Hyperdiagnostics: Postcolonial Utopics of Race-Based Biomedicine

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The expansion of biomedical research into countries outside the United States and Western Europe is positing new biological links between populations based on race. This expansion includes six international projects occurring in Barbados, premised on the idea that the population is genetically representative of other black people. Based on ethnographic research tracking one such study, a genetics of asthma project, this article explores the ways Caribbean meanings of ethnicity and illness are reworked as Barbadian state medical practitioners become involved in facilitating the international genetics research on race and disease. As the state attempts to participate in an imagined future of genetic medicine, the hyperspecificity of genetic technologies create new medical meanings of race and disease. These changes rely on a paradoxical response by medical practitioners toward the high technology American genetic research as both authoritative and inapplicable, creating unexpected etiologies of illness and ethnicity.

Key Words: asthma; biomedicalization; ethnicity; genetics; racialization

“The really perverse thing about utopia is that, once articulated, it begins immediately to produce a desire for dystopia.” (Birkholz 2006:614)
The biology of race is a burgeoning field. A growing body of research attempts to link racial disparities in the prevalence and severity of common diseases—e.g., cancer, heart disease, asthma—with genetic propensities. The genetic basis for response to medications has been similarly differentiated by racial categorizations, including genes involved in drug metabolizing enzymes and chemotherapeutics. The Food and Drug Administration (FDA) has recently approved a heart medication, Bidil, that is the first pharmaceutical produced for and marketable to a particular racial group (see Kahn 2004). This medication and research in heart disease has been the focal point for debates in the past five years over whether there is a genetic basis for race. Anthropologists and sociologists have critically examined the burgeoning field that relies on long traditions in American concepts of race to make claims about underlying biological differences accounting for disparities in health and sickness (see Braun et al. 2007; Duster 2005; Jones and Perlis 2006; Kahn 2004; Kaufman and Hall 2003; Koenig et al. 2008; Lee et al. 2001; Montoya 2007; Shields et al. 2005). The various criteria used to demarcate black race in biomedicine—self-identification, geographic origin, sets of genes—create a slippage between race as innate and race as social (see Duster 2005). Today, this variation is an object of extensive argument in medical and scientific journals over whether there is a genetic basis for race and the utility of “race” to medicine (see Reardon 2005 for a recent history). In this moment of contestation, American regulatory and research practices are attempting to utilize racial classifications that they simultaneously critique. Market and moral pressures to address disparities in health are producing an expedient approach to racial categorization in which several criteria are each considered independently sufficient for classification (see Montoya 2007). I explore here how this science of race and disease extends into countries outside the United States and Western Europe.

With the focus on genomics, institutions like the FDA, National Institutes of Health (NIH), and pharmaceutical companies are drawing ethnic links between disease populations, assuming a common biology that distinguishes them from other populations. The pressure to address minorities, find therapeutic markets, target and explain disparities, and the increasing difficulty of conducting medical research on American populations results in expanded efforts to use biomedical data on populations in poorer countries to understand U.S. populations. This data comes from academic and pharmaceutical company projects that often rely on local governments for access to patients, facilitation of research, and robust medical records. As the FDA and NIH attempt to incorporate such
research, new links are being made between racial groups in the United States and populations in China, the Middle East, Africa, and Latin America. One such project in this internationalization of biomedical research is an American study of the genetics of asthma and race conducted in the Caribbean.

Despite having a population of only 269,000, Barbados is the site of six international disease genetics projects based on the claim that Barbadians are genetically representative of other black populations. One of these projects is an asthma genetics study conducted by researchers from Johns Hopkins University. This essay draws on ethnographic fieldwork tracking this study. From 2003–2004, I conducted research among the genetics team, Barbadian facilitators, and participant families involved in the study. Through interviews and participant observation, I explored the motives that bring these groups to this science of race and disease in the Caribbean and found ambiguities that allow the science to have difference relevance to a postcolonial government, researchers, and participant families. In this article, I argue that the transnational expansion of the American science of race and disease is reshaping state practices in postcolonial countries like Barbados that frame their populations as conducive to the global market in medical research. As the state attempts to participate in an imagined future of genetic medicine, the hyperspecificity of genetic technologies create new medical meanings of illness and ethnicity. These changes rely on a paradoxical response by medical practitioners toward the high-technology American genetic research on race and disease as both authoritative and inapplicable.

CITIZEN PARTICIPANTS

The six current international genetic studies of disease in Barbados are conducted by academic and industry research teams based in the United Kingdom and the United States, including, particularly, Johns Hopkins University and Stony Brook University. This research includes genetic propensity for cancers, acute lung injury, obstructive sleep apnea, asthma severity, and two genetic studies of dengue hemorrhagic fever (one American, one British). Previous research in Barbados has also examined the genetics of glaucoma. Barbados is the site of so much biomedical research because of claims about race: the population is considered by the researchers to be 92 percent black, based on the census (Barbados Statistical Service 2002) and the studies are premised on the idea that Barbadians are genetically representative of other black populations, particularly African Americans (Nickel et al. 1999). These projects join other biomedical research in posing Caribbean populations as Afro-Caribbean, equivalent
to African American, in contrast to European, Caucasian, or other similar ethnic/racial distinctions. Researchers have looked for innate processes or genetic predispositions that characterize these black populations. These studies correlate Afro-Caribbean peoples as black with particular genetic predispositions for disease (Kousta et al. 2001; Nemesure et al. 2003; Spencer et al. 2000) or innate propensity for obesity, skin disease, and other conditions (Dunwell and Rose 2003; Pomerleau et al. 1999; Westermann et al. 2003).

The Barbados Asthma Genetics Study was begun in 1993 by a team from the Johns Hopkins Medical School. The study has received funding from the NIH’s National Heart, Lung and Blood Institute (NHLBI) in addition to a multinational pharmaceutical company. This ongoing research has resulted in the participation of more than 125 families of individuals who have asthma, and the collection of DNA samples and phenotype and questionnaire data on socioeconomic indicators and asthma history and severity. It is heralded by the team as the largest database of asthmatics of African descent. Results have found evidence of chromosome linkage with asthma and have correlated this with African Americans, as part of the Collaborative Study on Genetics of Asthma. The Barbadian population is consequently considered by the researchers to be representative of African American asthmatics in contrast to other ethnic groups.

But why Barbados in particular? The primary reason is the nation-state in the form of Barbados’s peculiar mix of nationalized health care and integration into global medical markets. The American genetics team comes to Barbados as a source of robust medical facilities and records and access to patient participants. The extensive international biomedical work relies on the Barbadian government: the projects are facilitated by the interaction of a U.S.- or UK-based research team and Barbadian doctor/researchers usually through the Barbados Ministry of Health (MOH). The MOH provides records, and, more importantly in the eyes of the genetics team, Barbadian doctors and nurses who facilitate the study—conduct data collection and participant recruitment. The nationalized health care system is also significant for producing common access to medicine and care, considered by the genetic researchers to make the population less heterogeneous than other groups and thereby more amenable to gene-environment research. In one discussion about why Barbadians are good candidates, a researcher explained to me that while they are not genetically isolated or homogeneous as are the Icelanders, this disadvantage was offset by the extraordinary health care system in place and the educational levels of Barbadians. Patients are understood to be particularly willing participants in the studies, attributed by the researchers to their education level and a value placed on medical care by Bajans (the more vernacular term for Barbadians). Mary
Warner is a member of the Johns Hopkins team. She indicated to me the significance of the education levels for study facilitation, noting, “They have a literacy rate higher than the U.S.” As Carla Freeman has demonstrated, these qualities of stability and education levels have been significant in attracting international business to Barbados and are representations employed by both Barbadian officials and multinational companies (Freeman 2000). In the case of biomedicine, these rhetorics present Barbadian citizens for research and intervention.

