of funding at the health center, it was funding for HIV and not for opportunistic infections like TB (unless the patient also had HIV). If, as was the case with Gogo Mtembu, a person had TB and not HIV, these additional resources were not to be used for his or her care.

Finally, this funding came from international sources like the President's Emergency Plan for AIDS Relief, Right to Care, and Médecins Sans Frontières, which meant that the rollout of ART and, by extension, care at the PCHC's HIV ward came with a whole host of conditions set in places far from Pholela. Funders, the WHO, and the South African government had negotiated and adapted an ART protocol, which mandated a certain standard of care and a set of clinical and laboratory norms for the treatment of HIV patients in Pholela (Southern African HIV Clinicians Society 2008). One of the most important requirements was that a specially trained medical doctor must oversee and treat all ART patients, regardless of the simplicity or complexity of their case (Steinberg 2008). According to the protocol and the funding that provided for it, the doctor could not see any other cases of illness or ill health, not even complicated TB cases. To determine whether a patient was HIV positive, he or she needed a blood test. In this single test, the parameters were set for whether or not a patient was to be seen and treated by a doctor and supported with international funds.<sup>10</sup>

Perhaps, then, it is no surprise that Dr. Smith insisted that Gogo Mtembu have another HIV test

before he took her on as a patient. His insistence was, however, a good deal more complicated than a simple following of the rules. After all, in taking the X-ray in hand, Dr. Smith had already decided to break protocol and help diagnose a patient from a different ward. His initial diagnosis, after looking at the film, was of HIV–TB coinfection and his insistence on another HIV test was meant simply to confirm. In a sense, given the X-ray he held in his hand and his vast clinical experience, he was certain of this diagnosis. Indeed, Dr. Smith was backed by the WHO-produced ART protocols that hung on the clinic wall, which specifically state that HIV-positive patients with extra- or nonpulmonary TB should start ART regardless of their CD4 count and regardless of their laboratory results (WHO 2004). To back up for a moment, when the PCHC's internationally-mandated ART protocols were originally written, there were many places in sub-Saharan Africa without consistent access to laboratory facilities. As a result, using population-scale data on infection rates for both HIV and TB, health officials wrote protocols to enable clinical diagnosis (cf. WHO 2004). Although laboratory tests are now pervasive, this doctor and others were schooled in a different set of assumptions about HIV and TB. Given community-wide HIV rates, in a different time and place and without the aid of laboratory results, Dr. Smith would have diagnosed Gogo Mtembu with HIV–TB coinfection and would have started her on treatment.

In a context of imperfect laboratory results, this logic makes sense. Even in South Africa where HIV tests are very reliable, other laboratory tests are not. For instance, on a different Tuesday, Dr. Smith and I were poring over the chart of what looked to be a desperately ill patient with a CD4 count of one. (CD4 counts provide a measure of immune system power; healthy people have CD4 counts between 500 and 1,500. In 2008 patients started ART treatment when their CD4 counts dipped below 200, regardless of other symptoms; Southern African HIV Clinicians Society 2008.) As we looked up, in walked a young man who appeared to be perfectly healthy and fit. When the doctor asked him how he was feeling, he said he was fine, maybe a little bit tired, but otherwise fine. It was clear to everyone that this young man had a CD4 count of more than one. As the patient left, Dr. Smith quietly voiced his frustration at the unreliability of laboratory tests. Luckily, he had lots of clinical experience with HIV and knew to trust his instincts. Indeed, he would often disregard lab results completely (as he tried to do with Gogo Mtembu), making treatment

decisions based on previous experience and the clinical standards hanging on the wall. Although this knowledge and experience surely saved lives, it also meant that Dr. Smith often trusted the clinical presentation of symptoms over laboratory results.

