

Rethinking Biomedicine

Vinh-Kim Nguyen

1 Introduction

My conversations with Yehuda Elkana started after I had been working as a physician for almost a decade. I started seeing my first patients in my early twenties, and had a busy clinical practice in two inner city hospitals in Montréal, spanning outpatient and inpatient care of patients with HIV, general accident & emergency medicine, and caring for patients hospitalized on internal medicine wards. The work was draining, and surprisingly monotonous. I was soon confronted with the limitations of medical training in understanding and addressing what were clearly important social factors affecting my patients' illnesses, and frustrated by the reductionism of the focus on diagnosing and treating specific illnesses. I turned to anthropology with the naïve hope that it would help me understand the underlying social causes of the illnesses I confronted at the hospital. I was perplexed that young men who knew how to protect themselves from the virus were still getting infected; that some died more quickly than others; and that virtually no attention was paid to where the epidemic was exploding unabated, in Sub-Saharan Africa. I enrolled in a Master's and then a PhD, began to conduct fieldwork on Africa's HIV epidemic, and finally had the occasion to meet Yehuda in 1998; he has been a mentor to me ever since.

In this chapter I will examine how Yehuda's concepts of "partial theories" and of "rethinking the enlightenment" contribute to rethinking biomedicine in the age of global health (Elkana 2011). The chapter stems from conversations Yehuda and I had in the early years we knew each other, when he was engaged in a project he called "Rethinking the Enlightenment" – a bold yet simple project, which in many respects drew from Foucault's seminal essay "What is Enlightenment" (Foucault 1984). As an adolescent, I had become fascinated with structuralism. The books that absorbed my attention heralded Lévi-Strauss, Lacan and Althusser and, depending on the author, either Piaget or Foucault (!) as the four horsemen of a unified linguistic paradigm for the human sciences. By the time I met Yehuda, I was thankfully less naïve and certainly more critical of totalizing theories, having passed through a postmodernist phase. What I took from these conversations with Yehuda, in the late 1990s, would

prove to be fundamental to the direction my thinking and research would take. Rethinking the enlightenment, Yehuda noted, should not throw the baby out with the bathwater. He encouraged me to rethink universal theories in partial terms. Joking that it was because he was getting old, Yehuda was deeply interested in medicine.

The term biomedicine is used to refer to the Western-born and now global medical system founded on biological understandings of illness: hence the prefix, which distinguishes biomedicine from other medical systems, such as Chinese Medicine or Ayurveda, whose ways of knowing and of practicing are based on different understandings of the body and its relationship to the environment. This new medicine emerged in Parisian teaching hospitals, where structured observations of patients' signs (findings on physical examination) and recording of their symptoms came to be systematically linked to autopsy findings. "Anatomical pathology" was born, and with it, the dogma that signs and symptoms were superficial manifestations of underlying organ dysfunction. Patients' afflictions were classified by organ system according to pathological findings. Disease came to be viewed as a universal phenomenon, biologically invariant but filtered through the prism of individual bodies into subjective symptoms and objective signs. Two other developments solidified biomedicine's dogma that affliction disease was the result of biological perturbations and damage to organs. Bodily fluids and tissues were extracted and studied in laboratories, revealing the chemical processes at work in healthy bodies. Biochemical pathways were elucidated, and "normal" biological values established for chemical substances found in blood and tissues and for the cells found in the blood. Anatomy became virtual, as X-rays and ultrasound rays were used to pierce and visualize the inside of the body, making it possible to visualize pathological changes before death and the possibility of autopsy.

A medical system that "internalizes" causes of illness could be expected to fall short in understanding "external" causes. Epidemiology, as the study of the distribution of disease in populations, provides a first step to examining the social context of illness. But after a year of graduate coursework in epidemiology, I realized that the quantitative and reductionist approach of epidemiology was a two-edged sword. While it brought rigour to clinical observation and the establishment of causality, the standardization of clinical facts necessary to quantification was ill equipped to capture the role of context and of individual difference. Beyond the body proper lay the social realm, and the turn to social sciences in general – and anthropology in particular – offered a grasp on the broader question of affliction. Yehuda encouraged me to draw on the social sciences as a method rather than as an explanation. Coming to view theories as accurate, valuable, but partial accounts of reality was an insight I owed to Yehuda, and it led me to reconsider the limitations of

social epidemiology. Even if epidemiology was too reductionist to capture the complexity of social context, the difficulty was perhaps also epistemological: what if the problem was the universalism of biomedical claims on explaining illness?