The posing of Barbados as ideal for genetics research thereby intimately links the state with the patient, in the figure of a kind of citizen participant: education levels, health care infrastructure and stability, and patient acceptance of research are understood to interact to make a population advantageous to research. The Barbadian government’s Ministry of Health works to bring international pharmaceutical and bioscience research to the country, creating new medical partnerships between American and British research teams and Barbadian medical practitioners who facilitate the studies.

GENETIC FUTURISM

The Barbadian researchers involved in the studies are usually critical figures in Bajan medicine as heads of hospital departments or practitioners with large private practices; they are experts in their fields with enough cache to have access to large groups of patients who can become participants. The genetics team works to attract these facilitators at conferences and private meetings. In these sites, the American researchers accentuate the technologies and precision of genetics as significant to the country.

The Johns Hopkins–Barbados Genetic Epidemiology of Obstructive Lung Disease Research Conference took place in Barbados in 2004. This conference, conducted by the genetics teams, was designed to share the research and to recruit any medical practitioners interested in becoming involved in the studies. AstraZeneca partially funded the event and attendance was high, with an audience primarily composed of general practitioners and family doctors. The genetics teams gave four presentations (with extensive question-and-answer periods) on genetic studies into acute lung injury, obstructive sleep apnea, asthma, and the environmental aspects of childhood asthma. The interactions between researchers and Barbadian medical practitioners at such meetings are highly influential, as I found in conversations with general practitioners and specialists discussing a range of diseases.

In this forum, the genetics teams portrayed genetics research as a massive endeavor moving with increasing speed. In the presentation on acute lung
injury, the geneticist remarked, “What we are definitely advantaged by is that the Human Genome Project has led to these wonderful advances in technology: we can look at SNPs [single nucleotide polymorphisms] faster, we can do more gene expression, we can look at all of the genes at one time.” These accolades link the Barbados collaborations to other international research by which the biomedical future is being created. In this formulation, the medical unknown of these conditions becomes knowable through technological expertise of genetics research. He continued, “These technologies don’t mean a thing unless you have clinicians to marry this technology to what’s happening in the clinic.” The genetic technologies are presented as central to caring for the patient. The conference presentation on asthma genetics also focused on the scope and speed of emerging technologies. Mary emphasized the complexity of asthma as involving multiple genes and gene-environment interactions, necessitating the candidate gene method adopted by the Barbados Asthma Genetics Study. She talked about the study finding an association with asthma in the chromosome region of 12q, noting, “STAT6, IFNG, MYPT1, BTG1 … are examples of many, many candidate genes in this region.” This emphasis on the scale of discovery and the sophistication of technologies accentuates the potential of medical genetics; the research has uncovered multiple potential causes (genes) that presumably affect the experience of disease populations such as Bajan asthmatics, requiring gene-environment research to understand. There is a kind of anxiety in this depiction: the listing of genes masks the lack of success geneticists have had in finding strong associations between any set of genes and asthma. In this presentation, even as genes for asthma are revealed, the arcane list of genes—STAT6, IFNG, and others—creates an enigma for the Barbadian doctors that is only resolvable via high-throughput genotyping technologies. The medical unknown of conditions like asthma becomes knowable through interpreting and utilizing the results of various genetics research projects. Mary discussed the team’s use of higher-throughput genotyping technology produced within months of the presentation, allowing a scale of genotyping impossible in the past. As with the acute lung injury project, this mass of information is reinforced by the scale of the projects, as the data are made available electronically, “so that any investigator anywhere can conduct a blood test for a gene of their choice.” The direction of this scale and scope of research was indicated by the sense of possibility: “We’re just beginning.”

Through these venues, the American teams represent genetics research as a high-technology, high-speed, large-scale network, making the studies relevant to the participating country (see Fortun 1998). The cartography of the genome map in this representation allows a continual detail, a finer and finer-grained discovery as depiction. The map’s specificity and sharpness
confer authority on the narratives of health, inequities, ethnic history, and pathologies that are contained within its narrative structure. This detail produces a mass of data qua knowledge qua importance. This "fecundity of genetics" is supported by the expansion of research in Barbados. The genetic approach to disease allows the integration of databases from studies of unrelated diseases, and a consequent ability to expand research on a population to include different conditions. The international projects occurring in Barbados draw from one another; the existing patient groups, blood samples, and databases generate continual potential for studies of new diseases and drug response. For example, the sleep apnea and dengue genetic studies recruit individuals from the asthma genetic study, through an additional questionnaire. The dengue group found during preliminary investigation that a genetics of dengue project was already occurring in Barbados, conducted by a researcher from London.\textsuperscript{9} The projects thereby operate by a kind of involution that reinforces the impression of a rapidly expanding science that is the future of medicine. For the Barbadian facilitators, this brings sophisticated technologies and knowledge into the troubled postcolonial state’s medical system.

Technology and expertise are at the heart of this seduction of biomedical progress. The value of the collaboration for the Bajan researcher is in the genotyping technologies, diagnostic machines, and funding.\textsuperscript{10} This access to technology is not necessarily direct. Often the U.S. researchers are valued as the mediators rather than the providers of international diagnostic technologies by conducting genotyping of Barbadian patients in the United States. For example, in the case of the dengue study, plans were made for genotyping to be done at Johns Hopkins for unrelated studies already in progress by the Barbadian researchers. The expertise and technological sophistication of the U.S. teams are accentuated for the Barbadian researchers in these agreements. Prestige is critical here; as one of the leading biomedical facilities in the world, Johns Hopkins carries the significance of having the most current biomedical knowledge. In addition, the teams offer training of medical staff involved in the studies. By collaborating with the geneticists, doctors and nurses are often flown to the United States to receive training in study protocols, medical procedures, and use of technologies. For the acute lung injury study, plans were made to bring Barbadian nurses to Johns Hopkins for training in study facilitation and to bring internal medicine residents at QEH to Johns Hopkins Hospital to observe internal medicine practices there. This expertise is of particular value to Barbadian physician/researchers both to facilitate the study and to improve medical care.

