Report of the First Community Consultation on the Responsible Collection and Use of Samples for Genetic Research
September 25-26, 2000

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Executive Summary

The First Community Consultation on the Responsible Collection and Use of Samples for Genetic Research was held in Bethesda, Maryland, on September 25-26, 2000. The consultation was convened by the National Institute of General Medical Sciences (NIGMS) of the National Institutes of Health (NIH), in cooperation with and with financial support from the National Science Foundation, the Department of Energy, and eight other NIH components (National Human Genome Research Institute, Fogarty International Center, National Institute of Environmental Health Sciences, National Institute on Deafness and Other Communication Disorders, National Institute on Aging, National Eye Institute, National Institute of Neurological Disorders and Stroke, and Office of the Director). Approximately 120 individuals participated in the consultation, half from a broad range of communities and populations, and half from government. The participants shared their views and concerns about population- and community-based genetic research, expanding the focus of the meeting from the collection and use of blood or other tissue samples for genetic research to broader issues and concerns about the conduct of genetic research in general with populations and communities.

With completion of the first draft of the human genome sequence in June 2000, scientists have unprecedented opportunities for further research that will help them develop methods to understand, treat, and prevent human diseases. Through genetic research, scientists now know that individuals and populations are more alike than they are different and that most genetic variation occurs within all ethnic and racial groups, resulting from their common origin. Only about 200,000 sites among the 3 billion bases of human DNA account for functionally significant, common variants in the world's population, while 99.9 percent of the genome is the same between any two individuals. Genetic research that involves populations and communities, particularly those with a higher frequency of a particular disease, is important for identifying genetic variants that may be associated with a disease. The promise of this research has already been shown, with the discovery of gene variants associated with a number of diseases, including cystic fibrosis, diabetes, Tay-Sachs disease, and colon cancer.

The participation of populations and communities in genetic research presents some concerns, however, and every effort must be made to ensure that the research proceeds fairly. The potential for discrimination, stigmatization, and breaches of privacy is a major concern for individuals and communities who may wish to participate in the research. Other concerns relate to the definition of communities, the perceived benefits and risks of the research for these communities and their members, and the full participation of communities in the entire research process. Different communities and community members will have different needs and interests in the proposed research and may want to participate in various ways.

Several overriding themes for NIH-supported genetic research involving populations and communities arose during the discussions:

- Involving communities in the planning, conduct, and reporting of research can be a "win-
win" situation for both NIH and the communities participating in genetic research.

- The ethical principles of beneficence, justice, and respect for persons should be upheld in all community-based research. The primary message to researchers is: "do no harm."

- NIH must consider community aspects and risks and benefits to the community as significant, and as important, as the risks and benefits for individuals.

- NIH should implement systemic changes in its extramural grants program to advance biomedical and behavioral research in a responsible way by including the community at every stage of the research.

Ten major recommendations for genetic research involving populations and communities are, in brief:

1. Define "Community" in Appropriate and Meaningful Ways. "Community," a social construct, can be defined in many different ways, and individuals may consider themselves members of multiple, fluid communities. Reliable criteria are needed for defining communities for genetic research, and all potential stakeholders should be included in the definition of community for a particular research study.

2. Understand the Potential Benefits and Risks for Communities and Community Members. As much as possible, all benefits and risks should be identified and understood in consultation with the community during the planning, conduct, and followup of a research study. Special efforts may be needed to maximize the benefits and to minimize the risks or harms to communities and their members.

3. Obtain Broad Community Input for All Phases of Research. Communities participating in genetic research may have a strong desire to be involved in all aspects and stages of the research. Researchers should give special attention to soliciting broad input throughout the community, and NIH should establish criteria, goals, and mechanisms for obtaining input from communities.

4. Respect Communities as Full Partners in Research. Lack of reciprocity between communities and researchers undermines the research process. Effective research depends on the full participation of communities and on mutual respect and a continuing, interactive dialogue between researchers and communities. Researchers should be encouraged to be sensitive to communities' perspectives and needs.

5. Resolve All Issues Pertaining to Tissue Samples. Continued efforts are needed to clarify the legal status of tissue samples; establish criteria for the collection, use, and storage of samples; understand the potential risks and benefits for individuals and communities providing samples; and assure appropriate procedures for obtaining informed consent regarding samples. Communities should participate fully in these efforts.

6. Establish Appropriate Review Mechanisms and Procedures. Researchers are, and should be, held accountable for any research involving communities. NIH should ensure the transparency of this research to communities and foster the participation of communities,
public advisory groups, and institutional review boards in initial and ongoing reviews of community-based research studies.

7. **Facilitate the Return of Benefits to Communities.** Communities participating in research often do not believe that they receive any benefits, or returns, from their participation. Researchers should make an effort to provide these benefits, and NIH should extend support for follow-up studies of the benefits of research for communities and their members. The ownership of research results and data needs to be clarified.

8. **Foster Education and Training in Community-Based Research.** To enhance researchers' understanding and skills for conducting community-based genetic research, support is needed for education and training of predoctoral investigators and for continuing education for established investigators and research reviewers. Curricula should include community issues; ethical, legal, and social implications of genetic research; and model programs.

9. **Ensure Dissemination of Accurate Information to the Media and Public.** NIH should disseminate widely the results of genetic research which shows that genetic variation within populations is greater than that between populations; foster education of health professionals about these findings; and promote dialogue with the public about the ethical, legal, and social implications of genetic research.

10. **Provide Sufficient Funding and Encourage Partnerships.** NIH should provide sufficient funding to ensure that meritorious community-based genetic research can be conducted adequately. Specifically, NIH should expand funding to foster community involvement and participation in this research and encourage partnerships among government, industry, and academia.

**Introduction**

The First Community Consultation on the Responsible Collection and Use of Samples for Genetic Research, held September 25-26, 2000, was one of the first large NIH meetings to bring together diverse communities to address ways of involving these communities in genetic research. Genetic issues affecting individuals (e.g., genetic screening and privacy of genetic information) have been, and continue to be, addressed in many meetings and discussions. The consultation provided a forum for members of identified populations in the United States to exchange views formally and informally with research administrators. For one and a half days, educators, social scientists, biologists, lawyers, ethicists, clergy, doctors, nurses, and community leaders from diverse communities engaged in lively and thoughtful discussions.

The consultation included five presentations from researchers and research administrators; two panels, which focused on potential benefits and risks to populations participating in genetic research and on lessons from international experiences; five breakout groups, which were asked to address a series of questions about issues affecting communities; and a plenary session for reports from each breakout group and a general discussion.
Welcome and Opening Remarks

The meeting organizer, Dr. Judith H. Greenberg, Director, Division of Genetics and Developmental Biology, NIGMS, NIH, welcomed the participants to the First Community Consultation. She reviewed the purpose of the meeting and emphasized NIH's interest in hearing the participants' views on the collection and use of tissue samples for genetic research and in beginning a process to develop ways to involve communities in research that affects them. She noted that "community" and "population" are used interchangeably at NIH and can be defined variously, reflecting different contexts.

Dr. Greenberg provided background on NIGMS's cell repository and noted that members of some populations, researchers, and bioethicists have raised concerns about possible negative consequences to a community resulting from storage and use of tissue samples from that community. The participants at an NIGMS workshop in 1999 endorsed the scientific value of the continued collection of samples from identified populations, but only if members of the community are appropriately involved in decisions about the use of these samples. The First Community Consultation was convened to hear a wide range of views on how best to involve U.S. communities in research that uses tissue samples. Dr. Greenberg thanked the planning committee, external advisors, and sponsors of the meeting for making the consultation possible.

