Published in final edited form as:

Soc Sci Res. 2013 September ; 42(5): 1402–1409. doi:10.1016/j.ssresearch.2013.03.004.

New Strategies for Biosample Collection in Population-Based Social Research

Heather H. Gatny^{a,*}, Mick P. Couper^a, and William G. Axinn^a

^aInstitute for Social Research, University of Michigan, Ann Arbor, MI USA

Abstract

This paper aims to increase understanding of the methodological issues involved in adding biomeasures to social research by investigating the potential of an event-triggered, self-collection technique for monitoring biological response to social events. We use data from the Relationship Dynamics and Social Life (RDSL) study, which collected saliva samples triggered by a life event important to the aims of the study—the end of a romantic relationship. Our investigation found little evidence that those who complied in the biosample collection were different from those who did not comply in terms of key study measures and sociodemographic characteristics. We also found no evidence that the biosample collection had adverse consequences for subsequent panel participation. We did find that prior cooperation in the study was an important predictor of biosample cooperation, which is important information in developing biosample collection strategies. As demand for biological samples directly linked to social data continues to grow, effective low-cost collection methods will become increasingly valuable. The evidence here indicates that self-collected biosamples may offer tremendous potential to meet this demand.

Keywords

biomeasures; biosample collection; event-triggered collection; self-collection

1. Introduction

Social science research increasingly acknowledges the interactions between biological forces and human behavior—a scientific trend making the collection of biological samples increasingly common in population-based social research (Haas and Timmermans, 2008; Hobcraft, 2009; Kall, 2008; National Research Council, 2007). The appeal lies in the knowledge to be gained by linking biomeasures to measures of attitudes and behaviors (National Research Council, 2007). The potential for this area of research is tremendous given the increasingly wide range of biomeasures that can be collected from relatively easily obtained biological samples such as saliva, urine, and blood (Hofman, 2001; Lindau and McDade, 2007). The analysis we present here is designed to increase understanding of the methodological issues involved in adding biomeasures to social research by investigating the use of an event-triggered self-collection technique in a population-based study of young women.

© 2013 Elsevier Inc. All rights reserved.

*Corresponding author. Address: Institute for Social Research, 426 Thompson St., Ann Arbor, MI 48106, USA. Phone: 734-615-3560. Fax: 734-615-3557. hgatny@umich.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Numerous large-scale social research studies collect biological samples (CDC, 2010; Harris et al., 2009; Hauser and Weir, 2010; Hu et al., 2006; ICF Macro, 2010; Riboli et al., 2002). Although these studies collect different types of biosamples for varying purposes, they all obtain the samples in-person using trained study staff. This procedure makes biospecimen collection so expensive that many smaller scale research projects cannot afford to add this crucial new scientific dimension and large surveys must limit the number and scale of their collections.

As demand for biosamples is increasing in social science research, the need for new methods to collect biospecimens effectively and affordably has also grown. It is now feasible that some biological samples (e.g., saliva, urine, blood) could be collected by respondents themselves and mailed back to study staff. However, key concerns about this approach remain. First and foremost, researchers must be sure that respondents who comply are not different in terms of key study measures or sociodemographic characteristics from respondents who do not comply. In general, little research attention has focused on the possible nonresponse bias resulting from differential compliance with biospecimen requests in large-scale surveys. In one exception, Sakshaug, Couper, and Ofstedal (2010) examined correlates of physical measurement consent in the Health and Retirement Study (HRS). Although overall consent rates were high (93% for body measurements, 84% for saliva, and 83% for blood spot collection), they found that groups likely to be survey nonrespondents or to require extra effort to interview consented at lower rates to physical/biological measurement. This suggests that those who feel burdened by the survey request or have concerns about confidentiality are less likely to consent to physical measures.

Sakshaug et al. also found significant between-interviewer variation in consent rates, suggesting that interviewers may influence, directly or indirectly, the decision to provide biosamples. This variation may result from the effort or skill interviewers use in persuading reluctant respondents to comply with the request for biosamples, allaying confidentiality concerns, and assisting respondents with the procedures. In self-administered surveys, however, little is known about how respondents react to biosample requests or about consent rates in the absence of face-to-face contact.