As the genetics team meets with private and public doctors, they thus accentuate the technologies that they bring and lists of genes associated with
prevalent conditions. The Barbadian researchers, in turn, present Barbados as an ideal site for such research. I attended a meeting at the QEH between three Johns Hopkins researchers and a Barbadian physician, Taylor Newton, to discuss a potential study on the genetics of asthma severity. As the Johns Hopkins researchers described the project, the QEH was considered a possible site. This suggestion carried both an enticement—Johns Hopkins would bring its technologies and expertise to the hospital—and a challenge—can the QEH handle the project? Taylor responded to the implicit challenge by talking about the high prevalence of asthma, as indicated by visits to the hospital, mentioning the 10,000 asthma cases in 2003. He also discussed the history of asthma care in Barbados. He first focused on the problematic former treatment practices: “[At the Accident and Emergency Department] we would just make a circle of terbutaline and go to each patient, adrenaline, adrenaline, adrenaline, all around.” Contrasting this practice with modern medicines and the current sophisticated strategies used in the Asthma Bay, Taylor emphasized the progress made by the hospital in asthma care, making his case for Barbados as the site of the genomic research. In such interactions, the Bajan practitioners framed patient populations as potential international genetic participants and a sophisticated Barbadian health care system well positioned for such research.

But for the exchange to occur, the emphasis on capability must be complemented with areas of need. In interactions with the genetics research teams, Bajan practitioners present the care in Barbados as considerably better than other Caribbean islands, while simultaneously indicating the problems and deficiencies where technologies and expertise would help. This included the difficulties of multiple techniques of diagnosis used in Barbadian medicine. At the meeting between Taylor and the geneticists studying asthma severity, Taylor emphasized the variation in asthma diagnosis among general practitioners, referring to the diagnosis of “bronchial asthma” or a “whiff of asthma.” This led to a conversation about diagnosis in the Accident and Emergency Department:

Johns Hopkins researcher Eric Reid: Are there any competing diagnoses?…
Who picks the label [whether it was] asthma or cough, who picks?
Taylor: We will see them. We currently use the GINA [Global Initiative for Asthma] guidelines. There is a type of asthma, cough variant, I think exists but some of my colleagues don’t.

Taylor here conveyed the hospital as the preeminent source of diagnoses in Barbados while noting areas where further expertise (such as the genetics team’s) would help. At this point in their conversation, another Johns Hopkins researcher, Mary Warner, joined in by asserting the validity of
the hospital diagnosis: “I have to say that what is called an asthmatic here who has then gone into our study has always been an asthmatic, which is a testimony to the diagnostics here.” Exchanges such as this mutually stabilize particular techniques of asthma diagnosis and categorization. The hospital technique is both relied on and validated by the genetics research.

The authority accorded the technology is critical to this exchange of challenges and offers. In one conversation between Taylor and a genetics team researcher, Taylor focused on this pragmatic utility of the biomedical research: “You will percolate my interest when the genetics translates into medical care at my front door.” The researcher responded by referring to a registry system Johns Hopkins would provide. He then talked about recruiting patients for studies of asthma care: “I’m not talking about drug trials, I’m talking about tracking [emergency department visits] for follow up care.” As the Johns Hopkins researcher and Barbadian doctor attempt to draw each other into the project, the U.S.-based genetics research is represented as not restricted to financial incentives as it becomes a part of the Barbadian public health system. The American researchers portray the research as international, fast-paced, and inevitable while simultaneously responsive to the medical needs of a resource-poor postcolonial country. The Bajan facilitators present the areas of needed assistance from the high-funding and high-technology American team while portraying their own sophistication as an attractive site for this market in medical research. Recent social analyses have explored the significance of technology to bio-medicine (see, e.g., Galison 1997; Keating and Cambrosio 2003; M’Charek 2005). These works focus on the social, historical, and political production of agreement in science and medicine around particular technologies and the categories they produce. I emphasize here a more contested and cultural significance of genotyping technologies in which American genetics researchers strategically employ the authority accorded such technologies while Bajan medical practitioners come to see them as simultaneously precise and opaque. Technology in these uses becomes “technology”: a category reflected on and interpreted diversely.

These partnerships form around the significance given to genotyping technologies—to Bajan health, medical care, and the science of medicine. The international genetics studies are employed in this context to represent Barbados as a medical and political leader in the region (also see Whitmarsh 2008a). Edward Wright is a Barbadian government researcher centrally involved in almost all of the international biomedical research occurring in Barbados. Detailing the history of medical research in Barbados, he focused on the many foreign-based projects. The international significance was considered critical: “The Barbados Eye Studies received four consecutive NIH grants and led to the publication of more than 30 reviewed papers.” He
spoke with fervor of the various projects: the International Study on Hypertension in Blacks; the Barbados Asthma Genetics Study; the Cancer Study, also funded by the NIH ("I believe this is the only NIH-funded project with a non-American P.I. [principal investigator]"); two Wellcome Trust projects; and European Union funding of HIV research. The political connections with the United States confer a cosmopolitan biomedical status; medical officials use the research to position Barbados as involved in the high-technology multinational future of medicine.

This embrace of global biomedicine plays into long traditions among Caribbean nations of political positioning as "international." Edward discussed competition with Jamaica: "Jamaica is far in advance in terms of medical research activity...several decades ahead of Barbados." However, according to Edward, Barbados maintained its position as the center for biomedicine in the eastern Caribbean: "People come from the OECS [Organization of Eastern Caribbean States] to Barbados for medical treatment." He spoke with pride about the fact that "30 papers from Barbados are presented every year at the Caribbean conference on medicine." He also positioned this research as necessary to the health of the population: "Research is not only fundamental to medical training, but fundamental to health." The citizen participants are constituted as the postcolonial government positions itself as a medical and political leader in the Caribbean, insofar as it is imbricated in a global economy that includes biomedical markets. The state embrace of the studies thereby relies on a "genetic futurism." Genetics is made the medicine of tomorrow, with the attendant values of being at the forefront of the global medical interventions. Medical officials portray their nation as biomedical markets to attract such research.

The play of wants and offers in these medical partnerships is a postcolonial government’s response to the discourse of genetic fecundity. Medical practitioners in resource-poor countries like Barbados work to attract such research in order to gain from the promised medical future. These technologies confer a symbolic objectivity, seen to create better medicine. Lawrence Beecher is a doctor who helped to recruit patients for a genetics study from his private practice. During an interview in his office, he explained the relevance of the genotyping technologies to diagnosis: "there are possibly different types of asthma. Genetics would be very useful in defining asthma—now, we have no objective means, as you know. We have wheezing." The technologies are valued as producing an authoritative specificity. The Bajan medical practitioners simultaneously portray their dire need for such expertise and their modernized ability to contribute in a process of utilizing and adapting to this biomedical potential. These delicate countermovements comprise a foundational mix of skepticism and hope in the genetic future: as I learned, facilitation of the research does not necessitate enthusiasm for it.
In conversations with the doctors, nurses, and administrators who recruit participants, provide access to biological samples and medical records, and administer the studies, I came across strong criticisms of the genetics research. Lawrence talked about his misgivings toward the asthma genetics research:

In terms of the asthma condition, when the first study was done 23 years ago, there was a 1.03 percent prevalence. This increased to 18 percent then 20 percent as found in ISAAC. Genetics does not account for the dramatic change.