Opening Remarks

Dr. Ruth L. Kirschstein, Principal Deputy Director, NIH, described the importance and value of genetic research and of the public's involvement in decisionmaking and planning for this research. She noted, in particular, the value of NIGMS's and other tissue repositories and the need to ensure that these samples are responsibly collected, stored, and used. Dr. Kirschstein highlighted the success of genetic research, for example, in identifying the single-gene defects for Huntington's disease and cystic fibrosis and in explaining the effects of some single-gene variants on individuals' response to drugs. She also noted that most common diseases are more complex and are associated with a variety of genetic and environmental factors. The completion of the first draft of the human genome sequence in June, 2000 will help researchers untangle the complexity of genetic variations and gene-environment interactions within and across population groups.

Dr. Kirschstein anticipated that considerable progress will be made in treating genetic diseases, and she noted that much progress has been made possible by the availability of tissue samples. The opportunities for research are unique and exciting; yet, the process of conducting genetic research with populations and communities is still largely unexplored and a considerable challenge for the future. Dr. Kirschstein noted that NIH and the scientific community must move forward with great caution, to protect individuals and identified groups and to avoid dissemination of mis-information. Current regulations, providing for the protection of individuals, must be expanded to also protect communities and groups participating in research.

Dr. Kirschstein encouraged the communities of the participants to become partners with NIH.
at the beginning of this process of collaboration to ensure that the research proceeds fairly. She invited the participants to share their insights and experience for the benefit of NIH.

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Genetic Research and the Role of the Community: A Case Study of Jewish Attitudes

Prof. Karen Rothenberg, University of Maryland School of Law, Baltimore, presented an overview of the historical context, current issues, perceived value, and discrimination and stigma associated with genetic research in the Jewish community; the potential role of the Jewish community in genetic research; and the results of a pilot study of attitudes about this research in the Jewish community. She highlighted the media's role in communicating and formulating perspectives within, and outside, the Jewish community.

Historically, Jewish attitudes about genetic research have passed through three phases. Beginning in the 1920s, the eugenics movement precipitated a belief in the "genetic inferiority" of Jews, resulting in restrictive quotas on immigration to the United States and with the Holocaust. By the mid-1970s, the community viewed genetic research positively and participated successfully in genetic testing for Tay-Sachs disease. More recently, this community has expressed concern about the use of tissue samples stored from this earlier period for genetic research on breast cancer and colon cancer affecting the Jewish population. While the community places strong value on testing for genetic diseases and the knowledge, medical benefits, and social justice gained from genetic research, fears about the misuse of genetic information and potential discrimination and stigma are being expressed and are being fueled by the media. In response to the rising tension between these fears and the concern that an overreaction may halt research that could benefit the community, some Jewish scientists have called for a group debate on gene studies which would include professional groups, NIH, and national advisory committees.

Prof. Rothenberg noted that findings of a recent pilot telephone survey of 287 Jews from a diverse community in the Baltimore/Washington, DC, metropolitan area are informative. Among the respondents, 82.1 percent noted that genetic research was very important to "help society"; 62.4 percent were very concerned about potential discrimination and anti-Semitism in the United States; 74.0 percent and 62.4 percent said that conveying the benefits of research through the informed consent process was very important to the family and the Jewish community, respectively; 71.0 percent said that conveying the risks of research through this process also was very important to the Jewish community; and more than 77.0 percent noted that community consultations were very (41.0 percent) or somewhat (36.0 percent) important, but only 55.0 percent said that community approval was very (21.0 percent) or somewhat (34.0 percent) important.

Prof. Rothenberg suggested that the Jewish community could contribute positively to considerations of the appropriate roles of institutional review boards (IRBs), informed consent, community consultations, tissue bank panels, and community consent. Critical issues for community consultations include how the community is defined and who speaks for the community.

The Culture of Science: The Biomedical Outcomes of Genome Research

Dr. Francis Collins, Director, National Human Genome Research Institute, NIH, presented a scientist's perspective on the genetics of human disease. He noted that the First Community Consultation was timely and important and that the Human Genome Project includes attention to the ethical, legal, and social implications of genetic research. Quoting John Dewey as saying, "Every great advance in science has issued from a new audacity of imagination," Dr. Collins said that the major scientific motivation for genetic research is to understand the disease process and to predict individuals' risk of disease and to use the information gained to design more effective interventions. Driving the Human Genome Project is a desire to understand the genetic contributions to all diseases. Some diseases have large genetic components, such as single-gene disorders (e.g., cystic fibrosis); some diseases are affected by multiple genes and environmental factors (e.g., adult-onset diabetes); and some diseases arise largely from environmental factors (e.g., Acquired Immunodeficiency Syndrome, or AIDS), but have some genetic influences.

Dr. Collins noted that 99.9 percent of the genome is the same between any two individuals and that only about 200,000 sites in the DNA account for functionally significant, common variants in the world's population. He noted further that the world's population has evolved from a single population in Africa and that the "branching tree" of relatedness, commonly used to depict the connections between different populations, should really be a "trellis" consisting of many connected branches. Most genetic variation occurs within all ethnic and racial groups, which results from our common origin. The large overlap among groups in the genetic variation they contain, as well as the large amount of historical mixing among groups, mean that the separation of human populations into precisely defined racial categories is scientifically unjustifiable.

Dr. Collins stated that most genetic variants of functional significance are differences at single DNA sites, single-nucleotide polymorphisms (SNPs). By cataloging the variants in individuals with and without a particular disease, scientists can potentially identify genetic variations that correlate with risk of the disease, which will help to identify genes affecting that disease. Finding the genes helps scientists to understand the process that leads to the disease, with the hope of then developing interventions to prevent or treat the disease. When a small number of individuals start a new population, they may happen to have a higher frequency of a particular genetic variant that contributes to a disease. The population may then have a more uniform genetic basis for the disease and a higher frequency of the disease than the parent population or populations with more heterogeneous backgrounds. This "founder effect" means that such populations are useful for finding genes affecting diseases that their members have. Similarly, some variants have arisen in certain populations and have not spread much to other populations. Scientists have been able to find particular variations associated with an increased frequency of disease among certain populations. Examples of diseases associated with this founder effect include cystic fibrosis in northern Europeans, sickle cell disease in African and Mediterranean populations, and Tay-Sachs disease and colon cancer in Ashkenazi Jews.

Dr. Collins emphasized that the founder effect is "real" and can be successfully explored
within population groups. A major concern is how to balance the potential medical benefits of this research with the potential risks of stigmatization. He agreed that a continuing dialogue is needed between communities and researchers.

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Discussion

The participants expressed strong concern about potential discrimination, stigmatization, and breaches of privacy for individuals and communities participating in genetic research. Dr. Collins noted that the Administration and the Congress are taking steps to establish effective legal protections against such outcomes for individuals in the workplace and by insurance carriers and that protections for communities still need to be addressed. Prof. Rothenberg emphasized that the dialogue between researchers and communities must be maintained over the continuum of a study—before, during, and after. For example, communities must participate in discussions of whether a study is even worth doing.

Commenting on the participation of communities in genetic screening, Prof. Rothenberg noted differences in participation and trust among African American communities (e.g., in genetic screening for sickle cell disease) compared with Jewish communities (e.g., for Tay-Sachs disease). She emphasized the need for community involvement, participation of researchers from the community, and legal protections against potential discrimination.

