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Neoplastic Africa: Mapping Circuits of Toxicity and Knowledge

And since a dead man has no substance unless one has actually seen him dead, a hundred million corpses broadcast through history are not more than a puff of smoke in the imagination.
 -Albert Camus, *The Plague*

On May 20, 2009 months after the Zimbabwean government had appealed for international assistance, twenty-eight new cases of cholera, and one cholera death were reported. By then, as the epidemic began to wane nearly 100,000 people had fallen sick and over 4000 had died according to official reports.¹ The vast majority of the country had been affected, and cholera had crossed the borders with cases reported in Botswana, Mozambique, Zambia, and South Africa.

The cholera epidemic in Zimbabwe was horrifying in human terms, dangerous in its rapid, far-reaching spread, and it offered stark political testimony of just how far the Mugabe regime had allowed sanitation, water, and health care infrastructure, or any vestige of the social contract to erode. The nineteenth century narrative of cholera yet again breathed new life through the 21st century misery of Zimbabwe's now great unwashed and the rapaciousness of the Zimbabwean political elite. For all that it was unimaginable, the epidemic was all too familiar, and a predictable global health apparatus of water purification tablets, medicines, doctors, epidemiologists, and supply trucks sputtered into action.

But on that same day -- the 20th of May 2009 -- there was another Zimbabwean death, this one across the border in Gaborone, Botswana. It wasn't cholera that killed Lovemore Makoni. The disease though equally appalling, was much more common. Yet ironically it seems totally foreign to our image of African health and illness. Lovemore lay in the medical ward of PMH, short of breath and wracked with pain and panic. Mr Makoni, a barman at a local club, had cancer (Kaposi's sarcoma or KS) in his lungs. He urgently needed chemotherapy, which fortunately produces relatively rapid results in many KS patients. But he had a delay in raising funds, and so was now nearing the end of his third week in PMH still awaiting treatment. Though medical care, including oncology is provided as a public good for Botswana's citizens (an African public for whom the term public health still has some meaning), as a Zimbabwean national Mr. Makoni had to pay.

When I arrived in the crowded medical ward with Dr P, who was meeting this patient for the first time, Mr Makoni engaged us. He was quite active in explaining his situation. A private, newly diagnosed cancer patient in a public hospital, a Zimbabwean

¹ World Health Organization, "Cholera in Zimbabwe: Epidemiological Bulletin Number 24, Week 21 (17 - 23 May 2009)" www.who.int/entity/hac/crises/zwe/sitreps/zimbabwe_epi_w24_17_23may2009.pdf (downloaded 26 October 2009)

immigrant living in a highly xenophobic time and place, he was desperate.² Dr P looked at me and in that flat tone characteristic of experienced doctors in urgent situations said, “we will pay for him (meaning Dr P and myself) if need be, but he *will* get chemo this afternoon.” At lunchtime I headed to the cash machine to get my portion of the money Mr. Makoni would need (no more than the cost of an evening out in New York City) – and we phoned the medical ward to send the patient over for his chemotherapy. An orderly wheeled Mr. Makoni to oncology, where he arrived dead. Mma O, one of the nurses, discovered his passing and called out for Jesus as she pulled a curtain around the cubicle where he sat.

If cholera is what we expect, cancer is not. The countless African cancer patients like Lovemore Makoni have never quite fit into our broader understandings of African health or the community of cancer. In the coming decades this will change, but in the year of Mr. Makoni’s death, his disease was only just beginning to pierce the collective imagination of the global health and oncology industries.³ In 1991 Lawrence Summers, then Vice President and Chief Economist of the World Bank, promoted in a now infamous World Bank memo the dumping of toxic waste in Africa, since Africans didn’t live long enough to care about cancer. He tapped into a long-standing image of African publics as biologically simple ones; undergirded by an assumption that infectious disease, fertility, and malnutrition are the problems that matter in African health.⁴ Such problems, the reasoning still often goes, are those of poverty and underdevelopment, while cancer goes hand in hand with wealth and industrialization. Summers couldn’t imagine Lovemore Makoni who at thirty-three could hardly be considered old. Nor could he imagine the fulminating mass on Mary Sedibelo’s breast, the blasts packing Boniface Modipane’s bone marrow, or the tumor that was strangling Rradikgomo Molefi’s throat shut. Nor could he envision the seemingly endless queue of patients, and the relentless pressures on bed-space in this tiny oncology ward where Lovemore died.

Summers was not alone. Why? How historically and today are Africans envisioned or ignored by the global health and oncology industries, and what impact does this have on the nature of biomedical triage, care, and research on the African continent? If this book examines the PMH oncology ward as a microcosm of twenty-first century public tertiary care in southern Africa, this chapter shifts scale to consider a political economy of knowledge in Africa, (particularly in southern Africa), in relationship to cancer. It traces a history of the alternating invisibility and visibility of African cancers, asking what kinds of biological publics are envisioned in global public health, and the ensuing taxonomies of care and prevention that follow from this vision. Such visions are

² On xenophobia in Botswana see, Francis Nyamnjoh, *Insiders and Outsiders: Citizenship and Xenophobia in Contemporary Southern Africa* (Zed Books, 2006).

³ Paul Farmer, Julio Frenk, Felicia M Knaul, Lawrence N Shulman, George Alleyne, Lance Armstrong, Rifat Atun, Douglas Blayney, Lincoln Chen, Richard Feachem, Mary Gospodarowicz, Julie Gralow, Sanjay Gupta, Ana Langer, Julian Lob-Levyt, Claire Neal, Anthony Mbewu, Dina Mired, Peter Piot, K Srinath Reddy, Jeffrey D Sachs, Mahmoud Sarhan, John R Seffrin, “Expansion of cancer care and control in countries of low and middle income: a call to action,” *The Lancet*, August 16, 2010, 6736(10): 61152-x (published online).

⁴ The Summers memo of December 12, 1991, when he was Vice President and Chief Economist of the World Bank has been excerpted and reproduced on numerous websites including:

<http://www.jacksonprogressive.com/issues/summersmemo.html>;

<http://www.whirledbank.org/ourwords/summers.html>; and <http://www.mindfully.org/WTO/Summers-Memo-World12dec91.htm>

inherently partial: the African political and business elite often travel to European hospitals for their cancer care. Money brings access to metropolitan oncology services, while lack of resources renders the cancers of the broader public invisible to epidemiological attention in contexts where diagnostics are lacking.

In many ways it seems broader African publics are imagined as people still living in a past where infectious disease and hunger make for a life that is nasty, brutish, and short. There is, of course, a tremendous truth to the hunger and the infections that afflict people.⁵ And yet, these people are not living in the past. Indeed their present is an extremely complicated one. The PMH oncology ward, and the larger African cancer epidemic subvert the overly narrow model of infectious disease upon which public health models of epidemiological transition have long been constructed. Indeed, as we saw viral cancers are emerging as a profoundly post-modern problem across east and southern Africa, one that gains synergy around HIV co-infection. The epidemiological and institutional attention garnered by the presence of these new cancer patients is beginning to unearth a much broader problem of cancer facilitated by shifting ecological (in the broadest sense), and demographic conditions on the continent. Yet, the global health community while beginning to recognize this unfortunate fact, is ill-prepared to respond, given the structures and logics by which they approach Africa. So too the metropolitan oncological research community is equally unprepared. Their utterly tremendous resources (a hybrid of philanthropic muscle, first-world government funding, and pharmaceutical company investment) are deployed towards developing new drugs, techniques, and technologies rather than towards expanding access or tailoring extant therapies and insights to suit African populations in need.

The WHO and the International Agency for Research on Cancer (IARC) aptly described this dynamic in 2003.