Many specialists and participant families shared this critical view of the focus on genetics based on the increase in asthma in Barbados. In a conversation with another study facilitator, I asked whether there was more asthma in Barbados than in the past. The facilitator replied:

Yes, it seems like it. But I’m not sure. I mean, with all this research, but they still don’t know [pauses] what causes it. I mean genetics is part, but there’s got to be an environmental part too, doesn’t there? I guess it’s a lot of things. We eat different foods now, genetically modified foods are everywhere, aren’t they, you don’t even know if you’re eating them. And industrialized countries are bringing all this stuff to places, saying they’re making it better, but that’s where asthma is going up.

For this facilitator, the international commerce that brings the genetics research is implicated in the disease being studied.

Lawrence also considered genetics research unresponsive to the economic realities of the country; he went on to discuss the lack of facilities for genotyping in Barbados: “There’s no place for genetic testing here; we had to send all of our work to Europe for testing.” He found the study insufficient to account for the specificity of Barbados, both in terms of asthma experience and as having future treatment implications restricted to wealthier countries; yet he valued the potential of such research to reduce variation in diagnoses found in current Barbadian medical practice.

This mix of desire and criticism toward the study reflected the sense of a genetic future likely to leave the marginalized country behind. One facilitator talked with me about the increasing genetic projects in Barbados and other countries as a part of modernization that was overwhelming in its complexity. This facilitator remarked with a tone of resignation, “This genetics and genomics research. It’s just going to go on and on.” These doctors and nurses at different levels of study facilitation gave a sense of their involvement in a massive project with its own inertia. The speed
and scale of genetics in these narratives was not a fecundity but a problematic excess.

This criticism was often framed in terms of the motives of the international research occurring in Barbados:

A lot of studies are being done. People are getting on the bandwagon, and studies are being done where drug companies give money to show their drug is better. And there’s the genetic study. What I want to know is how is this going to affect the way I treat the patient there [indicates examination room]. If there’s no impact on what I do with the patient, then genetics of asthma studies are just for Nature and Science articles.

For this facilitator, the pharmaceutical company and academic interests were tied together in international projects that are in danger of being inapplicable to Barbados. This doctor shared Lawrence’s view that Barbados would be unlikely to utilize genetic technologies in medical practice. Such analyses turn the scale of projects from an asset into a criticism, implying that these global practices come from market interests. These interpretations reveal the plurality of meanings accorded “genetics” as it becomes transnational. Research on the biological becomes here an ambiguous science, a search for illness explanations that are precise yet over-rely on technological innovations and markets. Bioscience concepts like the biological are associated with the institutions that create them; in Barbados, the science of genetics is associated with market-driven obsessions as much as objective authority. This ambivalence creates deeply conflicted attempts to integrate the research into Barbadian medical care, as I explore in the remaining pages. The ambiguous evaluations are integrated into the medical significance given to “race” and “genes.”

HYPERDIAGNOSTICS OF RACE

For the American teams, the studies in Barbados are saturated with race from the beginning: they come to Barbados as a population considered biologically representative of black populations. The Bajan medical officials and practitioners, by contrast, come to the study as a source of technology and expertise considered to be the future of medicine. The race of their patient populations only becomes significant to the Bajan medical researchers and practitioners through the genetics studies. Lévi-Strauss has noted that in gift exchange, “the agreed transfer of a valuable from one individual to another makes these individual into partners, and adds a new quality to the valuable transferred” (1969:84). As with any deployment
of medical technology and expertise, meanings are constituted through the use of the genetic technologies. As Barbados takes part in the international market in medical research, the extraordinary specificity of technologies of race and disease give both new meaning.

As mentioned, race is critical to all the international genetic projects occurring in Barbados. Biomedical uses of race are multiple, drawing on sets of genes, attribution by skin color, self-identification based on census categories, and geographic location. When biomedical researchers enter neighborhoods, homes, and doctors’ offices, they come across other sets of distinctions: in Barbados these distinctions include nationality, surnames, and Caribbean identity. The 92 percent black figure comes from the Barbadian census which offers the following categories to mark for “ethnic origin”: Black, White, Chinese, East Indian, Arab, Mixed, and Other. In the 2000 census, 93 percent of those who responded marked Black; 3.2 percent White; 2.6 percent Mixed, and 1 percent East Indian (Barbados Statistical Service 2002). This categorization draws from common official designations of race in the Anglophone Caribbean (on these designations, see Khan 2004). The contrast of East Indian and White, or Chinese and Black, reveal a relational nexus of race and nationality. As elsewhere in the Caribbean, a shift toward black identity arising out of political development in the 1960s and 1970s continues to be a strong current in ethnic identities (see Hall 1997; Harrison 1995; for an exploration of ethnicity and political economic power in the Caribbean, see Robotham 1996). The national origins of Barbadians historically, aside from England and Africa, include the importation of people from India as labor, and immigration primarily from the Caribbean islands (particularly Guyana and St. Vincent and Grenada). In Barbados, races and the level of distinction between them are differentiated by nation. Indian, Guyanese, Chinese, White, Bajan are all contrasted with each other at different points.

This plurality is precluded by the biomedical framing of race, creating uneasy attempts at stabilization. The asthma genetics study is conducted through home visits. In these visits, the study facilitators take blood samples, collect dust samples, conduct spirometry (measuring lung function with an instrument into which patients exhale and inhale), and administer an asthma questionnaire. Race becomes part of the study data through the questionnaire, which includes asking the family members for their “racial/ethnic background” and that of their parents. Family members offered varied responses to this attempt to stabilize Bajan ethnicity. Several answered with indications of nationality, drawing from the contrasts discussed above. One woman answered a question about her parents’ racial background by saying “My grandmother is Portuguese.” Another responded, “Father and mother both from Guyana.” One mother, who
identified herself as Bajan, commented: “Well, to be honest with you, my grandfather was white. But he married into black... So we came down that line. But my foreparents were white.” In these responses, the Bajan families emphasized relational meanings of ethnicity, drawing together Caribbean heterogeneity and family histories, with a sense of multiple solidarities. During an interview with a mother who participated in the research, I asked about parental background. She remarked: “They are Bajans. Bajan.” Her husband interjected, “Bajans, Africans.” The mother responded: “I don’t know. I go through my mother. My mother and father Bajans,” and laughed. This multiplicity—contrasting and equating a solidarity with Bajans, a history with Africa, family affinities, and humor about this multiplicity—is critical to identities of ethnicity. A pause was audible in these assertions about race to the researchers; there was a hesitation in the statements about not having that name here, and white foreparents, and Bajans as Africans versus as Bajans. In these pauses, the families expressed the discrepancy between the variability and liveliness of ethnic identities and the stability of a single identification inscribed for medical analysis. Their sense of the researchers’ desire for such stability could thereby become a part of the study.