A participant remarked about the tremendous overload of information on genetics that is being disseminated to the public and suggested that better ways to communicate and disseminate information need to be explored before focusing on the participation of communities in research. Dr. Collins agreed and noted that a poll conducted by Time Magazine and CNN in June, 2000 demonstrated a "disconnect" among the public: 46 percent of those surveyed responded that they thought the Human Genome Project, when completed, would likely be generally harmful, but 61 percent said that if they could gain information about their genetic code or DNA, they would want to know what diseases they were predisposed to get. He suggested that a long, detailed process of listening and sharing of information through community consultations will be needed to "sift through" individuals' complex assumptions about genetic research.

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Scientific Basis of Conducting Genetic Studies on Identified Populations

Dr. Aravinda Chakravarti, McKusick-Nathans Institute for Genetic Medicine, Johns Hopkins University School of Medicine, Baltimore, expanded on the scientific rationale for conducting genetic studies in identified populations. He noted that: (a) the genetic variation in the human genome is largely observable within any population and is widespread worldwide; (b) the pattern of variation worldwide is shaped by human history and ecology; and (c) geneticists and biologists choose a specific population to study because a genetic disorder or trait occurs with fairly high frequency in that population or previous research indicates that the study would help the understanding of a genetic disease.
Dr. Chakravarti noted that the first known genetic difference in humans was established in the 1930s with identification of the ABO blood groups. Subsequent findings of variability in human DNA sequences (e.g., for DMD1, the dystrophin gene associated with muscular dystrophy) show that the frequency of genetic variants may vary among populations but most variants are found in most populations; variants restricted to a specific population group are extremely rare. He agreed with Dr. Collins that the "branching tree" does not convey the complexity of human relatedness. He noted further that the commonality of genetic variation in large regions of the world is the basis for hypotheses of the origin and migration of human populations from Africa. Dr. Chakravarti agreed further with Dr. Collins on the importance of the founder effect and the potential for understanding certain genetic diseases by studying variants in specific population groups. For example, by focusing on a Finnish population and on the Old Order Mennonites, scientists have been able to identify the single-gene variants responsible for two rare disorders and an intestinal defect. And, as shown by the distribution of sickle cell disease and malaria, some variants may provide a health advantage in some regions of the world, but not in others, which contributes to differences in the frequency of the genetic variant among populations.

Dr. Chakravarti noted that completion of the first draft of the human genome sequence also helps scientists to explore genetic diseases with a complex mode of inheritance. He suggested that 60 percent of genetic diseases arise in adults and are multifactorial. To elucidate the causes of these diseases, scientists will have to study both genetic and environmental factors and gene-gene and gene-environment interactions. This research will initially require a systematic search and cataloging of variations, especially SNPs, in the sequence of DNA. He emphasized that tissue samples are an extremely valuable resource for cataloging genetic variants. Once these variants are discovered, researchers can compare the frequency of specific variants in individuals with the disease to controls without disease, in order to find genes contributing to the disease. Studies are under way to explore these differences in insulin-dependent diabetes mellitus, Alzheimer's disease, venous thrombosis, osteoporosis, and resistance to AIDS.

Discussion

The participants again noted the need to educate the public about the genetics of human disease and the implications of studies of the human genome. The concepts of inheritance within families, the founder effect, "genetic drift," and the uniqueness of individual susceptibility to disease within populations need to be communicated better to the general public and to specific communities invited to participate in genetic research. For many communities (e.g., Native Americans), the value of genetic research has not been communicated effectively.

Dr. Chakravarti noted that studies of genetic variants and of human migration patterns are both important for understanding human disease. He said that population-based research has been important for establishing the frequency of genetic variants within and among populations and that the definition of a population depends on the nature of the research to be conducted. By studying the variation in the human genome, scientists will be able ultimately to address the genetics of disease in families and populations and the prevention of disease in individuals.
Culture of Communities that Participate in Research

Dr. Nancy Press, Department of Public Health and Preventive Medicine, Oregon Health Sciences University, Portland, addressed the "culture of communities," as a counterpoint to Dr. Collins' remarks on the "culture of science." She noted five major points: (a) communities are defined by social and ethnic group boundaries; (b) boundaries between groups are highly permeable; (c) social and ethnic identities and boundaries are fluid and purposeful; (d) few individuals reside fully in one group over time and place; and (e) social challenges to group barriers and the responsiveness of groups to these challenges precede genetics.

Dr. Press emphasized the difficulty of defining "community" as a social or biological unit with boundaries. Barriers used to identify and isolate groups are highly permeable, e.g., the transfer of genes among interacting groups (e.g., along trade routes). Social barriers are not only permeable, but also can be socially constructed, redefined, and manipulated to reform a group or community. Drawing on the sociological theories of Frederick Barth and Max Weber, Dr. Press noted that ethnicity represents a social boundary and is fluid and purposeful. For example, individuals who have immigrated to the United States may have multiple social and ethnic identities (e.g., as a Mayan Indian, a Guatemalan, or a North American). Similarly, the reaction and response of individuals or populations to group identities (e.g., Hispanic, or American) depends on time and place. Dr. Press also noted that challenges to group identity (barriers) are based on social definitions, not genetics. Referring to a contemporary elite group in Charleston, South Carolina, she noted that a genetic connection existed among members of this group and was supposed to be necessary and sufficient for group membership, but that, actually, some individuals were subtly excluded despite their genetic connection, in order to preserve the links of wealth and status to the group.

Identifying the spokesperson(s) for a particular community or ethnic group and obtaining a community or group's consent to a research study are especially problematic. The different perceptions of genetic screening for breast cancer between urban Indians in a Seattle-based study and the views expressed by Native American leaders demonstrate the problems of identifying who speaks for the community. Dr. Press emphasized that community spokespersons are important, but they are also power brokers guarding the socially constructed boundary of their group and are thus likely to have different perceptions than those of the lay group members.

In closing, Dr. Press commented on communities' concerns about stigmatization. She urged that stigmatization be included among the potential risks of research on consent forms for individuals and groups invited to participate in genetic research.

Discussion

Dr. Press suggested that the purpose of the First Community Consultation should be to
define the concepts of community and community consultation and to discuss the purpose and limits of community-based genetic research. Some participants noted that they already considered themselves part of the community present at the meeting and that they expected to share their experiences with other community members. One participant emphasized the need for respect in all community interactions, as conveyed in the Spanish word "comunidad." Some participants noted that the definition of "community" for the consultation and whether all communities were represented at the meeting were not clear. Dr. Press urged that the scientists attending the meeting consider themselves participants in the community, rather than presenters to the community.

Dr. Press also noted that eugenics is a potentially volatile issue for some communities, as researchers seek to unravel the genetics of phenotypic variations. Participants emphasized the need to educate the media and the public about this research and to caution reporters about misrepresenting primary research findings out of context.

Panel: Potential Benefits and Risks to Populations that Participate in Genetic Research

Dr. Yvette Roubideaux, College of Public Health, University of Arizona, Tucson, moderated a panel of four who considered the potential benefits and risks to populations participating in genetic research. The panelists addressed the concept of community, the concerns of communities about genetic research, the potential benefits and risks of this research for communities, the promise of genetic research, and specific issues for Native Americans.

Concept of Community

Dr. Mildred Cho, Stanford University School of Medicine, Palo Alto, California, agreed with Dr. Press that "community" is a slippery notion. She urged the participants to consider "community" in its broadest terms, beyond the concepts of race or ethnicity. She agreed with others that neither "race" nor "ethnicity" is useful for genetic research, but she cautioned that persons may continue to try to use genetics to explain these classifications, which are already defined in other ways. Dr. Cho suggested that genetic research will create new groups (e.g., defined by disease) and stimulate evolving notions of community, defined by criteria which do not yet exist. In addition, genetic research could lead to the identification of new markers (e.g., physical traits, such as hair color, that might be associated with a disease, such as cancer), which may become the basis for stigmatization.