2. The Track Record for Low Cost Biomeasurment

Previous studies have implemented, with varying success, self-collected biosample designs. Table 1 summarizes the key features of studies with biosamples collected and returned via mail by the respondents. Some of these studies did not assess sociodemographic differences between responders and non-responders (Cozier et al., 2004; Etter and Bullen, 2011; Egan et al., 2003; Feigelson et al., 2001; Freeman et al., 1997; Hansen et al., 2007). Several of the studies that did assess differences found significant response variation by sociodemographic factors such as age (Avendano et al., 2011; Bloomfield et al., 2003; Boyle et al., 2010; Etter and Perneger, 2001; Kang et al., 2011; Kozlowski et al., 2002; Margolis et al. 2011; Rylander-Rudqvist et al., 2006) and race (Bloomfield et al., 2003; Boyle et al., 2010; Crider et al., 2006; Kozlowski et al., 2002; Le Marchand et al., 2001). Others, however, found no statistically significant differences in compliance by these factors (Bauer et al., 2004; Etter et al., 2005; Fidler et al. 2011; Halpern et al., 2012; Osmond et al., 2000). Given the lack of assessment in some studies and the contradicting results of others, the literature provides no clear conclusions on sociodemographic differences between respondents who do and do not comply with requests for self-collected biosamples. However, an important possibility is that variation across study designs is responsible for these differences in compliance rates.

Longitudinal measurement of the same individuals across time has become one of the most important tools for general population research in the social sciences. Demand for more

frequent measures and rising costs of face-to-face contact has pushed all longitudinal research to consider less expensive data collection modes independent of scientific pressures to add biomeasures. It is crucial to evaluate self-collected biosample requests in a longitudinal study design that does not feature face-to-face contact.

3. Biosample Collection and Panel Study Participation

Though some research has focused on the correlates of consent to requests for self-collected biosamples, less is known about the consequences of requesting such samples on respondents' future participation in ongoing studies. The concern for social research is that asking respondents to provide a biospecimen may make them less willing to participate in future surveys whether or not they provide the biological sample. This potential participation effect, especially concerning in social research that collects observations over multiple time periods, is thought to have two main causes. First, respondents may believe that biological data are more personal and private than social data (Greely, 2009), and may thus consider a request for a biosample to be an invasion of privacy that makes them suspicious of the entire study and less willing to participate in later data collection. Second, respondents may view the addition of a biological specimen collection as tipping the scales in the burden-to-benefit ratio for study participation (Groves and Couper, 1998; Groves et al., 2000). The difficulty of providing a biological sample relative to answering survey questions, along with the intrusiveness of the request, may make future participation less likely.

Internet-based surveys are a special case that deserves attention. As internet access has expanded worldwide, conducting survey interviews via the web has become an attractive method for lowering the costs while increasing the frequency of interviewing in longitudinal studies (Couper 2008). However, the addition of biological sample collection may be especially detrimental to participation rates in web surveys – and particularly for repeated web surveys in longitudinal studies – because the response burden is already relatively high and interviewers are not available to encourage, reassure, or help respondents in collecting biospecimens. Adding biomeasures to studies of this kind, however, has considerable scientific potential. For example, by using key life events measured in a web panel survey to trigger biospecimen collection, it is possible to integrate a dynamic record of linked social and physiological changes. And if the web panel surveys are conducted frequently, response-driven biomeasurement will provide a timely gauge of biological changes that occur in immediate and longer term response to life events. This analytic capacity is likely to be of tremendous value for a wide range of research topics.

In this paper, we aim to increase understanding of the methodological issues involved in adding biomeasures to social research by investigating the potential of an event-triggered, self-collection technique for monitoring biological response to social events. The study we investigate collected saliva samples by mail from a population-based sample of young women enrolled in a web panel survey. First, we examine response to the biosample request, which was triggered by a life event important to the aims of the study—the end of a romantic relationship. Second, we look for evidence of differential noncompliance on measures important to the study that might bias study results. We also investigate how study participation characteristics are associated with compliance—associations that may help social scientists design more successful biosample collections. Third, we examine the effects of asking a respondent to provide a biological sample on ongoing participation in the panel study.