Despite many new agents becoming available, often at great cost, the gains in terms of cure rates have been small. Fashion for high dose chemotherapy with bone marrow transplantation, the use of marrow support factors, biological therapies such as monoclonal antibodies or cytokines, have resulted in little overall gain but considerable expense. The driving force for medical oncology comes from the USA, which spends 60% of the world's cancer drug budget but has only 4% of its population [the bulk of the rest of this cancer drug budget is accounted for by Japan and Europe]. Huge cultural differences exist in the use of chemotherapy, with USA-trained physicians following aggressive regimens for patients who in other countries would simply be offered palliative care. This has created a tremendous dilemma for those responsible for health care budgets. For example, the use of paclitaxel in patients with metastatic breast cancer will prolong survival by 6 months at a cost of US\$12,000. In many countries this would far exceed the total health care consumption throughout a cancer patient's life. Yet the pressure to use expensive patented drugs is enormous. Conferences, travel and

⁵ Hunger is an extremely pressing problem, one that greatly complicates ARV provision. See for example, Ippolytos Kalofonos, "All I eat is ARVS: The Paradox of AIDS Treatment Interventions in Central Mozambique," *Medical Anthropology Quarterly* 24(3), 2010: 363-380.

educational events sponsored by the drug industry rarely give a real perspective on the effective prioritization of cancer for poorer countries.⁶

As a result patients like Lovemore Makoni face a situation in which the oncological cutting edge keeps edging up cost and therapeutic intensity with what are sometimes only marginal payoffs for metropolitan patients, while patients in impoverished contexts are often ignored wholesale for lack of funds. In middle-income countries like Botswana patients receive care from clinicians like Dr P who are buckling under the weight of growing caseloads, while struggling to adapt metropolitan knowledge, technologies, and goods to African biological, technological, institutional, and economic circumstances. In some ways this means practicing a past oncology for contemporary patients, since clinicians must rely only on drugs whose patents have expired, and work without the latest laboratory and imaging techniques.⁷ In 2010, I watched Dr V, a Zimbabwean oncologist, hunting through medical journals from the late 1960s. She and her Cuban oncologist colleague at Mpilo hospital often must go back decades in the published medical literature to debate and determine best care practices for their patients, even as they strive to stay current in their knowledge. In the process as we will see in the following chapters, the clinical staff, patients, and relatives are left to handle the ethical, intellectual, existential, and personal fallout from this mismatched and imbalanced process of knowledge and technology transfer.

In this chapter I trace some of the logics underlying the shifting center of gravity in oncology and African medical science and public health. I draw out a brief history of progressive narratives of epidemiological transition that have a hard time framing cholera and cancer (or tuberculosis and heart disease, or diabetes and hunger, or road accidents and maternal mortality) in the same historical epoch, despite their simultaneous abundance in places like Harare in 2009. I argue that cancer's African invisibility, its conceptual impossibility, had to be created. And ironically, this has rendered African publics particularly vulnerable to the carcinogenic fallout of global capital. Yet, as we enter the second decade of the twenty first century, cancer is beginning to emerge from the shadows through a combination of techno-scientific, economic, and epidemiological shifts. The new HPV (human papilloma virus) vaccines for genital cancers represent a recent shift in this logic in an era when private pharmaceutical companies are beginning to pay greater attention to Africa as a site where they simultaneously enact philanthropy and create knowledge and markets. I take up these issues in a brief discussion, showing how cancer is made visible once it can fit Africa's extant public health frameworks, in other words when it is rendered as yet another sexually transmitted disease. I then go on to look beyond virology to contemplate the carcinogenic fallout of global markets for tobacco and occupational ill health resulting from the extraction of raw materials under exploitive labor conditions.

This discussion is schematic. Because of tremendous gaps in our epidemiological knowledge and because of the long gestation period for many cancers, tight etiological arguments are simply not possible for many contexts in Africa. Indeed this is part of my

⁶ Bernard Stewart and Paul Kleihues eds., *World Cancer Report* (WHO and IARC) (Lyon: IARC Press, 2003): 281-282

⁷ Iruka Okeke, *Divining Without Seeds: the Case for Strengthening Laboratory Medicine in Africa* (Cornell University Press, 2011).

argument. Cancer's visibility or invisibility in a given population is created through a dense network of knowledge accumulation and production, and that this network is uneven or lacking in many parts of Africa. Therefore, this chapter is intended to open discussion of how the invisibility of cancer in Africa facilitates on the one hand the production of carcinogenic relationships on the continent, and on the other, clinical knowledge that is often ill suited to African clinical contexts, furthering the imperative of clinical improvisation. The PMH oncology ward is historically situated within this broader framework of ideas and activity.

Across the globe understandings of cancer as a "disease of development" does not square with realities on the ground. This should not surprise us. We have long known to be wary of progressive narratives. We know that development trajectories based on specific western European and/or North American models do not fit actual economic, political, social, and infrastructural histories from Changsha to Lahore to Bujumbura. And so not surprisingly, models of epidemiological transition, which take "development" as their temporal telos, are ill-suited to project or capture the changing burden of disease. Similarly we know that poverty, racism, and cancer enjoy a troubling synergy, embodied for example, in the complex production of invisibility surrounding occupational lung cancers for African uranium miners, as described by historian of science Gabrielle Hecht, and discussed below.⁸ Unfortunately, as Lovemore Makoni's experience illustrates, a new dystopic epidemiological narrative is emerging in Africa, one in which cholera and cancer not only co-exist, but gain synergy around poverty. This has implications for how we imagine and approach cancer.

Infectious Disease or the Price of Development?

Global public health has long been founded on an assumed developmental telos. The goal was to mirror the epidemiological transition of Western Europe, Japan, the United States, and Canada. Infectious disease, malnutrition, and high birth rates would all need to fall through efforts guided by state and global initiatives. Life expectancy would grow and chronic illnesses would eventually become the significant problem. Most public health activity in Africa during the course of the past century -- animated by a range of competing interests, have developed within this epidemiological progress narrative that rendered contemporary health in historical terms.⁹

Such narratives have also hinged on a narrow model of infectious disease that privileged disease transmission over illness. For example, as I have argued elsewhere, the vast burden of extra-pulmonary TB has long been marginalized from tuberculosis

⁸ "Poverty Blamed for Blacks High Cancer Rate," *New York Times* April 17, 1991; Keith Wailoo, *How Cancer Crossed the Color Line* (Oxford University Press, 2011); Gabrielle Hecht, "Africa and the Nuclear World: Labor, Occupational Health, and the Transnational Production of Uranium," *Comparative Studies of Society and History* 51(4), 2009: 896-926; Gabrielle Hecht, *Uranium from Africa and the Power of Nuclear Things* book mss.

⁹ There is a tremendous literature on these issues in Africa: Randall Packard, "The Healthy Reserve and the Dressed Native: Discourses on Black Health and the Language of Legitimation in Africa," *American Ethnologist* 16(4), 1989: 686-703; Jean Comaroff, "The Diseased Heart of Africa: Colonialism, Medicine, and the Black Body," S. Lindenbaum and M. Lock [eds], *Knowledge, Power, and Practice: The Anthropology of Medicine and Everyday Life*. (Berkeley: University of California Press, 1989); Megan Vaughan, *Curing Their Ills: Colonial Power and African Illness* (Stanford U Press, 1990); And of course see Johannes Fabian, *Time and the Other: How Anthropology Makes its Object* (Columbia U Press, 1983).

campaigns. Such infections do not facilitate transmission of the tubercule bacillus, though they do produce widespread debility.¹⁰ From the vertical campaigns intended to prevent and halt the spread of infectious diseases, to family planning campaigns, maternal child health initiatives, the primary care movement of the 1970s, to the fee-for service health services of the 1980s and 1990s, and the HIV prevention and treatment programs of the 21st century – health planners have envisioned biologically simple publics grappling with primary questions of infectious disease transmission, malnutrition, and fertility. Statistical collection, which drives health planning and imperatives, accordingly has focused on disease transmission, vaccination coverage, births, and deaths. And a security framework, sometimes related to labor-hunger or racialized demographic anxieties, has framed these questions of infectious disease transmission and demography in a politics of urgency and defense.¹¹

Yet if we follow cancer closely we begin to see a slightly different narrative emerging. Many of Africa's cancers are facilitated by sub-clinical infections (with Hepatitis B, Human Herpes virus-8, Epstein Barr virus, Human Papilloma virus, etc), or chronic clinical infections (malaria, or schistosomiasis) that over time can foster cancers. Carcinogenesis is complicated. For example, liver cancers appear to be fostered by a combination of subclinical infections with hepatitis, and the presence of aflatoxins in poorly stored African grains. Human papilloma virus (HPV) facilitates all squamous cell cervical cancers, but many more women have HPV than will ever develop cancer of the cervix.¹² In many cases, however, these disease progressions are fostered by the immunosuppression brought by malnutrition and HIV. Well over a decade ago epidemiologists estimated, “The proportion of cancers [in 1995] attributed to infectious agents is higher in developing countries (23%) than in developed countries (9%). This proportion is greatest among women in Western, Eastern, and Central Africa, where 40% of all cancers are associated with chronic infections...”¹³ This dynamic may be increasing as more people are put on antiretrovirals, but it is hardly novel. The recognized relationship between infectious agents and cancer illnesses is longstanding in Africa.

Indeed half a century ago, researchers in east and central Africa made significant contributions to the field of cancer immunology, and to clinical oncology.¹⁴ At the center

¹⁰ Julie Livingston, *Debility and the Moral Imagination* ch. 4.