Communities Concerns About Genetic Research

Ms. Maricela Aguilar, Department of Pediatrics, Division of Genetics and Metabolic Disorders, The University of Texas Health Science Center at San Antonio, questioned the
interest in studying different culturally diverse groups when "behind all skin colors, we are genetically 99.9 percent the same." She noted the importance of altruism of many minority individuals who choose to participate in research studies to benefit the common good. For research involving diverse communities, Ms. Aguilar emphasized the need to (a) relate communities' cultural values/beliefs systems about health and illness to their response to the research and to recommendations for treatment; (b) encourage the involvement of indigenous researchers (e.g., minority researchers) who have an understanding of the community; and (c) address literacy levels of diverse minority populations and preferred learning styles in the development of educational materials that would help individuals and communities understand recommendations for treatment and participation in research; and (d) address the role and influence of the individuals' cultural environment (i.e., diet, physical activity) in disease.

Examples of the relevance of cultural values/beliefs systems and environment include the observed unwillingness of some Mexican American women to participate in a prenatal blood test for neural tube defects because of their cultural and religious/spiritual value for life and a perception that the medical community would prescribe abortion; the cultural relationship of poor diet and physical inactivity to the increased incidence of diabetes observed among Hispanic Americans, especially children; and the reticence of some health care professionals to perform hip replacements for arthritis among Hispanics because of their apparent increased risk of complications due to diabetes and obesity. In closing, Ms. Aguilar posed the question: "Why should we (the diverse community) trust you (the health professional, genetic researcher) to do the right thing?"

Potential Benefits and Risks of Genetic Research

Dr. Charmaine D. Royal, National Human Genome Center, Howard University College of Medicine, Washington, DC, focused on the potential benefits and risks for historically underserved, underrepresented, and disenfranchised groups. She noted that these groups, which are usually defined racially, have already suffered stigmatization and discrimination. Two potential, and inseparable, benefits of genetic research for these groups are improved physical health and improved social health. Dr. Royal noted that genetic research can have a major effect on increasing understanding of complex, chronic diseases (e.g., cancer, diabetes, hypertension) common in these populations. She suggested that improved social health (which includes improvement in political and economic well-being) will lead to improved physical health and, ultimately, to reduction in health disparities. Dr. Royal noted that the finding that 99.9 percent of the human genome is the same for all people has enormous implications for understanding and addressing health disparities.

Four potential risks of genetic research for underserved groups are misapplication and misuse of genetic information (e.g., by health insurers), diminished access to genetic services and inability to actually benefit from the research, the targeting of individuals in already-vulnerable communities for genetic testing, and exploitation (e.g., researchers not "giving back" to communities). Dr. Royal noted that the one-third of Hispanic Americans and one-fourth of African Americans who do not have health insurance may question whether they want to participate in genetic testing since they may not benefit from this testing by accessing health services if needed. She also noted that the African American community is
concerned about potential inequity in the distribution of resources for genetic research, citing unequal funding for research on sickle cell disease and cystic fibrosis. In addition, some groups (e.g., Native Americans) question the returns to the community of genetic research that results in the patenting and commercialization of genes.

In closing, Dr. Royal noted that many members of underserved groups are focused on "just getting through each day" and are not very concerned with the potential benefits or risks of genetic research. She urged researchers to be cognizant of issues important to these communities and to establish dialogue with the communities.

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The Promise of Genetic Research

Ms. Suzanne Kindregan, A-T Children's Project, Springfield, Virginia, presented a very different perspective. As the parent of a child with ataxia telangiectasia, a complex hereditary disorder, she noted that genetic research offers the potential benefit of finding a cure or treatment and that this benefit outweighs any potential risks that might be identified. Approximately 600 children in the United States suffer from ataxia telangiectasia. Responding to the question posed by Ms. Aguilar, she noted that this community would say, "We have to trust you, and we will do our part to help you in any genetic research." She believed that, for this community, genetic research has no risks.

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Specific Issues for Native Americans

Dr. Roubideaux emphasized that, for Native Americans, genetic research offers potential benefits, but the benefits should not come at the expense of the beliefs, culture, and rights of Native Americans. She noted 10 overriding issues for this community, as follows.

1. As sovereign nations, Native American tribes are different from other communities (or minority groups) in the United States. For example, permission must be obtained from the nation for collection, storage, and use of tissue samples.

2. Legally, Federal agencies and researchers must consult with tribal leaders about any activities affecting the tribe. A separate process and structure needs to be established for consulting with tribal leaders.

3. Approval of the tribe must be obtained, and the nation has every right to accept, limit, or reject the research proposed.

4. Race is not a sound or accepted research concept for Native Americans and has no relevance for genetic research. Many Native Americans may be descendants of different tribes, have differing amounts of Native American blood quantum, and be partial descendants from non-tribal populations.

5. The risks of genetic research are very great for Native Americans because of the large potential for discrimination and stigmatization.

6. Obtaining informed consent is especially problematic—the terms used by U.S. researchers are not meaningful to Native Americans, who have different languages and cultures than in the United States.

7. Native Americans need to be better educated and informed about genetic research.

8. Tribal communities rarely receive the results or benefits of research that involves them.
and, hence, are reticent to participate in other research. Meaningful communications need to be established between researchers and tribes.

9. Native Americans hold a cultural belief that the body, including tissue samples, is sacred. Patenting the results of research on the body is, therefore, a major concern.

10. The culture of science may not connect well with the culture of Native Americans or other peoples.

Discussion

The participants thanked and complemented the panel members for their "elegance, passion, and truth" in sharing their communities' concerns about genetic research. The participants mentioned again the need to eliminate racial classifications in NIH research, educate the public about genetic research, involve communities in all phases of a study and from the beginning, and develop respectful ways of interacting between researchers and communities.

One participant voiced additional concerns about research involving Native Americans. He urged researchers to not depersonalize the issues, and he emphasized that tribal leaders will seriously address the risks and benefits of genetic research, exercise sovereignty on behalf of their peoples, and decide on the standards and limits of the research. He noted that, to guarantee meaningful research results, tribal representatives must "sit at the table" with researchers to address "threshold issues" such as tribal ownership of data, protocols to educate the tribe about the research, time limitations for collecting samples, return and/or disposal of tissue samples when the research is completed, protocols for terminating individuals' participation in a study, and tribal permission to utilize samples for other research. The participant emphasized that Native American tribes have a collective history of powerful and valid beliefs, and he welcomed researchers into these communities to help improve their quality of life.

An individual from the mental health community noted that mentally ill persons constitute a community, but receive little protection (e.g., health insurance) from the Federal Government, do not have sufficient access to health care, and usually do not benefit, as individuals or a community, from the results of research. Mentally ill persons who are minorities or homeless are particularly vulnerable.

Another participant remarked that science and medicine are at a "crossroads"; that is, science (e.g., genetic screening) is proceeding much more rapidly than is medicine (i.e., treating or curing disease), and medicine needs to "catch up." One participant expressed concern that the scientific community's emphasis on genes will focus attention away from other factors (e.g., access to health care) affecting individuals' health.

Panel: Lessons to be Learned from International Experiences

Dr. Frances C. Rawle, Medical Research Council, London, United Kingdom, moderated a panel of three who conveyed lessons learned from international experiences in genetic research. The panelists commented on the concerns of communities participating in this...
research and on country- and disease-dependent issues. They shared their experiences from research in Finland, India, West Africa, and the United Kingdom.