How did biomedicine develop universal claims to account for illness? The claim that biology is of universal applicability is clearly at the heart of biomedicine. But, two additional and linked universalist claims are central to biomedicine's universal scope and, practically speaking, its worldwide dissemination and cross-cultural appeal. These are, on one hand, the assumption of an essential, transcultural inner self, and a series of interlocking claims that this inner self is a both locus of unpredictability and knowable through the illumination of truths buried there. Glossed as the unconscious, it is within this inner self that resists knowledge that pathogenic secrets can be found. Self-discovery, and more importantly release of these secrets, is seen as therapeutic. This is linked to the important assumption of individuation; that is, that the self and the body are bounded into discrete individual units. This assumption founds the methodological individualism of the biomedical sciences which aggregate selves into populations, unlike in sociological thought that tends to see individuals as products or even secretions of what the anthropologist Kroeber terms as "superorganism" from which individuals are hived off (Kroeber 1968).

From its philosophical heritage as a "science of man", anthropology had become by the early twentieth century an empirical discipline dedicated to the study of culture, and its method: ethnography. The shift from philosophy to ethnography was made possible by the nineteenth century forefathers who included Lewis Henry Morgan in America, James George Frazer in Scotland and Edward Burnett Tylor in Britain (Morgan 1877, Frazer 1907-1915, Tylor 1924). The nineteenth century "armchair anthropologists" were fascinated by accounts of exotic tribes in America and Africa and developed a comparative approach to the study of humanity, where difference was framed in terms of culture and (regrettably) race. After World War II, scientific racism had rightly been discredited and culture remained the unique frame for the scientific study of human difference. By then fieldwork amidst exotic cultures (ethnography) had emerged as the signature method for anthropology. Prolonged immersion in an exotic "other" culture has since been considered both the methodological benchmark and a professional rite of passage for anthropologists. From this experience, contemporary health research has taken the concept – and method – of "participant observation", which I have often seen reduced to just a few hours' observation and interaction! The obligation of a year or two of immersion in the life of a foreign community – ideally an isolated tribal community – is today neither realistic nor particularly relevant in an age of global media penetration, mass migration, and a massive shift towards urban life. Ethnography

has since changed, as well as its objects of study. It is no longer the study of tribes through long-term immersion. In its place, anthropological theories are used to trouble common sense and bring into sharp focus figures that which otherwise would have stayed in the background. The “object” of ethnographic enquiry is delineated using theoretical constructs, much in the way the tribe as an object of study was coterminous with the theoretical construct of culture. The comparative approach inherent in anthropology exploits “exoticization” as a form of critique. The exotic practices of other cultures are shown to be, in fact, rather more sensible than our own; alternatively, our own common sense and everyday practices can be shown in new light as bizarre. Theoretically, and methodologically then, an anthropological study of biomedicine seeks to relativize and complicate our everyday assumptions that make us take biomedicine for granted, accentuating the unfamiliar to make biomedicine strange.

An anthropological approach to biomedicine would presume careful study of biomedical worlds through daily immersion in the strange culture of biomedical tribes and their life-ways. The experience of viewing biomedicine as a foreign land, a territory inhabited by unfamiliar peoples with strange customs, is a common one for medical students as they go through the obligatory rites of passage – dissecting human corpses in anatomy lab, learning to negotiate ward duties, participating in the elaborate and terrifying choreography of the operating theatre. The experience of becoming a doctor provides an insider’s perspective on the worlds of biomedicine that proved useful in considering biomedicine as an anthropological object of study.

In his quest to rethink the Enlightenment, Yehuda encouraged me to use an ethnographic approach to biomedicine to examine and think through how biomedicine might not be as universal as it claimed, while acknowledging its power and usefulness as a partial theory of human suffering. As a result, I came to focus on what seemed to me to be the three core epistemological commitments of biomedicine – universal biology as the ontological ground of illness, a hermeneutics of “deep self”, and biological commensurability of populations around the globe.

