Non-Communicable Diseases, Political Economy, and Culture in Africa: Anthropological Applications in an Emerging Pandemic

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So-called 'diseases of lifestyle' are playing a major role in epidemiological transitions in many developing countries. Stratifying, urbanizing, and ageing African populations face rising levels of non-communicable diseases (NCDs). This article examines the need for anthropological perspectives on the causes, prevention, and control of NCDs, such as diabetes and hypertension, in Africa. Anthropologists have been silent on these topics in African public health for a decade or more. Community-oriented field studies on structural and socio-cultural aspects of NCDs are urgently needed. There can be little doubt of the benefits to be gained from a multi-disciplinary approach to NCD study and intervention for developing countries. However, key institutions setting the research agenda are doing so without the input of anthropologists or social epidemiologists, and without an emphasis on social science capacity strengthening in African countries. (*Ethn Dis*. 2003;13[suppl2]:S2-149–S2-157)

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Evolving Health Development Priorities in Africa

During the 1990s, it became apparent that non-communicable diseases (NCDs) were playing a much more prominent part in African population and health transitions than previously thought.[1,2] By 1990, for example, at least half of all people suffering from diabetes (more than 25 million) lived in developing countries.[3] In East Africa, increased rates of NCDs have been linked to social change and development, rapid urbanization, and overall population ageing.[3,4] One source has concluded that in the United Republic of Tanzania, hypertension already plays an important underlying role in mortality, even in rural areas.[5]

Combating communicable diseases such as HIV/AIDS, malaria, and diarrhea, clearly must remain the top priority for improving the health of the world's poorest citizens.[6,7] Nevertheless, the reality is that rates of preventable NCDs in poor countries have been escalating rapidly. The 1990 Global Burden of Disease study predicted that within the next 20 years sub-Saharan Africa will experience greater increases in NCD morbidity and mortality than any other region of the world.[2] This suggests that the globalization of consumption patterns and lifestyle changes is introducing a new and complex dimension into Africa's poverty/disease/health development nexus which cannot reasonably remain un-addressed by the international health community.[8,9]

In response to these challenges, the international health community recently set an agenda for confronting NCDs in developing countries, and in the Africa region in particular.[10–12] The aim is to enhance "the capacity of countries to reduce significantly the burden of NCDs and improve the quality of life and life expectancy . . . through the efficient prevention and control of NCDs."[12] This will be accomplished through:

1. improved epidemiological surveillance;
2. a major emphasis on community-based programs of risk reduction;
3. the dissemination of low-cost case management and NCD control; and
4. increased capacity of developing-country institutions to undertake research to inform decision making.

The question then arises: which of the various disciplinary resources in international health are best situated to contribute to accomplishing this agenda? This article argues for the early inclusion of anthropologists in its formation and attainment. The focus is on hypertension, heart disease, and diabetes as NCDs of escalating importance in the African context. It should be noted that these conditions are not the only non-communicable conditions of public health importance on the continent. Unipolar major depression, for example, is predicted to become the single largest cause of disability-adjusted life years (DALYs) lost globally, and to dramatically increase in importance in sub-Saharan Africa early in the twenty-first century.[13] In contrast to mental health,[14–16] however, hypertension and diabetes in Africa have been virtually unexamined by anthropologists and other social scientists.

The 1990 Global Burden of Disease study predicted that within the next 20 years sub-Saharan Africa will experience greater increases in NCD morbidity and mortality than any other region of the world.[2]

Table 1. Some areas amendable to anthropological research and intervention in NCDs in Africa

Culture change
Explanatory models of emerging chronic diseases
Belief systems and social structures affecting tobacco and alcohol use
Diet and obesity
Exercise
Genetic, behavioral, and psychosocial adaptation
Health beliefs
Development of empirical and culturally appropriate 'lifestyle' and 'stress' concepts
Socio-economic status and poverty
Urbanization
Cost-effective interventions
Improved epidemiological surveillance of health education
Patient-focused and home-/household-based programs of disease management and care

A LACK OF ENGAGEMENT IN THE AFRICAN CONTEXT

In the African context, key conceptual questions must be asked about the social and cultural determinants, management, meaning, and impact of emerging NCDs. A search of several online databases using combinations of MESH search terms such as "cross-cultural comparison," "anthropology," "hypertension," "blood pressure," and "diabetes," yielded no significant research on social and cultural aspects of NCDs such as hypertension and diabetes in Africa for at least 10 years. To date, anthropologists who have engaged in the escalating discussion about globalization and health inequalities have failed to engage these issues as they pertain to common NCDs.[17,18] Thus, this new agenda's lack of a social science perspective, and, more specifically, an anthropological one, is not solely due to lack of interdisciplinary spirit on the part of agenda-setters.

In Africa, as elsewhere, confronting the context of risk in which NCDs are taking hold will be central to the success of the international health agenda as outlined above. Understanding the social and cultural basis of health, healing, and population change in Africa will be no less central to these public health challenges than it has been in the past.[19,20] Contextual forces, such as history, political economy, gender, and cultural beliefs about the nature of good and ill health cut across everything from designing improved epidemiological surveillance of NCDs to health education and the design of cost-effective health services.

