Consenting postpartum women for use of routinely collected biospecimens and/or future biospecimen collection

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Abstract The National Children's Study (NCS) Harris County, Texas Study Center participated in the NCS Provider Based Sampling (PBS) substudy of the NCS Vanguard Phase pilot. As part of the hospital-based birth cohort component of the PBS substudy, we conducted a secondary data analysis to evaluate the proportion of postpartum women who consented to future biospecimen collection alone and to both future collection and use of residual birth biospecimens. In phase 1, 32 postpartum women at one hospital were asked to consent only to maternal future biospecimen collection. In phase 2, 40 other postpartum women from the same hospital were asked for an additional consent to use residual clinical biospecimens from the birth event that otherwise would be discarded, including cord blood and maternal blood and urine. Among 103 eligible women, a total

of 72 participated. They were 28.3 ± 5.9 years old on average; 58 % were Hispanic; 63 % consented in English, and 37 % in Spanish; 39 % had some college education; 42 % were married; 60 % had an annual family income $< \$30,000$; and 51 % were employed. In phase 1, 59 % consented to future biospecimen collection, and in phase 2, 95 % consented to both future collection and use of at least one residual birth biospecimen, with a difference between phases of 36 % [95 % CI 17–54 %]. Demographic characteristics did not differ among those who did and did not consent. Postpartum women were significantly more likely to grant consent for use of future and residual hospital-obtained biospecimens than future biospecimen collection alone.

Keywords Residual · Biospecimen · Postpartum · Consent

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Introduction

The National Children's Study (NCS), authorized by the Children's Health Act of 2000 and implemented by the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development, was initially conducted as a pilot Vanguard Study of approximately 5000 children to evaluate the feasibility, acceptability, and cost of study procedures (Landrigan et al. 2006). As part of the NCS Vanguard Study, the Texas Harris County Hospitals and Universities NCS (HC-HUNCS) Study Center evaluated postpartum consent for maternal and infant biospecimen collection. After the NCS Vanguard Study was completed, the NIH terminated the NCS.

Biospecimens were an essential component of the NCS as advances in biomolecular and informatics technologies provide new ways to identify and derive information for genetic, epidemiologic, and translational research. The use of residual biological specimens is not new, and studies have shown that

the public is generally supportive toward research using donated human biological specimens (Hoeyer et al., 2004; Hoeyer et al., 2005; Lewis et al. 2013a, b; Kaufman et al., 2012). However, the types of biological specimens, the circumstances in which consent for biospecimen collection is requested, and the logistics of the consenting process may modify the response to consent (Evans and Meslin 2006; Hiratsuka et al., 2012; Fong et al., 2004; Hakimian and Korn 2004; Chan et al., 2012; Caenazzo et al., 2012; Gefenas et al., 2012). Our study documented the consent for future collection of biospecimens and the use of hospital-collected residual maternal and birth biospecimens among postpartum women, a group in which the consenting process is rarely studied.

The formative study from which the data for this investigation were derived was not designed specifically to evaluate consent for collection of biospecimens for research, including genetic testing. The primary study, however, presented an opportunity to do so. While a comprehensive evaluation of issues surrounding the consent process cannot be accomplished, we believe this secondary data analysis contributes to the field. In this paper, we report on the feasibility and acceptability of consenting women post-delivery before hospital discharge for (1) future collection of biospecimens or (2) future and residual hospital-collected biospecimens.

Methods

Study setting

The NCS Program Office selected three Harris County birth hospitals and biospecimen collection was conducted in one of these. The hospital is a private non-teaching hospital with 1000–2000 births per year, private labor and delivery rooms, and 28 private postpartum rooms.

At hospital admission, women were given a standard hospital packet that contained a flyer on the NCS. Study staff that approached eligible women for participation referred to the flyer when introducing the study before screening them for eligibility. Women were given the same information during each of two study phases.

Study population

PBS, the primary study, was conducted in three study counties with HC-HUNCS being one of them. The PBS utilized a two-level hierarchical probability sampling frame; at the provider level, the probability of selection was based on the number of births at each provider location from among all prenatal provider locations in the county and outside if they delivered services to women residing in the study county. A sample of provider-locations stratified by various characteristics (e.g.,

percent Hispanic, percent Medicaid, and geography) was selected with probability proportionate to size (based on the estimated number of births) as a representative set of provider locations. Within the selected sample of prenatal care provider locations, a probability sample of pregnant women was identified. In practice, operationalizing the design for the prenatal care provider locations preceded a hospital-based sample for various reasons including feasibility of initiating field operations and the administrative complexities of seeking permission and access to multiple organizational units within hospitals. Choice of the birth hospitals was based on a convenience sample due to the small number of hospitals in two of the three study counties. The sampling frame for identification and enrollment of mothers who recently delivered a newborn at the hospital used a probabilistic approach.