2 Universal Biology

The idea that the human body, particularly when it comes to illness, can be explained in terms of chemical reactions and interactions between cells, tissues and organs is relatively new. Until the nineteenth century, humoral medicine – which posited illness as resulting from imbalances in the body’s key fluids: blood, bile and phlegm – held sway, and illness was seen as a singular and unique event, intelligible only in terms of the patient’s particular constitution

and history. As mentioned earlier, several historical developments helped shift the concern with individual constitution and specificity to the terrain of a universal biological theory to explain illness. The emergence of modern hospitals allowed the structured examination of patients, new technologies to measure patient's bodily functions (thermometers, blood pressure cuffs, and so on), and the systematic recording and collection of physical signs and symptoms far beyond what would have been possible in individual physicians' consulting rooms. Observations of the living could then be linked to changes in organs visible in those patients who did not survive, and whose bodies were opened up for examination. This was an important step: for the first time illness could be standardized through systematic associations of autopsy with clinical findings. Organic lesions (nodular livers, blackened lungs, floppy hearts etc.) were examined under the microscope, and the differences between these and normal organs were described. Attention then turned to tissues and, as the power of the microscope grew, cells, and then the structures within cells. At the same time, the science of chemistry was harnessed to examine chemical interactions in bodily fluids – blood and urine mainly – extracted and brought to laboratories newly developed for that purpose. Standardisation and quantification lent coherence to this vast enterprise, allowing symptoms, lesions, and chemical imbalances to be grouped and classified into ever better described discrete disease entities.

In the new theatres of biomedicine – operating theatres, wards, and consulting rooms – the power of biological theories of equivalence came increasingly to light, allowing technologies and interventions such as chemically standardized drugs, or surgical interventions, to be developed, shared, and applied to patients in different parts of the world, and with good effect. Pasteurian theories also proved their worth in Europe and then throughout the world, notably in public health and hygiene. Today, there is no doubt that the articulation of biology to medical practice in biomedicine has unleashed an unprecedented capacity to mitigate illness. The power of biology lies in its ability to articulate a global set of standards for intervening on the body, much in the way internet protocols allow computers to talk to each other, or engineering allows machines to travel across different terrains. Differences in constitution and context are glossed over.

3 **The Inner Self**

Another universalist assumption of biomedicine is that we are all endowed with an inner, and “true” self. A rich strain of anthropological literature has shown the many ways in which “self”, “personhood” or “personal identity” both

vary across cultures and are inextricably caught in a web of social relations. Classical anthropology has shown how “identity” is relational, constructed through the grammar of kinship that maps relatedness and distance, and not only in “primitive society”. As early as 1938, Mauss argued that the “notion of the person” in Western societies was derived from a Roman, juridical understanding of the bearer of legal responsibility (Mauss 1938). Anthropologists have since moved away from this fixed, structural view of kinship as a formal, even mathematical system, turning to examine practices of relatedness in everyday life. Contemporary and classical anthropologists agree nonetheless that the “self”, the “person”, and “individual identity” are fluid and relational terms that rarely coincide neatly with the bounded physical body, or with a social identity, no matter which society one is studying. In contrast, biomedicine remains wedded to the idea of a stable, pre-existing infrastructure of selfhood. While this idea is most thoroughly developed in theories of personality, and particularly in Freud’s theories of the unconscious, it resonates throughout neurosciences in general and is a central assumption of psychiatry in particular. Even in contemporary psychiatry, which eschews a normative view of the self to focus on treating symptoms, symptomatology and the resulting nosology (or classification of symptoms into groups such as “personality disorders”) remains freighted with assumptions of underlying invariant selfhood, however minimalist.

Three kinds of biomedical technologies enact a universal self. The most widespread, and simplest, are what I have called “confessional technologies” that incite the patient to reveal the truth of the self, to disclose emotions and events otherwise kept hidden. Confessional technologies cue and train those prompted to turn inwards and draw out into language a particular form of selfhood; these days, they are deployed within a broader culture of self-disclosure powered by social and broadcast media. Psychotherapies are the most developed form of confessional technologies that affect change through discursive interventions - such as interpretation - on the matter of the self. The third and final family of technologies act directly on experience, rather than through language: these are the pharmaceuticals that alter our moods.

Linguistic and pharmacologic technologies saturate biomedical practice, insistently appealing to an inner, essential self at every turn. Even in the most mundane medical interaction - a runny nose or a sore back still requires a history of symptoms and behaviours (fever? since when? what did you take for it?) whose invisible, assumed substrate is the self. Even the most clearly somatic - and non-psychological - symptoms conjure an experiencing, acting self. And when symptoms escape easy physical explanation, the psychological self emerges as the key to understanding and alleviating suffering. This call to

the self contrasts with other medical traditions, who embed individual symptoms in consideration of the relationship with cosmic forces, flows of energy, or ancestral spirits. Within biomedicine, two different approaches to the self exist in tension. The first traces its origins to Freud's discovery of the Unconscious and his subsequent development of the technique of psychoanalysis. Using techniques such as free-association or the interpretation of dreams to probe the unconscious, Freud developed a theory of the architecture of the self. The self's architecture split the self between the unconscious repository of repressed desire and pathogenic secrets, and a conscious ego; an airy and open house built on a closed and dark foundation (Freud 1924).