¹¹ Nicholas B. King, “Security, Disease, Commerce: Ideologies of Post-Colonial Global Health.” *Social Studies of Science* 32(5/6), 2002: 763-789; Andrew Lakoff, Two Regimes of Global Health,” *Humanity: An International Journal of Human Rights, Humanitarianism, and Development* 1:1 (Fall 2010); Andrew Lakoff, The Generic Biothreat, or, How We Became Unprepared,” *Cultural Anthropology* 23:3 (2008).

¹² Lundy Braun and Ling Phoun, “HPV Vaccination Campaigns: Masking Uncertainty, Erasing Complexity,” in *The HPV Vaccine and Sexual Risk: Citizens and States at the Crossroads of Cancer Prevention*, eds. Keith Wailoo, Julie Livingston, Stephen Epstein, and Robert Aronowitz (Baltimore: Johns Hopkins University Press, 2010).

¹³ Bernard Stewart and Paul Kleihues eds., *World Cancer Report* (WHO and IARC) (Lyon: IARC Press, 2003)p. 61.

¹⁴ John Iliffe, *East African Doctors: A History of the Modern Profession* (Cambridge University Press, 1998): 142-143. See for example: D. P. Burkitt and S. K. Kyalwazi, “Spontaneous remission of African lymphoma,” *British Journal of Cancer* 21(1), 1967: 14-16; Olweny, C. L. M., Toya, T., Katongole-Mbidde, E., Mugerwa, J., Kyalwazi, S. K. and Cohen, H. (1975), “Treatment of hepatocellular carcinoma with Adriamycin: Preliminary communication,” *Cancer*, 36 (1975): 1250–1257; Vogel, C. L., Templeton, C. J., Templeton, A. C., Taylor, J. F. and Kyalwazi, S. K., “Treatment of Kaposi's sarcoma with actinomycin-D and cyclophosphamide: Results of a randomized clinical trial,” *International Journal of Cancer*, 8 (1971): 136–143; Taylor, J. F., Templeton, A. C., Vogel, C. L., Ziegler, J. L. and Kyalwazi, S.

of this work was a recognition that certain cancers can arise as co-infections in immuno-challenged patients, and that silent (or sub-clinical) infections matter not only in terms of disease transmission (what I am calling the narrow infectious disease model), but also in terms of long-term neoplastic outcomes.¹⁵ In the 1960s and 1970s when the bulk of this research was performed the center of gravity in cancer research, a growing field, was at least somewhat balanced by the formation of the International Agency for Research on Cancer (IARC), which was established by the World Health Assembly in 1965. IARC picked up on work forged by the International Union Against Cancer, which had included the development of regional subcommittees for Africa, Asia, and Latin America, and which had organized workshops including on pathologies of particular concern to Africa: Burkitt's lymphoma, primary cancer of the liver, hemangiosarcoma, etc.¹⁶

IARC emerged out of a distinct security logic, amid fears that industrial pollutants and other toxins could not be contained within national borders, thus making cancer a key issue for the post-World War II international community. Initial proposals made this logic explicit – recommending that nations contribute one half percent of their military budgets to form the agency.¹⁷ The agency was founded at a time when “the chemical environment was perceived as the cause of most cancers.”¹⁸ At the heart of the IARC mission lay “geographic pathology” or the attempt to compare environments and corresponding cancer epidemiology to determine potential environmental etiologies. This was a paradigm that fostered African cancer research.¹⁹ Environment was understood initially in its broadest sense, to include factors like diet and cigarette smoking, the prevalence of various infectious agents, as well as chemical pollutants, etc.

And yet, as Nixon declared war on cancer in the U.S. in the early 1970s, and government money flowed into American cancer research, the weight of research and the paradigms underlying its loci would shift decidedly. From 1964 through the 1970s the National Cancer Institute had poured research money into a special Virus Cancer Program, charged with determining “whether viruses cause human cancer, and if so what to do about it.”²⁰ But ten years later the program was criticized for its lack of results.²¹ As Siddhartha Mukerjee explains,

[C]ancer biology, the NCI, and the targeted Special Virus Cancer Program had all

K., “Kaposi's sarcoma in Uganda: A clinico-pathological study,” *International Journal of Cancer*, 8 (1971): 122–135; Ziegler, J. L., Cohen, M. H., Morrow, R. H., Kyalwazi, S. K. and Carbone, P. P., “Immunologic studies in Burkitt's lymphoma,” *Cancer*, 25 (1970): 734–739.

¹⁵ Carcinogenesis is complex, and in many cases poorly understood, so this is not to argue that these viruses in and of themselves *cause* cancers. Instead it makes more sense to understand them as necessary, but not sufficient causes in many cases.

¹⁶ This history is outlined by the founding director of IARC in John Higginson, “From Geographic Pathology to Environmental Carcinogenesis: a Historical Reminiscence,” *Cancer Letters* 117(1997): 133–142.

¹⁷ John Higginson, “The International Agency for Research on Cancer: A Brief Review of Its History, Mission, and Program,” *Toxicological Sciences* 43 (1998): 80.

¹⁸ *Ibid.*, 83.

¹⁹ And, it was a paradigm in turn fostered by research into African cancers. Una Maclean, “Nigeria 1956–65: A Medical Memoir,” *African Affairs* 83 (333), 1984: 543–66. I thank Iruka Okeke for bringing this to my attention.

²⁰ Barbara J. Culliton, “Cancer: Select Committee Calls Virus Program a Closed Shop,” *Science* vol. 182, no. 4117 (Dec 14, 1973): pp1110–1112 (quote on p1111).

²¹ *Ibid.*

banked so ardently on the existence of human cancer retroviruses in the early 1970s that when the viruses failed to materialize, it was as if some essential part of their identity or imagination had been amputated. If human cancer retroviruses did not exist, then human cancers must be caused by some other mysterious mechanism. The pendulum, having swung sharply toward an infectious viral cause of cancer, swung just as sharply away.²²

This process set up an intellectual, political, and economic environment, culminating during the Reagan era, in which molecular biology and genetics began to draw many researchers away from environmental research and into narrower models of inquiry.²³ At the same time the broader technological field in which oncological research was embedded shifted through the development of new technologies like PCR that both facilitated genetic research and put it further out of reach for African laboratories.

There was, however, some limited technological improvement in this period in the form of increased provision of radiotherapy services. Beginning in the 1970s the International Atomic Energy Agency (IAEA), another agency that would emerge out of a unique cold war technological context, partnered with the WHO to run programs intended to improve capacity for badly needed therapeutic radiation services in the developing world. Part of the IAEA mandate as an autonomous UN agency, was to “seek to accelerate and enlarge the contribution of atomic energy to peace, health, and prosperity throughout the world.”²⁴ Amid the contentiousness of both nuclear power and weaponry, development in the form of health care represented at least one rationale that seemed unquestionable. In 1970, sub-Saharan Africa (excluding South Africa, whose services would be racially segregated and profoundly mal-distributed under apartheid) had only 6 high-energy radiotherapy machines. This would increase to 20 by 1989 with technical and training support from the IAEA. Nonetheless, by 1991 the agency could still claim that “only about 35% of the countries in Africa have any facilities for radiation therapy, and in many cases these are grossly ill-equipped and understaffed,” a problem they saw as arising at least in part out of the “lack of awareness by the competent authorities of the extent of the cancer problem in many countries owing to an absence of cancer registries and statistics.”²⁵ What was visible to some at the IAEA would unfortunately remain hidden to mainstream oncology for decades to come.

As cancer research moved to the center of metropolitan bio-scientific agendas, it was beginning to atrophy in Africa rather than expand. By the 1980s with attention being drawn to retroviruses in Africa, the interest in cancer could have gained new import, as some advocated at the time, positing a particularly important relationship and set of

²² Siddhartha Mukherjee, *The Emperor of all Maladies: A Biography of Cancer* (New York: Scribner, 2010): 357.

²³ Robert Proctor, *Cancer Wars: How Politics Shape What We Know and Don't Know About Cancer* (Basic Books, 1996); Keith Wailoo and Stephen Pemberton, *The Troubled Dream of Genetic Medicine: Ethnicity and Innovation in Tay-Sachs, Cystic Fibrosis, and Sickle Cell Disease* (Johns Hopkins U Press, 2006).

²⁴ M. Nofal, F. Durosinmi-Etti, G.P. Hanson, and J. Stjernsward, “Supporting Cancer Care in the Developing Countries: Role of IAEA/WHO,” *International Journal of Radiation Oncology, Biology, Physics* vol. 19 (1990): 1249-1256.