Finland

Dr. Juha Kere, Finnish Genome Center, University of Helsinki, Finland, commented from "both sides of the table," as a scientist conducting research on genes associated with multifactorial diseases and as a member of the Finnish ethnic community. He agreed with Drs. Collins and Chakravarti on the importance of studying the genetic variation that underlies human disease and noted that research on small, isolated populations (e.g., the Finnish population), using tissue samples from patients and relatives, may "give the best value" for analyzing the genetic determinants of multifactorial diseases.

Specific considerations to address when conducting this research in general and, in particular, in Finland relate to the phases of the research. First, to collect information on the occurrence of disease, knowledgeable physicians are needed to diagnose patients and compile epidemiological data. Second, to launch a genetics study, clinical researchers are needed to obtain appropriate permissions and consent as required by law, organize sample "drives," and track data to ensure the validity of results. Third, to generate meaningful genetic information, skilled and knowledgeable personnel are needed to analyze samples using advanced biochemical and molecular genetic techniques and to seek biological correlations.

Dr. Kere noted that Finnish investigators have extensive experience in conducting genetic studies among Finnish subpopulations to identify genetic determinants in asthma, psoriasis, systemic lupus, cleft palate, and dyslexia, among other phenotypes. The lessons learned from this experience for international research can be summarized as follows: (a) every study is different and requires a distinct, detailed approach that incorporates knowledge about the disease, concerns of patients and families, motivations for the research, respect for the community, and progress reports to participants; (b) economic benefits that accrue from the study (e.g., patents) need to be distributed among the participants, but intellectual property rights related to information on the disease and clinical diagnoses mostly belong to the medical and scientific organizations conducting and supporting the study; (c) the benefits of improved scientific understanding and training of young scientists are valuable and should be available to local collaborators; (d) local researchers and communities, as the primary data producers, must be considered equal contributors to a study and participate in all phases of the study in multinational collaborations; and (e) in general, research that exploits clinicians and communities in other countries to gain samples that are transferred to Western laboratories (i.e., "helicopter science") should not be supported by NIH or other research sponsors. Dr. Kere anticipated that the benefits of genetic research will be enormous, but he cautioned scientists to be cognizant of individuals' and communities' perceptions of the motivations of researchers and the need for interaction with these communities.

Commenting on the status of genetic research in Finland, Dr. Kere noted that Finland recently established the Finnish Genome Center, a national genotyping and analysis center modeled after the U.S. Center for Inherited Diseases Research (CIDR), located at Johns Hopkins University. Commenting specifically on tissue samples, Dr. Kere said that establishment of a repository of tissue samples has been considered repeatedly and rejected in Finland, largely because of concerns about the sufficiently high quality of information, the
desire for clinical scientists to be actively involved in the defining of phenotypes, and
difficulty in defining acceptable policies for access to samples. Also, a Finnish law
regulating the protection of individuals participating in medical research has essentially
rendered unacceptable open-ended collections of samples for unspecified purposes.

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India

Dr. Partha P. Majumder, Anthropology and Human Genetics Unit, Indian Statistical
Institute, Calcutta, India, emphasized that the definition of community is context-dependent.
In contrast with the United States, for example, communities are relatively easy to define in
India, where populations are less mixed and are primarily intra-marrying (e.g., castes, tribes,
religious communities). Dr. Majumder emphasized that the process of family- or population-
based research is country-dependent and that standards established in the United States may
not be appropriate in other countries. He cited the following four main problems for
conducting population-based research in India: (a) establishing contacts with groups, (b)
obtaining individuals' consent, (c) storing tissue samples and transporting them to a
laboratory for analysis, and (d) communicating research results.

Dr. Majumder noted that permission to conduct research in an Indian community must be
obtained from local administrative authorities, but outreach to respected individuals in the
community and group consultations are often needed to ensure full participation. Written
informed consent may be difficult to obtain because of individuals' low levels of literacy,
lack of awareness about scientific research, fear of medical procedures owing to a lack of
previous exposure to them, and wariness about signing papers. Using audio- or videotapes to
record and document consent has been a useful approach.

In addition, storing and transporting tissue samples from the rural areas are difficult because
of India's relatively poor infrastructure (e.g., lack of electricity, inadequate transportation and
roads). And, different approaches are needed for communicating research results. In India,
individuals are less concerned about confidentiality and privacy and prefer to learn about
research findings in the presence of other local, literate persons or in group meetings.
Women, in particular, will almost always be accompanied by their husbands. To ask the
husband to leave when collecting data from women is often culturally inappropriate. Also, in
communities with low literacy and little scientific awareness, concepts such as the future use
of samples, patents, and profit-sharing are extremely difficult to convey. Other problems for
family-based studies include individuals' lack of birth dates and social customs which
sometimes do not allow women to provide their husband's name, or may not allow
individuals of some tribes to provide the names of their deceased.

In discussion, Dr. Majumder emphasized that many genetic findings (e.g., in general, the
genic variation between individuals within a population is greater than the genetic variation
between populations) are contrary to perceptions, held by some segments of the public, that
population-based genetic studies promote racism. He mentioned that it is crucial for human
geneticists to reach out to the public and explain research results in lay language, to prevent
misinterpretation and to win greater public sympathy for genetic studies.

Commenting on a suggestion to undertake development projects among populations in
conjunction with scientific research, Dr. Majumder noted that scientific research and development projects should be kept separate. While it may be laudable to "do some good" for the population being studied, the ethical principle to "do no harm" should be insisted upon. Scientists are not the best persons to plan and undertake development projects and, because funds for scientific research are meager and hard to obtain, diverting research funds to promote development may be counter-productive both scientifically and socially. It is desirable that governments should utilize research findings on a population to separately undertake relevant development projects with the population. In these endeavors, scientists should collaborate actively with development agencies.

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West Africa

Dr. Charles Rotimi, National Human Genome Center, Howard University, Washington, DC, drew on his experience in studying complex, multifactorial diseases (e.g., hypertension, diabetes, breast cancer, cardiovascular disease) to comment on the practicalities of conducting genetic research in West Africa. Two key concerns for research in this region are: (a) obtaining informed consent, and (b) obtaining community validation (i.e., approval).

Experience has shown that critical issues in obtaining informed consent include the need to translate consent forms into the local language, to involve the community in identifying appropriate words for key concepts (e.g., candidate gene, risk), to be flexible in modifying the form, and to pilot-test forms to ensure that translations are meaningful. With regard to community validation, Dr. Rotimi noted that African investigators have expressed several concerns about international research studies conducted in Africa. These concerns include lack of female participation on IRBs; Eurocentric, country-inappropriate descriptions of potential risks; the danger of causing a shift in the local power base when selecting community spokespersons; the difficulty of conveying the notion of chronic diseases which may not be curable; the need to ensure full consent of female participants who may be hesitant about saying "no"; and inappropriate compensation for individuals' participation in research. Dr. Rotimi emphasized the importance of involving African investigators as full partners in all phases of a research study.

In closing, Dr. Rotimi listed research approaches that have worked well in African communities. These include employing community members as research staff (to engender trust); using local clinics (to acquaint community members with the research); being proficient in handling biological samples; maintaining a presence in the community (to foster informal dialogue); respecting local values; and instituting procedures to evaluate participants' level of understanding about the research being conducted.