4. Methods

We use data from the Relationship Dynamics and Social Life (RDSL) study, which investigates the determinants of early pregnancy. The RDSL study uses a population-based

sample of 1,003 young women, ages 18–19, residing in a single county in Michigan. Respondents participated in an initial 60-minute face-to-face baseline survey interview between March 2008 and July 2009. The baseline interview yielded a response rate of 83.6% (RR1; AAPOR 2011). All respondents were invited to participate in a weekly journal-based study – a mixed-mode (internet and phone) survey – over the subsequent 2.5 years. In all, 84% of baseline survey respondents participated in the journal study for at least 6 months, 79% for at least 12 months, and 75% for at least 18 months.

The biosample collection was conducted between October and December 2009. The first 150 unique respondents to report the end of a romantic relationship in this period were eligible to participate.¹ These respondents received saliva sample collection kits containing a letter that explained the biomeasure component of the study, the \$20 incentive to participate, and how to collect the sample; two copies of a consent form (one to sign and return with the sample and one for the respondent to keep for her records); one saliva collection tube with bubble wrap; and one prepaid priority mail envelope for returning the saliva sample. Half of the respondents were selected at random to receive the sample collection kit in an express mail bubble envelope, and half to receive the kit by regular first class mail in a plain, white bubble envelope with a University of Michigan mailing label. Respondents were instructed to collect and return the sample as soon as possible, but no other constraints were placed on the sample collection (e.g., collecting the sample within a specified time period or at a particular time of day). Sending the kit was the first and only contact with the respondent regarding the biospecimen collection. Respondents did not receive any advance warning that they were selected to participate, and no follow-up was made to remind respondents after the collection kits were mailed out.

4.1 Outcomes

We examine two different types of outcomes. The first is simply whether or not the respondent provided a saliva sample (65% of the 150 selected respondents did). Second, we gauge ongoing study participation by time to completing the next journal entry (mean = 2.36 days).

4.2 Saliva sample participation

In our analysis of ongoing participation in the panel study, we use a dichotomous measure for providing a saliva sample (N=97). A second dichotomous measure indicates if the respondent was requested but did not provide a saliva sample (N=53). The reference group in our analysis is composed of 150 unique respondents who also reported in the journal the end of a romantic relationship (the saliva sample collection trigger), but were ineligible to participate because the trigger occurred just prior to the launch of the biosample collection. A comparison of this reference group to the analytic group asked to provide a saliva sample revealed no significant differences on key sociodemographic characteristics.

4.3 Key study measures

We examine differential participation on several key measures of the RDSL study to check for systematic non-response. These include dichotomous measures of 1) whether a respondent had two or more lifetime sexual partners; 2) whether a respondent ever had sex without birth control; and 3) whether a respondent was ever pregnant.

¹Power analyses with our overall obtained sample size of 150 suggest that with 80% power, we can detect a significant difference (using the .05 significance threshold) of an effect with Cramer's $V = .229$ or higher (χ^2 value of 7.9 or higher). Using Cohen's proposed ranges for interpreting Cramer's V this suggests we have the power to detect the entire range of medium and large effects as well as the upper range of small effects (Cohen 1988).

4.4 Sociodemographic characteristics

In terms of respondent characteristics, we include dichotomous indicators for race, measured as African American versus non-African American; educational attainment, measured as high school or less versus more than high school; current school enrollment (yes/no); partner status, measured as married/engaged/cohabiting versus single; and age of biological mother at first birth, measured as younger than 20 versus 20-plus. A respondent is coded as receiving public assistance if she reported currently receiving at least one of the following: WIC, FIP, cash welfare, or food stamps.

4.5 Study participation characteristics

We examine two other factors that might affect participation in the biomeasure component using dichotomous measures for 1) prior survey cooperation, coded as 1 for below average rate of journals completed and 0 otherwise, and 2) random selection into mode of sending saliva kit, coded 1 for express mail and 0 for first class mail.

The RDSL sample was released in a series of 4 replicates across 17 months. We include a categorical variable for sample replicate, ranging from 1 to 4.

4.6 Analytic strategy

Our analysis has three parts. The first is consideration of the overall response to the biosample self-collection request. The second is an investigation of differential noncompliance with the biosample request, employing a series of chi square tests to test for compliance differences by key study measures and sociodemographic and study participation characteristics. The third is an investigation of the effects of the biosample request on ongoing participation in the panel study, using multiple regression analyses to test the independent effects of biosample and study participation on days to completing the next journal interview.

