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ARTICLE

Ethical Implications of Including Children in a Large Biobank for Genetic-Epidemiologic Research: A Qualitative Study of Public Opinion

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The National Institutes of Health and other federal agencies are considering initiating a cohort study of 500,000 people, including 120,000 children, to measure genetic and environmental influences on common diseases. A community engagement pilot study was conducted to identify public attitudes and concerns about the proposed cohort study, including the ethics of involving children. The pilot included 15 focus groups where the inclusion of children in the proposed cohort study was discussed. Focus groups, conducted in six cities, included 141 adults of different ages, incomes, genders, ethnicities, and races. Many of the concerns expressed by participants mirrored those addressed in pediatric research guidelines. These concerns included minimizing children's fear, pain, and burdens; whether to include young children; and how to obtain children's assent. There was little agreement about which children can assent. Some voiced concern about children's privacy, but most expected that parents would have access to children's study results. Some believed children would not benefit from participating, while others identified personal and societal benefits that might accrue. A few people believed that children's participation would not advance the study's goals. To successfully include children, proposed cohort study would need to address children's changing capabilities and rights as they grow and reach the age of consent.

KEY WORDS: children; community engagement; genetics; public opinion; focus groups; cohort study

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INTRODUCTION

Because the results of medical research on adults cannot always be extrapolated to infants, children or adolescents, the National Institutes of Health, the Food and Drug Administration, and the U.S. Congress issued multiple policies between 1997 and 2002 designed to stimulate pediatric clinical studies [Ward and Kauffman, 2007]. It is estimated that the number of children enrolled in U.S. pediatric clinical trials rose from 16,000 in 1997 to 45,000 in 2001 [Sharav, 2003]. Observational epidemiological studies of children have grown in response to the increasing prevalence of childhood diseases including obesity,

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autism, and asthma and environmental risk factors such as lead and pesticides [Duramad et al., 2006]. The technological ease of genotyping collected DNA samples has also led to studies of the genetic basis of childhood diseases. Established cohort studies of children have installed genotyping components [Jones et al., 2000; DeMeo et al., 2002] and at least two large prospective studies of children measuring the role of genetics and environmental exposures are being undertaken or considered [Kaiser, 2006; National Children's Study, 2007]. These pediatric studies have employed a wide variety of protocols to obtain assent from and protect the rights of child participants.

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A Proposed Cohort Study of Genetics, Environmental Factors, and Lifestyles

To help untangle the interactions between genes and environmental factors that underlie common, complex conditions like obesity, cancer, and diabetes the NIH has proposed a plan for a new, very large cohort study, distinct from the National Children's Study, that would enroll both children and adults [Collins, 2004]. A draft of design considerations for this study recommends that an observational cohort of 500,000 Americans, including 120,000 children under the age of 18, be followed for 10–12 years [NHGRI, 2004].

The proposed observational study would attempt to enroll a representative sample of U.S. children and adults based on age, gender, race, geographic region, education, and urban or rural residency. Participants would not be selected for prevalent health conditions. The sampling unit would be the household, so participating children would likely have a parent or guardian enrolled in the study. Appropriate assent procedures would be developed for children.

Under the draft study design [NHGRI, 2004], all participants would undergo a baseline interview and examination. For children, data might be collected on demographics, medical and family history, use of medications, school absences, environmental exposures, sleep habits, dental health, and access to and use of medical care. Height, weight, waist and hip circumference, heart rate, blood pressure, vision, and hearing would be measured. Biological specimens would include a blood sample, spot urine, saliva, and hair or nail clippings. For children under the age of six, head circumference would be measured and data on various developmental milestones, safety, maternal history and prenatal exposures would be collected. Children between the ages of 6 and 18 would be asked about safety, given a focused medical history, and assessed for mental health, school performance, weight fluctuations, behavioral traits, and influences of peer pressure. Children over 12 would be asked about the use of tobacco, alcohol and drugs, and quality of life.