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United Kingdom

Dr. Rawle reported that information on the public's and minorities' views of genetic research is lacking in the United Kingdom. She noted that, from the information that is available, it would seem that, for that country, the main issue is one of exclusion, rather than inclusion.
Dr. Rawle said that the Medical Research Council and the Wellcome Trust recently conducted a preliminary qualitative research study to ascertain the public's thinking about the use of human biological samples in research, particularly genetic research and issues such as informed consent. This study was conducted in preparation for a large prospective study of gene-environment interaction that will include establishment of a resource for tissue samples from approximately 500,000 people ages 45 to 64. Baseline and follow-up data on lifestyle and environmental risk factors will be matched with genetic polymorphisms in this population. Public acceptability of the research is crucial.

The information from the preliminary study, obtained from focus groups and interviews with community and religious leaders, indicates that disease-focused, medical research is widely accepted by the public, but that genetic research is viewed negatively as mysterious and sinister, especially research related to cloning and eugenics. The main concerns expressed by the participants in this study related to the possible misuse of samples and individual data (e.g., by insurers, employers, police, immigration authorities) without proper consent. There was a perceived association of DNA and DNA testing with criminality (in relation to forensic use) and determination of immigration status or paternity. The participants did not express concerns about group discrimination and emphasized the need to include ethnic communities. They also suggested that interest in participating would increase if an independent oversight committee were established in addition to the existing ethical review system and including representation from the minority community. Dr. Rawle noted that the sponsoring organizations are proposing to establish such a committee which would include lay members and individuals with legal and ethical expertise.

Discussion

The participants commented on the need to identify ways to ensure women's participation in research. They also noted differences in national values and laws (e.g., in Finland, Iceland) pertaining to the protection of individuals (and tissue samples) in medical and genetic research. In addition, the participants encouraged consideration of communities' research interests and a reprioritization of research topics to focus on needs and concerns identified by communities (e.g., access to affordable care, short stature) in addition to scientists' priorities. They suggested that every funded research project with a non-local priority should be required to include a local (i.e., community) priority.

Current Policies for Protection of Human Subjects

Dr. Greg Koski, Office for Human Research Protections (OHRP), U.S. Department of Health and Human Services (DHHS), commented on OHRP regulations for the conduct and use of research involving human subjects. He remarked that all the issues being discussed by the participants were critically important, and he urged the participants to comment on the existing regulations in order to help DHHS formulate improved policies and procedures.

Dr. Koski noted that the DHHS regulations are based on several main principles.
example, identifiable tissue samples have the same protections (e.g., privacy, confidentiality) as human subjects, and informed consent to use the samples must be obtained if practicable. Dr. Koski noted that IRBs have a large responsibility and latitude to make adjustments to protect subjects (including samples) as appropriate and with the highest ethical standards, but many IRBs may not be well equipped to exercise this responsibility. He also noted that although protections are in place for individuals and families by removing identifiers, similar protections have not been established for communities. This problem would be magnified by the establishment of large tissue banks, although they would be valuable resources for science. Appropriate policies and procedures would need to be developed beforehand.

Dr. Koski also noted the formation of a new Human Research Protections Advisory Committee, which will continue to address regulations and issues pertaining to the protection of human subjects in research. In addition, the National Bioethics Advisory Commission recently issued a report that addresses pertinent issues and offers pragmatic recommendations for use of tissue samples.

Discussion

The participants suggested that existing regulations should address the potential risks and benefits, for individuals and communities, associated with (a) commercialization of results from research on tissue samples, (b) access to improved care resulting from research, and (c) appropriate compensation for risks taken. Dr. Koski noted that these issues are important for policy discussions and that the regulations require research participants to be informed of all potential risks and benefits. He also noted that the aim of research is to develop new knowledge and that research participants may not necessarily receive direct benefits from this research.

The participants also commented on the role of IRBs, the importance of involving individuals and communities in making decisions about the use of tissue samples and potential risks and benefits, and the need for consent forms that are understandable to individuals and communities. Dr. Koski suggested that more emphasis should be given to the consent process than to the form and that IRBs need clearer guidance on these issues. Focusing on the interests and concerns of research participants is essential.

Charge for the Breakout Groups

Dr. Greenberg asked each of five breakout groups to address five questions concerning genetic research involving communities. She asked the groups to focus on issues affecting identified communities when tissue samples from community members are collected and used for genetic research. The five questions pertained to the major benefits and risks to communities of collecting and using tissue samples, mechanisms for ensuring appropriate community input during the planning stages and throughout the research, ways to accommodate different views of individual community members, the appropriateness of mechanisms for obtaining community input for all communities, and specific ways the
mechanisms would work (i.e., handling of issues, recommendations, appeals).

In her charge to the breakout groups, Dr. Greenberg noted that while some genetic research involving identified populations can have immediate applications to the population being studied, other research is more basic and does not have immediate clinical application or may benefit a broader community than the one being studied. She suggested that eliminating all potential harms may not be possible, but minimizing them may be achievable by obtaining input from, and involving, communities in the research. Possibilities include consulting directly with community leaders and members, increasing the responsibilities of IRBs, and/or establishing special oversight groups in addition to IRBs.

The breakout groups met for approximately two and a half hours. The discussion leaders for the five groups were: Dr. Anahid Kulwicki, Oakland University, School of Nursing, Rochester, Minnesota; Dr. Robert S. Pozos, Department of Biology, San Diego State University, California; Dr. Vivian Ota Wang, Division of Psychology in Education, Arizona State University, Tempe; Dr. Aida Giachello, Mid-West Latino Research and Policy Institute, University of Illinois, Chicago; and Rabbi Gerald I. Wolpe, Louis Finkelstein Institute of the Jewish Theological Seminary, Philadelphia, Pennsylvania.

Recommendations: Issues and Concerns

The five breakout groups reported on their discussions during a final plenary session. All the participants then had an opportunity to express their views individually during a discussion of the reports. The issues and concerns identified by the breakout groups and the participants during the plenary session are summarized below as 10 major recommendations. The participants broadly addressed the questions posed by Dr. Greenberg, expanding the discussion from the issues surrounding the collection and maintenance of tissue samples per se to a more general consideration of genetic research involving identified communities and population groups. Several overriding themes, as noted in the Executive Summary, were as follows:

- Involving communities in the planning, conduct, and reporting of research can be a "win-win" situation for both NIH and the communities participating in genetic research.
- The ethical principles of beneficence, justice, and respect for persons should be upheld in all community-based research. The primary message to researchers is: "do no harm."
- NIH must consider community aspects and risks and benefits to the community as significant, and as important, as the risks and benefits for individuals.
- NIH should implement systemic changes in its extramural grants program to advance biomedical and behavioral research in a responsible way by including the community at every stage of the research.

Recommendations

1. Define "Community" in Appropriate and Meaningful Ways.
The participants emphasized that "community" can be, and is, defined in many different ways. From a social science perspective, communities are fluid, permeable, and ever-changing, and individuals may consider themselves members of many different communities. Reliable criteria need to be established and utilized for defining communities for behavioral and biomedical community-based research, incorporating the different perspectives of scientists and communities.

All potential stakeholders should be included in the definition of a community, and they must be adequately represented, as determined by the community and the researchers. Potential stakeholders include governing officials, community leaders, representatives of business and social organizations, community members, and researchers. Special attention and incentives may be needed to identify and involve certain stakeholders (e.g., low-income groups, individuals with mental health disorders).

2. Understand the Potential Benefits and Risks for Communities and Community Members.

The participants noted that the perceived benefits and risks of genetic research may vary by community and community member. As much as possible, all benefits and risks should be identified and understood in consultation with the community during the planning of a research study and should be reviewed as the study proceeds and during followup.