The genetics research makes these multiple and conflicting ethnic identities into biological categories, equating the patients as “Afro-Caribbean” with African Americans. This transformation is based on the biomedical technologies of race. The genetics team argues that both African Americans and Barbadians have approximately 25 percent Caucasian admixture, a percentage employed in articles and conversations. This datum is based on an analysis that was conducted some years after the Barbados Asthma Genetics Study began, when the Johns Hopkins team wanted to give a genetic basis to their claim that Barbadians could biologically represent African Americans. Some of the team members in collaboration with another group of geneticists examined the prevalence of a gene involved in the expression of a blood group protein (DARC) (Nickel et al. 1999). Individuals who express the protein are called Duffy-positive, and those who do not are Duffy-negative. Other biomedical research has found a very low prevalence of Duffy-positive individuals in West Africa, and genotyping of a different allele (Fya) involved in DARC expression has been used to analyze Caucasian admixture (Graves 2001:201–3). In the present study, individuals were genotyped for two alleles (DARC/C0 and /C0T): homozygotes for DARC/C0 are Duffy-negative, while those who have at least one /C0T allele are Duffy-positive. The results were produced from three primary populations: 90 individuals chosen from 33 families in the Barbados asthma study; 93 individuals from a population in Cartagena in Colombia; and 235 individuals from 126 African American families participating in the CSGA,
recruited in Chicago, Baltimore, and Minnesota (644 individuals) in addition to 48 African American individuals from the University of Chicago. The analysis found that Duffy-positive individuals comprised 35.74 percent of the African Americans and 21.11 percent of the Barbadians. This result is interpreted to indicate an approximately equivalent Caucasian admixture between Afro-Caribbeans and African Americans.

The ways biomedical researchers identify race draws on self-identification based on census categories, geographic location, and eyeballing. When researchers enter neighborhoods or homes they come across different ways of identifying. In Barbados, this includes nationality, surnames, and Caribbean identity. The critical point here is that race is multiple in both approaches (among the families and in the research). The difference is that the genetic technologies turn the valued space of contestation found in “Bajans, Africans” into the valued stability of “25 percent Caucasian.” Biomedicine thereby turns the valued space of contestation found in “Bajans, Africans” into the valued stability and inscribability of “25 percent Caucasian.” Vernaculars of race contain contradiction to keep multiple identities in play. By contrast, technologies of race use multiple criteria to create a single unequivocal representation. The plurality of race—the excess of signification it allows—is foundational to its use; the stabilization into a single meaning (i.e., as genetic, or biological, or skin color gradients) is a retroactively attributed stability only possible within this excess. This extreme precision of measurement applied to a highly variable object is a kind of hyperdiagnostics of race. Such extraordinary use of specificity is what gives the technologies of race an aura of authority. The Barbadian medical practitioners work to make the research relevant to medical care, relying on the authority associated with the precision of these hyperdiagnostics.

In the eyes of researchers and Barbadian doctors, Barbados is racially homogeneous. For Edward—the Barbadian researcher involved in several studies discussed previously—the census was somewhat misrepresentative:

According to the government census, Barbados is 92 percent black, four something percent white and a small percentage of Asians. There are a small number who label themselves mixed. The truth is that many who are mixed label themselves black. The North American political culture has made the description of black popular because North American tradition has historically been prejudiced against racially mixed people, so people are identifying themselves as black.

Edward, like many, places “race” as a historically and socially contingent identification (“label”) while naturalizing a biological race (“many who
are mixed’’). His interpretation contrasts the census and other kinds of self-identification with biomedical realities. He continued:

In medicine, a popular definition of race and ethnicity is the majority of grandparents a person has, so if they have three black grandparents, then he is black. If a person has three Asian grandparents, he is Asian. And if he has three white grandparents, he is white. So there is probably an overestimation of blacks in the census.

Like most medical practitioners, Edward thereby gives final authority on racial categorization to medical meanings, in contrast to either state statistics or self-identification. This approach of medically relevant race dovetails with a genetics team’s emphasis on the moral significance of the biology of race and disease.

**URGENT RACE SCIENCE**

The research team presents the value of a racial database to Barbadian officials and facilitators. During the conference meant to recruit new medical practitioners, the team indicated the importance of Bajan participants as black to genetic research. A researcher talked about the genetic significance of Barbadians as having come from African descent, referring to the common view that African populations have more genetic variation than populations in any other geographic area. This is taken to be an advantage for medical genetic research attempting to narrow a genetic region associated with a medical outcome. Referring to the Barbadian studies, the researcher mentioned that “populations of African descent allow us to genotype fewer SNPs” making them “of tremendous value to the scientific community.”

In the eyes of the researchers, this scientific advantage of particular racial groups is complemented by medical importance. In a presentation on acute lung injury, the speaker noted that the ALI DNA bank includes Caucasians and African Americans with acute lung injury. He remarked:

African Americans have a worse time with ALI than Caucasians. They have higher morbidity and mortality. This is why we are particularly attentive to ethnic-specific susceptibilities.

Medical research on biological race here becomes a moral project. The research is considered necessary as acting on the inequalities that connect black Americans and black Barbadians. A similar sense of genetic research redressing health disparities was expressed in the presentation on obstructive sleep apnea. After discussing the high levels of undiagnosed sleep apnea that are estimated to exist, the researcher talked about the problems associated
with the condition; e.g., motor vehicle accidents, hypertension, and short term memory loss. These medical effects were linked to ethnicity through the “increased prevalence of OSA in non-white populations” including Hispanic and Americans of African descent. Ethnicity was discussed as one of the risk factors for the condition, making Barbados a particularly important site of research. Later, the researcher made this link by noting that African Americans and people of African Caribbean descent with hypertension are at increased risk of stroke. In this representation, international studies that tie divergent populations together as biological races are a necessary intervention on inequality. Genetic research is framed as an urgent science, drawing on rhetorics of social justice. This framing of biological race-disease research as addressing inequalities creates new approaches to health and ethnicity.

ETIOLOGIES OF “ENVIRONMENT” AND “RACE”

Barbadian medical interpretations of asthma etiology are responding to the international genetics research giving “environment” as a cause of asthma new meaning. With a shift to tourism as the basis for the economy, Barbados has undergone recent rapid modernization. Health practitioners in Barbados implicate these changes as environmental causes of asthma, including air pollution from increased automobile use, pesticides, and building and road construction. At the meeting between Taylor and the genetics-of-asthma group, Barbadian industrial practices were discussed. Taylor talked about the increase in dust at certain times of the year, relating it to roadwork and building construction: “I stress the prevention with my doctors, because there is more construction now. When you wash your car and set it outside and let the rain fall, it would look like you didn’t wash your car. So we are breathing that right now.” Other causes of asthma-related visits to the emergency department were raised, including Sahara dust (the allergens, smoke, and dirt brought to Barbados from Africa by winds) and the dust from cane harvesting (as Taylor put it, “During the crop season, the harvester spews dust about a mile high. The guys doing this can hardly see their eyes”). Through the genetic study, these causes, often discussed by Barbadian health care practitioners, are addressed. The collaborations are seen as bringing U.S. expertise to the particularities of Barbados asthma, a condition now seen as produced by an environment in contact with particular genes.

The genetics group reframes the environmental aspects of asthma in Barbados through the “gene-environment” dichotomy. Environment becomes dust in the home. In Mary Warner’s presentation on the genetics of asthma, environment was defined as exposure to endotoxin (an allergen in bacteria associated with pets, vermin, livestock, dampness, and other...
household characteristics) that interacted with genes. Environment—as endotoxin exposure—is made an object in interaction with genetic background; practices in Barbados—such as pet and chicken ownership and the presence of vermin—are analyzed with respect to the particular genetic variants found by asthma studies.