Follow-up as planned would consist of contact twice a year to update participants' medical status, though children's data might be updated more frequently. Self-reported disease would be confirmed using participants' medical records. One or two re-examinations would be carried out approximately every 4 years. Blood and urine samples would be collected at each exam. Additionally, participants, including children, might be asked to monitor (or be monitored for) things such as diet, physical activity, environmental exposures or biomarker levels.

Extensive genotyping would be performed on collected DNA at the time of sample collection. Other standard laboratory panels would also be measured. Blood lead levels would be measured in all children, and for children under age 5, elevated lead levels would be reported back to parents within 1 week of the receipt of study results. Remaining biological specimens would be stored for use in future analyses.

One of the most important components of the proposed study is that samples and data would be made available to the broader scientific community for studies of gene-environment interactions after cohort study participants' consent or assent to the use of their de-identified data by outside investigators. Outside investigators could come from other academic research institutions or for-profit companies.

The proposed cohort study would be observational, providing participants little in the way of direct medical benefits. Clinically relevant results of initial and follow-up exams would likely be returned to participants including children, should the participant desire this information, and a notification and referral system would be established. Whether individual results of genetic testing or other monitoring would be reported back to participants is unclear.

Ethical Considerations of Observational Genetic Studies of Children

With few exceptions [Santelli et al., 2005] little is known about the ethical issues raised by the inclusion of children in genetic epidemiologic research. A small number of studies have focused on parents' and children's opinions about the consent process [Brody et al., 2003; Broome et al., 2003; Geller et al., 2003; Tait et al., 2004; Stolt et al., 2005; Chappuy et al., 2006; Gattuso et al., 2006; Rodriguez et al., 2006; Eder et al., 2007; Sammons et al., 2007] and general participation [Bernhardt et al., 2003] in studies of genetic susceptibility. Some studies have looked at parents' reasons for participation or refusal, and their considerations of study risks and benefits [Tait et al., 2004; Gattuso et al., 2006; Rodriguez et al., 2006]. Other studies have examined parents' attitudes

about whether to perform neonatal and early childhood genetic testing for conditions such as deafness and what to do with the results [Middleton et al., 1997; Burton et al., 2006]. However, few studies have solicited people's thoughts on a broad range of ethical issues about pediatric research involving genetics [Geller et al., 2000, 2003; Grosfeld et al., 2000; Bernhardt et al., 2003; Arar et al., 2005; Segal et al., 2007].

To understand and incorporate the public's opinions about the design and implementation of the proposed cohort study, and to test methods for ongoing public involvement in the study should it be funded, the National Human Genome Research Institute (NHGRI) recently approved a 2-year pilot public engagement pilot study [Genetics and Public Policy Center, 2007]. The public consultation project has not been designed to justify any aspect of the proposed cohort study, including the inclusion of children.

The first phase of the public consultation project included focus groups that discussed several aspects of the proposed study including opinions about the research on children. Results of these focus groups are summarized here. Participants' ethical concerns about children's participation are analyzed for their congruence with current guidelines on pediatric research to see where public concerns will be easily addressed, and which issues study planners and the public may disagree on.

MATERIALS AND METHODS

In January, 2007, applications to conduct human subject research were approved by both Johns Hopkins University and the Abt Associates Institutional Review Boards to conduct focus groups. After a pilot study, 15 focus groups were conducted in March and April of 2007, in five cites selected to achieve regional representation—Philadelphia, Pennsylvania; Phoenix, Arizona; Kansas City, Missouri; Jackson, Mississippi, and Portland, Oregon. Focus group members were recruited across a range of demographic categories, including age, education, race, ethnicity, gender, and socioeconomic status (Table I). One group with a prevalent health risk behavior (smoking), and one group subject to an environmental exposure (long-time residents near Three Mile Island in Middletown, Pennsylvania) were conducted.