²⁵ F.A. Durosinmi-Etti, M. Nofal, and M. M. Mahfouz, “Radiotherapy in Africa: Current Needs and Prospects,” *IAEA Bulletin* 4 (1991): 24, 25.

research possibilities in the virology-oncology nexus in Africa.²⁶ And yet, war and political predation in Uganda had destroyed the capacity of one of the key oncological research sites in central Africa.²⁷ Structural adjustment policies had snuffed out some of the nascent oncology work on the continent, which had showed promise only a decade or two earlier under IARC auspices. At the same, metropolitan oncological research was coming to emphasize more sophisticated laboratory techniques, genetics, and imaging and drug development, thus widening the gap between African and metropolitan oncology (save for the pocket of metropolitan research in then-apartheid era Johannesburg and Cape Town).

In 1984, in his welcome address to the Symposium on Virus-Associated Cancers in Africa organized by the Organization of African Unity, the WHO, and IARC held in Nairobi, Olufemi Williams, hematologist and executive secretary of the OAU's Scientific Technical and Research Commission described the total lack of African oncological capacity.

...It is perhaps pertinent to stress at this point that there is a severe shortage of trained manpower in the fields of virology and oncology in Africa. It is therefore not surprising that there are very few virologists and oncologists at this meeting. If I were to hazard a guess, I would say that for the whole continent of Africa, which has a population of over 400 million, there is perhaps a ratio of one oncologist to 10 million people and one virologist to 1 million people. These figures may not even be realistic but they reflect the current situation in Africa. In addition to these shortages, there are extremely few institutes of virology or institutes or facilities for cancer research or training in Africa. To quote figures there are less than 10 of these institutes throughout the 50 countries of Africa...²⁸

The narrow infectious disease model of African public health – breathed new life through HIV and the interest in retroviruses had regained ascendancy now decoupled from the complexities of cancer, even as researchers within the US and other metropolitan contexts began to grapple with the carcinogenic outcomes of HIV.²⁹ HIV research would

²⁶ A Olufemi Williams and Gregory T. O'Connor, "Introduction," in A. Olufemi Williams, Gregory T. O'Connor, Guy B. De-The, and Couavi A. Johnson, eds, *Virus-Associated Cancers in Africa* IARC Scientific Publications Number 63/OAU/STRC Scientific Publications Number 1, International Agency for Research on Cancer, Lyon France, (Oxford U Press, 1984): pxii.

²⁷ The Uganda Cancer Institute had grown out of a lymphoma treatment center at Mulago Hospital – initially funded by the U.S. National Institute of Health in the late 1960s, and which was a site of American scientific collaboration in the early 1970s.

²⁸ A. Olufemi Williams, Gregory T. O'Connor, Guy B. De-The, and Couavi A. Johnson, eds, *Virus-Associated Cancers in Africa* IARC Scientific Publications Number 63/OAU/STRC Scientific Publications Number 1, International Agency for Research on Cancer, Lyon France, (Oxford U Press, 1984): xxv-xxvi.

²⁹ In the late 1980s and early 1990s there was clinical research and interest in AIDS related malignancies, particularly KS and lymphoma among US based researchers, but cases of cancer began to decline after the introduction of protease inhibitors in the mid 1990s. A greater flurry of work on AIDS related malignancies (particularly Non-Hodgkins Lymphoma, HPV related genital cancers, and KS) including treatment recommendations followed in the late 1990s and early 2000s. See for example, several of the articles collected in Feigal, Levine, and Biggar eds., *AIDS-Related Cancers and Their Treatment* (New York: Marcel Dekker, 2000). In 1995 the National Cancer Institute established the AIDS Malignancy Consortium (AMC) with 15 main Clinical Trials Sites to develop therapeutic protocols for AIDS related cancers. Yet the AMC project was short lived and was not refunded when its grant expired in 2004. For a

offer new insights into immunosuppression that would lead to crucial breakthroughs in scientific knowledge about oncogenic viruses and the viral origins of tumor suppressor gene sequences. Yet this knowledge was not produced with Africa in mind, despite the growing burden of immunosuppression on the continent.

But despite these developments, the 1990s Africa remained far from the center of gravity in oncology, and oncology far from the center of gravity in Africa. Among cancer researchers, and critical work was done at the nexus of HIV and virus-associated cancers. But without epidemiological support, which proved difficult given the lack of cancer registries and diagnostic and screening abilities, this new work was not sutured to African contexts, where such cancers occur at the greatest proportions. Despite the weight of scientific knowledge the relationship between viruses and cancers could remain marginalized in the public imagination, as well as in the agendas of global health and development.³⁰

One of the reasons for this marginalization of viral cancers was an understanding of cancer as a “disease of civilization.” Modern oncology research was founded, in part, on the notion that primitive people living in a “state of nature” exhibited low rates of cancer.³¹ This model predominated in Euro-American scientific (and popular) understandings of cancer for the first half of the twentieth century. Africans were long placed outside of history, such that contemporary Africans were viewed by Europeans and Americans as evidencing a static, but deep human past.³² In other words, American oncology was grounded on a false African twin, such that high rates of cancer in the US were understood in relationship to the supposed non-existence of cancers in Africa, creating a set of geographic horizons in American oncology that are only just starting to erode.

If oncology obscured African cancer in the final decades of the twentieth century, African public health, driven in large part by external interests, did likewise, failing to fit cancer into its logics or its politics of triage, despite a promising moment of critical intersection in the 1960s. International health as a domain of professional practice, institutional logic, and as animating force in the distribution of resources and knowledge, emerged out of a combination of nineteenth and twentieth century security concerns brought by global commerce (where ships might unload pathogens as well as goods), and the labor-hunger of European colonialism. This was later furthered by a post WWII developmentalist drive to create consumer markets in the global south. Though IARC was conceived in this spirit of international security during a cold-war era of African decolonization, this particular vision of international health proved difficult to sustain.³³

brief overview of the AMC see Jeffrey Shouten, “The Rise and Fall of the AIDS Malignancy Consortium,” *Research Initiative Treatment Action*, summer 2003: 30-31.

³⁰ Even such an astute critic of the cancer industrial complex as historian of science Robert Proctor was able in 1995 to claim, “it is probably fair to say that undue attention has been given to this particular collection of agents [viruses]. The same could be said for infectious agents more generally.” Robert N. Proctor, *Cancer Wars: How Politics Shapes What We Know and Don't Know About Cancer* (New York: Basic Books, 1995): 14.

³¹ This is not to suggest that cancer was thought directly related to affluence. Scrotal cancers had long been associated with chimney sweeps, and mesothelioma with asbestos workers, for example. Rather it was associated with that problematic term “modernity”.

³² Fabian, *Time and the Other: How Anthropology Makes Its Object* (Columbia University Press, 1983).

³³ See Randall Packard, “Visions of Postwar Health and Development and their Impact on Public Health Interventions in the Developing World,” in F. Cooper and R.M. Packard, eds. *International Development*

By the 1970s African cancer and IARC itself were rendered outside of the dominant international health vision of Africa with its long-standing focus on infectious pathogens and population control. This marginalization intensified as World Bank and IMF led structural adjustment in African public health coincided with the intensive turn to genetics in metropolitan oncology.

Pharmaceuticalized Publics: HIV and the Emergence of African Cancer

The African HIV/AIDS epidemic, which began to be felt in the mid 1980s in central Africa and then spread across southern and east Africa in the ensuing decade, came at a moment when health services in many countries were beginning to crumble in the face of imposed austerity measures and user fees. Across southern Africa, even viable public health systems in places like Botswana, were soon overwhelmed by the huge numbers of gravely ill patients. Many of those patients might have had a cancer, but it was HIV that understandably dominated attention. In Botswana, as in other countries in Africa's "AIDS belt" this was a time of existential crisis and widespread loss of life. The public biomedical system offered little to African AIDS patients other than some empirical treatments for opportunistic infections. Little, if any pain relief was on offer, and most significantly, the small but rapidly growing arsenal of effective antiretrovirals developed by multinational pharmaceutical corporations were priced well out of the reach of all but a few Africans with private wealth or international connections. Africa and its patients were rendered outside of the markets that mattered and markets had become the mechanism by which health care was distributed.³⁴

Over the past decade this situation has begun to change in the face of a new and growing era of public-private partnerships in African health care.³⁵ Markets continue to matter tremendously, but HIV activists were able to insert moral arguments into the competition between different modes of drug manufacture. Along with political leaders in certain interested and reformist states (like Brazil or India), they succeeded in changing international market structures and controls, producing attendant shifts in the ways pharmaceutical companies approach African patients.³⁶ Because of these changes, antiretroviral therapies have finally arrived in Africa. In some places, like Botswana, these drugs are donated to an arm of the national health care program, which has universal access as its mandate and goal. In others they arrive as part of an uneven patchwork of non-governmental and state led services.³⁷ Either way, this development marks a major

and the Social Sciences. Berkeley, University of California Press, 1997, pp. 93-118; Nicholas B. King, "Security, Disease, Commerce: Ideologies of Postcolonial Global Health," *Social Studies of Science* 32 (5-6) 2002: 763-789.