5. Results

5.1 Response to the self-collected biosample request

We mailed a saliva sample kit to 150 RDSL respondents who reported the end of a romantic relationship and were eligible to participate in the collection. Of these, 97 (or 65%) mailed back a saliva sample. This response rate is higher than many previous studies with self-collected biosamples (see Table 1). In addition, all 97 (100%) of the RDSL respondents who provided a sample returned an initialed consent form as instructed which means all the samples were usable in terms of obtaining required consent.

5.2 Differences in compliance

Chi-square tests of differences between those who did ($n = 97$) and did not ($n = 53$) respond to the request for a saliva sample are shown in Table 2. We found no evidence of differential noncompliance on key study measures. For sociodemographic characteristics, we found only one association with compliance: those who provided a biosample were more likely to be receiving public assistance. In terms of study-related characteristics, those who provided a biosample were more compliant journal participants – that is, they were less likely than nonresponders to be below average on the proportion of journals they completed – and they were more likely to have received the sample collection kit by regular first class mail than by express mail.

As shown in Table 2, the majority of the differences observed between those who did and did not provide a saliva sample are not only statistically insignificant, they are also

substantively quite small. Also, we estimated the independence of the relationships shown in Table 2 in a logistic regression model (not shown in tables) and we found the same results.

5.3 Effects on panel study participation

In Table 3 we present results from the analysis of differential study participation following the saliva sample request. Our model estimates the effect on subsequent participation for the 150 who received a saliva sample request (and who did or did not provide one) compared to 150 other study participants who also reported the end of a romantic relationship – the saliva sample collection trigger – but did not receive a saliva sample request because the trigger occurred just prior to the launch of the biosample collection. The model variable is the log of the number of days to completing the next journal interview. We transformed the variable by taking its log because it is skewed to the left, with most respondents completing their next journal within about a week. The estimate controls for key study measures, sociodemographic characteristics, and sample replicate.

We found the request to provide a saliva sample had no negative impact on subsequent study participation. In fact, those in the saliva sample collection group who complied with the request completed their next journal in *fewer* days than their counterparts in the group that did not receive a saliva sample request. Among all study participants, we found that prior level of study participation predicted post-biomeasure collection participation. That is, being below average in the proportion of journals completed during the study prior to the saliva collection component was associated with a greater number of days to completing the journal immediately following the saliva collection, regardless of inclusion in the collection group or compliance with the collection request.

6. Discussion

This study intended to evaluate (1) response to an event-triggered, self-collection technique for biosamples, (2) differential noncompliance in the collection, and (3) effects of the collection on participation in an ongoing web panel survey. We achieved a 65% return rate from the respondents selected to participate in the biosample collection on the basis of a triggering event – a rate that indicates the feasibility of an event-driven approach to collection.

Overall, we found little evidence that those who complied in the biological sample collection by mail were different from those who did not in terms of key study measures or sociodemographic characteristics. This lack of differential nonresponse suggests that the responding group is representative of the entire biomeasure sample for analytic purposes. We did find, however, that respondents who provided a sample were more likely to be receiving public assistance, a likelihood perhaps impacted by the \$20 incentive offered for participation.

A key predictor of providing a saliva sample was prior cooperation in the study, which indicates that respondents may view self-administered mail-in biosamples as not very different from online journal surveys in terms of effort or intrusiveness. This means measures of prior cooperation could be used by studies to predict biomeasure nonresponse in advance so that additional follow-ups or incentives are budgeted at the correct level. Respondents who are deemed less likely to comply can be targeted to receive a more intensive recruitment protocol such as a home visit by study staff.

We also found respondents who provided a sample were more likely to have received a saliva sample collection kit by regular first class mail. We believe this may have been because (1) the University of Michigan mailing labels on these kits looked more legitimate

and important than the express mail packages, and/or (2) the participants were used to receiving panel study materials by mail with University of Michigan labels, and were more likely to recognize and open their kits than were participants who received the express mail packages. Mailing the kits by first class or express mail also had no effect on the response time of those who sent back saliva samples. Because express mail is much more expensive than first class mail these results are important considerations for cost control of self-administered biosample collections in panel studies.

A major strength of this study is that it examines not only the likelihood of participation in a mail-in biological sample collection, but also the effects of the biological data collection on ongoing participation in a social science panel study. Requesting and providing a biological sample by mail did *not* appear to negatively affect ongoing participation in the panel study. In fact, the request for a biological sample is associated with higher compliance, in the form of shorter time to complete the subsequent online interview, among respondents who provided a sample. In this case, receipt of the sample collection kit in the mail may have served as a reminder to respondents to complete the next journal interview.