The moderator guide included a description of the proposed NIH cohort study, followed by questions on a wide array of related topics, including the participation of children. A video describing the purpose and design of the proposed NIH cohort study was developed to provide uniform introductory information on the cohort study to focus group members. The original informational video was shown to the first six focus groups in Middletown, Philadelphia, and Phoenix. After the Phoenix groups, a short segment of the video showing an NHGRI official describing potential important findings from the proposed NIH cohort study was deleted to remove a source of potential bias. The edited version was shown to the remaining groups in Kansas City, Jackson, and Portland. The overview of the study, which was considerably less detailed than the description above, is found in the Online Supplementary Material. Following the introduction, focus group members were asked whether it would be acceptable to include children in such a study, whether there were categories of children that should not be recruited, and what ethical issues would be raised by the inclusion of children in such research.

In January, 2007, a pilot focus group with eight participants in an ongoing longitudinal cohort study of genes and environment was conducted and videotaped in Hagerstown, Maryland [Trimble et al., 2005]. The interview guide was revised based on the pilot group. After the pilot study, no changes were made to the wording of the questions on children's participation. In the pilot focus group, questions about the inclusion of children and recruiting of households were the second topic discussed, after soliciting initial responses to the idea of the cohort study. Between the pilot study and the other focus groups, questions about perceptions of study burdens were moved to precede questions about children.

Each focus group comprised individuals who were homogeneous with

TABLE I. Focus Group Characteristics

	Focus groups		
City	Group 1	Group 2	Group 3
Philadelphia and Middletown, PA	Urban, lower SES, white	Urban middle and upper middle SES African American	Environmentally exposed (Three Mile Island)
Phoenix, AZ	Middle SES White	Upper middle SES elderly (>62)	Young (<30) Latino/a
Kansas City, MO	Middle SES white	Rural white	Urban, lower SES, white
Jackson, MS	Urban African American	Rural African American	Smokers
Portland, OR	Middle SES white	Upper middle SES elderly (>62)	Asian

Urban: lived within city limits. Rural: lived outside metro area. Lower SES: HHI < $45K. Middle SES $45K < HHI < $65K. Upper Middle SES $65K < HHI.

respect to the characteristics shown in Table I. Focus group members signed a consent form and provided demographic information. Each was given a $75.00 cash incentive. Focus groups were moderated and lasted 2 hr.

Each group was audiotaped and transcripts were read into the NVIVO 7.0 software package [QSR International Pty Ltd, 2006]. Primary text codes corresponding to the organizational headings of the focus group guide were assigned. Three project staff members independently generated lists of potential secondary codes based on three transcripts. The lists were discussed to define a single list of secondary codes. Three additional staff members applied the secondary codes to a fourth transcript, and compared their coding decisions, developing rules to make coding more consistent. A single code was used to identify all instances of speech related to children's participation in the proposed NIH cohort study. Data from the pilot study were excluded from the analysis. The remaining 15 transcripts were coded with the secondary codes in an NVIVO database. Text related to children was organized and analyzed for common themes. Findings about the inclusion of children are summarized below, using direct quotes to provide examples and details of the focus group members opinions.

RESULTS

Including the pilot, a total of 141 adults of diverse backgrounds participated in the focus groups. The average focus group included nine people (Table I).

In the focus groups, the majority of members' opinions about including children in the proposed NIH cohort study fell into one of three main categories:

- The importance of obtaining children's permission and their ability to give it,
- risks and burdens versus benefits of study participation
- return of study results to children and their parents.

Running throughout were concerns about the evolution of a child participant's rights and responsibilities as the child moves through adolescence and the age of consent, and how the proposed cohort study would maintain flexibility to address children's increasing maturity and capabilities.

The Importance of Obtaining Children's Permission, and Their Ability to Give it

Focus group members were very concerned about ensuring that children would not participate in the cohort study against their will. The terms 'permission' and 'consent' were used by focus group members, although the literature and regulations refer to a child's assent.

In the majority of the focus groups, there were members who objected to the inclusion of children in the cohort study because they thought that children would be unable to provide informed permission or assent to participate. Members in several groups believed that children would not understand the goals or implications of the study, the nature of the genotypic data, or what a 10-year commitment involves. Without a child's informed agreement, many thought it would be unfair or unethical to subject children to the study's burdens, risks or discomforts.