While these experiences and international protocols shaped diagnosis and treatment, they also shaped understandings of illness (especially at places like the PCHC and among its workers). In the HIV/AIDS ward at the PCHC, getting the “right” diagnosis for a patient involved balancing the patient’s symptoms, Dr. Smith’s knowledge and experience, laboratory results, and international mandates (for more explicit studies of how diagnostic uncertainty is managed, see Mol 2002; Street 2011). Significantly, for those working in the HIV clinic, HIV became the prism through which they viewed health. The reality that this model and these funding conditions and lab facilities produced was, however, partial (Haraway 1988); it failed to take into account the specificities of life, livelihoods, poverty, and precariousness in Pholela. It also left little space for attention to the internal ecologies of individuals. People in places like Washington, DC, Geneva, and Pretoria were deciding what and who should be treated how, with little attention to the specificities of health and health care among the individuals in this place. This was not perfectly true; as the case of Gogo Mtembu reveals, Dr. Smith, patients, and nurses often subverted these rules and regulations. Nonetheless, this is the broad context that shaped health and the provision of health care in Pholela.

### **The Political Ecology of Miliary Tuberculosis in Pholela: A Multiscalar Analysis**

Now that we have an idea of the ecology of miliary TB, the health profile of Pholela, the local articulation of health and illness, and the political economy of life, health, and health care in rural South Africa, let us return to the story of Gogo Mtembu and her X-ray. The clinical protocol that guided Dr. Smith’s behavior and formed the basis for HIV treatment and care presupposed a relationship in Gogo Mtembu’s body between HIV and miliary TB. The diagnosis that derived from this logic, the one the doctor was clearly hinting at, misunderstood the specific ecology in Gogo Mtembu’s body, an ecology that included miliary TB but not HIV.<sup>11</sup> On this day, in this HIV clinic in rural sub-Saharan Africa, the doctor’s diagnosis took a

standardized protocol and applied it to a place—to a body—that did not fit (cf. Lock and Kaufert 2001; Nguyen 2010). For their part, the authors of the protocol had taken a place into account, only their place was resource-poor sub-Saharan Africa; it was Pholela. The treatment protocol reflected this—there were only minimal requirements for lab tests and doctors had extensive criteria and latitude for diagnosing HIV clinically. The specifics of illness in individual bodies and the dynamics of this uncommon TB infection—an attention to an internal ecology—were lost on these standards.

Whereas these protocols might explain Dr. Smith’s initial behavior, they do not explain how this HIV-negative woman contracted a rare form of TB most commonly associated with HIV. For that, we must go back to the biology of miliary TB and to Gogo Mtembu’s internal ecology. We must scale down our place-based analysis to the body. When we do so, we see that for HIV-negative people, miliary TB is most common in the elderly, especially women, many of whom have depressed immune systems. In this frame, HIV is just one of a number of possible reasons for immune system compromise. Age- and poverty-related ill health—dietary deficiencies and less-than-optimal preventive care—offer other important baselines. Further, the presence of any form of TB is only possible if a person has been exposed to the bacillus—if she inhales it, thereby getting it into her lungs; and the more exposure, the higher the likelihood of contracting the illness. Gogo Mtembu was an elderly woman living in a poor area of rural South Africa where TB was rife thanks to the large number of HIV-positive people who were sick with TB.

Could Gogo Mtembu have contracted miliary TB if HIV had not been all around her? Certainly. Would she have? Probably not. Although Gogo Mtembu did not have HIV, she was likely undernourished, with a suppressed immune system thanks to decades of grinding poverty and age (Pritchett and Summers 1996; Farmer 1999; Wagstaff 2002); she literally embodied South Africa’s uneven political economy. In addition, the crisp April morning on which this story unfolded offered a reminder of cold evenings spent in poorly ventilated, smoky huts where airborne bacteria easily pass as family members and visitors cough. Frequent encounters with TB sufferers in the shared spaces of everyday life would have offered ample opportunity for Gogo Mtembu to inhale the bacilli and for the bacilli to settle in her lungs. Indeed, a study of high levels of TB among HIV-negative miners revealed that in the