³⁴ Meredith Turshen, *Privatizing Health Services in Africa* (Rutgers University Press, 1999).

³⁵ Rene Gerrets, "Globalizing International Health: The cultural politics of 'partnership' in Tanzanian malaria control." PhD dissertation, New York University, 2010; Betsey Brada, "Uncertain Futures, Experimental Lives: The Politics of Knowledge in Botswana's AIDS Epidemic," PhD dissertation, University of Chicago, 2011.

³⁶ These are very complicated dynamics that incorporate dynamic legal and market structures accompanying the rise of the World Trade Organization, and attendant shifts in intellectual property rights. Kristin Peterson XXXX; Joao Biehl, "The Activist State: Global Pharmaceuticals, AIDS, and Citizenship in Brazil." *Social Text*, 2004, 22(3):105-132; Joao Biehl, "Pharmaceuticalization: AIDS Treatment and Global Health Politics," *Anthropological Quarterly* 80 (4), 2007: 1083-1126.

³⁷ Susan Reynolds Whyte, Michael Whyte, Lotte Meinart, and Betty Kyaddondo, "Treating AIDS: Dilemmas of Unequal Access in Uganda," *SAHARA-J: Journal of Social Aspects of HIV/AIDS*, 1(1), 2004: 14-26;

moment in what anthropologist, Joao Biehl has described as the “pharmaceuticalization” of public health.

In this scenario, pharmaceuticals, while incredibly important, are offered in the absence of, and as a replacement for hollowed out African health systems. Or they form the nexus for vertical (disease specific) public health campaigns, which run alongside highly constrained state institutions. Historians might recognize this as a return to the magic bullet campaigns of the 1950s. Meanwhile, as Biehl puts it, “pharmaceutical companies are themselves engaging in biopolitics, gaining legitimacy and presence in both state institutions and individual lives through drugs.”³⁸

Since the advent of aminopterin over a half century ago, oncology has become a highly pharmaceuticalized endeavor. Yet, given the invisibility of African cancers since the 1970s, and the huge markets in the west for high cost therapies, which support rapid paced drug development, places like Botswana would seem to lie outside of the market logics of oncology, even as they have been folded into those of HIV. While this is true to a great extent, the global cancer markets are complex, dynamic, and multifaceted enough to sometimes draw in African patients, rendering their cancers visible.

Most of the drugs in PMH oncology are off-patent drugs developed in the 1970s and 80s, and manufactured by Indian pharmaceutical firms that specialize in generics. But many newer cancer drugs are still too expensive for use in the ward, even in their generic form. This was the case with imatinib, also known by its brand name Gleevec [Glivec]. Gleevec, was approved in the United States by the FDA in 2001 and immediately hailed as a wonder drug for patients with chronic myeloid leukemia and gastrointestinal stromal tumors. But it is a very expensive drug and meant to be taken life-long. In January 2007, during a visit by a team of pharmaceutical representatives, Dr P asked about imatinib, but the price was well above what he thought acceptable for a public health system interested in equity. At the time, a standard dose of Gleevec cost well over US\$3000 per month for patients in the U.S., and even though the price he was quoted for a generic brand was considerably less, it was too high given the lifelong financial commitment it would require on behalf of each patient.

But, unlike many other expensive cancer drugs with only marginal benefits, though Gleevec could not cure it had also proved remarkably effective, and Dr P wanted it for his patients. So he began to seek out other avenues. After his application stalled with the Novartis office in South Africa, Dr P approached executives from Novartis at a cancer meeting in Europe. With their help he was able to enroll PMH patients with chronic myeloid leukemia on Gleevec, through a Novartis corporate philanthropy program. This meant sending blood samples to South Africa where they would be tested for the presence of a specific translocation gene to determine biological eligibility. And it meant collecting personal economic data on each patient to demonstrate that they were financially eligible to receive the drug as a gift. By June 2008, a dozen or so eligible patients were called in to begin taking the drug, which they were told was a gift from friends in Switzerland.

Botswana patients were not alone in receiving free Gleevec from Novartis. In 2006 Novartis had already assisted more than “20,000 patients in 80 countries,” through

Vinh Kim Nguyen, *The Republic of Therapy: Triage and Sovereignty in West Africa's Time of AIDS* (Duke University Press, 2010).

³⁸ Joao Biehl, “Pharmaceuticalization: AIDS Treatment and Global Health Politics,” *Anthropological Quarterly* 80 (4), 2007: p.1093.

its Glivec International Patient Assistance Program.³⁹ By giving the drug away to those who could not afford it, Novartis was able to fend off competition by the Indian generics industry. This competition was not located in southern Africa; as we have seen even generic imatinib was too costly for most patients in Botswana. As Stefan Ecks argues, Novartis's real interest is the market in the U.S. and the European union, where they feared that Indian generics could potentially "leak" back in, as could organized patient demand for lower prices. In other words, part of the global pricing strategy of new cancer drugs like Gleevec, rely on gifts to poor patients in the global south, so that a broader community of consumer activism does not emerge to undercut the profits to be made in the global north. At the same time, corporate philanthropy programs in the U.S. provide Gleevec to American patients in need for similar reasons.⁴⁰ Drugs as gifts given to some patients sustain drugs as commodities purchased by others, as Eck explains.

The gift of Gleevec for a handful of leukemia patients, suggests one small avenue for making African cancers visible in an era of corporate philanthropy. The recent entry of big pharma into the viral oncology market through the development of the new human papilloma virus vaccines, suggests another. Given the synergy between HIV and HPV, and the high prevalence of the disease, African cervical cancer has been rendered visible amid this new, intensively pharmaceuticalized era in global public health.⁴¹ This legibility was accomplished by rewriting cervical cancer through that classic trope in African disease – the STD.⁴²

Cancer as STD – Vaccine in the Era of the Public-Private Partnership

Back in PMH oncology, just across the ward from where Lovemore Makoni's corpse once sat, a row of women with cervical cancer lie in their beds awaiting the van that will take them across town. There they will queue for their turn with the country's only radiotherapy service, a linear accelerator owned by the Gaborone Private Hospital, which serves public patients on the government's dime. Some of these women are actively bleeding, many have serious pain, and all are understandably worried for their futures and those of their children. Each Sunday ambulances from the northern referral hospital in Francistown deposit women with cervical cancer at PMH and the interim

³⁹ Stefan Ecks, "Global Pharmaceutical Markets and Corporate Citizenship: The Case of Novartis' Anti-cancer Drug Glivec," *Biosocieties* 3 (2008): 172.

⁴⁰ Stefan Ecks, "Global Pharmaceutical Markets and Corporate Citizenship: The Case of Novartis' Anti-cancer Drug Glivec," *Biosocieties* 3 (2008):165-181.

⁴¹ Joao Biehl, "Pharmaceuticalization: AIDS Treatment and Global Health Politics," *Anthropological Quarterly* 80 (4), 2007: 1083-1126.

⁴² The appeal of the STD for making African health intelligible is long-standing. Randall Packard and Paul Epstein, "Epidemiologists, Social Scientists and the Structure of Medical Research on AIDS in Africa", *Social Science and Medicine*, 33 (1991): 771-794; Nakanyike Musisi, "The Politics of Perception or Perception as Politics? Colonial and Missionary Representations of Baganda Women, 1900-1945," in Allman, Geiger, and Musisi eds, *Women in African Colonial Histories*, (Bloomington: Indiana University Press, 2002), pp.95-115; Meghan Vaughan, "Syphilis and Sexuality: The Limits of Colonial Medical Power" in *Curing Their Ills*, 129-154; Editorial, 'Syphilis in the Uganda Protectorate', *British Medical Journal*, 2,(1908): 1037; Editorial, 'Syphilis in Uganda', *The Lancet*, 2 (1908):1022-1023; S.L. Kark, 'The Social Pathology of Syphilis in Africans', *South African Medical Journal*, 1949, vol 23, pp77-84; Caldwell, J., Caldwell, P., & Quiggin, P. "The social context of AIDS in sub-Saharan Africa," *Population and Development Review*, 15(2) 1989, 185–234; Suzette Heald, "The power of sex: Some reflections on the Caldwells' 'African sexuality' thesis," *Africa*, 65 (1995), 489–505; Nancy Hunt, *The Nervous State* (forthcoming, Duke University Press).

home, where patients lacking Gaborone based relatives may be housed while receiving treatment in the radiation unit. Each week Dr P struggles to find beds for these women in this perpetually overcrowded hospital and its satellite dormitory.