Genetic research has potential benefit for individuals, families, and communities; researchers; industry; and society. In general, communities may benefit from elucidation of disease-causing genes, identification of individuals and groups at risk of genetic disease, development of cures and effective treatments for disease, prevention of disease, improved health, and increased community resources resulting from research studies (e.g., for capacity building, education, and followup). Researchers may benefit from increased recognition and research funding. Industry may receive financial benefits from commercialization of research results, and society may benefit from overall improvements in health and health care.

The major perceived risks of genetic research to both individuals and communities in the United States are stigmatization and discrimination. The participants noted that discrimination exists in many environments (e.g., social, occupational, insurance) and that the difficulty of legislating individuals' attitudes and practices needs to be acknowledged and addressed. They called for expanded legislation to address specific discrimination issues for both individuals and communities (e.g., legal rights, social discrimination). Other risks include communities' unrealistic expectations (e.g., about researchers' altruism), the withdrawal of funds from the community when the research is completed, and the potential use of genetic information to ration health care (e.g., treatment and drugs) based on the estimated number of individuals affected with a disease.

The participants also suggested that basic genetic research is more problematic for communities than is disease-specific research because of the greater potential to
profile groups and thereby to disrupt, or harm, communities. The potential for racial profiling was a particular concern, and the participants urged NIH to call for an end to racial profiling. They also urged NIH to seek other ways, as appropriate and as needed, to minimize group harms and to recruit for research participants without "naming" a specific community. For example, specific restrictions could be established and incorporated as review criteria in NIH's Requests for Applications and Requests for Proposals. In addition, the participants noted that the NIH/DHHS requirements for human subjects research should be disseminated widely and that community groups should have sufficient opportunity to comment on, and contribute, to them.

The participants also called for a review of the entire informed consent process. They noted the need to clarify the concept and use of informed consent (e.g., among non-literate communities, for potential participants in clinical studies), as well as the procedures and legal aspects of obtaining informed consent. One suggestion was that third parties that do not have a vested interest in the research proposed could be utilized for obtaining informed consent. Caregivers present a special circumstance because of their potential role in making difficult ethical, social, and legal decisions for family members participating in community studies. The participants noted that caregivers may be important stakeholders in the community and that their role may differ among ethnic groups.

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3. Obtain Broad Community Input for All Phases of Research.

The participants emphasized that communities participating in genetic research may have a strong desire to be involved in all aspects of this research, from the beginning to the end, including followup. Communities are concerned about researchers' definitions of the community, identification of community spokespersons, designation of research topics, sensitivity to community needs and problems, accountability, and potential "ignorance and arrogance" in relation to the community. Two key questions are: Who decides what is studied? and Who speaks for the community?

When obtaining community input, special attention must be given to identifying all potential stakeholders and "bridges" (e.g., the media) in the community and soliciting their input. Researchers need to accommodate the interests of all members sensitively to avoid exacerbating or creating divisions within the community. They should be encouraged to conduct preliminary research to identify potential issues and problems that may cause turmoil in the community. Researchers also should strive to select community partners (leaders, organizations) knowledgeably and carefully to ensure that these individuals can adequately represent the multiple and diverse views within a community. The participants noted that no one individual alone can speak for the community.

Four ways to foster community input in NIH-funded genetic research studies are:

- develop general criteria and goals for obtaining input from communities based on the nature of the communities or aggregate groups and the type of research to be conducted;
- create mechanisms, as appropriate, for obtaining input from diverse groups
within communities (e.g., multidisciplinary planning, utilization of the media to solicit input and recruit participants);

- establish mechanisms for ensuring appropriate input (e.g., focus groups, town hall meetings, informal and formal dialogues, partnerships, oversight committees); and

- disseminate the results of all communications broadly within the community.

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4. Respect Communities as Full Partners in Research.

The participants emphasized that lack of reciprocity between researchers and communities undermines the research process in community studies. Effective research depends on the full participation of the community and a continuing, interactive dialogue between researchers and communities. This participation and dialogue must be based on mutual respect, including respect for individuals' and communities' beliefs and values. The participants noted, in particular, that genetic research entails the unraveling of humans' biological "story" and may tap into individuals' and communities' religious "stories" and meaning of life. They encouraged researchers to be sensitive to these ongoing stories and to understand that genetic research may be creating new meanings and stories that may not reflect peoples' ongoing stories.

Specific recommendations included the following: assure that the community participating in a study is involved at all stages of the research process; require regular, ongoing community consultations throughout the study, and encourage use of electronic communications (e.g., e-mail, listserv, Web sites) whenever possible; sensitize researchers to communities' perspectives and needs and the importance of educating, informing, and seeking the consent of research participants; encourage researchers to adopt a community organization model for their research and to "listen" to and establish true partnerships with their research communities; and encourage multidisciplinary research teams that include both biomedical and social scientists.

The participants also encouraged researchers to consider the broader environmental context of genetic research when planning studies, analyzing and interpreting data, and reporting findings. The context of this research includes factors such as nutrition, poverty, access to health care, and environmental and sociocultural differences. To be avoided are genetic reductionism and a unidimensional focus on ethnicity or socially defined groups. The participants urged researchers to provide communities access to information about research opportunities and to solicit research ideas from them so that the research can be responsive to communities' needs, as defined by the communities.

At the same time, the participants cautioned against the potential to "demonize" or polarize the research community and to "drive underground" important biomedical and behavioral research. They noted that researchers are important stakeholders in community-based research and should be participants in community discussions pertinent to their research. In addition, the participants noted that companies are frequently reluctant to address issues of genetic research involving communities, and they suggested that industry be invited to engage in explicit, respectful discussion and
dialogue about these issues.

One particular issue may be the involvement of communities in designing, reviewing, and approving research protocols. Although the participants emphasized that communities should be involved in the full range of planning, design, conduct, and followup of studies, including the design and review of research protocols, they disagreed on the community's role in approving protocols. Some groups (e.g., advocating on behalf of patients with genetic diseases who would benefit by a potential cure) would prefer to give researchers full responsibility for research protocols. Other communities, which are especially concerned about the potential for discrimination and stigmatization, may prefer to have a role in approving protocols. Native American tribes, which are sovereign nations, have full legal rights of approval and rejection of any studies conducted in their communities or with their community members. In all cases, the focus should be on minimizing risk to individuals and communities and fostering dialogue and partnerships between communities and researchers.

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5. Resolve All Issues Pertaining to Tissue Samples.

The participants noted that the legal status of tissue samples needs to be clarified and that strict criteria for the collection, use, and storage of samples need to be established. They suggested that tissue samples should be defined to include all tissues (e.g., skin, hair, teeth, cell lines), alive or dead, taken from the human body in the past (repository samples) and in the future. They urged NIH to undertake a review of the potential risks and benefits for individuals and communities providing tissue samples and of the procedures and legal aspects of obtaining informed consent for collecting, storing, and using tissue samples.

Some of the concerns that need to be addressed include the following: the role (i.e., jurisdiction) of IRBs in reviewing research involving tissue samples; the implications of storing tissue samples and cell lines (e.g., the time context for research, anonymization of data, needs of researchers and communities); ethical and legal questions about the use of general informed consent (i.e., uninformed consent) for subsequent studies on tissue samples; the ethics of parents' consent for use of children's tissue samples over time (e.g., after the children have reached majority age); and NIH policies to protect against unauthorized use and disposal of tissue samples from Native American communities by U.S. researchers.