confined space of the mine shaft, increases in TB infections were “caused by [the] onward transmission from the increased number of (mainly HIV-positive) tuberculosis cases” among miners (Sonnenberg et al. 2004, 661). The closed, smoky huts where Pholela’s residents spend their winter nights function much like mine shafts for the passage of TB. Once TB entered Gogo Mtembu’s body, her internal ecology, which was shaped by the socionatural and political–economic context in which she lived, provided fertile ground for the production and profusion of the millet-like clusters of cells that are so striking on an X-ray. In other words, the “nature” inside of her body was inextricably linked to the “nature” outside. It was Gogo Mtembu, as an elderly woman, and her internal ecology, which did not include HIV, in combination with what Stillwaggon (2006) referred to as the “ecology of poverty”—the larger political–economic context of life and livelihoods in rural South Africa—all located in the place of the body that produced Gogo Mtembu’s surprising miliary TB.

Pholela’s residents, including the HIV clinic’s nursing sisters, understood this from the start.<sup>12</sup> For them (and eventually for Dr. Smith), Gogo Mtembu had extrapulmonary TB, not HIV or “these diseases.” They were certain of this, which was part of the reason Gogo Mtembu and the nurses were so insistent in the face of Dr. Smith’s rebuffs. As explained earlier, in many senses, “these diseases” is the articulation of Pholela’s local biology, of the specific experience of ill health today. It refers to a wide set of symptoms—biological processes—inside of residents’ bodies, as well as to the particular cultural context in which they unfold. Further, it includes attention to people’s livelihoods and the limits of the local environment; it represents the health of Pholela’s social body. For Pholela’s residents, Gogo Mtembu did not have “these diseases,” because she was “too old.” In this framework, the distinction had less to do with Gogo Mtembu’s seropositivity (the presence of HIV in her blood) than it did with her age and the reality of ill health in Pholela today. Whereas ART protocols presupposed a relationship between HIV and TB in Gogo Mtembu’s body, Pholela’s residents’ taxonomy of health insisted that an old woman would just have miliary TB—the named, biomedical disease—rather than “these diseases”—an unspecific reality of ill health and youth. As Lock (1993a) wrote, “the collapse of nature into culture is not uniform, for local knowledge and politics informs and delimits technological incursions” (148). In other words, the smaller scales of our analysis—the

body and the community—shape or limit the effect of global organizations and the imposition of supposedly “universal” technical protocols. Residents’ understanding and experience of health, as articulated through “these diseases” and as based on age, shape their interactions with treatment protocols and the diagnosis and treatment that follows.

By now the similarities between “these diseases” and HIV/AIDS should be striking. As a syndrome, AIDS manifests in any number of symptoms—different diseases—preying on an individual’s depleted immune system. In addition, in South Africa, both HIV/AIDS, as a disease passed mainly through sexual intercourse, and “these diseases” are understood and treated as illnesses of youth. There are, of course, significant differences. The local category of “these diseases” is much broader than HIV/AIDS; AIDS can only be caused by HIV, whereas anyone who is the right age and sick can have “these diseases.” This breadth allows residents to point to a larger reality of ill health in their community; it allows for an attention to illness in the social body. This social focus also leaves space for illnesses not caused by HIV. This difference is significant. As an unspecified, age-based health condition, “these diseases” refers as much to the trouble with and the troubles of youth in Pholela as it does to a broad set of symptoms and illnesses. Indeed, in conversations with residents, particularly older people, they explained “these diseases” in terms of community-wide social problems with youth. In one conversation I had with an old woman who was a healer, she explained that “these diseases” have come to Pholela at this moment because “people are changing their lifestyle.” The youth do not show respect, they do not listen to their elders, and they are promiscuous. Whether sexual behavior has changed substantially is questionable, especially in light of both the oral histories I collected and ethnographic work from the 1930s onward (e.g., Wilson 1936). Nonetheless, it is clear that this named category of difficult-to-explain and varied illness—“these diseases”—offers a central focus through which to articulate frustrations with changes in broader social life and material circumstances in rural South Africa.