Experience from the North in NCD prevention has shown that expensive community-based initiatives for risk behavior modification have generally failed, or met with only modest success.[21] This includes at least one intervention with a cross-cultural focus, which included the participation of target communities in design and control strategies.[22] A variety of factors may account for the lack of significant measurable progress. However, those involved in community intervention studies have concluded that "they may have under-estimated the complexity of community dynamics, the intricacies of formal, as well as informal, community structures, and countervailing societal and economic forces . . . Obviously, we need a much better understanding of community forces that influence change."[23] If this concern can be raised for community-based approaches in developed countries after decades of planning and effort (not to mention tens of millions of dollars in research funds), clearly it can be addressed at this comparatively early stage with respect to developing-country NCD initiatives.

Therefore, a multi-disciplinary effort that includes an anthropological perspective would seem an obvious course to adopt. Anthropologists should involve themselves in the early stages of this emerging effort rather than waiting to be called on to explain failures and unintended consequences of well-intentioned but imperfectly conceived programs, as has too often been the case in the past. The sub-fields of cultural, medical, nutritional, and demographic anthropology and human behavioral ecology can bring vital perspectives to both applied and theoretical problems in confronting the determinants of NCDs in Africa (Table 1), as they have for infectious diseases, including malaria, diarrhea, and HIV/AIDS.[24–27] As one review of epidemiological and anthropological evidence on hypertension argued almost 20 years ago, "socio-cultural influences should be the predominant focus and concern of public health."[28] In the African context this call has yet to be answered.

Although it is beyond the scope of this article to include an extensive review of contributions made by social scientists, and anthropologists in particular, to NCD work in developing countries outside of sub-Saharan Africa, even a basic familiarity with these fields should be adequate to begin the dialogue. The remainder of this article begins such a discussion; it does not claim to be an extensive review, or to treat comprehensively any of the many com-

plex issues raised. (For a review of anthropological studies of hypertension, see Dressler's recent contribution.[29])

A Holistic Approach is Required

Social anthropologists and social epidemiologists adopt a 'holistic' approach to phenomena under study, believing that the wider cultural, social, political, economic, and historical context surrounding the rise of any disease is important to its full understanding. Medical and demographic anthropologists usually include local disease ecologies and demographic conditions, as well as major determinants of health (such as social and economic stratification), in this holistic view. Social, cultural, political, and economic forces are also woven into the health system itself, encompassing the relationship between patients, families, and medical practitioners, whether they be 'modern' or 'traditional.'[20,30,31]

Many epidemiologists and anthropologists would see the rise of NCDs as rooted in health transitions, and share the basic premise that such transitions are shaped locally by rates of fertility change, the distribution of risk factors, and by the health system's responsiveness.[32] Risk, a malleable concept in epidemiology,[33] is usually defined in terms of variables associated with individual vulnerability. Many social scientists have criticized this as conceptual reductionism, terming it the 'epidemiological fallacy.' Epidemiologists studying determinants of cardiovascular disease in Europe and North America are increasingly adopting analytical techniques that allow for multiple and hierarchical levels of variation (such as multi-level modeling). This is an implicit acknowledgment of the need to redress reductionistic concepts of risk, and represents approaches to quantitative data to do so.

A more anthropological or social epidemiological concept of risk,[34] by contrast, would encompass structural and social vulnerabilities, as well as biological and behavioral ones. Within such a health transition perspective, anthropologists would draw a wide circle around the notion of 'risk' and 'risk factors.' In particular, they would explore how the rise of NCD risk reflects the changing social and economic position of certain groups and individuals relative to other members of society. In this model of risk, structural, environmental, and individual forces would all receive consideration in the design of NCD intervention and policy. This holistic 'upstream' view, which is fundamental to public health, has yet to be widely applied to NCD work in Africa.

Early cross-cultural comparisons of blood pressure and socioeconomic status, for example, suggested that risk could fruitfully be explored through examining variables such as 'level of engagement with cash economies,' or 'levels of economic competition.'[35] As one study of social status and blood pressure in the Caribbean concluded, "linkages and interactions between the macro and micro need to be incorporated systematically into the rapprochement of political-economy and human biology."[36] Expressed another way, anthropologists should seek to understand how globalization, local economic development, and urbanization, change the basic conditions of day-to-day life for certain groups in society. These factors influence such mundane practices as what people eat, how they get exercise, and what non-food substances they use—all of which affect risks of developing conditions such as hypertension, diabetes, or heart disease, as well as affecting how people respond to falling ill. In the study of HIV/AIDS in Africa, this approach has sometimes been called 'ecological' or 'environmental.'[37,38] Ecology also serves as a 'master' metaphor for some current directions in social epidemiological theory.[39] With the concept of culture being the only major exception, the foregoing summation of an anthropological approach to NCD (albeit greatly simplified) concurs with recent theoretical frameworks for globalization as well as health and social epidemiology.

Culture is often evoked as a reason for the failure of interventions, or as an obstacle to their success; however, even in contemporary theoretical frameworks, the concept fails even to gain a mention.[39,40] Without the more active engagement of anthropologists in the area of public health praxis, the culture concept—a key element of context—will remain under-theorized, a ghost in the machine that will hamper professional understanding of the manifestations of conditions of interest, and ways to address their root causes. A brief example follows.