Through this depiction, genotyping technologies become critical to analyzing “environmental” causes of asthma. A later speaker discussed asthma in different populations as involving many environmental and non-environmental factors, and presented his own research into asthma severity employing genotyping technologies. The genetics research comprises the most extensive studies of allergens found in Barbados, and analyzing the environment—whether pollutants, household practices, or climate—here relies on genetic expertise and tools. In the subsequent question-and-answer period, the Barbadian practitioner audience worked to make these findings relevant to Barbados’s “environment.” The physician/researcher Edward Wright asked whether the humidity in Barbados affected the kinds of pollutants that Barbadians are exposed to, particularly in terms of the dust from Africa. Another doctor asked what particular interventions were employed in the study—for example, how cigarette smoking was reduced and how contact with allergens was avoided. This line of questioning—attempting to apply the study’s results to the specificity of Barbados—dominated the discussion. Environment is subtly reshaped through such exchanges. Medical practitioners reframe ideas of pollutants, dust, and pesticides as interacting with genetic predispositions, requiring high-technology expertise, as they attempt to localize the research to the specificity of Barbados. For the Bajan facilitators, the research binary of genetic/environment creates new ways of formulating the effect of modernization and diet, requiring arcane knowledge and technologies that threaten to make the whole endeavor pointless.

This reframing around an opaque technology creates new meanings of disease etiology. After a morning of home visits, two Barbadian facilitators were talking with a Johns Hopkins geneticist in the office used by the asthma genetics group. One of the facilitators asked the geneticist about the results of the asthma genetics studies. (In the following exchange, “p-gram negative bacteria” are an allergen that causes asthma attacks):

Rachel: Have you found a gene for asthma?
Geneticist: There are many involved. In my work I found that the gene for the receptor for the p-gram negative bacteria is connected with asthma. It’s actually complicated because more receptors for the p-gram negative endotoxin to bind to makes the person up-regulate that part of the immune response which means they
down-regulate the asthma response. So, having the gene for more receptors makes you have less severe asthma.

Rachel: Explain again.

After the geneticist did so, Rachel responded with the reason she asked the question: “Then, so, because the patients ask me what we’re looking for.” Mark, the other facilitator, joined in here: “Yeah, that’s the first thing they ask.” The geneticist replied, “Yes, but the reason that I haven’t been telling them is that if they have the gene, then more dust will help them, so it’s hard to know what to tell them.” Mark responded, “So it’s a balance.”

Through such exchanges Rachel and Mark came to associate the gene vaguely with dust in the home and to see genetic research as particularly opaque. Asthma thereby became linked to genetic background in a way that required genetic knowledge to understand or utilize. Anthropologists and sociologists have explored the ambiguity introduced as genetic associations with disease interact with older medical techniques (Brookes-Howell 2006; Featherstone et al. 2005; Kerr 2000; Latimer et al. 2006; Shaw et al. 2003; Whitmarsh et al. 2007). In Barbadian medicine, genes operate as vague objects that carry the disease from one family member to another. “Genetic predisposition” is an association with American expertise more strongly than a practical medical term. Genetics is associated with the forefront of biomedicine and considered centrally involved in asthma, giving shape to environmental and other explanations, without a precise operation in etiology for the Barbadian facilitators.

This vague genetic background of disease is given racial meaning. In the conversation between the geneticist and Mark and Rachel, the geneticist talked about the ethnic significance of the results:

And, we found that the gene is exactly 50 percent less among African Americans. And the same with Afro-Caribbeans. So people of African descent have exactly half the chance of having the gene for less severe asthma.

For the Barbadian researchers, an environment of exposure to allergens and household practices interacts with a vague genetic background associated with being black. This is not simply a restriction of meanings. New connections between diseases as elsewhere disparate as asthma and hypertension are forged; new significance is given to familial practices of livestock ownership or housing materials. Where in other approaches to wheezing in Barbados, the home is where pollutants and insecticides cause wheezing among children, now the home is where familial genes interact with particulate matter and dander from animals and pests.
The reconfiguration of illness etiology and ethnicity draws on the moral immediacy of genetics research. In my conversation with Edward, he referred to the genetics of cancer study:

There is a higher incidence of prostate cancer in blacks. This has been found among African Americans in the U.S., in Brazil, and in Trinidad and Tobago. So it is the most important cancer in black men.

For Edward, as for others, this medical urgency is the primary reason for the need for studies of Barbadians that connect them with other black populations. Another Barbadian researcher explained the significance of the genetics of asthma research to me: “blacks have more atopy and more asthma.” These new biological, racial conditions are knowable through international genetic research, as one facilitator indicated when talking about the various studies occurring in Barbados: “There’s the cancer study…the diabetes study, and there was the glaucoma study, also by Stony Brook, an 11-year study. They did find that it was genetic—it’s a black person's disease.” A moral immediacy creates a need to make use of the international trade in research on the genetics of race and disease.

These new meanings produced by exchanges between Bajan medical practitioners and American genetics researchers have a dynamic quality, as expertise is diversely evaluated. Barbadian medical practitioners associate asthma genetics with the expertise, technologies, and scale of international biomedicine. For many, such research is simultaneously authoritative and inapplicable, misguided. This discordance results in frustrated attempts to apply the team expertise to Barbadian patients and the emergence of new medical links, including asthma as vaguely associated with genetic background and various conditions as possibly “black person’s diseases.” These links are understood to require genotyping technologies to fully grasp, creating a continually undermined attempt to make use of this problematic force of genetic biomedicine that will be the future.

James Boon has noted that cultural meanings are not so much shared as exchanged (1982:121). The medical partnerships of Barbadian doctors and U.S. genetics teams give new shape to race, Bajans, and asthma; it is a shape that incorporates the technological and monetary disparities between the two. And I would add that meanings, like gifts, when exchanged are infused with the significance accorded the giver. For the Barbadian doctors, the genetic basis of race-asthma links is associated with U.S. expertise and the biomedical future. These two associations connote both authority and absurdity. The extraordinary precision of genotyping technologies of race and disease are thereby valued for increasing “objectivity” even as their authority is undermined for being arcane and inconsequential to Bajan
health. Such conflicting attitudes are produced between American medical institutions and practitioners in countries utilized for their patient populations. Even as these market forces and the genetic future are denigrated, new medical interpretations of illness etiologies are created around the hyperspecificity of technologies of race and disease.

**POTENTIAL IN THE PRESENT**

As with other biomedical research currently operating, race is understood by the genetics team to be a proxy—a tool or a model until more precise genetic, environmental, clinical knowledge is produced that will obviate the need for these racial distinctions. Race as a proxy emphasizes an idealized temporality, as focus is placed on the future of biomedicine. I would characterize race in biomedicine not as the attempt to create an authoritative discourse of race (what other kind is there) but rather by its compulsive search for social justice through hyperdiagnostics.