Like all studies, this one has limitations. We asked respondents to collect and return a single saliva sample “as soon as possible.” Fewer respondents may have complied if we had requested multiple samples, established a short deadline, or specified a time of day to collect the sample(s). We did not assess the viability of the saliva samples, a process that might have yielded a lower response rate. We also only used a single type of event to trigger sample collection and response may vary depending on the trigger event. However, we did pick an event that is quite stressful in the lives of the respondents compared to many other kinds of events and so it is possible response rates would be even higher for many other kinds of events. Although our sample is population-based, it consists of only young women from a single county, who may be different from men or other age groups or those from other areas when it comes to their response to biosample collections. Nonetheless, this small-scale exploratory study allows us to explore issues that have not previously been addressed in the literature.

7. Conclusion

The results obtained in this analysis regarding response rates and differential noncompliance for a mail-in biological sample collection added to a web panel study, and the effect of the biosample collection on respondents’ continuing participation in the study, are especially significant given the growing demand and steep costs for biological collections in social science research. Overall, this study found little evidence that those who comply in a biological sample collection by mail are different from those who do not comply in terms of key study measures and sociodemographic characteristics. Likewise we did not find evidence that biological sample collection has adverse consequences for subsequent participation in panel studies. We did find that prior cooperation in the study is an important predictor of providing a biological sample, which suggests implementation strategies for biological sample collection. Together this evidence indicates that using low-cost, mail-based self-collection kits for biosamples can yield relatively high response rates and generalizable results without jeopardizing future study participation. Moreover, our results suggest that event-triggered biospecimen collection has the potential to actually improve response rates in ongoing panel studies, especially among respondents who comply with the biospecimen request. Because of the tremendous knowledge to be gained by linking biologic/genetic data to social science data, the demand for biological samples in social research is likely to continue to grow, making effective low-cost options crucial to future research.

Acknowledgments

This research was supported by a grant from the National Institute on Drug Abuse (R21 DA024186, PI Axinn), two grants from the National Institute of Child Health and Human Development (R01 HD050329, R01 HD050329-S1, PI Barber), and a population center grant from the National Institute of Child Health and Human Development to the University of Michigan's Population Studies Center (R24 HD041028). The authors gratefully acknowledge the Survey Research Operations (SRO) unit at the Survey Research Center of the Institute for Social Research for their help with the data collection, particularly Vivienne Outlaw, Sharon Parker, and Meg Stephenson. The authors also gratefully acknowledge the intellectual contributions of the other members of the RDSL project team, Jennifer Barber, Steven Heeringa, and Yasamin Kusunoki. Any errors or omissions are the responsibility of the authors.