In every focus group the concerns about consent were shared by the focus group members who supported enrolling children. Several people explicitly stated that a parent's permission would be expected and required before a child could participate in the cohort study. People in several focus groups suggested that a parent's permission would be sufficient for a minor to participate, but that each child should be re-consented when they turn 18 (or became old enough to understand the study). Others argued that older children should be allowed to decide for themselves.

> "I think it matters, too, how old the child is. If you've got a young child you can say, yes we're going to do this but when they turn into teenagers, they can make their own choice, are they going to do this or not." Female, Portland, Middle Class White

Other focus group members who supported enrolling children said that a parent's proxy consent would not be sufficient permission, and that children should not be forced to participate against their will.

> "... to what extent can you make commitments for kids[?] Is it fair to little Timmy that his parents say you know, we signed up for this study and now he has to wear a pedometer for the next ten years. Though I do support getting data from children along the way, I am just saying I do think that would be something to consider." Male, Phoenix, Young Latino

In a small number of focus groups there was concerned that parents might coerce their children to participate in order to receive study incentives.

> "... if the parent goes oh I'll sign for them, that's because they're greedy and want the money...I know they're looking for out their kids, but if you sign them you get 3 extra grand if your kids does it. And then all they think about is the money because oh, I got bills to pay and this and that. This should never come up." Male, Kansas City, Rural White

In response to these concerns, one of the most important conditions for including children was that a child's assent be given before enrolling. In 11 of the focus groups, at least one person said that a child's permission (or assent) should be required in order to participate, or that children should be able to dissent.

Defining the exact criteria to determine which children could be approached to give assent was difficult. Focus group members were asked if there were any categories of children that should not be invited to participate. In ten of the groups, people were concerned that children who participated should be able to understand the study in order to provide assent. In many focus groups,

people specified age cutoffs, which ranged from ages 5 to 16.

> "What is the age group that you are doing? I would say, a teenager, I would not feel nearly as bad because you can present it to them, and they would probably understand it, but you get anyone younger than that, and they are not going to; and so, you have spoken for them, and even though you may want to know, to help other children out, they have a right; and so, I don't think you could expect that." Female, Phoenix, Upper Middle Class Elderly

Another condition that members of eight different focus groups placed on children's participation was that a child be allowed to withdraw her own assent. A few people said children should be able to withdraw at any time, while others suggested that when they reached the age of consent (or a given level of understanding or maturity), the decision to remain in the study should be handed over to them.

> "I mean, like, if the child wants to withdraw, well, that is a good question, because if they just aren't doing it because it is interrupting their Sponge Bob time, then I think you should make them do it. But if it is really something that they don't want to do because they don't feel comfortable doing it, I think that they should be able to withdraw from it when they are able to make that conscious decision." Female, Phoenix, Young Latino

Risks and Burdens Versus Benefits of Study Participation

According to members in the majority of the focus groups, a parent permission would almost certainly depend upon their evaluation of the risks and benefits to their children in the proposed study. Focus group participants described some of the factors they would consider when trying to decide if including a child in the proposed cohort study would be appropriate.

Risks and burdens. In four of the focus groups, members were concerned about enrolling children in the cohort study because children might experience unnecessary fear. Exposing children to frightening experiences that could otherwise be avoided could erode trust between parent and child. In three of the groups, people noted that children, especially very young ones are afraid of doctors and needles used for blood collection.

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Members of three focus groups suggested that the proposed study might be less intimidating if examinations were performed by a child's regular pediatrician. To help minimize burdens and fears, people suggested limiting the children's examination to the questions and procedures that make up a routine pediatric physical. Others said children's participation should be limited to minimally invasive procedures—potentially painful or invasive tests should be excluded from the children's protocol.

Participants who were parents in three of the focus groups did not want to add the study to their child's long list of activities. For example, requiring participants to keep daily activity or diet records could create a large burden, either for participating children or their parents.