Risk and African 'Maladaptation'

Implicit theories of culture pervade the epidemiological literature. Most of those familiar with contemporary research on AIDS, in particular, are at least sensitive to this concern. There is a strand of the AIDS literature that is both relevant to NCDs and illustrative of the need for anthropological engagement; this strand concerns ideas about culture change and adaptation to modernity.[41] The example may be apt, given that AIDS is not only a chronic disease, it has often been portrayed (like some NCDs) by both international health experts and local populations in Africa as 'a disease of development.'[41,42] The oversimplification of African adaptation to modern life was evident in the models of epidemiological risk and control that dominated the scientific understanding of AIDS for nearly a decade.[43]

These models were based upon naive assumptions about African sexual beliefs and practices. In this regard, epidemiologists tended to portray risk in 2 different ways: as either a matter of indi-

vidual choice in adopting protective behaviors, such as condom use or partner reduction, or as group vulnerability resulting from maladaptation to modern urban environments.[44,45]

Anthropologists and historians were quick to point out that this latter formulation of epidemiological risk and vulnerability was antiquated. Since the colonial era, 'culture' in the village context was seen as a reactionary set of beliefs hindering development, holding people back from becoming modern.[46–49] Culture was also viewed as a reservoir of medical misconceptions, making communities resistant to healthful change. However, when Africans made the jump to 'modern' settings, such as cities and industries, medical researchers perversely denigrated or pitied them for having 'abandoned' or 'lost' their culture, a state that rendered them more vulnerable to disease.[48]

Since at least the mid-1900s, Africans were seen, in an epidemiological context, as being stranded in a conceptual no-man's land between modernity and tradition without a clear set of principles that might protect them from the unhealthy risks of living in cities and participating in wage labor economies.[47,50,51] As an extension of this simple view of adaptation, concepts such as 'urban' vs 'rural,' or 'modern/Western' vs 'traditional,' were juxtaposed as if they were clear-cut dichotomous variables, when they were not.[52]

These concepts persisted into the era of AIDS research and control, covering too much conceptual territory with too little sociological rigor. They have played such a predominant role in Western studies of change in population health in Africa, that African clinicians and epidemiologists have begun to apply them to NCDs. "If one considers ecological urbanity as a continuum from rural to urban, the information obtained therefrom supports the thesis that [chronic heart disease] is a function of Westernization or social sophistication."[53] If left unchallenged, these views may become embedded in the conventional epidemiological wisdom about NCDs among Africans (or Americans of African descent[54]), as they did in the case of AIDS.

It is dangerous to apply a naive maladaptationist cultural theory to research on NCDs and risk in health transitions in Africa because, as seen with the study of AIDS, such a theory neglects to include a thorough assessment of social structures and meaning. These are issues that have proved central to understanding health and illness in Western settings. In the case of AIDS, these issues have been explored most extensively in health transition,[19] or 'culture and political economy,' approaches.[55–57]

This is not to say that studies of adaptation and modernization should be excluded from the agenda; however, they must be framed with theoretical rigor. Within anthropology, the subfield of human behavioral ecology, for example, can help refine the concept of adaptation as it relates to modern settings and NCD risk. Propositions that "the anthropological evidence . . . [suggests] . . . that human maladaptations in affluent society are due to a dissonance between the modern culture and the evolutionary legacy"[28] may, thereby, be framed as testable hypotheses and investigated as such. When reinforced by careful ethnographic research, concepts of modernization, stress, and adaptation, have offered useful insights into NCDs in the Americas and Samoa.[29] Such approaches could be extended to research in sub-Saharan Africa.

APPLICATIONS OF ANTHROPOLOGY TO NCD PREVENTION AND CONTROL

A cultural and political economy approach is central to understanding the root conditions of NCD transitions and structural risk in Africa; however, anthropology can also contribute to NCD prevention and control. Some familiar concerns about anthropology in public health are that 'traditional' ethnographic research takes too long, rarely points to clear therapeutic or preventive interventions, and is usually too culturally or geographically specific to be generalizable. Again, the experience of anthropological involvement in confronting AIDS should lay most of these concerns to rest.[58–63] Further, as research on NCDs from non-African settings has demonstrated, anthropologists can collaborate effectively, both in model building and hypothesis generation, and in the design and evaluation of interventions. Researchers in the Americas have produced a growing literature on cultural and contextual aspects of NCD-related belief and behavior. A great deal of this work has been conducted among disadvantaged or marginalized populations, including American Indians in the United States, Canada, and the Caribbean.[22,29,36,64–80]

Explanatory Models and Qualitative Research on the Experience of NCD

One of the most common ways anthropology has been used to improve the design of NCD care in non-African settings has been the application of Kleinman's concept of 'explanatory models.'[81] The study of explanatory models, or 'cognitive domains,' of illness has been part of medical anthropology since the 1980s. These terms refer to concise statements of illness beliefs, from both professional and lay sources, collected using ethnographic or qualitative methods. They have been proposed as standard techniques for clinical NCD work in the United States,[82,83] and standard methods for utilizing them to conduct comparative work in international health have been developed.[84]

Despite their widespread application, we know almost nothing about local concepts and self-perceptions of NCDs such as hypertension and diabetes among Africans, or about explana-

tory models and beliefs regarding etiology. Nor do we have information about how gender informs the experience of these illnesses; treatment seeking in the context of plural healthcare systems; concepts and practices of local providers; and long-term household or family impact and coping strategies.