References

- American Association for Public Opinion Research (AAPOR). Standard definitions: Final dispositions of case codes and outcome rates for surveys. 7. AAPOR; 2011.
- Avendano, M.; Scherpenzeel, AC.; Mackenbach, JP. Can biomarkers be collected in an internet survey? A pilot study in the LISS Panel. In: Das, M.; Ester, P.; Kaczmirek, L., editors. *Social and Behavioral Research and the Internet*. New York: Routledge; 2011. p. 371-412.
- Bauer JE, Rezaishiraz H, Head K, Cowell J, Bepko G, Aiken M, Cummings KM, Hyland A. Obtaining DNA from a geographically dispersed cohort of current and former smokers: Use of mail-based mouthwash collection and monetary incentives. *Nicotine and Tobacco Research*. 2004; 6(3):439–446. [PubMed: 15203777]
- Bloomfield PJ, Steinger KC, Kent CK, Klausner JD. Repeat chlamydia screening by mail, San Francisco. *Sex Transmitted Infections*. 2003; 79:28–30.
- Boyle, J.; Kilpatrick, D.; Acinerno, R.; Ruggiero, K.; Resnick, H.; Galea, S.; Koenan, K.; Galernter, J. Biological specimen collection in an RDD telephone survey: 2004 Florida Hurricanes Gene and Environment Study. In: Aday, LA.; Cynamon, M., editors. *Ninth Conference on Health Survey Research Methods*. National Center for Health Statistics; Hyattsville, MD: 2010. p. 176-184.
- Center for Disease Control and Prevention. National Health and Nutrition Survey. U.S. Department of Health and Human Services; 2010.
- Cohen, J. *Statistical power analysis for the behavioral sciences*. 2. Hillsdale, NJ: Erlbaum; 1988.
- Couper, MP. *Designing effective web surveys*. Cambridge University Press; New York: 2008.
- Cozier YC, Palmer JR, Rosenberg L. Comparison of methods for collection of DNA samples by mail in the black women's health study. *Annals of Epidemiology*. 2004; 14:117–122. [PubMed: 15018884]
- Crider KS, Reefhuis J, Woomert A, Honein MA. Racial and ethnic disparity in participation in DNA collection at the Atlanta site of the national birth defects prevention study. *American Journal of Epidemiology*. 2006; 164(8):805–812. [PubMed: 16877537]
- Egan KM, Newcomb PA, Titus-Ernstoff L, Trentham-Dietz A, Mignone LI, Farin F, Hunter DJ. Association of NAT2 and smoking in relation to breast cancer incidence in a population-based case-control study (United States). *Cancer Causes & Control*. 2003; 14(1):43–51. [PubMed: 12708724]
- Etter JF, Bullen C. Saliva cotinine levels in users of electronic cigarettes. *European Respiratory Journal*. 2011; 38(5):1219–1220. [PubMed: 22045788]
- Etter JF, Neidhart E, Bertrand S, Malafosse A, Bertrand D. Collecting saliva by mail for genetic and continue analyses in participants recruited through the internet. *European Journal of Epidemiology*. 2005; 20:833–838. [PubMed: 16283473]
- Etter JF, Perneger TV. Measurement of self reported active exposure to cigarette smoke. *Journal of Epidemiology & Community Health*. 2001; 55:674–680. [PubMed: 11511648]
- Feigelson HS, Rodriguez C, Roberston AS, Jacobs EJ, Calle EE, Reid YA, Thun MJ. Determinants of DNA yield and quality from buccal cell samples collected with mouthwash. *Cancer Epidemiology, Biomarkers & Prevention*. 2001; 10:1005–1008.
- Fidler JA, Stapleton JA, West R. Variation in saliva cotinine as a function of self-reported attempts to reduce cigarette consumption. *Psychopharmacology*. 2011; 217(4):587–593. [PubMed: 21556806]