Another, more recent approach emerged with the discovery that drugs could treat mental disorders, from the development of antipsychotics in the 1950s onwards. If Freud's psychology offered an approach to inscribing the self in a theory of the mind, psychopharmacology promised to locate the self in a biological account of the brain. New generations of psycho-pharmaceuticals have been developed to treat mood disorders as well as more severe psychiatric illnesses. As their side effect profile has improved, use of mood-disorder drugs has expanded concomitantly with the growth in diagnostic categories for mental disturbances. Drugs now exist to treat social phobia, attention deficit, and a variety of other conditions that until recently were not considered as diseases. The term "cosmetic psycho-pharmacology" was coined to refer to the psycho-pharmaceutical mission creep that became evident in the wake of the "Prozac revolution". (Prozac, or fluoxetine, was the first drug to be introduced of a new class of antidepressants called SSRIs, or selective serotonin reuptake inhibitors, that came to be widely used because they had much less side effects than earlier classes of antidepressants). The effectiveness of these drugs is situated within a lexicon of disorders and a vocabulary of symptoms that inexorably refers to a suffering self – rather, than, for instance, disordered social relations.

The linguistic and pharmacological selves revealed in biomedical practice and enacted within a broader, western, and mediatized culture of self-disclosure contrast with existing, relational notions of personhood. But unlike relational forms of personhood visible in the kinship- or supernaturally derived forms of identity visible in some cultures, the inner self of biomedicine is taken to be the universal norm. Anthropological accounts of spiritual healing, however, suggest that this need not be the case.

Amongst those who claim Wolof or Lebou ancestry in Senegal, for instance, the *rab* denotes ancestral spirits often held responsible for unexplained events, curious coincidences, and mysterious afflictions. Spirit possession and other conceptions of forms of supernatural illness causation are common all over

the world and have been extensively studied by anthropologists. Spirit possession in Senegal was studied in the 1960s by a noted French anthropologist working with the Dakar School of Ethnopsychiatry. Zempléni documented how afflictions attributable to spirit possession vary along a continuum. At one end, spirit possession is total: there is no more “self”, only the spirit. These cases are evidenced by the birth of deformed children and serious illnesses that transform the body (such as kwashiorkor, a serious form of malnutrition). A prescient child is evidence of a powerful spirit that “amuses itself by dominating its little companion”. In most cases however, illness is caused by intermittent possession by the spirit, a state that requires active management by a healer, with the goal of accomplishing a *modus vivendi* with the possessing spirit who has “colonized” the self of the patient (Zempléni 1966).

In non-biomedical healing traditions like these, powerful therapeutic agents are mobilized through ritualized practice to achieve tangible diagnostic and therapeutic effects, mirroring the way in which psychoanalysts must themselves undergo treatment in order that they may master their own counter-transference to achieve therapeutic effect for others. Social relations and their skilful reworking are explicitly acknowledged as integral to healing: the successful healer must enlist families and indeed entire communities to “own” the symptom collectively in order that the illness can be cured.

4 Global Health

If bodies and selves are essentially equivalent, then they can be aggregated into groups to constitute populations. Knowledge derived from the study of populations can then be interpolated back into individual bodies. A belief in the universality of biology does not make all bodies the same; rather, it establishes a set of agreed-upon rules about how the body is assumed to work, and furnishes a series of hypothetical equivalences, for example, that a liver, a stem cell or a chromosome is biologically equivalent in all human bodies. Human biology thus becomes a yardstick that can be used to measure difference in terms of variation relative to a norm, and in this way, bodies become commensurable.

The idea of biological commensurability allows people to be sorted into standardized groups and populations because their biology is assumed to be the same. This provides the grounds for meaningful comparisons to be made among them. The power of the assumption of biological equivalence is visible in global health. Despite significant contextual differences, populations that are geographically, historically, and socio-culturally disparate can be subject to

standardized interventions developed in far-away places. The assumption of biological universalism provides a set of standards for designing, testing and implementing interventions independent of local context. This is the hallmark of *global health*.