The HC-HUNCS Study Center enrolled women post-delivery prior to discharge from the hospital in two phases: phase 1, June 9–29, 2013, and phase 2, June 30 to July 23, 2013. Women were eligible for inclusion if they were at least 18 years old, lived in Harris County at the time of delivery, had either no prenatal care or prenatal care at one of the non-sampled prenatal care locations in the NCS Provider-Based Sampling (PBS) substudy, and gave birth during the PBS substudy sampling period. The postpartum hospital staff prescreened for these eligibility criteria in postpartum women during the sampling period, and women prescreened as eligible were approached for participation at least 12 h after the birth event, during hospital visiting hours, and prior to maternity discharge.

Consent

This NCS Vanguard Study was approved by the NCS Federated Institutional Review Board (IRB) at NICHD, the participating hospital, and Baylor College of Medicine IRBs. All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975 as revised in 2000. In both study phases, consent was requested for future collection with or without genetic testing of maternal biological specimens. When consenting to future biospecimen collection and genetic testing, women were told that biological samples might be collected as part of future NCS visits. In phase 1, women were asked only to consent to future biospecimen collection with or without genetic testing. In phase 2, women were also asked to consent to the collection and genetic testing of residual maternal blood collected for clinical care by the hospital for the birth event, and residual umbilical cord blood and/or collection of an additional filter paper card with up to four blood spots at the time of the routine hospital newborn screening heel stick blood collection with or without future genetic testing. Except for neonatal heel stick/blood spot samples,

biospecimens were collected only from samples that would otherwise be discarded and not collected from women and neonates solely for the purposes of the study. Women were informed that they could provide consent to all, some, or none of the biological materials and that they could change their decision for this consent during the study.

The process of seeking consent was scripted and performed in English as well as Spanish (or other language using a translator) by the same three trained data collectors in both phases of the study. The process was standardized with the use of a Birth Visit Information Sheet. Each participant received a consent booklet which could be reviewed by the patient's significant other and family. The potential participant could choose to read the consent booklet on her own without the data collector or have the consent booklet read to her by the data collector. Examples of information provided in the consent booklet are as follows.

What are the possible benefits of being in the National Children's Study?

If you need medical or social services, we will give you the names and contact information for people and agencies that can try to help. But the Study cannot and will not pay for your health care or mental health services.

What if I want to leave the National Children's Study?

Leaving the Study will not affect your access to health care or any other benefits you may be receiving, like those from Social Security, Medicaid, WIC, or the Supplemental Nutrition Assistance Program.

Does the National Children's Study pay for health care for my family or me?

The Study cannot and will not pay for health care or mental health services for you or your family. If you need medical or social services, we will give you the name and contact information for people and agencies that can try to help. The information we collect is for research purposes only. Being part of the Study does not take the place of your usual doctor or clinic visits.

The study protocol did not include the collection and recording of the number of hours post-delivery for conduct of consent process. All consents were, however, conducted prior to hospital discharge; thus, the time period for consent post-delivery was quite short. Women without complications were discharged, on average, from within 24 h to 2 days post-delivery. Participants were informed during the consenting process that they would be compensated, but were not notified about the amount of compensation (\$25 for completing any study visit and an additional \$25 for providing any

biospecimen) until after they had agreed to participate in the study.

Data collection

Trained data collectors used standardized eligibility screeners, consent forms, and birth visit interviews to collect information directly from participants in person (all eligibility screeners, consents, and all but two birth interviews) or by telephone (two birth interviews). We used consent forms to estimate the frequencies of consent, and NCS eligibility screeners, and birth visits to estimate frequencies of corresponding characteristics that might affect consent.

To operationalize the objectives of our study, feasibility and acceptability were defined a priori. This was a formative study; thus, feasibility was the success of consenting the study participants per study protocol and acceptability was the agreement of the study participants to engage in (1) the consent process and (2) the components of the consent form.

Statistical analysis

This is a secondary data analysis. We compared the frequency of consent to future collection alone (phase 1) and future as well as residual clinical biospecimens collection (phase 2) using chi-square test and 95 % confidence intervals. For phase 1, we evaluated the features associated with consent using exact logistic regression. For phase 2, we used Fisher's exact test because only 2 of 40 subjects refused consent.

Data access and confidentiality

We conducted the study under the policies of a data use agreement with the NCS Program Office. To minimize the risk of study participant identity disclosure, Table 2 presents only percentages and excludes variables with counts lower than the NCS disclosure avoidance threshold (i.e., data on race, home ownership, and number of people living in the household were excluded).

Results

Study participants

During the study period, 355 women delivered at the study hospital, 103 were eligible for study participation (all received prenatal care), and 72 consented to study participation: 32 in phase 1 and 40 in phase 2 (Table 1). The average maternal age was 28.3 ± 5.9 years, 58 % of mothers were Hispanic, 63 % were consented in English, 37 % in Spanish, 39 % had some college education, 42 % were married, 60 % had an annual family income <\$30,000, and 51 % were employed before delivery.