The study of explanatory beliefs about NCD causes and care also offers opportunities for addressing the patient/practitioner relationship. This will be important to both improving clinical medical services, and to working with traditional healers, who are often in a better position than clinicians to provide more psycho-social support in the NCD context.[85] In an era of rapid development and social change, cultural meanings and behavioral patterns associated with good health, as well with ill health and disease management also will change. Indeed, anthropologists have documented ways in which the most fundamental ideas about the human body are informed by cultural values, thereby changing over time.[86–88]

Development of Lifestyle and Stress Concepts

The concepts of 'lifestyle' and 'stress,' like those of culture and risk, are poorly operationalized in the developing country NCD literature of the maladaptative viewpoint, and so are of limited utility. As with 'culture,' the lifestyle concept often functions as a catch-all category for a set of risk factors assumed to be interconnected, and to relate to some imagined scale of modernity. Political economy and powerlessness cross-cut these ideas implicitly; we need to make these concepts more explicit, empirical, and measurable. These risk factors include urban residence, strained social or kinship networks, lower levels of physical activity, greater likelihood of cigarette smoking, or consumption of fatty food. Since 1963, anthropologists in South Africa have demonstrated that a simple notion of lifestyle is unlikely to prove fruitful for the understanding of variations in blood pressure.[89] More nuanced understandings of adaptive strategies and coping in the complex world of South African apartheid were required.

Dressler and colleagues have developed the lifestyle concept in research on socio-economic and cultural dimensions of hypertension in the Americas.[29,36,65–69] This has entailed the measurement of 'lifestyle incongruity,' a model in which individual differences in social and psychological characteristics are related to large-scale processes. Their aim is to connect upstream forces with downstream outcomes in a way that is both biologically and sociologically plausible.[36]

As an extension of concepts of changing lifestyle and stress, social cohesion is also relevant in assessing risk of NCDs in rapidly changing developing country settings. A breakdown of perceived levels of social cohesion may relate to both NCDs, and to an increased sense of vulnerability to forces beyond the individual's control.[72] For example, social class differences in blood pressure among Jamaicans were mediated by perceived levels of social support for men, and by economic stress for women.[69]

The exact pathways by which stress, lifestyle incongruity, lack of social cohesion, or relative powerlessness, might lead to the development of chronic diseases are not understood. Concepts such as 'alostasis' and 'alostatic load' refer in a general sense to the toll taken on specific bodily systems due to chronic over- or under-stimulation. Such attempts to locate and measure the ways in which social and cultural stresses can be directly linked to pathological outcomes, even to pinpoint the physiological processes that mediate between body systems and environment in this way, need a great deal of theoretical development to be both physiologically and sociologically plausible. Nevertheless, there are tantalizing findings from research on the physiological and adrenocortical responses to chronic stress, and to change in social status, among both humans, and non-human primates.[90–92] While not of immediate impact for primary prevention or control, these areas of research may soon point to pathways that mediate physical responses to stress in conditions of relative and absolute deprivation. This, in turn, might some day help to explain how NCDs can become burdening diseases of the poor, as well as the rich.

Locus of Control and NCDs

A common hypothesis is that those who perceive the cause and course of their illness to lie beyond their personal influence may adhere poorly to treatment; however, the theory was tested cross-culturally in the area of diabetes with inconclusive results.[93] This notion of 'locus of control' has been applied in clinical anthropology in the United States, and in cross-cultural research on both diabetes and hypertension.[72,78,82,83] A group in Yugoslavia, for example, worked to strengthen the sense of social support for elderly people with hypertension.[94] They identified culturally relevant institutions upon which to style their efforts, and the resulting self-help groups met with some success. This approach may be an extremely important one in the African context. Many cultural theories of disease causation in Africa locate the etiology of sickness, at least in part, as being beyond individual control. Thus, at a simple level, one may hypothesize that in social settings where illness causation is strongly associated with the malevolent actions of others it may be difficult to motivate wide-scale preventive behaviors or to sustain participation in treatment plans or self-care initiatives.

Nutritional Anthropology

Research on diet and nutrition are obviously crucial to an NCD prevention and control agenda in Africa. Maladaptationists are correct insofar as they perceive that contemporary views on

NCD-related risks are connected to the past. In order to make this more than a platitude, anthropologists can observe changes in the uses and cultural perceptions of salt, sugar, tobacco, fat, and alcohol.[95] They can also probe the very meanings of modern consumption and commodities,[88] specifically in relation to NCDs. 'Traditional' notions of body image and associations among fatness, fertility, health, and wealth, for example, are virtual stereotypes in Africa. These need to be unpacked in specific contemporary settings with regard to ideas about the life course, marriage, advertising, and mass media, and the effects of wealth upon individual behavior.[96] A richer understanding of this social/cultural/biological nexus complements a culture and political economy approach and can clearly inform programs of primary prevention.