On the other side of the hospital, in one of the gynecology clinic rooms, lies the only colposcopy clinic in the southern half of the country. The Ministry of Health was now recommending pap smears for all HIV positive women, and the clinic was set up to monitor patients whose smears indicated a high risk for cervical cancer. Here the gynecologist peers through a special machine (donated by BOTUSA – the CDC- Ministry of Health partnership), with a magnifying lens that highlights the cervix of the woman on the exam table. Peering through the speculum, trying to learn the gynecologist’s vision, sometimes I am surprised at how clearly a thick, vascular, meaty tumor is framed in the eye piece. Usually the view is subtler. When he finds a suspicious lesion, Dr T, the gynecologist, takes a biopsy, making a drawing in the patient’s health card to indicate its location. He will use the drawing in a few months time when the patient returns for further internal investigation to confirm and definitively stage the cancer. Dr T makes these drawings because they don’t have the glucose solution you would need in theater to see the lesion (“they have been ordering it forever,” he explains) – so the drawing guides them. He says at home (in central Europe) they cut the cone and stretch it with pins on a piece of cork so that it is spread out and doesn’t shrink in the formalin. Then they note where on a clock (with cervix as circle) the biopsy was taken – 4 o’clock for example. Not here. Here, he comments wryly, pathology doesn’t even recognize that it is a cone.

There is a bottleneck in gynecology, so these women are booked a few months hence to complete diagnosis and begin treatment. Such patients have already waited six months for the results of their pap smears (given the limited laboratory capacities for processing these tests), and then another several months for booking at colposcopy. Many are new to gynecology and have to be taught how to put their feet in the stirrups, and the purpose of the speculum. Some are in too much pain to allow Dr B a thorough exam. By the time the gynecologist is able to inspect their cervix and order a biopsy, nearly all of those with cancer (many, thankfully are not so afflicted) are too far along for a simple hysterectomy. And many of these patients also have HIV thus complicating their treatment options and further lowering their chances at cure.

Meanwhile in a small office at the back of the hospital, near the HIV clinic, Dr. Doreen Ramagola-Masire, a Motswana gynecologist working for the University of Pennsylvania is piloting a new see-and-treat approach for the country that could potentially obviate the need for pap smears.⁴³ Patients come to her clinic, which is on the grounds of PMH. Dr R-M examines their cervix visually using a solution of either iodine or acetic acid that helps to illuminate any lesions. If she finds a lesion, she then removes it on the spot. Together with the new HPV vaccines, these see-and-treat technologies are remarkably welcome developments.⁴⁴ Though their success depends on well-trained staff, they eliminate the need for laboratory capacity necessary to process pap smears, and the

⁴³ For a discussion of the challenges of screening through pap smear and colposcopy in these settings as versus the new Visual Inspection with Acetic Acid (VIA or see and treat) see, Lynette Denny, Michael Quinn, and R. Sankaranarayanan, “Screening for cervical cancer in developing countries,” *Vaccine* 24S3 (2006) S3/71–S3/77.

⁴⁴ Doreen Ramogola-Masire, “Cervical Cancer, HIV and the HPV Vaccine in Botswana,” in *The HPV Vaccine and Sexual Risk: Citizens and States at the Crossroads of Cancer Prevention*, eds. Keith Wailoo, Julie Livingston, Stephen Epstein, and Robert Aronowitz (Johns Hopkins University Press, 2010).

period in which lesions can progress while the patient waits for her surgical appointment. So too are they garnering a new level of attention to one aspect of the African cancer epidemic.

Yet with the vaccines in particular, only time will tell how well a three –part high-cost vaccine developed to sell to American consumers will fit Africa’s many contexts.⁴⁵ If there are already some concerns as to the long-term efficacy of the vaccine in the U.S. and western Europe, preliminary research points to potential problems in African reliance on the importation of technologies developed with metropolitan contexts in mind (as is the case across the spectrum of oncological practice). The two vaccines on the market (Gardasil and Cervarix) address only the two oncogenic (or what are called “high risk”) viral subtypes (16 and 18), which are associated with the vast burden of cervical cancer and dysplasia in the U.S. Though 16 was the most prevalent in rural Gambia,⁴⁶ in some parts of Africa, the epidemiology of high-risk viral subtypes for HPV appears to differ from the U.S. context. Evidence from a 2007 study of 150 HIV infected women in urban Zambia, for example, found that high risk HPV strains 52 and 58 were more common than HPV 16 or 18 in women with high-grade squamous intraepithelial lesions or squamous cell carcinoma. Within Africa and beyond, “studies are unanimous, thus far, in showing that HIV-infected women are more commonly infected with non-16 and -18 high-risk (HR) HPV types, such as 52 and 58.”⁴⁷ Moreover aggregate data suggests that fifty percent of HIV positive women in sub-Saharan Africa who had HPV 16 or 18 were co-infected with another HPV type.⁴⁸ But knowledge is still inconclusive about the extent to which “non-HPV-16 and -18 types persist in actual CIN3/cancer histological specimens of HIV-infected women.”⁴⁹ Even where a vaccine targeting 16 and 18 is biologically appropriate, questions remain as to whether the suppression of prevalent oncogenic viral subtypes (in this case HPV 16 and 18) through vaccination might provide an opportunity for selective pressure by other currently less prevalent oncogenic subtypes within a given population. Furthermore, in the US these vaccines were tested for their suppression of precancerous cervical lesions, but we know far less about how effective they are in suppressing cancers themselves in a context where precancerous lesions are rarely picked

⁴⁵ Julie Livingston, Keith Wailoo, and Barbara Cooper, “HPV Skepticism and Vaccination as Governance: The U.S. and Africa as a Lens onto the North-South Divide,” in *The HPV Vaccine and Sexual Risk: Citizens and States at the Crossroads of Cancer Prevention*, eds. Keith Wailoo, Julie Livingston, Stephen Epstein, and Robert Aronowitz (Johns Hopkins University Press, 2010).

⁴⁶ Sahasrabudhe, VV, “Prevalence and distribution of HPV genotypes among HIV-infected women in Zambia,” *British Journal of Cancer* (2007) 96, 1480 – 1483; Wall, S.R. et al, “Cervical human papillomavirus infection and squamous intraepithelial lesions in rural Gambia, West Africa: viral sequence analysis and epidemiology,” *British Journal of Cancer* (2005) 93, 1068 – 1076. See also, Nubia Muñoz, F. Xavier Bosch, Silvia de Sanjosé, et al. “Epidemiological classification of human papillomavirus types associated with cervical cancer,” *New England Journal of Medicine* (2003) 348: 518-527.

⁴⁷ Nathalie Dauphin McKenzie, Erin N. Kobetz, James Hnatyszyn, Leo B. Twiggs, Joseph A. Lucci III, “Women with HIV are more commonly infected with non-16 and -18 high-risk HPV types,” *Gynecologic Oncology* 116 (2010) 572–577 (quote on p. 573).

⁴⁸ Karly S. Louie, Sylvia de Sanjose, and Philippe Mayaud, “Epidemiology and Prevention of Human Papillomavirus and Cervical Cancer in Sub-Saharan Africa: A Comprehensive Review,” *Tropical Medicine and International Health* 14(10), October 2009: 1287-1302.

⁴⁹ Nathalie Dauphin McKenzie, Erin N. Kobetz, James Hnatyszyn, Leo B. Twiggs, Joseph A. Lucci III, “Women with HIV are more commonly infected with non-16 and -18 high-risk HPV types,” *Gynecologic Oncology* 116 (2010) 572–577 (quote on p. 573).

up, and in particular where HPV and HIV are locked in a deadly synergy.⁵⁰ One reason the bio-scientific community understands relatively little about the complexities of HPV in Africa, despite the high rates of genital cancers, is that such knowledge ultimately hinges on the combined presence of population-based cancer registries, with accurate clinical data, and sophisticated laboratory ability to test for HPV within cervical cancer specimens or in women who were suffering them.⁵¹ Yet, such infrastructure is lacking in the very places where cervical cancer poses its greatest threat.