> "She has a lot of other things that she needs to focus on other than this. She'll be going to college soon. So, she won't have the time" Female, Philadelphia, Urban African American

Another risk mentioned in six focus groups was that the study would invade children's privacy. Collecting a large amount of information from children including genetic information might result in discrimination later in life, and asking children lots of personal questions about their health might be invasive.

Finally, participants from six focus groups said that the impact of risks or burdens would depend on the ages of children studied, and that young children (defined variously as infants; those younger than 12 months, younger than 18 months, and younger than 4 years) should be excluded for this reason.

Benefits. Members of six focus groups (including two of six groups who saw the introduction with the NIH official speaking about possible benefits and four of nine who did not) believed that the cohort study would provide little or no benefit to healthy children since the study protocol would involve only a medical checkup. Participants in seven focus groups (including three who saw the NIH clip) wondered whether enrolling children would benefit the larger goals of the cohort study and society. Children might not provide reliable data for the duration of the study. Young children might be unable to comply with much of the protocol, or to supply accurate answers to questions that parents did not know the answers to. Although older children and teenagers would be more likely to understand questions and able to follow protocols, in two focus groups people believed that teens would be less willing to comply. Also of concern was that teenagers (and in some cases younger children) might not provide honest responses to questions about topics including diet, smoking, alcohol use, disease history, and sexual behavior. Participants in a few groups questioned whether collecting such inaccurate data would be worthwhile.

In 10 focus groups (three of which saw the NIH clip), there were members who disagreed, saying that children might benefit from participation. Some who were parents said that including

their own children would permit insight into disease patterns in their families, or help predict whether a child might develop a disease that runs in the family. In five different focus groups, people thought including children might shed light on how the unique combination of two parents' genes influence a child's health. Children might also benefit more directly from participating. Members of five focus group pointed out that participation might increase children's health. Some noted participation would guarantee at least one physical exam for children in the study. Children who might be sick at the study's outset, as well as those who develop an illness during the study might also receive medical attention sooner as a result of the exams and follow-ups, or get important health information in the form of research results.

Potential benefits to society were also identified. Participants in five focus groups (including two who saw the NIH clip) thought that enrolling children would be an essential part of a study to understand the role genes play in disease.

> "Because they [children] are a part of the genetics of me, you know, fathers, my grandparents, my dad's grandparents, my grandparents." Female, Kansas City, Middle Class White

Several participants in five different groups (including two who saw the NIH clip) understood the relevance of studying children together with their relatives in order to examine the effects of genes, shared environments, and early childhood exposures.

> "I just think it's important that, if you have one person in the family, that you have multiple people within that same household. Because you want to know is it something environmental that's affecting everyone in the house or is it something genetic that's just one person that lives there? If it is genetic, is that in combination with the environmental factors, so if I have something, my children have it as well? You know, you want to know what the interactions are between, you know, genetic and environmental, and if it's affecting everyone, if it's not, if it doesn't, if it's just affecting the mother or just the father, why?" Female, Kansas City, Poor Urban White

It was not entirely clear what weight focus group members would give these benefits to society in the decision of whether to include children.

Return of Study Results to Children and Their Parents

The proposed cohort study would collect and generate a large amount of data on individual participants, demographic and geographic subgroups, and the entire cohort. Standard assays from the exam might provide useful clinical information for individuals. Returning data to individuals about genotypes with previously established clinical utility might identify other risks that a participant could alleviate. Aggregate study results representing new associations also could be of interest and clinical importance to study participants. It is similarly conceivable that individual genotype and exposure data related to a new finding could be returned to individual participants, although in most cases the clinical utility of such information would be unclear. We asked participants which of these types of results they would expect to see if they were a participant in the cohort study, and who the findings should be shared with. Although participants were not asked specifically about the return of children's results, in seven focus groups people commented on the matter.