- Freeman B, Powell J, Ball D, Hill L, Craig I, Plomin R. DNA by mail: An inexpensive and noninvasive method for collecting DNA samples from widely dispersed populations. *Behavior Genetics*. 1997; 27(3):251–257. [PubMed: 9210796]
- Greely HT. Collecting biomeasures in the Panel Study of Income Dynamics: Ethical and legal concerns. *Biodemography and Social Biology*. 2009; 55(2):270–288. [PubMed: 20183909]
- Groves, RM.; Couper, MP. *Nonresponse in household interview surveys*. John Wiley & Sons; New York: 1998.
- Groves RM, Singer E, Corning A. Leverage-saliency theory of survey participation: Description and an illustration. *Public Opinion Quarterly*. 2000; 64(3):299–308. [PubMed: 11114270]
- Halpern CT, Harris KM, Wagner B, Whitsel EA. Challenges of measuring diurnal cortisol concentrations in a large population-based field study. *Physiconeuroendocrinology*. 2012; 37(4): 499–508.
- Hansen TO, Simonsen MK, Neilsen FC. Collection of blood, saliva, and buccal cell samples in a pilot study on the Danish Nurse Cohort: Comparison of the response rate and quality of genomic DNA. *Cancer Epidemiol Biomarkers*. 2007; 16:2072–2076.
- Hauser, Robert M.; Weir, David R. Recent developments in longitudinal studies of aging in the united states. *Demography*. 2010; 47:S111–S130. [PubMed: 21302430]
- Harris, KM.; Halpern, CT.; Whitsel, E.; Hussey, J.; Tabor, J.; Entzel, P.; Udry, JR. *The National Longitudinal Study of Adolescent Health*. University of North Carolina; Chapel Hill: 2009.
- Haas S, Timmermans S. Towards a sociology of disease. *Sociology of Health & Illness*. 2008; 30(5): 659–676. [PubMed: 18564975]
- Hobcraft J. Reflections on the incorporation of biomeasures into longitudinal social surveys: An international perspective. *Biodemography and Social Biology*. 2009; 55(2):252–269. [PubMed: 20183908]
- Hofman LF. Human saliva as a diagnostic specimen. *The Journal of Nutrition*. 2001; 131(5):1621S–5S. [PubMed: 11340128]
- Hu P, Wagle N, Goldman N, Weinstein M, Seeman T. The associations between socioeconomic status, allostatic load and measures of health in older Taiwanese persons: Taiwan Social Environment and Biomarkers of Aging Study. *Journal of Biosocial Science*. 2006; 39:545–556. [PubMed: 17052381]
- ICF Macro. *Demographic and Health Surveys*. U.S. Agency for International Development; 2010.
- Kall D. Blood, sweat, and tears: Embedding biological sampling in social science research on children. *Biodemography and Social Biology*. 2008; 54(1):113–123. [PubMed: 19350764]
- Kang DR, Kim C, Hur NW, Shim JS, Shin SC, Suh I. Factors associated with participation in providing buccal cell DNA for a genetic epidemiologic study. *Public Health Genomics*. 2011; 14:127–134. [PubMed: 20926846]
- Kozlowski LT, Vogler GP, Vandenberg DJ, Strasser AA, O'Connor RJ, Yost BA. Using a telephone survey to acquire genetic and behavioral data related to cigarette smoking in “made-anonymous” and “registry” samples. *American Journal of Epidemiology*. 2002; 156(1):68–77. [PubMed: 12076890]
- Le Marchand L, Lum-Jones A, Saltzman B, Visaya V, Nomura AM, Kolonel LN. Feasibility of collecting buccal cell DNA by mail in a cohort study. *Cancer Epidemiol Biomarkers Prev*. 2001; 10:701–703. [PubMed: 11401922]
- Lindau, ST.; McDade, TW. *Biosocial surveys*. The National Academies Press; Washington, DC: 2007. Minimally invasive and innovative methods for biomeasure collection in population-based research.
- Margolis DJ, Papadopoulos M, Apter A, McLean IWH, Mitra N, Rebbeck T. Obtaining DNA in the mail from a national sample of children with a chronic non-fatal illness. *Journal of Investigative Dermatology*. 2011; 131(8):1765–1767. [PubMed: 21509047]
- National Research Council. *Biosocial surveys*. The National Academies Press; Washington, DC: 2007.
- Osmond DH, Catania J, Pollack L, Canchola J, Jaffe D, MacKellar D, Valleroy L. Obtaining HIV test results with a home collection test kit in a community telephone sample. *Journal of Acquired Immune Deficiency Syndromes*. 2000; 24:363–368. [PubMed: 11015153]

- Riboli E, Hunt KJ, Slimani N, Ferrari P, Norat T, Fahey M, Charrondiere UR, Hemon B, Casagrande C, Vignat, Overads K, Tjonneland A, Clavel-Chapelons F, Thiebauts A. European Prospective Investigation into Cancer and Nutrition (EPIC): Study populations and data collection. *Public Health Nutrition*. 2002; 5(6B):1113–1124. [PubMed: 12639222]
- Rylander-Rudqvist T, Hakansson N, Tybring G, Wolk A. Quality and quantity of saliva DNA obtained from the self-administered oragene method-a pilot study on the cohort of Swedish men. *Cancer Epidemiology, Biomarkers & Prevention*. 2006; 15:1742–1745.
- Sakshaug JW, Couper MP, Ofstedal MB. Characteristics of physical measurement consent in a population-based survey of older adults. *Medical Care*. 2010; 48(1):64–71. [PubMed: 20050351]

Highlights

- We investigate an innovative, event-triggered technique for collecting biosamples.
- Those who comply in biosample collection similar to those who do not comply.
- No evidence biosample collection has adverse consequences for panel participation.
- Prior cooperation in the study is important predictor of providing a biosample.