The rewriting of cervical cancer as an STD fits one element of cancer into the old epidemiological narrative of African public health without interruption. And, not surprisingly, these new HPV technologies fit neatly into the evolving logics of public-private partnership that are restructuring global public health. Merck pharmaceutical, developer of Gardasil (one of the two HPV vaccines on market), and partner in Botswana's pioneering national ARV program has recently committed to donate \$500 million worth of the vaccine (valued at the price it commands on the U.S. private market) to programs in 23 "of the world's poorest nations."⁵² This move is a first step towards establishing this new, and still controversial vaccine into the basic vaccination schedule in the developing world.

Genital cancers matter tremendously in human terms in places like Botswana where countless women are suffering and dying from cancers of the cervix and vulva, and so these vaccines are awaited with cautious optimism. And Merck has proven a generous and important partner in Botswana. Perhaps it is necessary to render a cancer as an STD for it to make sense within the logics of African public health. Yet, the reduction of complex pathology to vaccine-preventable STD threatens to erase cancer's complexity through an infectious disease versus chronic illness schematic. Indeed synthetic estrogens, tobacco, and other toxins appear to combine with HPV in facilitating genital cancers. And the high infection and death rates from cervical cancer in Africa are as much about the lack of comprehensive women's health services (such as those Dr Ramagola-Masire is attempting to develop for Botswana) as they are the sexual networks that the STD logic and the HIV co-infections imply. In other words, the STD logic, the narrow infection disease model, points towards pharmaceuticalized and behavioral interventions. Meanwhile the cancers themselves point towards the need for more broadly conceptualized forms of care. Nonetheless viral cancers, now entangled with HIV, STDs, and the pharmaceuticalization of public health are regaining visibility as an extended form of infectious disease.

Carcinogenic Invisibility

In 1996, I joined staff from the local clinic at a village meeting in eastern Botswana. Such meetings are common in the country, where a history of participatory democracy and public communication have meant that meetings – between a family group, a neighborhood, a village, or an age cohort – have been central to political and social life since long before colonialism. Colonial and later postcolonial bureaucratic and

⁵⁰ Charlotte J. Haug, "Human papillomavirus vaccination --- Reasons for caution," *New England Journal of Medicine* (2008) 359: 861-862.

⁵¹ I am grateful to Robby Aronowitz for this point.

⁵² Shannon Pettypiece, "Global: Merck Gives \$500 Million of Vaccine to Poorer Nations," *Bloomberg News* (09.23.09), Thursday September 24, 2009, <http://www.aegis.com/news/ads/2009/AD091661.html> (accessed 7 November 2009).

development initiatives in turn, co-opted the meetings as a standard form of communication. This particular meeting was well attended because even though it took place in a relatively minor village, the paramount chief of the *morafe* came. I have attended many public meetings in Botswana, but I still remember this one in particular, because of my surprise when the chief stood up and began lecturing about *motsoke* (tobacco). My Setswana wasn't good enough to follow everything he said, but I understood clearly when he lit a cigarette, blew the smoke through a piece of white cloth and then held the cloth up to show the nasty brown stain the smoke had left behind to everyone gathered. At a time when such meetings often included demonstrations about condoms and lectures about tuberculosis, the chief was talking tobacco.

Many of the men listening to the chief that day were former miners. Just like many of the men lying in PMH oncology, quietly hungering for breath under their oxygen masks, or awaiting their next meal of Ensure through the nasogastric tube hanging taped to their nose and threaded via the surgeon's knife through the narrow opening in an esophagus now crowded with tumor. For much of the twentieth century, the majority of able-bodied Batswana men from the southeastern region of the country crossed the border to work deep underground in South Africa's mines.⁵³ The system of oscillating migration, where African men left their families to live in mine compounds for extended periods of time, only returning home for short visits, became a defining feature of southern African history. From as far away as Angola and Malawi, and as close as Lesotho, Botswana, and Mozambique, able-bodied men disappeared into the bowels of South Africa, Southern Rhodesia, Swaziland, and South West Africa and brought forth gold, asbestos, diamonds, platinum, uranium, and other minerals. The profits were channeled along transnational, institutionally racist lines. The southern African system of colonial migration was pathological – creating a perfect delivery system for the dissemination of first malnutrition and tuberculosis and later HIV (and HPV).⁵⁴ It drew men into gold mines where radon daughters emanated from the rock. It produced mine waste laden with asbestos and uranium-laced tailings. It also created new markets for commodities like commercially manufactured cigarettes and alcohol, and new modes of consumption. It created cancer while depending on its invisibility.

If rendering genital cancers as STDs has helped them gain scientific visibility and funds in southern Africa, the same cannot be said for rendering esophageal or lung cancers as occupational risks associated with the complex ecology of the southern African mining industry. There are several reasons for this. In this region, with its high rates of endemic tuberculosis and overstretched public health and diagnostic infrastructure, lung cancers are routinely misdiagnosed as tuberculosis and treated with antibiotics. Indeed, many of the PMH lung cancer patients underwent TB treatment before they were referred to Dr P who finally established a proper diagnosis for their lung cancer. It is impossible to know how many more such patients die without access to a proper diagnosis. And tuberculosis

⁵³ Julie Livingston, *Debility and the Moral Imagination in Botswana* (Bloomington: Indiana University Press, 2005); Isaac Schapera, *Migrant Labour and Tribal Life: A Study of Conditions in the Bechuanaland Protectorate* (London: Oxford University Press, 1947).

⁵⁴ Randall Packard, *White Plague, Black Labor: Tuberculosis and the Political Economy of Health and Disease in South Africa* (University of California Press, 1989); Mark Hunter, *Love in the Time of AIDS: Inequality, Gender, and Rights in South Africa* (Indiana University Press, 2010); Didier Fassin, *When Bodies Remember: Experiences and Politics of AIDS in South Africa* (University of California Press, 2007).

appears to increase lung cancer risk, so there is the possibility of a plural diagnostic need.⁵⁵ Occupational and environmental health hazards associated with industry are often difficult to establish. Multifactoral models of causation based on occupational or environmental exposure are complex to establish and made all the more challenging by the long gestation period for cancers. Industry commands resources, including access to data, and therefore can produce doubt about causation through preemptive science. Whereas workers and community members are often ill-positioned to seek research that serves their interests.⁵⁶ Historically these dynamics were exacerbated in southern Africa, where until recently African workers and community members were systematically denied legal and political rights.⁵⁷ In other words, the scientific and epidemiological invisibility of radiation and asbestos exposure and their effects on miners were structured by racial-capitalist logics that have historically made occupational health a key concern in the region.⁵⁸

Despite the fact that Africans produce 26 percent of the world's uranium, Gabrielle Hecht demonstrates that occupational radiation exposure in places like Namibia, became invisible through intertwined global scientific and geopolitical erasures of African nuclear activity.⁵⁹ In South Africa, for example, the Witwatersrand gold mines are rich in uranium ore. Surveys of radon exposure in the mines performed in the mid 1950s, found relatively low levels, and autopsy data failed to reveal any excess lung cancer among miners. South African scientists thus concluded that "high ventilation standards" in these gold mines and "stringent safety precautions" prevented any occupational health hazards. Yet as Hecht explains, this science, like subsequent studies undertaken in 1971 by the South African Atomic Energy Board (AEB) in collaboration with the Chamber of Mines masked the political economy of race.

These studies were done at the height of apartheid. Race structured exposure. The AEB study, like those in the 1950s and 1960s, were based on average radiation levels taken in only ten percent of the mines. White miners worked shorter shifts, and were positioned in the cooler, intake airways where ventilation cleared the radon. Black miners worked the rock face where the radon built up at much higher rates, in some places "reaching ten times ICRP [International Commission on Radiological Protection] dose limits." Yet the South African scientists based their claims on autopsy data taken from

⁵⁵ Engels, E. A., Shen, M., Chapman, R. S., Pfeiffer, R. M., Yu, Y.-Y., He, X. and Lan, Q. (2009), "Tuberculosis and subsequent risk of lung cancer in Xuanwei, China." *International Journal of Cancer*, 124: 1183–1187.

⁵⁶ See for example, Gerald Markowitz and David Rosner, *Deceit and Denial: The Deadly Politics of Industrial Pollution*, (University of California Press and the Milbank Memorial Fund, 2002), idem *Deadly Dust, Silicosis and the Struggle for Workers' Health* (Princeton University Press, 1991); Chris Warren, *Brush with Death: A Social History of Lead Poisoning* (Johns Hopkins U. Press, 2001); Gabrielle Hecht, "Hopes for the Radiated Body: Uranium Miners and Transnational Technopolitics in Namibia," *Journal of African History* 51(2010): 213-234.

⁵⁷ African miners were not allowed to form unions in South Africa until the 1980s, and Africans were disenfranchised in South Africa until 1994, in South West Africa (now Namibia) until 1990, and Southern Rhodesia (now Zimbabwe) until 1980.