In its social nature, “these diseases” offered the possibility for remedy, too. As the elderly healer explained, if the youth change their behavior and act properly, if they “think before they do things,” then the health of the community will improve. By contrast, she saw no long-term hope for HIV. She explained, “There are only pills that help [people with HIV] live longer”; there is “no cure” (for more on the importance of a

“cure” to thinking and treatment about HIV see Schoffeleers 1999; Steinberg 2008). Significantly, HIV could only be treated (although not cured) individually with medication. “These diseases,” as an illness of the social body, could only be treated by a large-scale change in behavior among the youth (those sick with “these diseases”). Although they might manifest in similar physical symptoms and at similar points in the life course, Pholela’s residents understand that HIV and “these diseases” are most certainly different.

In the similarities between “these diseases” and HIV/AIDS, and more important in their relationship to each other, the limits of the concept of local biology becomes clear. Local biology reminds us that the health profile of Pholela as a whole—of the social body—is deeply and widely marked by both the ecology of HIV/AIDS and its opportunistic infections and by age-related struggles over influence and authority. Political ecology reminds us that this local biology is always, everywhere shaped by larger, global contexts. Nowhere is this clearer than in the case of HIV/AIDS and the multinational institutions, nongovernmental organizations, and international protocols that shape its prevention and treatment and, by extension, South Africa’s health care system. Global best practices understand HIV/AIDS in resource-poor areas as a sexually transmitted infection that passes among young people. This understanding is then absorbed into the local biology of health in Pholela—“these diseases”—where youth is one of its distinguishing features. Although a person like Gogo Mtembu might very well contract TB from a neighbor as a result of his or her HIV, she would not have “these diseases.” In absorbing the logic of international HIV/AIDS prevention programs, Pholela’s residents reveal that their local biology is also global; local articulations of health cannot be separated from global HIV/AIDS programs. It is therefore by placing local biologies into a nested political ecology of health that starts with the scale of the body and moves through to the global that we can best understand health in rural South Africa today.<sup>13</sup>

In their similarities, however, HIV/AIDS and “these diseases” are both incomplete. In conflating HIV on the one hand and “these diseases” on the other with youth, both frameworks underestimated the toll of debilitated immune systems (of HIV/AIDS and long-term poverty) on community-wide health for people of all ages. If we scale down our analysis to the body and take account of its internal ecology and we allow for the possibility that HIV/AIDS enables an increase in the spread of infectious diseases like TB at

the community scale, then we see that Gogo Mtembu was sick with miliary TB because of HIV. Like all ecological systems, Gogo Mtembu’s internal ecology was shaped by the internal ecologies of the people around her, and these ecologies sit in a particular social and political-economic context. Bodies, with their internal ecologies, are socionatural places just like parks and cities. Without high levels of HIV–TB coinfection among her neighbors—without their internal ecologies shaped by poverty and including HIV and rare forms of TB—it is unlikely that Gogo Mtembu would have contracted miliary TB. Turning then to Pholela’s local biology and recognizing it as produced in conversation with global health care protocols, we begin to see how and why “these diseases” misunderstands the reality of illness in Pholela. This broad (mis)understanding of community-wide health means that people in Pholela (residents, nurses, and doctors alike) fail to recognize that the physical health of the very young and the very old is intimately linked with that of the youth; they fail to recognize that someone like Gogo Mtembu can suffer from “these diseases,” too. More significant, perhaps, this mischaracterization means that the government and international funders fail to recognize the true health impacts of HIV/AIDS. Seropositivity indicates the presence of HIV in a person’s bloodstream and body, but it does not adequately indicate whether a person is suffering from an HIV-related illness.