CAPACITY IS SCARCE, BUT OPPORTUNITIES EXIST TO STRENGTHEN IT

The Global Forum for Health Research is committed to addressing what it has termed the '90/10' imbalance in resources for research on health issues: 90% of global resources are spent on investigating problems affecting 10% of the world's population. The successes met by these efforts should not merely be directed at issues, but also at the specific strategies for researching them through a range of disciplinary perspectives, including anthropology and other social sciences. Social sciences, and the strengthening of developing country capacity in social research, have long been core components of WHO's program of Tropical Disease Research. An acute need exists to support African graduate students and institutions desiring to become involved in anthropological research on NCDs in Africa.

A particularly important opportunity for capacity strengthening in social science research on chronic diseases in Africa involves the network of 'demographic surveillance' (DSS) sites around the continent. These sites, with their continuous longitudinal monitoring of dynamic population cohorts and their health, are gaining an increasingly important role and voice in informing intervention policy and practice.[97] In 1997, a global network of such sites (the INDEPTH Network, http://www.indepth-network.net) was established. On top of these DSS platforms, a variety of long-term monitoring programs can be established to track population health, poverty conditions, and risk factors over time. One such effort, the Tanzanian Adult Morbidity and Mortality Project (http://www.ncl.ac.uk/ammp), has already begun to explore the role of NCDs in mortality transitions, and the links of NCDs to impoverishment.[98–100] DSS sites, and the INDEPTH Network through which many of them assist each other, have routinely focused on demography and epidemiology, occasionally employing anthropologists. Demographic surveillance sites and INDEPTH are committed, however, to strengthening developing country capacity, not only in the areas of demography, epidemiology, and information technology/data systems, but also in bio- and social statistics, anthropology, sociology, and economics.

The needs are too great to be met by this channel alone, and those responsible for supporting social research capacity development focused on the leading infectious diseases should consider carefully the looming needs for these perspectives in coming health transitions in Africa.

CONCLUSIONS

While socio-cultural issues will clearly affect NCD control, social science perspectives have been absent from both policy statements and action plans. In the new domain of NCD control in the 'tropical disease' context, the emphasis on community action should be matched with a commensurate commitment to explore the complexities of community life. Local researchers and practitioners should be at the forefront of these efforts.

Without the full partnership of anthropologists, sociologists, geographers, historians, social demographers, and micro-economists, efforts to confront NCDs run the risk of repeating past mistakes.

It is hoped that the public health community concerned with the prevention and control of NCDs in Africa will be quick to embrace the involvement of anthropologists and other social scientists. Without the full partnership of anthropologists, sociologists, geographers, historians, social demographers, and micro-economists, efforts to confront NCDs run the risk of repeating past mistakes. The 'added value' of strengthening the local research and policy capacity will bolster the impact of the major resource commitments advocated by bodies such as the Global Forum for Health Research and WHO.[12]