The genetics team poses the participants as black in constituting a database on those with the greater burden of disease; the Barbadian state poses patient populations as black in order to gain from the medical discoveries to come. Beneath a simple exchange of records and patient access for technologies and co-authorship, there is a trade in these utopics of biomedicine. Through representations by the genetics team, the facilitators and other medical practitioners come to see Barbadians as biologically linked to African Americans and genetics as the future of biomedicine. For the Bajan medical officials and facilitators, genetics research is itself a kind of proxy or stand-in for actual biomedical care, a care-as-potential. The Barbadian facilitators in turn represent patient populations and state facilitates as conducive to helping produce this future.

The transnational expansion of biomedical research thereby relies on representing a high-technology future of global medicine. As Kaushik Sunder Rajan (2006) has argued in the case of India, nationalism is at the heart of such globalization: the exchanges that comprise genomics include postcolonial nations positioning themselves as making use of multinational markets and medical possibilities. There is a paradox in this positioning for Sunder Rajan, as the nation claims to be a big player in biocapital and to be resisting biopiracy, to be simultaneously at the mercy and the forefront of multinational biomedicine. In the case of Barbados, facilitators get involved in international biomedical research in order to be a part of the sophisticated techniques and technologies of international biomedicine while criticizing such high-technology science as arcane and inapplicable. Barbadian medical officials and practitioners thereby employ racialized
and geneticized meanings of disease culled from genomics research that they
denigrate as useless to their citizenry. Such a conflicted approach is a post-
colonial state’s paradoxical response of desire and rejection toward the
expanding American genetic research on race and disease.

The result is that medical care and public health interventions are
transformed. Afro-Caribbean is equated with African American, both of
which become a risk factor for the genetic risk of developing asthma.
A risk of a risk is a kind of uncertainty abstracted into certainty; those
“of African descent” innately require particular medical interventions and
monitoring, wherever they may be, and whatever their experience. Instead
of logics—market, technological, or otherwise—the hyperdiagnostics of race
suggest a compulsive science—the extreme use of precision around a contra-
ddictory object.\(^{17}\) In Barbados, diseases like cancer and asthma become racia-
lized and vaguely genetic. They are diagnosable through family history, at
times require preventative interventions, and are only knowable by employ-
ing state-of-the-art international biomedical technologies and expertise.

Nikolas Rose and Carlos Novas (2005) have argued that formations of
citizenship are increasingly based on biology and that biomedical results
are used to give legitimacy and shape to legal, social, and ethnic popula-
tions. They use their concept of “biological citizenship” to understand
19th and 20th century political practices around race, eugenics, health of
the population, innate moral capacities, blood, at-risk groups, worker
compensation, and other categories (2005). My own sense is that the
“biological” here conflates current concepts from the biosciences with diver-
gent meanings over the past 200 years. Blood, family, skin color, health, ill-
ness, descent, and the body are linked and contrasted diversely in different
settings, historically and today. Defining these all in terms of their “biology”
accentuates particular and recent scientific discourses. In the current focus
on the politics of life itself, this “life” takes its meaning from the biosciences.
Positing a radical break brought about by this “life” being malleable, poli-
tical, cultural, recapitulates the discourse of biotechnology and genomics.\(^{18}\)

This mutes the plurality produced when biomedical meanings are asso-
ciated with their institutional beginnings. As Ricardo Ventura Santos and
Marcus Chor Maio (2004) have shown in the case of Brazil, the contested
significance of genetics of race—celebrated even while criticized for being
high-technology—creates foundationally conflicting meanings: there are
plural “genomes.” This plurality arises because discourses and practices that
claim to operate on “life itself” are analyzed as coming from particular
kinds of expertise, countries, and markets.\(^{19}\) The biological is a concept tied
to the institutions and expertise that give rise to it—in this case the
American or British geneticists and biotechnology companies that come
to Barbados to create a science of race and disease. For instance, Bajan
families of asthmatics participate in U.S.-based genetics research as a rejection of the focus on pharmaceuticals by the state, while ridiculing the significance of heredity to asthma (Whitmarsh 2008b). Or, as argued here, Bajan medical practitioners and officials come to see asthma and race as genetically linked, a bond only knowable through sophisticated and opaque technologies and expertise, and yet in this process come to denounce the relevance and necessity of such technology and expertise, opening alternatives even as they implement this utopia of racialized genetic medicine.20

The contradictory evaluations of this expertise become part of the meaning of “biological.” Genetic research on race integrates, contests, and draws on older political discourses around race, as Ventura Santos and Chor Maio (2004) have demonstrated. The racialized genome is used as one discourse among many in Barbados, interacting with broader discourses of ethnic identities, postcolonial internationalism, and modernization as cause of illness. This destabilized and underdetermined plurality of biomedical concepts—their cultural life—opens aporias in the ascendancy of one discourse.

Genetic futurism is thus having an impact in conflicting ways. Far from eradicating or replacing the multiplicity and contradictions of race, biomedical uses of race rely on this multiplicity. If race had no more meaning than the presence of a set of genetic markers, it would have little utility and less currency among medical practitioners or families. Its “proxy” nature—that appearance can stand for genetics, or self-identity for disease propensity—is not incidental but foundational. It is only through its emotive, controversial, and multiple meaning that biological ideas of race can have such significance; this variability constitutes the avenues for the use of particular race-disease connections. This use of race sits uneasily with biomedicine’s claim to a lack of ambiguity. Race in American biomedicine is a kind of psychosis, in the sense Lacan gives us, in which the signifier has escaped its chain of signification—race is simultaneously pronounced as a biological reality, an epistemological tool, and a social construct. And, as in a psychosis, the result of this disconnect is an overattachment to the signifier. In race-disease science, the contradictions of race create a search for hyperprecise numbers to give the racial designations authority. These hyperdiagnostics of race are rooted in the desire to use genotyping technologies to redress inequalities. Researchers become attached to these technological diagnostics amid the anxieties around using racial categories in medicine today. And in turn, these technologies give a new authority to the claims of biological racial histories that predispose for conditions such as cancers, asthma, and heart disease. But the mania of using the hyperdiagnostics—following through on the extreme precision of measuring everything ethnic—can paradoxically make it seem untenable. The use of hyperdiagnostics of race in Barbados by medical practitioners is one such moment, where the
extraordinary precision of the technologies makes them oscillate from authoritative to absurd. Genotyping technologies of race and disease get valued for increasing “objectivity” even as their authority is undermined for being useless to Bajan health. This ambivalence opens up the space for medical practitioners in countries like Barbados (chosen for their patient populations) to consider the diagnostics both the product of expertise and beholden to American commerce, and thus inapplicable to the country. As a result, new medical practices are being created around the hyperdiagnostics of race and disease in ways not reducible to their logic, instead relying on anxieties about the uncertainties of “race,” the desire to redress inequalities through genetics, and frustrated hopes to take part in this biomedical future. As the American science of race and disease extends across national borders, it interacts with postcolonial political aspirations, rejections of marketized medicine, and ethnic identities that contrast with those in the United States. This desire and denunciation of this science reveal the dystopia envisioned amid the utopia of a future of race-based medicine.

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NOTES

1. For ethnographic analyses of the way American biomedical researchers take up racial classifications, see Fullwiley (2007) and Montoya (2007); also see the essays collected in Koenig, Lee, and Richardson (2008).
2. Genetics of race is also employed in the use of DNA ancestry tests offered by biotechnology companies (see Bolnick et al. 2007). Stephan Palmié (2007) has argued that the adjudication of race based on genetics confers a supposedly apolitical hereditary material reality on social mores (such as hypodescent and linear identifications) that have been long problematized.