There is much at stake in both scholarship and practice by expanding our understanding of the HIV/AIDS pandemic to include older and younger people. Understanding illnesses like Gogo Mtembu’s as a health impact of HIV/AIDS would force us to imagine a different kind of HIV/AIDS-related health care program. It might even push us to move away from the vertical treatment model—so visible in the clusters of red chairs—in which each disease is treated separately, instead pushing us toward a more patient-centered or community-centered approach. If we understand HIV/AIDS as a catalyst for the spread of disease throughout the social body, rather than simply the body proper, vertical treatment programs like the one at the PCHC no longer make sense. As Scheper-Hughes and Lock (1987) showed, health always sits in the connections among the social body, the individual body, and the body politic. A political ecology of health like the one offered here adds to these three bodies by incorporating internal ecologies and the influence of global political-economic structures on health and health care. I argue that recognizing health as socionatural and as simultaneously operating

at multiple scales helps us to understand particular health conditions, like HIV and TB, in particular places, like Pholela. Perhaps more important, an approach that incorporates the biological processes inside of people's bodies, the ways in which different people—clinicians, scientists, and area residents—understand illness, and the political-economic context in which health and health care are experienced, helps to expand studies of health in geography to incorporate a political ecological approach. All of this scholarly insight then pushes us to think differently about HIV and TB in sub-Saharan Africa, teaching us that to treat the illness of an individual like Gogo Mtembu, we must also treat the community and the socionatural environment in which she lives. If we took to heart this lesson, the integration of health services, a focus on improved baseline health and improved living conditions, and access to doctors for all complicated cases, regardless of seropositivity, would become the hallmarks of health care in the age of HIV/AIDS. And we—scholars and practitioners alike—would understand health as socionatural and as always constituted at multiple scales.

## Acknowledgments

First and foremost, I owe a tremendous debt to Thozile Nguse, my research assistant and collaborator, for all of her help in the community-based research that underpins this work. I would also like to thank Claire Wendland and Becky Mansfield for thoughtful comments they offered as discussants on different versions of presentations of this article. Matt Turner offered invaluable (thoughtful and tough) comments on the first full draft of the article, strengthening it immeasurably. Susan Craddock and Ramah McKay provided helpful feedback and generous sounding boards that helped me see the forest and the trees as I revised. Three anonymous reviewers as well as Richard Wright and Mei-Po Kwan offered careful, critical feedback from which this article has benefited tremendously. Finally, I must thank Alex Nading, who not only introduced me to the concept of local biologies but has been talking through the ideas behind (and the specifics of) this article for close to a decade now.

## Funding

The research in this article was supported by a National Science Foundation (NSF) Doctoral Dissertation Improvement Grant and an NSF Graduate

Research Fellowship as well as a Raymond J. Penn Scholarship from the Land Tenure Center at the University of Wisconsin–Madison. Writing and revision was supported by a postdoctoral fellowship in the Agrarian Studies Program at Yale University.

## Notes

1. This opening story comes from an extended fieldwork stay in 2008 and 2009. More details follow in the Methods section of the article.
2. In accordance with human subjects protocols, I have changed all names.
3. To conduct this research, I received institutional review board approval and at the clinic and in the communities where I conducted my research, I always asked participants for permission to observe and ask questions. In my write-up here and in other places, I have changed key personal details (in addition to names) to protect the identity of research participants.
4. Scholars from several other disciplines, including public health and anthropology, have sought to articulate health as “biosocial” or “biocultural” (Goodman and Leatherman 1998; Singer and Clair 2003).
5. The idea of an ecosystem in health has been around for a long time, especially in environmental health circles (cf. Dubos 1959, 1965).
6. Even though Gogo Mtembu's military TB was in her lungs, it is considered extrapulmonary because it is so uncommon.
7. The title of the South African edition of Steinberg's (2008) *Sizwe's Test*, a book about HIV/AIDS in rural South Africa, is *Three Letter Plague*.
8. In sub-Saharan Africa, HIV passes mainly through sexual intercourse. As a result, when the doctor agreed that Gogo Mtembu was “too old” to contract HIV, he was clearly making socially and academically acceptable assumptions about Gogo Mtembu's (and by extension all elderly women's) sex life that might or might not have been true.
9. As part of my research, I conducted a household survey in three communities in Pholela in April and May 2008. My information on household composition and livelihoods comes from that survey.
10. Braun (2007) wrote of the “molecularization of life” to examine how the global extension of sovereign power has been mobilized to shape what biological futures are available to which people. Although Braun was concerned with biosecurity, his focus on the “molecular” in questions around biopolitics and biosecurity provides a valuable framework for thinking about the significance of the presence of HIV (the virus) in the blood of an individual for his or her access to health care and resources.
11. Remember, Gogo Mtembu had had an HIV test six months prior to the day on which this story unfolded and she insisted that she was still HIV negative. Given how pervasive HIV education is, it is reasonable to assume that Gogo Mtembu knew she was still negative. Regardless, if she had contracted HIV in the previous