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REFERENCES

1. King H, Rewers M. Diabetes in adults is now a Third World problem. The WHO Ad Hoc Diabetes Reporting Group. *Bull World Health Organ.* 1991;69(6):643–648.
2. Murray CJL, Lopez AD. Alternative visions of the future: projecting mortality and disability, 1990–2020. In: Murray CJL, Lopez AD, eds. *The Global Burden of Disease.* Boston, Mass: The Harvard School of Public Health on behalf of the World Health Organization and the World Bank; 1996:325–395.
3. Johnson TO. Diabetes in the Third World. *World Health.* 1991. 8–10.
4. Bulatao RA, Stephens PW. Global estimates and projections of mortality by cause, 1970–2015. Washington, DC: The World Bank, Population and Human Resources Department; 1992.
5. Ministry of Health and AMMP Team. *The Policy Implications of Adult Morbidity and Mortality. End of Phase 1 Report.* Dar es Salaam: United Republic of Tanzania; August 1997.
6. Gwatkin DR, Guillot M. *The Burden of Disease Among the Global Poor. Current Situation, Future Trends, and Implications for Strategy.* Washington, DC: The World Bank; 2000.
7. Gwatkin DR, Guillot M, Heuveline P. The burden of disease among the global poor. *Lancet.* 1999;354:586–589.
8. Unwin N, Alberti G, Aspray T, et al. Economic globalization and its effect on health. *BMJ.* 1998;316:1401–1402.
9. Unwin N, Setel P, Rashid S, et al. Non-communicable diseases in sub-Saharan Africa: where do they feature in the health research agenda? *Bull World Health Organ.* 2001; 79(10):947–953.
10. Howson CP, Reddy KS, Ryan TJ, eds. *Control of Cardiovascular Diseases in Developing Countries. Research, Development, and Institutional Strengthening.* Washington, DC: Board on International Health, Institute of Medicine/National Academy Press; 1998.
11. World Health Organization, ed. Cardiovascular research initiative in the developing countries. 2000. Available at: http://www.who.int/ncd/cvd/introducingcvi.htm
12. World Health Organization. *Regional Strategy for Non-Communicable Diseases (NCDs) in the Africa Region (2001–2010).* Geneva: World Health Organization.
13. Murray CJL, Lopez AD, eds. *The Global Burden of Disease.* Boston, Mass: The Harvard School of Public Health on behalf of the World Health Organization and the World Bank; 1996.
14. Janzen JM. *Ngoma. Discourses of Healing in Central and Southern Africa.* Berkeley, Calif: University of California Press; 1992.
15. Kleinman A, Good BJ, eds. *Culture and Depression: Studies in the Anthropology and Cross-Cultural Psychiatry of Affect and Disorder.* Berkeley, Calif: University of California Press; 1985.
16. Riesman P. The person and the life cycle in African social life and thought. *Afr Stud Rev.* 1986;29(2):71–138.
17. Farmer P. *Infections and Inequalities: The Modern Plagues.* Berkeley, Calif: University of California Press; 1999.
18. Schoepf BG, Schoepf C, Millen J. Theoretical therapies, remote remedies: SAPs and the political ecology of poverty and health in Africa. In: Kim JY, Millen JV, Irwin A, Gershman J, eds. *Dying for Growth. Global Inequality and the Health of the Poor.* Munroe, Me: Common Courage Press; 2000:91–126.
19. Caldwell JC, Findley S, Caldwell P, et al, eds. *What We Know About Health Transition: The Cultural, Social, and Behavioral Determinants of Health.* Canberra: The Health Transition Center, The Australian National University; 1990.
20. Feierman S, Janzen JM, eds. *The Social Basis of Health and Healing in Africa.* Berkeley, Calif: University of California Press; 1992.
21. Susser M. The tribulations of trials—intervention in communities. *Am J Public Health.* 1995;85(2):156–158.
22. Daniel M, Green LW, Marion SA, et al. Effectiveness of community-directed diabetes prevention and control in a rural aboriginal population in British Columbia, Canada. *Soc Sci Med.* 1999;48(6):815–832.
23. Feinleib M. New directions for community intervention studies. *Am J Public Health.* 1996;86(12):1696–1698.
24. Farmer P. Culture, poverty, and the dynamics of HIV transmission in rural Haiti. In: Brummelhuis HT, Herdt G, eds. *Culture and Sexual Risk. Anthropological Perspectives on AIDS.* Luxembourg: Gordon and Breach; 1995:3–28.
25. Inhorn MC, Brown PJ, eds. *The Anthropology of Infectious Diseases: International Health Perspectives.* Amsterdam: Gordon and Breach; 1997.
26. Nyamongo I. The malaria cognate: folk classification of illness among the Abagusii of Kenya. *Afr Anthropol.* 1997;IV(2):27–36.
27. Setel P. Overcoming structural obstacles among local implementors is key to AIDS prevention. *World Health Forum.* 1997; 18(2):215–217.
28. Blackburn H, Prineas R. Diet and hypertension: anthropology, epidemiology, and public health implications. *Prog Biochem Pharmacol.* 1983;19:31–79.
29. Dressler WW. Modernization, stress, and blood pressure: new directions in research. *Hum Biol.* 1999;71(4):583–605.
30. Baer H, Singer M, Johnson J. Towards a critical medical anthropology. *Soc Sci Med.* 1986;23(2):95–98.
31. Comaroff J. Medicine and culture: some anthropological perspectives. *Soc Sci Med.* 1978;12B:247–254.
32. Gribble JN, Preston SH. Introduction. In: Gribble JN, Preston SH, eds. *The Epidemiological Transition. Policy and Planning Implications for Developing Countries.* Washington, DC: National Academy Press; 1993: 1–8.
33. Frankenberg R. Risk: anthropological and epidemiological narratives of prevention. In: Lindenbaum S, Lock M, eds. *Knowledge, Power, and Practice. The Anthropology of Medicine and Everyday Life.* Berkeley, Calif: University of California Press; 1993:219–244.
34. Krieger N. Commentary: society, biology, and the logic of social epidemiology. *Int J Epidemiol.* 2001;30:44–46.
35. Waldron I, Nowatarski M, Freimer M, Henry J, Post N, Witten C. Cross-cultural variation in blood pressure: a quantitative analysis of the relationships of blood pressure to cultural characteristics, salt consumption, and body weight. *Soc Sci Med.* 1982;16(4): 419–430.
36. Dressler WW, Bindon JR. Social status, social context, and arterial blood pressure. *Am J Physical Anthropol.* 1997;102:55–66.
37. Barnett T, Blaikie P. *AIDS in Africa. Its Present and Future Impact.* New York, NY: The Guilford Press; 1992.
38. Sweat MD, Denison JA. Reducing HIV incidence in developing countries with structural and environmental interventions. *AIDS.* 1995;9(suppl):S251–S257.
39. Krieger N. Theories for social epidemiology in the 21st century: an ecosocial perspective. *Int J Epidemiol.* 2001;30:668–677.
40. Woodward D, Drager N, Beaglehole R, Lipson D. Globalization and health: a framework for analysis and action. *Bull World Health Organ.* 2001;79(9):875–881.
41. Setel PW. *A Plague of Paradoxes: AIDS, Culture, and Demography in Northern Tanzania.* Chicago, Ill: University of Chicago Press; 1999.
42. Fouraste RF. [Social perception of arterial hypertension from a transcultural perspective] (English abstract). *Ann Med-Psychol.* 1984;142(8):1087–1096.
43. Packard RM, Epstein P. Epidemiologists, social scientists, and the structure of medical research on AIDS in Africa. *Soc Sci Med.* 1991;33(7):771–794.
44. Grmek MD. *History of AIDS: Emergence and Origin of a Modern Epidemic.* Princeton, NJ: Princeton University Press; 1990.
45. Pela AO, Platt J. AIDS in Africa: emerging trends. *Soc Sci Med.* 1989;28(1):1–8.
46. Curtin P. Medical knowledge and urban planning in colonial tropical Africa. *Am Hist Rev.* 1985;90(3):594–613.
47. Jochelson K. HIV and syphilis in the Republic of South Africa: the creation of an epidemic. *Afr Urban Q.* 1991;6(1–2):20–34.