The fall of the Berlin wall was emblematic of the geopolitical shift from the “Cold War” to the “Forever War” unleashed by the September 11th attacks in New York. This period led to important developments in international public health efforts. International health had been structured by the architecture of post-colonial international cooperation, exemplified by organizations such as the WHO, or overseas development aid branches of northern governments (US-AID, DfID, etc.). In the 1990s, a new term – “global health” – gained prominence to describe a shift in the way health was to be imagined and addressed on a planetary scale. Fuelled by global epidemics of HIV and subsequently SARS, emphasis was put on transnational aspects of disease causation, detection, and treatment. As Cold War proxy states failed, “fourth generation” wars proliferated. Civilians became prime targets, rather than just collateral damage, and medical humanitarians such as MSF stepped in to deliver health care – and draw attention – to the conflicts. The proliferation of these “low intensity” conflicts also drew the attention of foreign policy think tanks, and US military experts in Washington, who worried about the potential for infectious diseases of the urban poor. That would pose a threat to the health of US soldiers mobilized in “asymmetric” conflicts, or even worse, threaten US national security if they were able to cross borders (as SARS eventually did). In the wake of the tech boom of the 1990s, new philanthropic actors emerged – such as the Gates Foundation – eager to make their mark in a field where it was easy to enhance one’s image. By the time of the 2001 attacks therefore, the intellectual and institutional groundwork had been laid for global health. The notion of health as a human right had gained enough traction by then to fuel a global activist movement that successfully advocated for access to expensive but lifesaving antiretroviral therapy for people with AIDS in Africa. Simultaneously, seeking to bolster the US’s international reputation in wake of the invasion of Iraq, the Bush Administration launched PEPFAR (the President’s Emergency Plan for AIDS Relief) which, in addition to being the largest global health program in history, supported the growing involvement of American churches and “faith based organizations” in global health efforts.

Thus, until the turn of the millennium, international health efforts had been devoted to improving the health of the world’s poor. These efforts relied on a public health approach that stressed cost effectiveness and “appropriate technologies” rather than clinical care. International health was borne by organizations such as the WHO, as well as overseas development aid agencies

that participated in the broad consensus that building hospitals and developing innovations to diagnose and treat diseases in developing countries was not the best approach. Curative-driven approaches were expensive, and tended to favour urban élites. Clinical care was therefore largely limited to “primary care” focussing on common and easily treatable conditions: malaria, diarrhoea diseases, tuberculosis.

The question of how, or even if, global health marks a paradigm shift from international health efforts that spanned the last half of the twentieth century, or just a gradual evolution, has been a subject of debate. Most commentators agree that global health marks a significant institutional shift, as new actors began to fund and run health programs internationally. Marcus Cueto locates the beginning of this shift with the World Bank’s decision to invest in health as an economic and development issue. In retrospect, the World Bank’s decision was part of a broader shift away from “hard” development that stressed infrastructure projects (dams, roads, and the like) towards “soft” development that focussed on human “infrastructure”: education, rights/empowerment, and as a result, health. This shift towards health as a development issue opened the door to a broader range of actors: NGOs and development agencies, including those working in famine relief or with children, previously unspecialized in medical issues, but whose work could now be connected to health. They joined missionaries and existing medical charities such as *Médecins sans frontières*, which has providing medical care to the world’s neediest since the 1970s. The global health era marked an upswing in private and public funding for religious organizations, now termed “Faith Based Organisations”, and the growing influence of US-based evangelical churches, although not without controversy. Since the late 1990s, universities, foundations, and philanthropies of all sorts swelled the ranks of medical humanitarian and religious organizations. The proliferation of actors has at times led to chaos, and posed significant coordination and governance challenges, particularly for the states on whose territories they intervene. Decisions, such as who does what, are made by unwieldy – and unelected – bodies who must arbitrate the competing interests of a diverse field of donors and “doers” who implement programs, and often have competing interests. Euphemistically, the politics of global health have given rise to a pervasive language of “partnership” and “collaboration”, the underside of which has been investigated by anthropologists such as René Gerrets in his study of the Roll Back Malaria Partnership (Gerrets 2015).

Others have stressed the growing importance of transnational factors – such as global trade, migration, and religious and social movements – in shaping the health of populations. A hallmark of globalisation has been the rapid shifts of capital, and industrial production, across borders to take advantage of

liberalized trade opportunities and local labour markets. The health impacts are as enormous as they are varied. For workers whose jobs have been outsourced the familiar litany of joblessness related mental health and substance abuse issues are well documented, and indirect consequences related to social breakdown are now gaining some attention. Negative consequences on health in the factories and sweatshops where the jobs are outsourced are also well documented, as recent attention to high suicide rates in Chinese iPhone factories highlight. Dramatic incidents, such as deadly fires in Bangladeshi sweatshops, are only the tip of the iceberg. Unsafe working conditions where lax occupational health standards contribute to lower labour costs can be expected to generate the significant burden of physical and psychological morbidity that was the original target of occupational health regulation in the global North.