six months, because of the virus's slow-moving nature and the pathology of miliary TB, it would be unwise to blame her (hypothetical) HIV for her miliary TB.

12. For an outstanding account of how different people enact illness in a body, see Mol's (2002) *The Body Multiple*.
13. A number of medical anthropologists, most notably Farmer (1999, 2005, 2006), offer the concept of structural violence as a way to understand how the health of people in places like rural Haiti is shaped by uneven global political-economic structures. Although incredibly important for this analysis and more generally, this body of work misses the way in which micro- and local processes feed back into and shape global institutions and protocols (even as it acknowledges that they do). In other words, for all of its attention to the ways in which broad structures shape the health and lives of individuals, it remains a model in which the global determines the local. As this story of Gogo Mtembu and her miliary TB reveals, Gogo's internal ecology and that of her neighbors, local concern over the fate of youth, local rates of HIV and TB, and globally produced protocols all shape health and health care in Pholela; the local and the global work together.

## References

- Ahmed, N., and S. E. Hasnain. 2011. Molecular epidemiology of tuberculosis in India: Moving forward with a systems biology approach. *Tuberculosis* 91:407–13.
- Bassett, T. J., and K. B. Zuéli. 2000. Environmental discourses and the Ivorian savanna. *Annals of the Association of American Geographers* 90:67–95.
- Bekker, L.-G., and R. Wood. 2010. The changing natural history of tuberculosis and HIV coinfection in an urban area of hyperendemicity. *Clinical Infectious Diseases* 50: S208–S214.
- Bendich, A., and R. J. Deckelbaum. 2005. *Preventive nutrition: The comprehensive guide for health professionals*. New York: Humana Press.
- Braun, B. 2007. Biopolitics and the molecularization of life. *Cultural Geographies* 14:6–28.
- Breier, M. 2008. *The shortage of medical doctors in South Africa*. Durban, South Africa: HSRC, DPRU, and SWOP Research Consortium.
- Brotherton, P. S., and V.-K. Nguyen. 2013. Special issue: Beyond the body proper: Global politics/local biology. *Medical Anthropology* 32(4): 287–392.
- Castree, N., and B. Braun. 2001. *Social nature: Theory, practice, and politics*. Malden, MA: Blackwell.
- Chandra, R. K. 1997. Nutrition and the immune system: An introduction. *American Journal of Clinical Nutrition* 66:460S–463S.
- Corbett, E. L., C. J. Watt, N. Walker, D. Maher, B. G. Williams, M. C. Raviglione, and C. Dye. 2003. The growing burden of tuberculosis: Global trends and interactions with the HIV epidemic. *Archives of Internal Medicine* 163:1009–21.
- Douek, D. C., M. Roederer, and R. A. Koup. 2009. Emerging concepts in the immunopathogenesis of AIDS. *Annual Review of Medicine* 60:471–84.