48. Packard RM. *White Plague, Black Labor.* Berkeley, Calif: University of California Press; 1989.
49. Vaughan M. *Curing Their Ills: Colonial Power and African Illness.* Palo Alto, Calif: Stanford University Press; 1991.
50. Callahan B, Bond V. The social, cultural, and epidemiological history of STDs in Zambia. In: Setel P, Lewis M, Lyons M, eds. *The History of Sexually Transmitted Diseases and HIV/AIDS in Africa.* Westport: Greenwood Press; 1999.
51. Chirwa WC. Sexually transmitted diseases in colonial Malawi. In: Setel P, Lewis M, Lyons M, ed. *Histories of Sexually Transmitted Diseases and HIV/AIDS in Sub-Saharan Africa.* Westport: Greenwood Press; 1999.
52. Cooper F, ed. *Struggle for the City: Migrant Labor, Capital, and the State in Urban Africa.* Beverly Hills, Calif: Sage; 1983.
53. Yonga GO. Development of risk factors for coronary artery disease in Africans. *East Afr Med J.* 1998;75(9):493–494.
54. Curtin PD. The slavery hypothesis for hypertension among African Americans: the historical evidence. *Am J Public Health.* 1992;82(12):1681–1686.
55. Farmer P. *AIDS and Accusation. Haiti and the Geography of Blame.* Berkeley, Calif: University of California Press; 1992.
56. Greenhalgh S, ed. *Situating Fertility. Anthropology and Demographic Inquiry.* Cambridge, Mass: Cambridge University Press; 1995.
57. Schoepf BG. Political economy, sex, and cultural logics: a view from Zaire. *Afr Urban Q.* 1991;6(1–2):94–106.
58. Ahlberg BM. AIDS Prevention with women and youth in Nairobi and Njeri. Paper presented at: African Studies Association Annual Meeting; 1993; Boston, Massachusetts.
59. Obbo C. The Language of AIDS in Rural and Urban Uganda. *Afr Urban Q.* 1991; 6(1–2).
60. Parker RG. Empowerment, community mobilization, and social change in the face of AIDS. *AIDS.* 1995;9(suppl):S27–S31.
61. Seeley J. *Searching for Indicators of Vulnerability: A Study of Household Coping Strategies in Rural South West Uganda.* Entebbe: MRC/ODA Research Program on AIDS in Uganda; 1993.
62. Setel P, Mtweve S. KIWAKKUKI: a brief history and analysis of a community-based response to AIDS. In: Klepp K-I, Biswalo PM, Talle A, eds. *Young People at Risk: Fighting AIDS in Northern Tanzania.* Oslo: Scandinavian University Press; 1995:149–164.
63. Varga CA. *KwaZulu Adolescents Negotiating Sex: Implications for Reproductive Health and HIV/AIDS.* Durban, South Africa: Department of Social Anthropology, University of Natal; 1997.
64. Anderson JM, Wiggins S, Rajwani R, Holbrook A, Blue C, Ng M. Living with a chronic illness: Chinese-Canadian and European Canadian women with diabetes—exploring factors that influence management. *Soc Sci Med.* 1995;41(2):181–196.
65. Dressler W, Balieiro M, dos Santos J. Culture, socioeconomic status, and physical and mental health in Brazil. *Med Anthropol Q.* 1998;12(4):424–446.
66. Dressler WW. Ethnomedical beliefs and patient adherence to a treatment regimen: a St. Lucian example. *Hum Organ.* 1980;39(1): 88–91.
67. Dressler WW. Education, lifestyle, and arterial blood pressure. *J Psychosom Res.* 1990; 34(5):515–523.
68. Dressler WW. The cultural construction of social support in Brazil: associations with health outcomes. *Cult Med Psychiatry.* 1997; 21(3):303–335.
69. Dressler WW, Grell GC, Viteri FE. Social factors mediating social class differences in blood pressure in a Jamaican community. *Soc Sci Med.* 1992;35(10):1233–1244.
70. Garro L. Cultural knowledge about diabetes. In: Young TK, ed. *Diabetes in the Canadian Native Population: Biocultural Perspectives.* Toronto: Canadian Diabetes Association; 1987.
71. Garro LC. Explaining high blood pressure: variation in knowledge about illness. *Am Ethnologist.* 1988;15:91–119.
72. Garro LC. Individual or societal responsibility: explanations of diabetes in an Anashinaabe (Ojibway) community. *Soc Sci Med.* 1995;40:37–46.
73. Garro LC. Intracultural variation in causal accounts of diabetes: a comparison of three Canadian Anashinaabe (Ojibway) communities. *Cult Med Psychiatry.* 1996;20(4):381–420.
74. Hagey R. The phenomenon, the explanation, and the responses: metaphors surrounding diabetes in urban Canadian Indians. *Soc Sci Med.* 1984;18(3):265–272.