The shift to factory work leads to greater dependence on processed and unhealthy goods, themselves increasingly available through a global trade regime that favours industrial over local food production. Growing consumption of processed foods is an important cause of skyrocketing rates of obesity and diabetes in the global South. Growing health consciousness in the global North has led to a paradoxical effect as regulatory and market pressures depress the profitability of unhealthy substances – tobacco and sugar being the most obvious. These substances are “dumped” in the global South where there are less (if any) regulatory, market, and public-awareness barriers to their consumption. Not surprisingly, we are now witnessing a world-wide explosion of diseases linked to diet, sedentary lifestyle, and environmental toxins.

Recent anthropological research suggests that global health does indeed constitute a paradigm shift. The field of “global health” is the current exemplar of how biology is globalized through a worldwide network of laboratories, hospitals, policies and programs. This not only enables interventions on individual bodies and populations on a planetary scale but also makes possible new ways of knowing human life – as it exists but also as it might be. The era of global health marks a planetary extension of biomedicine’s reach into everyday life, which had previously been largely limited to the deployment of biology as a standard for calibrating public health interventions. It’s important then, global health – understood as a global clinical space – makes aspects of human life visible, and even knowable in ways not previously possible. However, visibility and knowability in turn generate new forms of uncertainty.

Where before there have been local or national health systems and economies with tightly regulated flows, the shift in scale has in effect constituted a truly global therapeutic economy, facets of which we discover every day: the outsourcing of pharmaceutical research and development, the offshoring

of clinical trials. Less visible are underlying shifts in the way in which global health has enabled new relationships between labour, production and the commodity. Where before we had national systems for monitoring population health, a new global regime of surveillance draws on social media and networked computing power (including of course the internet) to try and predict the future: what I call a regime of anticipation. Telemedicine, pioneered in the 1970s (cf. e.g. Greene et al. 2016) has now become a truly intercontinental affair, as Indian physicians consult patients in West Africa. Global deployments of biomedicine to address population health assume an ontological distinction between infectious and “non-communicable” diseases (NCDs): what can be transmitted and what cannot. Paradoxically, it is the rise of the global health paradigm that has made this universal assumption increasingly difficult to maintain.

5 On the Non-Universalism of a Foundational Epidemiological Distinction

Infectious diseases are caused by micro-organisms that are transmitted from person-to-person or from animal-to-person, sometimes by an intermediate “vector” such as the mosquito. NCDs such as diabetes, cancers, or cardiovascular diseases are attributed to lifestyle factors such as smoking or diet, or simple ageing, earning them the additional moniker of “chronic” or “degenerative” diseases. The distinction between infectious and non-communicable is also geographic, such that infectious diseases are mainly considered threats to public health in the global South whereas in the wealthier North, such diseases are largely contained and have given way to chronic conditions. It is a distinction that is reproduced in global health organizations such as WHO, with separate departments and different approaches to disease control. However, it is a distinction increasingly difficult to maintain, for three reasons.

“Non-communicable” diseases are in fact transmitted – not by bacteria or viruses – but by ideas and emotions, often through intermediate objects that are consumed in the process. Numerous studies have now shown that obesity and diabetes, for instance, are transmitted along social networks. The more obese people in one’s social network, the more likely one will also be obese, for instance. Consumption of tobacco, sugar, and other stimulants and foods is linked to a range of desirable representations and feelings. Significantly, as wealthier populations increasingly seek to shield themselves from the negative health effects of such substances, global trade allows these substances to be effectively dumped on less protected populations. Cheap sugars (particularly

in the form of high fructose corn syrup) and fats are the source of an exploding epidemic of obesity in the global south. Even worse, widely banned toxins, such as asbestos, are readily found in the environments of people living in the shantytowns of megalopolises in Africa and the Americas.

Many NCDs, moreover, are increasingly linked to infectious agents. At least twenty per cent of cancers is thought to be due to viruses such as the Human Papilloma Virus that causes cervical cancer; this proportion is likely to grow as we come to better understand cancer. In this case, viruses are thought to trigger the body's cells to mutate into cancers. Cardiovascular diseases are now thought to be facilitated by chronic inflammatory processes that stimulate the deposition of cholesterol plaques in the arteries. These inflammatory processes, it is now believed, may be attributable in some part to the body's reaction to past infections. Debate also exists as to whether diabetes may have an infectious link. Certain forms of juvenile diabetes, which manifest usually at a young age when the body no longer makes insulin, have been linked to viral infections.