⁵⁸ Randall Packard, *White Plague, Black Labor: Tuberculosis and the Political Economy of Health and Disease in South Africa* (University of California Press, 1989); Joch McCulloch, *Asbestos Blues: Labor, Capital, Physicians, and the State in South Africa* (James Currey, 2002).

⁵⁹ Gabrielle Hecht, "Africa and the Nuclear World: Labor, Occupational Health, and the Transnational Production of Uranium," *Comparative Studies in Society and History* 51, 4 (2009): 896-926.

exclusively white patients. They dismissed the exposure of black patients by claiming they were temporary migrants yet most miners, like those coming from places like Botswana, would cycle through the mines to accumulate decades of work.⁶⁰

The scattered asbestos dumps that stretch across northern South Africa to the Botswana's border also bear this history of the invisibility of exposure, skewed science and the cultivated invisibility of cancer.⁶¹ For much of the twentieth century South Africa was a leading producer of asbestos. The raw material was sent to the global market, while the tailings "were used extensively in building materials and road surfaces in former mining regions."⁶² Children played on mine dumps, and in some cases attended schools built from asbestos laden brick. Tailings and sludge wound up in drinking water. As pathologist and historian of science Lundy Braun has established, the carcinogenic effects of all this asbestos, and the political and economic logics that structured hazardous exposures were part of an "invisible epidemic" of asbestosis and cancer. One doesn't need to travel to West Africa where "tonnes of toxic waste from British municipal dumps is being sent illegally to Africa,"⁶³ nor to Somalia's Puntland coast where the United Nations officials and Somali pirates have both reported that Asian and European toxic and nuclear waste has washed ashore⁶⁴ to see the problem of carcinogenic waste is not limited to Lawrence Summer's failed World Bank proposal.⁶⁵

Toxic waste isn't the only carcinogenic market relying on the invisibility of African cancer. Africa is now a target market for the tobacco industry in flight from shrinking US and Western European markets. GATT and later World Trade Organization agreements opened new possibilities for transnational distribution of cheaper tobacco in the 1980s and 1990s.⁶⁶ As with toxic waste, successful activism in the west (resulting in stricter domestic regulations and successful litigation) has inadvertently exported carcinogenesis to Africa. Unlike in Asia, where tobacco use has recently escalated alarmingly as tobacco corporations are opening vast new markets, the African "cigarette epidemic" is in its early stages in many parts of the continent.⁶⁷ In other parts of the

⁶⁰ Ibid pp. 917-922.

⁶¹ Joch McCulloch, *Asbestos Blues: Labor, Capital, Physicians, and the State in South Africa* (James Currey, 2002); Lundy Braun, "Structuring Silence: asbestos and biomedical research in Britain and South Africa," *Race and Class* 50(1), 2008: 59-78; Lundy Braun and Sophia Kisting, "Asbestos-Related Disease in South Africa: The Social Production of an Invisible Epidemic," *American Journal of Public Health* August 2006, vol 96, no 8: 1386-1396.

⁶² Lundy Braun, "Structuring Silence: asbestos and biomedical research in Britain and South Africa," *Race and Class* 50(1), 2008: 59.

⁶³ <http://www.independent.co.uk/news/world/africa/dumped-in-africa-britain8217s-toxic-waste-1624869.html> (accessed on 9 October 2009)

⁶⁴ <http://english.aljazeera.net/news/africa/2008/10/2008109174223218644.html> (accessed 9 October 2009); see also <http://www.timesonline.co.uk/tol/news/world/article418665.ece>

⁶⁵ See for example, Jennifer Clapp's excellent book on the subject. Jennifer Clapp, *Toxic Exports: The Transfer of Hazardous Wastes from Rich to Poor Countries* (Ithaca: Cornell University Press, 2001); and David Naguib Pellow, *Resisting Global Toxics: Transnational Movements for Environmental Justice* (Cambridge: MIT Press, 2008).

⁶⁶ Brandt, *The Cigarette Century* (chapter 13); Steve Sussman, Pallav Pokhrel, David Black, Matthew Kohrman, Stephen Hamann, Prakrit Vateesatokit, Stephen E. D. Nsimba, "Tobacco control in developing countries: Tanzania, Nepal, China, and Thailand as examples," *Nicotine & Tobacco Research* Volume 9, Supplement 3 (November 2007): S447.

⁶⁷ On China see for example, Matthew Kohrman and Xiao Shuiyuan, "[Anthropology in China's Health Promotion and Tobacco.](#)" *The Lancet*, vol. 372 (2008), S01:10-11.

continent, most notably South Africa, cigarette consumption has declined from its peak in 1990. This is at least in part the result of a significant public health campaign including new laws, which since 2000 have limited smoking in public places.

Data is partial. Figures on tobacco consumption are lacking for many places on the African continent. This is part of the difficulty in ascertaining the extent to which tobacco may or may not be a growing problem. According to the World Health Organization's 2002 *Tobacco Atlas*, high figures for smoking in Africa include an estimated 65 per cent of men and 35 per cent of women in Namibia; 66.8 percent of men and 31.9 percent of women in Kenya; and 59.5 percent of men and 43.8 per cent of women in Guinea.⁶⁸ I have been unable to corroborate these extremely high figures against other sources. But, given their targeting by tobacco multinationals that have been gradually buying up local plants and scaling up advertising efforts, and given the rapidly increasing rates of total cigarette consumption on the continent – there appears to be an upward trend underway in at least some places on the continent.⁶⁹ It will be decades before we see the cancerous outcomes of all these cigarettes, and yet the prospect is frightening in places like Botswana, Namibia, and South Africa which already have some of the highest rates of esophageal cancer in the world.

In 1994, as Americans entered the era of intensive, successful anti-tobacco litigation, Annie Sasco, an epidemiologist at IARC, sounded the alarm in a column in the pages of *Tobacco Control*. Sasco made an appeal for basic epidemiological data that was sadly lacking. Her plea underscored the ignorance of African cancer we saw in the field of development economics only a few years previously, in Summers' World Bank memo. She cited estimates that cancer mortality data only existed "for about 9% of the population, and cancer incidence for 0.5%."⁷⁰ Even as epidemiologists, social scientists and bench scientists poured into Africa to produce knowledge about AIDS, multinational tobacco was taking advantage of the production of scientific ignorance around cancer in Africa.

As historian Allan Brandt puts it, "The industry's assertion that harms deemed unacceptable in the affluent West are tolerated in the developing world smacks of a dubious moral calculus. It implies that people in India or Egypt really don't object to dying of cancer so long as they were spared from TB or cholera. Common sense suggests the fundamental flaw in this logic."⁷¹ And of course, this same logic is the one that underlies the transfer of toxic waste – or even a World Bank economic plan for the same. Yet, as cancer becomes highly visible in Africa, such logics fall apart. The family of Mokwena Mosiepele, a sixty eight year old man (a former miner?) who lay dying in PMH oncology with metastatic lung cancer in February 2007 found his condition tragic. Did it

⁶⁸ World Health Organization, *Tobacco Atlas* 2002.

http://www.who.int/tobacco/resources/publications/tobacco_atlas/en/index.html (accessed 14 February 2011). It is unclear to me how these numbers are generated, what differences there may be between urban and rural population, how heavily such consumers smoke etc.

⁶⁹ For example, total African cigarette consumption in 1995 was 131, 181 million cigarettes. By 2000 the figure stood at 212,788 million, a nearly 40 percent increase in a half-decade. G.E. Emmanuel Guindon and David Boscar, *Past, Current, and Future Trends in Tobacco Use* (The International Bank for Reconstruction and Development/World Bank, 2003).

⁷⁰ *Ibid.*

⁷¹ Allan Brandt, *The Cigarette Century: The Rise, Fall, and Deadly Persistence of the Product that Defined America* (Basic Books, 2007) p. 486.

matter to the late Lovemore Makoni, that he died of cancer rather than tuberculosis? We will never know.

Africans are living in a carcinogenic time and place – and this fact is producing much misery and loss. Yet, their cancers and the carcinogenic relationships that underpin them remain mostly obscured – due to the progressive developmental model that has long guided African public health, regardless of biological and social complexities on the ground. This model facilitates carcinogenesis, even as it marginalizes the needs of the hundreds of thousands of African cancer patients. This chapter has mapped these relationships of toxicity and knowledge, highlighting intersecting public health and epidemiological dynamics that are rapidly bringing African cancer into view. With this overview in place, let us return to the ward and pursue how oncological knowledge and technology are transferred within the clinical encounter.