In six of these seven focus groups members said that some or all of the study results pertaining to children under the age of 18 should be provided to their parents. In four focus groups, people suggested that once children reach the age of consent, individual study results should be communicated privately in the same manner that other adult participants receive the data. Members of two focus groups believed that children might be ready to receive their results at a younger age, or when they demonstrate a certain level of maturity. Although people in four groups stated that at some point as children mature, they should be given their own results, there was little concern expressed for the privacy of children's results before they reached this point. When focus group members spoke about access to children's results, nearly all believed that parents should have the right to know about information pertaining to their children, particularly if the information implied that a child was facing some immediate risk.

One person worried specifically about a child's genetic information being shared inappropriately with insurers or employers, and used against the child later in life. Concern was also expressed that if children could not answer exam questions in private they might not provide honest answers to sensitive questions. However, with the exception of one focus group member who believed adolescent participants should be able to control access to their study results, no other concerns about the privacy of children's research findings were expressed.

There was some question about whether individual genotypes for variants predisposing a child to late-onset diseases should be returned to children at all, since advances in treatment and a great deal of worrying might occur between the time such information was made available and the onset of any such disease. Many believed that returning information about genetic or other risk factors when the findings are inconclusive, or not clinically actionable might do all participants more harm than good. It was suggested that parents be able to opt out of receiving such information on participating children. However, focus group members did not explicitly discuss the protection of a child's right not to learn such information.

DISCUSSION

Current regulations and guidelines for the protection of children in research address several of the concerns raised by focus group members. The concern that no child should be forced to participate,

and that any child be allowed to dissent or withdraw has been echoed in the federal statutes [Federal Policy for the Protection of Human Subjects. Additional DHHS Protections for Children Involved as Subjects in Research, 1983]. Pediatric researchers are required to seek the consent of at least one parent, and assent from children in all cases where assent can be given [Federal Policy for the Protection of Human Subjects. Additional DHHS Protections for Children Involved as Subjects in Research, 1983].

In both the focus groups and in the literature, there is little agreement about what characteristics (e.g., age, maturity) should be used to decide if a child is ready and able to assent to a protocol, or what the cutoff(s) should be. Federal rules on assent are not specific on this point [Federal Policy for the Protection of Human Subjects. Additional DHHS Protections for Children Involved as Subjects in Research, 1983; Field and Berman, 2004], leaving the process open to interpretation and possible misuse. Studies using age as a metric of children's ability to assent have suggested ages between 7 and 14 as possible cutoffs [Weithorn and Campbell, 1982; Ondrusek et al., 1998; Wendler and Shah, 2003; Burke et al., 2005; Wendler, 2006]. However, at least two studies have found that children's ages were not correlated with the ability to provide meaningful assent [Susman et al., 1992; Ecoffey and Dalens, 2003]. Others found that a child's cognitive, emotional, and social development, and social context all helped determine whether they were ready for assent [Susman et al., 1992; Dorn et al., 1995]. Finally, other models of seeking a child's decision, including family consent or negotiated shared consent have been proposed [Renegar et al., 2001; Massimo et al., 2004]. There hardly seems to be one right answer to the question of when a child is ready.

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In contrast, both focus group members and the literature are fairly clear about what should happen when a child in the study reaches the legal age of consent. Members in most focus groups strongly believed that as the needs and capabilities of children change during the proposed cohort study, their growing autonomy and eventual status as adults should be reflected in the study protocols. Assent, re-assent, and consent processes for different ages and maturity levels would likely need to be developed. Several reviews of longitudinal pediatric research have recommended that consent in prospective studies be treated as an ongoing procedure that must be monitored and updated [Kuther and Posada, 2004; Helgesson, 2005; Burke and Diekema, 2006; Fisher, 2006]. When child participants reach the age of 18, federal guidelines state that they must be re-consented using the adult informed consent mechanism in order to continue in the study.

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This is not to say that focus group member's opinions always agree with the guidelines and related literature or vice versa. Guidelines on childhood research [Field and Berman, 2004] and on genetic testing in children [American Society of Human Genetics, 1995] caution against providing either parents or children with individual research findings or genetic test results unless they are the product of a clinically validated assay whose use has already been shown to improve childhood health outcomes. While some people felt that they would only like to receive personal results from the study when the result had some clinical utility, many others stated that they would want to receive all of the information researchers had available. Moreover, members of multiple focus groups would prefer to receive all the data available on their child, so that they could determine what to do with their child's data.