While the study of the relationship between NCDs and infectious agents is still in its infancy, it underscores how developments in the biological sciences have complicated the notion that diseases have simple causes. As epidemiologists increasingly turn to understanding social networks to account for how diseases are distributed in populations, notions such as "lifestyle" or "individual choice" lose explanatory power in the face of network-driven and social structural effects: one's social network conditions the "exposure" to lifestyles, just as social structure (e.g. social class) affects exposure and ability to shield one's self from risk. And as global health researchers point out the role of transnational flows of capital, commodities, livestock, and toxins in shaping public health throughout the world, the previous geographic division of infectious diseases in the south and chronic diseases in the north no longer holds.

6 Inequality and Global Health

The current pace of biomedical innovation is indeed staggering. Advances in diagnostics and in therapeutics have had dramatically reduced mortality from a wide range of diseases – even for less wealthy populations. New immune-based therapies for inflammatory conditions and cancers have garnered attention because of their cost and as a result because they are inaccessible to all but the wealthiest. The uneven distribution of the benefits of biomedical progress is therefore a central issue for our time, debated in policy and political circles at local, national and international levels. More disturbing is the

possibility that such inequities are not just unwanted side effects of biomedical innovation, but rather are produced by the very processes that create biomedical progress.

An analogy can be made with the Industrial Revolution that transformed the world by harnessing machine power and human labour to produce not only a sparkling world of commodities, but also the infrastructure of modern life that we now take for granted – light and power, as well as clean water flowing out of taps, easy travel, trade, and so on. It was Karl Marx who famously drew attention to the paradox of the Industrial Revolution and the capitalist organization of social relations that made it possible: while creating incredible wealth and spectacular transformation in the world for the (apparent) benefit of humankind, capitalism also led to unprecedented human misery. Marx's elucidation of this paradox was that capitalism in fact produced this misery, by exploiting human labour to generate profit for capitalists. Inequality was not a by-product or unfortunate side effect of the Industrial Revolution; it was what made it possible (Marx 1985).

Today we are witnessing what we might call a Therapeutic Revolution, where human futures are transformed by the ability of a range of biomedical commodities to diagnose, treat and enhance human life. Human life has been transformed by harnessing the manipulation of life in the laboratory (the biosciences) to the management of human populations through public health policies and interventions.

The transformation has been spectacular, bordering on science fiction, as organ transplants and “test-tube babies” attest. Amazement at the latest biomedical techniques (at the time of writing, artificial eyesight and face transplants come to mind) should not detract attention from the everyday infrastructure of a healthy life that we now take for granted, including vaccination, antibiotics, healthy teeth. The manipulation of life in laboratories (the biosciences) is harnessed to the management of human populations through public health policies that make these advances available, though usually only to select groups.

In a creative approach to illuminating the political economy of the therapeutic revolution, Joe Dumit examined how the pharmaceutical industry develops drug markets. Analyses of drug company strategies, epidemiological studies, and interviews with patients and physicians, led Dumit back to Karl Marx. Dumit was struck by the way in which nineteenth century machinery, ostensibly meant to “save” labour time, was used to produce commodities and generate profits for those who owned the machines and the factories that housed them. The drive for profits ended up enslaving workers who had to sell their time (as labour) to survive. Industrialization took time from the workers

and gave it to the capitalists that owned the means of production. Dumit wonders whether the pharmaceutical industry is at the heart of a similar phenomenon, whereby biomedicine has made us all into patients-in-waiting who must take drugs just to remain healthy.

The mechanism by which this is done is the clinical trial. Clinical trials do two things. First, they recruit and gather patients at risk for specific diseases; and second, they test whether drugs prevent disease in these patients. When clinical trials show that drugs work (as they almost invariably do since drug companies will not invest the considerable sums involved in running clinical trials unless they think they will have a favourable result) they in effect convert a probability (risk) into a symptom which must be treated, in effect depriving us of our “health” by making us into patients-in-waiting. Disease, as a clinical endpoint in a clinical trial, is useful in that it has a specific value that can be priced in terms of eventual drug market share. The extension of this logic is particularly visible in psychiatry, when clinical trials reveal that specific symptoms can be alleviated by drugs, leading them to be reclassified as diseases. Ultimately, then, any experience can become a symptom (Dumit 2012). Dumit’s insight is shared by sociologists such as Abraham (2010) who use the term “pharmaceuticalization” to refer to how the expansion of drug treatments cannot be explained by actual public health needs – but rather by market forces (Abraham 2010).