Table 1 Frequency of informed consent for birth cohort biospecimen collection by study phase and consent type

Phase	Births	Eligible	Study consent	Biospecimen consent				Genetic testing	
				Future	Residual			Child	Adult
				Type not specified	Adult specimens	Cord blood	Infant blood spot		
1	188	51	32	19	NA	NA	NA	NA	18
2	167	52	40	38	38	35	35	33	33

Biospecimen consent

The frequency of consent for collection of future and use of residual clinical biospecimens (95 %) was significantly ($p=0.0002$) higher than consent for future biospecimen collection alone (59 %), with a difference of 36 % [95 % CI 17–54 %]. The frequency of consent for use of samples for genetic testing differed significantly ($p=0.02$) between the two groups: 56 % consented in phase 1; 83 % consented in phase 2; and difference, 26 % [95 % CI 5–47 %].

Features associated with biospecimen consent

There were no significant associations between any characteristic of respondents and either future biospecimen collection alone or future and residual biospecimen collection (Table 2). For every category of characteristic, the frequency of consent to future biospecimen collection alone was less than 80 % while it was greater than 80 % for future and residual biospecimen collection.

Conclusions

In this study, postpartum women were significantly more likely to consent to future and residual hospital-obtained biospecimen collection and genetic testing than to future biospecimen collection and genetic testing alone. Our findings indicate that obtaining consent from postpartum women in the hospital for use of residual clinical biospecimens and biospecimens for future collection is feasible across a range of patient populations in women who received prenatal care.

Our results support the acceptability of use of residual biospecimens for medical research. Botkin et al. (2012) found that people from the general population in the USA (women and men, parents and non-parents) were supportive of using residual dried blood spots for research. After a systematic review of the literature on patients' experiences on donation of their residual biological samples, Chan et al. (2012) stated that further research is needed to learn which factors influence willingness to consent for the use of residual biospecimens. Our investigation of factors influencing consent for use of

residual biospecimens did not reveal any demographic characteristics influencing willingness to consent.

Our findings also support the feasibility of obtaining consent for residual biospecimen use. Marsolo et al. (2012) found that more than 86 % of subjects consented to biobanking of residual biospecimens. In addition, Vermeulen et al. (2009) found that 85 % opted to consent for use of tissue specimens from breast, prostate, and colorectal cancer surgery. Our study findings indicate that a high percentage of postpartum women also are willing to consent for use of their own and their neonates' residual biospecimens for medical research.

Finally, our findings are relevant and timely considering the recent proposal by the U.S. Department of Health and Human Services and 15 other Federal Departments and Agencies to modernize, strengthen, and make more effective the Federal Policy for the Protection of Human Subjects that was promulgated as a Common Rule in 1991 (U.S. Department of Health and Human Services, 2015). The proposed changes would require informed consent for secondary research with a biospecimen (for example, part of a blood sample that is left over after being drawn for clinical purposes). The results of this study indicate that consenting for secondary research with a biospecimen is feasible and the process is accepted by potential study participants, specifically during the immediate postpartum period.

Our study is not without limitations. We report the results of the study from only one hospital. We are also not able to determine to what extent additional financial compensation for providing biospecimens or the presence of the neonate's father or other family members influences a woman's decision to consent. The possibility of a learning effect on data collectors between the two study phases cannot be excluded.

For large, prospective research studies, the selection of a biospecimen collection method that is noninvasive, convenient, and cost efficient must be balanced with quality and quantity issues. In summary, we report higher consent from postpartum women for collection and genetic testing of future and residual hospital-obtained biospecimens than for future biospecimen collection alone. For large, prospective research studies, a biospecimen collection method that takes advantage of residual from routine biospecimen collection around labor and delivery in hospitals and other maternity settings should be considered.

Table 2 Features associated with consent to biospecimen collection

Characteristics	Phase 1 Future biospecimen collection		Phase 2 Future + residual biospecimen collection % consenting
	% consenting	Odds ratio [95 CI]	
Ethnicity			
Non-Hispanic	46	Reference	100
Hispanic	68	2.45 [0.70–13.80]	91
Language used for consent			
English	50	Reference	96
Spanish	69	2.19 [0.41–13.60]	92
Education level			
Less than HS/GED	64	Reference	82
HS/GED or more	57	0.77 [0.12–4.24]	100
Marital status			
Married	60	Reference	95
Living with partner	65	1.21 [0.18–7.91]	92
Income level			
<\$30,000	55	Reference	94
≥\$30,000	70	1.87 [0.31–14.50]	100
Employment before delivery			
Not employed	59	Reference	100
Employed	60	1.05 [0.21–5.43]	95
Neonate gender			
Female	69	Reference	96
Male	50	0.47 [0.08–2.37]	94
Infant feeding method			
Breast only	77	Reference	90
Breast and bottle	57	0.41 [0.05–2.72]	100

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflicts of interest.

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