Ethical issues are paramount and, at times, research on tissue samples may provoke a clash between science and ethical values. For example, the desire for anonymization of tissue samples may conflict with the ability to return the benefits of research to individuals and communities; ethical standards may be compromised when individuals give "voluntary" consent under social pressure; one-time informed consent may not suffice ethically for longitudinal research studies; and returning to collect samples from the same families for additional studies, after destroying earlier samples, may not always be ethical. These and other concerns need to be addressed thoughtfully and expeditiously.
The participants urged NIH to enhance the accountability and transparency of research on existing collections of tissue samples and cell lines, pursue peer review of the use of tissue samples for research, ensure that a community is informed when a collection of samples from the community is available, and involve communities in the shaping of policies that affect them.


The participants emphasized that researchers are, and should be, held accountable for any research involving communities. They urged NIH to initiate steps to ensure the transparency of this research to communities.

Steps to increase researchers' accountability and responsibility might include requiring researchers, in their research grant proposals, to justify their selection and definition of communities; demonstrate sensitivity for the larger ethical, legal, social, and "spiritual" implications of their research; anticipate potential group harms; specify actions to educate and inform the community about the research and to obtain consensus for the study; indicate ways to communicate research results back to the community; and demonstrate outreach.

The participants suggested that communities should participate effectively in reviewing research that involves communities. For example, "unintimidated" community advisory groups focused on the public's interest could be established and utilized to review research and to ensure that communities are included in the research process. In addition, community input could be obtained for the funding of grant applications.

The participants also suggested that NIH's public advisory groups could have an important role in reviewing applications for research projects involving communities, recommending funding priorities, and ensuring appropriate community representation and protection of community rights. They encouraged NIH to continue to evaluate the peer review process and the composition of study sections with the aim of enhancing the pool of, and criteria for, potential reviewers of community-based genetic research proposals.

Special efforts are needed to ensure that IRBs are informed, knowledgeable, and sensitive to the research aims of community-based studies and the communities involved in these studies. The participants urged NIH to require IRBs to assure that communities' interests are being met and to include continuing education in community-based research for certification of IRB members. They also suggested that the responsibility of IRBs should be expanded to include (a) serving as a liaison between communities and researchers and (b) determining when community-identifiable data should be used to address a research question. The IRBs, for example, could be asked to ensure that recruitment of poor and vulnerable populations is ethical with regard to their compensation for participation.

The participants also encouraged NIH to consider establishing an alternative, community-based IRB system to foster researchers' respect for communities, equal
partnerships, and training and employment for community partners. They also suggested that NIH consider instituting "slotted regulations," or different guidelines, for different types of research (e.g., biomedical research on disease, community- and population-based genetic research).

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7. **Facilitate the Return of Benefits to Communities.**

The participants repeatedly noted that communities participating in research often do not believe that they receive any benefits, or returns, from their participation. Efforts should be made by researchers to provide these benefits, which might include new information, better medicines and treatments, improved access to health care, education and employment, funding for continued studies, or additional research on concerns identified by the community. Two particular issues relate to the propriety of the data obtained and research followup.

Who owns the data is a significant question that needs to be addressed by both researchers and communities. The participants noted that the concept of ownership (e.g., of research results or human tissue) needs to be clarified, and they urged that ownership of data be defined to include the communities providing the data, as well as the researchers studying the data.

The participants also encouraged the NIH to extend support of community-based genetic research to include follow-up studies of the benefits of research for communities and their members. They emphasized that all participants in a research study should have access to the benefits of the research. Too often, research results are not translated into improved clinical outcomes and are not transferred back to the communities. Researchers, physicians, and community leaders should engage in a continuing dialogue to ensure appropriate followup and feedback on research results.

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8. **Foster Education and Training in Community-Based Research.**

The participants noted the need for education and training to enhance researchers' understanding and skills for conducting community-based genetic research. Support is needed for education and training of predoctoral investigators and for continuing education for established investigators and research reviewers. The ultimate aim of these efforts is to enhance researchers' knowledge of community-based research and their sensitivity to, and interaction with, communities participating in this research. Curricula should include issues identified by communities; information on ethnic and cultural differences between communities; the ethical, legal, and social implications of genetic research; and examples of successful, model programs.

The participants emphasized that researchers need to understand, and be sensitive to, the ethnic and cultural mores and norms of members of specific communities invited to participate in genetic research. Asian Americans, for example, particularly older persons, may appear quiet and passive, but be willing to participate if encouraged through targeted efforts to increase outreach and dialogue with them. Cultural and language barriers could be overcome within this population by reaching members and
groups through community organizations (e.g., churches, temples).

The participants also noted that the ethics of research on populations and communities involves new notions and differs from the ethics of research on individuals. Educating researchers about ethical issues is critical, and researchers should be required to embrace ethical standards and to demonstrate that they have received training in them.

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9. **Ensure Dissemination of Accurate Information to the Media and Public.**

The participants strongly emphasized that research showing that genetic variation within populations is greater than between populations needs to be advertised and disseminated widely to the media and the public. NIH has an important opportunity to highlight human genome research as having "paved the way for debunking the myth of race." In addition, health care professionals need to be better informed about the founder effect and to be cautioned against equating membership in a particular population with having a particular disease (e.g., African Americans and sickle cell disease).

The participants encouraged NIH to continue to promote dialogue with the public about the ethical, legal, and social implications of genetic research. They noted that public involvement in meetings and deliberations of the National Bioethics Advisory Commission is essential, and they urged that the Commission's reports be disseminated broadly to researchers and the public.

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10. **Provide Sufficient Funding and Encourage Partnerships.**

The participants expressed concern about balancing the funding for basic and clinical research. They urged NIH to provide sufficient funding to ensure that meritorious community-based genetic research can be conducted adequately.

Specific recommendations for NIH included the following: Expand funding to foster communities' involvement, participation, and partnership in community-based genetic research; foster the development of "structures" within communities to educate and empower community groups to participate in this research and to build consensus and capacity for this research within communities; support development of a database of clinical research, organized at national and local levels; increase funds for research training in community-based genetic research; enhance the participation of minorities in this research; increase funding for research on issues and diseases that affect communities of color; and consider funding research grant applications submitted by community groups. The participants also encouraged NIH to support corporate, government, and university partnerships in genetic research.

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**Future Action**

The participants called upon NIH to take specific action, as follows, to build on this First Community Consultation:

- Disseminate information from the Community Consultation widely and develop follow-up activities to expand on the recommendations offered during the consultation.

- Seek direct consultations with stakeholders and communities participating in genetic research.

- Convene similar additional conferences to focus on different aspects of the very complex issue of community-based clinical research. Conferences should be structured around particular themes and modified, as needed, to reduce potential barriers to participation (e.g., location and organization). Include fewer formal presentations; more time for interactive dialogue; participation of the media and biotechnology industries; greater representation of ethnic groups (e.g., Asian Americans, Native Americans, Hispanic Americans); distribution of pre-conference background materials consisting of brief, written summaries of pertinent issues; and verbatim recording of all conference deliberations. Potential topics for future conferences are:
  - group rights vs. individual rights in the context of biomedical research;
  - issues relating to research on stored tissue samples;
  - ownership of research data from community-based studies; and
  - specific issues for international studies.

Adjournment

Dr. Greenberg noted that this First Community Consultation was tremendously enlightening, and she thanked all the participants for the novel ideas and lessons they imparted during the presentations and discussions. She invited the participants to continue to provide input to her and said that additional consultations would follow.

The meeting was adjourned at 1:00 p.m. on Tuesday, September 26, 2000.

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