A more radical interpretation would be that better health for the consumers that make up the market for pharmaceuticals *requires*, or feeds off, the production of ill health in those excluded. Clinical trials require a “reserve army” of bodies who are available as research subjects; pharmaceuticals and diagnostic technologies that ultimately only benefit those in a position to afford them are most efficiently and cheaply developed using the bodies of those where these diseases are most common. Significantly, these diseases are not evenly distributed in global populations, but occur in populations most unable to shield themselves from health risks, while health risks (tobacco, refined sugars and fats, toxins) are shifted from rich to poor.

The core assumption of the biological equivalence of human bodies has remained unchallenged until recently. Growing evidence from epidemiology, and most importantly epigenomics, in fact suggests that bodies are not everywhere the same, but incorporate biological differences produced by history, environment, culture and diet. These findings point to how bodies may not be biologically equivalent, while recognizing the power of universal biology to set and regulate standards for intervening on bodies and treating illness. As a result, we are faced with a troubling paradox. The idea that context does result in significant biological differences suggests that global inequalities are in fact

more pernicious than initially thought, because they in fact get under the skin to rewire the organism. Yet biomedical innovation is increasingly reliant on the bodies of the poor and the excluded for raw material. Biological universalism is the convenient fiction that holds it all together. It allows biomedical innovations to be developed in the bodies of globally marginalized populations who constitute research subjects with the assumption that the benefits will be effective for all, while turning a blind eye to the circumstances that condition the social vulnerability of these excluded populations and may make them biologically refractory to the full beneficial effects of biomedicine. In his later years, Yehuda was increasingly preoccupied with global inequality. This consideration of biomedicine started with Yehuda's suspicion of universalism, and ends with his concern that global inequalities were threatening to devour the powerful legacy of the Enlightenment.

References

- Abraham, David. 2010. "Pharmaceuticalization of Society in Context: Theoretical, Empirical and Health Dimensions." *Sociology* 44 (4): 603–622.
- Dumit, Joe. 2012. *Drugs for Life*. Durham: Duke University Press.
- Elkana, Yehuda. 2011. "Rethinking the Enlightenment". *Approaching Religion* 1 (2): 3–6.
- Foucault, Michel. 1984. "What is Enlightenment?" In Paul Rabinow, ed., *The Foucault Reader*. New York: Pantheon Books, 32–50.
- Frazer, James. 1907–1915. *The Golden Bough: A Study in Comparative Religion*, 12 volumes, 3rd. edition. London: MacMillan.
- Frazer, James. 1939. *The Native Races of America: A Copious Selection of Passages for the Study of Social Anthropology from the Manuscript Notebooks of Sir James George Frazer/arr. and ed. from the Mss. by Robert Angus Downie*. London: P. Lund, Humphries.
- Freud, Sigmund. 1924. *Gesammelte Schriften VII. Vorlesungen zur Einführung in die Psychoanalyse*. Wien: Internationaler Psychoanalytischer Verlag.
- Greene, Jeremy, Condrau Flurin, and Elizabeth Siegel Watkins, eds. 2016. *Therapeutic Revolutions: Pharmaceuticals and Social Change in the 20th Century*. Chicago: Chicago University Press.
- Gerrets, René. 2015. "International health and the proliferation of 'partnerships': (Un)intended boost for state institutions in Tanzania?" In Paul Wenzel Geissler, ed., *Para-states and Medical Science: Making African Global Health*. Critical Global Health: Evidence, Efficacy, Ethnography, Durham, NC: Duke University Press, 179–206.
- Kroeber, Alfred. 1968. *The Nature of Culture*. Chicago: Chicago University Press.
- Marx, Karl. (1867) 1985. *Das Kapital: Kritik der politischen Ökonomie. Bd 1. Der Produktionsprozess des Kapitals*. Hamburg: Meissner.

- Mauss, Marcel. 1938. "Une catégorie de l'esprit humain : la notion de personne celle de 'moi'". *The Journal of the Royal Anthropological Institute of Great Britain and Ireland* 68: 263–281.
- Morgan, Lewis Henry. (1877) 1963. *Ancient Society, or Researches in the Lines of Human Progress from Savagery through Barbarism to Civilization*. Cleveland: Meridian.
- Tylor, Edward Burnett. 1924. *Primitive Culture: Researches into the Development of Mythology, Philosophy, Religion, Language, Art, and Custom*. New York: Brentano's.
- Zempléni, András. 1966. "La Dimension thérapeutique du culte des Rab, Ndop, Tuuru et Samp. Rites de possession chez les Lebou et les Wolof". *Psychopathologie Africaine* 2 (3): 295–439.