- Dubos, R. J. 1959. *Mirage of health: Utopias, progress, and biological change*. New York: Harper.
- . 1965. *Man adapting*. New Haven, CT: Yale University Press.
- Farmer, P. 1999. *Infections and inequalities: The modern plagues*. Berkeley: University of California Press.
- . 2005. *Pathologies of power: Health, human rights, and the new war on the poor*. Berkeley: University of California Press.
- . 2006. *Aids and accusation: Haiti and the geography of blame*. Berkeley: University of California Press.
- Glynn, J. R., A. Crampin, B. Ngwira, F. Mwaungulu, D. Mwafulirwa, S. Floyd, J. Pönnighaus, D. Warndorff, and P. Fine. 2004. Trends in tuberculosis and the influence of HIV infection in northern Malawi, 1988–2001. *AIDS* 18:1459–63.
- Goodman, A. H., and T. L. Leatherman. 1998. *Building a new biocultural synthesis: Political-economic perspectives on human biology*. Ann Arbor: University of Michigan Press.
- Guthman, J. 2011. *Weighing in: Obesity, food justice, and the limits of capitalism*. Berkeley: University of California Press.
- . 2012. Opening up the black box of the body in geographical obesity research: Toward a critical political ecology of fat. *Annals of the Association of American Geographers* 102:951–57.
- Guthman, J., and B. Mansfield. 2012. The implications of environmental epigenetics: A new direction for geographic inquiry on health, space, and nature–society relations. *Progress in Human Geography* 37:486–504.
- Hall, E. 2000. “Blood, brain and bones”: Taking the body seriously in the geography of health and impairment. *Area* 32:21–29.
- Haraway, D. 1988. Situated knowledges: The science question in feminism and the privilege of partial perspective. *Feminist Studies* 14:575–99.
- Health, K.-N. D. 2010. *Strategic plan: 2010–2015*. Pietermaritzburg; KwaZulu-Natal, South Africa: KwaZulu-Natal Department of Health.
- Heynen, N. 2006. Green urban political ecologies: Toward a better understanding of inner-city environmental change. *Environment and Planning A* 38:499–516.
- Hosegood, V., A.-M. Vanneste, and I. M. Timaeus. 2004. Levels and causes of adult mortality in rural South Africa: The impact of AIDS. *AIDS* 18:663–71.
- Hussain, S. F., M. Irfan, M. Abbasi, S. S. Anwer, S. Davidsson, R. Haqqee, J. A. Khan, and M. Islam. 2004. Clinical characteristics of 110 miliary tuberculosis patients from a low HIV prevalence country. *International Journal of Tuberculosis Lung Disease* 8:493–99.
- Jackson, P., and A. H. Neely. 2015. Triangulating health: Toward a practice of a political ecology of health. *Progress in Human Geography* 39:47–64.
- King, B. 2010. Political ecologies of health. *Progress in Human Geography* 34:38–55.
- Koch, E. 2011. Local microbiologies of tuberculosis: Insights from the Republic of Georgia. *Medical Anthropology* 30:81–101.