75. Hagey R. The Native Diabetes Program: rhetorical process and praxis. Special issue: cross-cultural nursing: anthropological approaches to nursing research. *Med Anthropol.* 1989;12(1[special issue]):7–33.
76. Heurtin-Roberts S. 'High-Pertension'—the uses of chronic folk illness for personal adaptation. *Soc Sci Med.* 1993;37(3):285–294.
77. Heurtin-Roberts S, Reisin E. Folk models of hypertension among Black women: problems in illness management. In: Coreil J, Mull JD, eds. *Anthropology and Primary Health Care.* Boulder: Westview; 1990:222–250.
78. Hunt LM, Valenzuela MA, Pugh JA. Porque me toco a mi? Mexican American diabetes patients' causal stories and their relationship to treatment behaviors. *Soc Sci Med.* 1998; 46(8):959–969.
79. Krieger N, Williams DR, Moss NE. Measuring social class in US public health research—concepts, methodologies, and guidelines (review). *Annu Rev Public Health.* 1997;18:341–378.
80. Nettelbladt P, Svensson C, Serin U, Ojehagen A. The social network of patients with schizoaffective disorder as compared to patients with diabetes and to healthy individuals. *Soc Sci Med.* 1995;41(6):901–907.
81. Kleinman A. *Patients and Healers in the Context of Culture.* Berkeley: University of California Press; 1980.
82. Blumhagen D. Hyper-tension: a folk illness with a medical name. *Cult Med Psychiatry.* 1980;4(3):197–227.
83. Blumhagen D. The meaning of hyper-tension. In: Chrisman NJ, Maretzki P, eds. *Clinically Applied Anthropology.* Dordrecht: D. Reidel; 1980:297–323.
84. Weiss M. Explanatory Model Interview Catalog (EMIC): framework for comparative study of illness. *Transcult Psychiatry.* 1997; 34(2):235–263.
85. Tshabalala G, Gill GV. Cultural aspects of diabetes in Africa. In: Gill G, Mbanya J-C, Alberti G, eds. *Diabetes in Africa.* Reach, Cambridge: FSG Communications; 1997: 275–279.
86. Csordas T, ed. *Embodiment and Experience.* Cambridge, Mass: Cambridge University Press; 1994.
87. Lambek M, Strathern A, eds. *Bodies and Persons. Comparative Perspectives from Africa and Melanesia.* Cambridge, Mass: Cambridge University Press; 1998.
88. Weiss B. *The Making and Unmaking of the Haya Lived World. Consumption, Commoditization, and Everyday Practice.* Durham, NC: Duke University Press; 1996.
89. Scotch NA. Sociocultural factors in the epidemiology of Zulu hypertension. *Am J Public Health.* 1963;53(8):1205–1213.
90. Sapolsky RM. Endocrinology alfresco: psychoendocrine studies of wild baboons. *Recent Prog Horm Res.* 1993;15:437–467.
91. Shively CA, Laber-Laird K, Anton RF. Behavior and physiology of social stress and depression in female cynomolgous monkeys. *Biol Psychiatry.* 1997;41:871–882.
92. Wilkinson RG. Comment: income, inequality, and social cohesion. *Am J Public Health.* 1997;87(9):1504–1506.
93. Greenfield SF, Borkan J, Yodfat Y. Health beliefs and hypertension: a case-control study in a Moroccan Jewish community in Israel. *Cult Med Psychiatry.* 1987;11(1):79–95.
94. Sokolovsky J, Sosic Z, Pavlekovic G. Self-help hypertensive groups and the elderly in Yugoslavia. *J Cross Cult Gerontol.* 1991;6(3): 319–330.
95. Walker ARP. Nutrition-related diseases in southern Africa: with special reference to urban African populations in transition. *Nutr Res.* 1995;15(7):1053–1094.
96. Treloar C, Porteous J, Hassan F, et al. The cross cultural context of obesity: an IN-

CLEN multi center collaborative study. *Health Place.* 1999;5:279–286.
97. Tollman SM, Zwi AB. Health system reform and the role of field sites based upon demographic and health surveillance. *Bull World Health Organ.* 2000;78(1):125–134.
98. Bovet P, Ross AG, Gervasoni J-P, et al. Distribution of blood pressure, body mass index, smoking habits, and associations with socio-economic status in Dar es Salaam, Tanzania, and associations with socioeconomic status. *Int J Epidemiol.* 2002;31:240–247.
99. Setel P, Hemed Y, Whiting D, et al. The worst of two worlds. Adult mortality in Tanzania. *Insights Health.* March 2001;1:3–4.
100. Walker RW, McLarty DG, Kitange HM, et al. Stroke mortality in urban and rural Tanzania. *Lancet.* 2000;355(9216):1684–1687.