Returning a child's genotype data to parents can bring up issues of privacy, since information about parental genotypes can be inferred. In some cases a researcher may even be obligated to inform a parent of their genetic risk based on a child's genotype. Existing guidelines note that it may be ethically more sound to preserve the child's right to choose not to know their genotype, as long as there is no immediate health benefit to disclosing the data [Field and Berman, 2004; Borry et al., 2006]. However, maintaining privacy between child and parent was not viewed as a critical issue by focus group members. Guidelines on return of results to child participants may conflict with parents' concern and desire to know expressed so clearly in the focus groups.

In addition to studying how parent's genes and shared environments affect children's health, the proposed cohort study could provide a unique opportunity to study methods related to children's assent, the perception and reality of children's risks and benefits, and return of individual children's results.

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environments affect children's health, the proposed cohort study could provide a unique opportunity to study methods related to children's assent, the perception and reality of children's risks and benefits, and return of individual children's results.

Issues related to children's participation in a genetic study where many of the findings will relate to late-onset diseases could be examined. The longitudinal nature of the study would offer a chance to examine how the relationship between the study and participating parents and children changes as the children mature. This type of work might be accomplished through ongoing community engagement efforts operating alongside the cohort studies in the areas where recruiting takes place.

The focus groups were designed to include people from a wide variety of backgrounds in order to help ensure collection of a broad spectrum of opinions. In the 15 focus groups that followed the pilot study, responses reached a satisfactory point of saturation; broad ranges of opinion were collected and repeated in several groups for all of the questions, without including responses from the pilot group.

The video viewed by the first six focus groups to explain the cohort study contained a segment approximately 20 sec in length of an NIH official extolling the benefits of such a study. Because of concerns about biasing focus group members' opinions, this segment was removed before showing it to the groups in Kansas City, Portland and Jackson. There was some concern that those who saw the NIH segment might view the study as being more beneficial. However, with respect to the benefits to both children and society if children were to participate, no differences were observed between groups who saw the NIH clip and groups who did not. The change in the video does not appear to have influenced member's opinions about the benefits of children's participation, or the lack thereof.

Limitations

One limitation of our study is that the qualitative nature of focus group data does not allow us to determine which concerns or benefits were viewed as most important, or whether benefits outweigh the concerns over children's participation in most cases. Another limitation of these focus groups is that a mixture of people with and without minor children contributed to these findings—worries and concerns may be more concentrated among parents of minors, whose consent would be required. Another limitation of these focus groups is that we did not speak to children to examine their perspectives and concerns about participation in the proposed study.

An additional limitation is that focus group data do not readily lend themselves to comparisons of differences between groups. To address this, the community engagement project will use the focus group findings as the basis for a representative nationwide survey to examine whether opinions about the cohort study are specific to particular segments of the population. On the issue of the inclusion criteria for children, where opinions seem to be heterogeneous, and the issue of return of children's study results, where public opinions may differ from those of research guidelines, it may be necessary to engage the community further to reach acceptable solutions. The next step may be to involve the real experts in the community—children themselves.

CONCLUSION

Community engagement to understand public concerns appears to be a useful step in helping a large, potentially controversial longitudinal study like the one proposed to effectively recruit and retain child participants [Rotimi et al., 2007; Sapienza et al., 2007]. However, it is also apparent that to be effective, study design teams must take community knowledge and concerns about children and translate them into a responsive and realistic study protocol. A large longitudinal study of children and adults must retain some degree of flexibility because children's rights and needs will differ from those of adults, and change profoundly during the study period. Clear communication at the outset about assent, dissent and re-consent, as well as the scope, risks and benefits of the study will be essential. Plans for return of individual results should be clarified up front. Burdens both to child participants and their parents must be minimized where possible, and the study protocol must be effectively implemented.

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