- Kumar, V., A. K. Abbas, and J. C. Aste. 2013. *Robbins basic pathology*. Philadelphia: Elsevier/Saunders.
- Lee, S. S., G. Meintjes, A. Kamarulzaman, and C. C. Leung. 2013. Management of tuberculosis and latent tuberculosis infection in human immunodeficiency virus-infected persons. *Respirology* 18:912–22.
- Lock, M. 1993a. Cultivating the body: Anthropology and epistemologies of bodily practice and knowledge. *Annual Review of Anthropology* 22:133–55.
- . 1993b. *Encounters with aging: Mythologies of menopause in Japan and North America*. Berkeley: University of California Press.
- . 2001. The tempering of medical anthropology: Troubling natural categories. *Medical Anthropology Quarterly* 15:487–92.
- Lock, M., and P. Kaufert. 2001. Menopause, local biologies, and cultures of aging. *American Journal of Human Biology* 13:494–504.
- Mansfield, B. 2008. Health as a nature–society question. *Environment and Planning A* 40:1015–19.
- Martinson, N., C. Hoffman, and R. Chaisson. 2011. Epidemiology of tuberculosis and HIV: Recent advances in understanding and responses. *Proceedings of the American Thoracic Society* 8:288–93.
- Mbali, M. 2013. *South African AIDS activism and global health politics*. Basingstoke, UK: Palgrave Macmillan.
- McCarthy, J. 2006. Neoliberalism and the politics of alternatives: Community forestry in British Columbia and the United States. *Annals of the Association of American Geographers* 96:84–104.
- Mol, A. 2002. *The body multiple: Ontology in medical practice*. Durham, NC: Duke University Press.
- Moore, D. S. 1993. Contesting terrain in Zimbabwe's eastern highlands: Political ecology, ethnography, and peasant resource struggles. *Economic Geography* 69:380–401.
- Moss, P., and I. Dyck. 1999. Body, corporeal space, and legitimating chronic illness: Women diagnosed with M.E. *Antipode* 31:372–97.
- Neumann, R. P. 1998. *Imposing wilderness: Struggles over livelihood and nature preservation in Africa*. Berkeley: University of California Press.
- Nguyen, V.-K. 2010. *The republic of therapy: Triage and sovereignty in West Africa's time of AIDS*. Durham, NC: Duke University Press.
- Pritchett, L., and L. H. Summers. 1996. Wealthier is healthier. *The Journal of Human Resources* 31:841–68.
- Republic of South Africa Department of Health. 2008. *National tuberculosis management guidelines*. Pretoria: Republic of South Africa Department of Health.
- Robbins, P. 2012. *Political ecology: A critical introduction*. Malden, MA: Wiley.
- Scheper-Hughes, N., and M. M. Lock. 1987. The mindful body: A prolegomenon to future work in medical anthropology. *Medical Anthropology Quarterly* 1:6–41.
- Schoffeleers, M. 1999. The AIDS pandemic, the Prophet Billy Chisupe, and the democratization process in Malawi. *Journal of Religion in Africa* 29:404–41.
- Sharma, S. K., A. Mohan, A. Sharma, and D. K. Mitra. 2005. Miliary tuberculosis: New insights into an old disease. *The Lancet Infectious Diseases* 5:415–30.
- Singer, M., and S. Clair. 2003. Syndemics and public health: Reconceptualizing disease in bio-social context. *Medical Anthropology Quarterly* 17:423–41.
- Sonnenberg, P., J. Glynn, K. Fielding, J. Murray, P. Godfrey-Faussett, and S. Shearer. 2004. HIV and pulmonary tuberculosis: The impact goes beyond those infected with HIV. *AIDS* 18:657–62.
- Southern African HIV Clinicians Society. 2008. *Southern African HIV Clinicians Society guidelines for antiretroviral therapy in adults*. Johannesburg: Southern African HIV Clinicians Society.
- Steinberg, J. 2008. *Sizwe's test: A young man's journey through Africa's AIDS epidemic*. New York: Simon & Schuster.
- Stillwaggon, E. 2006. *AIDS and the ecology of poverty*. New York: Oxford University Press.
- Street, A. 2011. Artefacts of not-knowing: The medical record, the diagnosis and the production of uncertainty in Papua New Guinean biomedicine. *Social Studies of Science* 41:815–34.
- Swyngedouw, E., and N. C. Heynen. 2003. Urban political ecology, justice and the politics of scale. *Antipode* 35:898–918.
- Turner, M. D. 2011. The new pastoral development paradigm: Engaging the realities of property institutions and livestock mobility in dryland Africa. *Society & Natural Resources* 24:469–84.
- Wagstaff, A. 2002. Poverty and health sector inequalities. *Bulletin of the World Health Organization* 80: 97–105.
- Wilson, M. 1936. *Reaction to conquest: Effects of contact with Europeans on the Pondo of South Africa*. London: Oxford University Press.
- World Health Organization (WHO). 2004. *Scaling up anti-retroviral therapy in resource-limited settings: Treatment guidelines for a public health approach, 2003 Revision*. Geneva: World Health Organization.
- . 2013. *Tuberculosis fact sheet*. Geneva: WHO Media Centre.

Correspondence: Department of Geography, Dartmouth College, Hanover, NH 03755, e-mail: abigail.h.neely@dartmouth.edu.