3. Such debates, in the Journal of the American Medical Association, Nature, the New England Journal of Medicine, Lancet, and other medical and scientific journals, often draw on genetic diversity research conducted by population geneticists. Genetic diversity research involves categorizing human populations by geographic areas and specific genetic loci chosen for their correlation with these areas. Population geneticists, as Reardon (2005) has shown, disagree on how best to categorize race. This includes disputes over how to determine the race of the population being studied (Rosenberg et al. 2002:298). For example, self-reporting is contrasted with inferring ancestry through genotyping. Such population genetics enters biomedicine through projects attempting to use genetic data on populations considered representative of particular races to account for medical outcomes (see Cavalli-Sforza 2007; Jorde et al. 2001; Romualdi et al. 2002; Wilson et al. 2001). For historical and anthropological analyses of such projects at the National Institutes of Health, see Epstein 2007; M’Charek 2005; Reardon 2005.

4. Ambiguities in the biomedical uses of race are highly visible in NIH practices. Since 1993, with the Revitalization Act, the NIH has had a policy advocating the inclusion of “women and members of racial and ethnic groups” in clinical research (see Reardon 2005). Lee et al. have noted that the NIH uses the racial classification scheme of the Office of Management and Budget (OMB), also used by the U.S. Census Bureau (2001:42; see also Shields et al. 2005). However, the OMB considers race and ethnicity categories sociocultural constructs, in accordance with the suggestions of the American Anthropological Association. The result of these policies has been a diversity of views of race and ethnicity in NIH-funded research. Due to the policy of considering race a social cultural construct, researchers applying for NIH funding almost ubiquitously use the term ethnicity instead of race. Ethnicity in this sense usually involves self-identification on a questionnaire as one of the U.S. census populations, and the uses of this identification in research varies from biological to social meanings in NIH-funded projects (Lee et al. 2001; on the radical variation in methods of determining race in biomedical research, see Shanawani et al. 2006).

5. Pharmacogenomic and genetic medical research is founded on the categorization of populations according to the differential distribution of medically relevant genes. This includes making patient populations genetically representative. In some approaches, the study population is taken to represent disease populations in general: DeCODE’s approach in Iceland explores the biomedically relevant genes through study of the biological materials and medical records from one country (see Palsson and Rabinow 1999 and 2005). Other teams pose the prevalence of genetic predisposition as particular to geographically or historically related populations (e.g., Ashkenazi women, African Americans). In genetics of asthma, as with many other common diseases (e.g., heart disease, diabetes, and cancers) populations are classified along ethnic and racial distinctions.

6. Anthropological analyses of science have explored the subjectivities of scientists as they create knowledge (e.g., see Latour and Woolgar 1979 on the production of scientific concepts; Rabinow 1996 and 1999 on reflexivity in the practice of biotechnology; and Gusterson 1996 on the culture of nuclear scientists). And recent science-studies research has explored the political economy of the science of race and disease (see Kahn 2004; Wailoo and Pemberton 2006). I went to Barbados to examine medical, governmental, and familial practices and interpretations that interact with this science and are integral to its production. I wanted to find what was at stake for the physicians, families, and state officials who formed the infrastructure for the genetics project: the desires and evaluations by which this science is
created and has a cultural life, making new medical meanings, national positioning, and patient identities.

7. All names used, excluding cited authors, are pseudonyms.

8. Michael Fortun has argued that a discourse of speed and high technology is integral to the practice of genomic research (1998). More recently Fortun has argued that the framing of an excess of genetic information is similarly constitutive.

9. I thank Carol Greenhouse for this interpretation.

10. For example, at a meeting on the genetics-of-obstructive-sleep-apnea project, a Bajan researcher noted that the Queen Elizabeth Hospital (QEH) rejected his requests for a diagnostic laboratory to explore sleep apnea. The result of the meeting was that the Johns Hopkins team would explore providing the sleep lab and funding while the Bajan physician would facilitate purchase of the polysomnography equipment and location of the laboratory.

11. See Aisha Khan (2004) and Deborah Thomas (2004) for subtle explorations of the relationship of nationality and ethnicity in the Caribbean countries of Trinidad and Jamaica, respectively. As Khan has argued, official discourses are themselves multiple in their approaches to race:

   When Indians' context and point of reference is India, they are not 'white,' but they are ‘Aryan,’ they are ‘Caucasian.’ Caucasian/Aryan are associated with Brahmanical (that is, high culture) Hinduism. As indentured immigrants, however, they are even further from ‘white,’ becoming, as ‘coolies,’ increasingly ‘black.’ Both because of and irrespective of their claims to Hinduism in the estimation of bourgeois sectors of Trinidadian society. (2004:41)

12. This contrasts with other links of nationhood and race: Robotham (1996) has argued that prior to the 1960s, the identity of “West Indian” was a way of disassociating Caribbean people from black Americans and Africans. As Karen Olwig (1999) has argued, discourses of Africa and history in the Caribbean today enact claims to political authority, responding particularly to changes wrought by tourism. H. Hoetnik (1985) reminds us that such analyses are largely restricted to the English-speaking Caribbean. Paul Gilroy (1993) has argued for the utility of black identities linking Caribbean, British, and North American peoples.

13. Anthropologists working in the Eastern Caribbean have explored this importance of nation to ideas of race: see Yelvington (1993); for subtle discussions of the ways claims of heterogeneity and hybridity are constituted in Trinidad, see Khan (1993 and 2004) and Segal (1993).

14. For social analyses of the genetics of racial admixture, see Bolnick et al. 2007; Graves 2001; Santos 2004.

15. See Amade M’Charek (2005) for an analysis of technologies as central to categories produced by genomics, including race.

16. Montoya has called such biomedical use of social and cultural experiences of racial groups “bioethnic conscription” (2007).

17. Biomedical categories, like goods in Boon’s reading (1999:299), “go crazy, or are already so ‘foundationally.’” Boon cites James Clifford in this insight.

18. This conflation contrasts with the more specific and I think useful meaning of new kinds of citizenship among authors that Rose and Novas cite, those employed by Deborah Heath, Rayna Rapp and Karen-Sue Taussig and by Adriana Petryna (Heath et al. 2004; Petryna 2002; also see Schaffer et al. 2008). For Heath, Rapp, and Taussig, families (and companies and public organizations) organize around diagnoses of genetic conditions, creating new political practices. Petryna argues that in the wake of Chernobyl, Ukrainian individuals represent themselves using the language of biological expertise. This is a reflexive use of scientific expertise to frame health and illness within a political economy of medicine.
19. For subtle ethnographic attention to such plurality, see Vincanne Adams’s (2001) work on the meaning of “science” in Tibet.

20. As Jean Pouillon wrote:

Ambiguity is not simply polysemy, the fact that a verb sometimes has one meaning and sometimes another, each of them unequivocal; it is, rather, that, above all, there is always doubt at the heart of the conviction, and that the affirmation itself indicates that it could always be suspended. (1982:5)

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