Table 1
Key Features of Studies with Biosamples Collected and Returned Via Mail by the Respondents

Authors, publication year	Location	Mode of biosample request	Biosample collected	Number of participants (response rate)	Study inclusion criteria
Avendano et al., 2011	Netherlands	Web	Blood, saliva	31, 30 (15.5, 15%)	Participants in Dutch Longitudinal Internet study for the Social Sciences
Bauer et al., 2004	USA	Mail	Saliva	110 (37%)	Participants in Community Intervention Trial for Smoking Cessation
Bloomfield et al., 2003	San Francisco	Mail	Urine	70 (22.4%)	Patients previously tested positive for chlamydia
Boyle et al., 2010	Florida	Telephone	Saliva	637 (41.3%)	Individuals from Florida counties directly affected by 2004 Hurricanes
Cozier et al., 2004	USA	Mail	Buccal cells	56–64 (35–40%)	Black women who had reported a diagnosis of breast, colorectal, or lung cancer
Crider et al., 2006	Atlanta	Telephone	Buccal cells	765 (47.6%)	Pregnant women
Egan et al., 2003	USA	Telephone	Mucosal DNA	791, 797 (60%, 50%)	Women aged 20–69 who were residents of Massachusetts or Wisconsin in 1997–1998
Eter and Bullen, 2011	Canada, France, Italy Switzerland, UK, USA	Web	Saliva	31 (16%)	Electronic nicotine delivery systems users
Eter and Perneger, 2001	Geneva	Mail	Saliva	98 (25%)	Current smokers and ex- smokers who had quit in the past two years
Eter et al., 2005	Switzerland	E-Mail	Buccal cells, saliva	315 (80%)	Visitors of a smoking cessation website
Feigelson et al., 2001	USA	Face-to-face	Buccal cells	24 (69%)	American Cancer Society National Home Office Research Department
Fidler et al., 2011	England	Mail	Saliva	1702 (24%)	Current smokers and recent quitters
Freeman et al., 1997	UK, Germany	Mail	Buccal cells	114, 116 (73%, 92%)	Participants in a twin study of children and a twin study of adults
Halpern et al., 2012	North Carolina, Ohio, Texas	Face-to-face	Saliva	146 (76%)	Sample of participants in the National Longitudinal Study of Adolescent Health
Hansen et al., 2007	Denmark	Mail	Buccal cells, saliva	38–72 (72–80%)	Female nurses aged 51+ and member of Danish Nurses Organization
Kang et al., 2011	Republic of Korea	Mail	Buccal cells	13084 (29.2%)	Sample of participants in the Korea Medical Insurance Corporation prospective cohort study
Kozlowski et al., 2002	USA	Mail, telephone	Buccal cells	870 (26%)	Aged 18+ recruited using random digit dialing methods
Le Merchand et al., 2001	Hawaii	Mail	Buccal cells	239 (67%)	Sample of participants in the Multiethnic Cohort Study
Margolis et al., 2011	USA	Mail	Buccal cells	732 (22.4%)	Children with atopic dermatitis from the Pediatric Eczema Elective Registry Program

Authors, publication year	Location	Mode of biosample request	Biosample collected	Number of participants (response rate)	Study inclusion criteria
Osmond et al., 2000	Chicago, LA, NYC, San Francisco	Telephone	Saliva	412 (67%)	Men who have sex with men
Rylander-Rudqvist et al., 2006	Sweden	Mail	Saliva	490 (80%)	Swedish men aged 53–87

Table 2

Differences in Provided a Sample by Key Study Measures and Sociodemographic and Study Participation Characteristics of Respondents (N=150)

	Total (N=150)	Did not provide a sample (N=53)	Provided a sample (N=97)	Chi-Sq (df)	P-value
Key Study Measures					
Lifetime number of sexual partners 2 or more	.79	.77	.79	.0836	.773
Ever had sex without birth control	.63	.66	.61	.3981	.528
Ever pregnant	.27	.23	.29	.6790	.410
Sociodemographic Characteristics					
African American	.36	.38	.35	.1072	.743
High school or less education	.59	.53	.63	1.437	.231
Enrolled in school	.75	.72	.76	.3818	.537
Married, engaged, or living with partner	.15	.13	.15	.1394	.709
Biological mother <20 years old at 1 st birth	.33	.36	.31	.3774	.539
Receiving public assistance	.28	.17	.34	4.936	.026
Study Participation Characteristics					
Below average proportion of journals completed	.39	.60	.27	16.29	.000
Express mail delivery	.57	.68	.51	4.230	.040

Note: Bold numbers indicate a statistically significant difference ($p < 0.05$) between proportions of sample women who did not and did provide a sample, two-sided tests.

Table 3

Multiple Regression Estimates of Effects of Requesting a Saliva Sample on the Log of the Number of Days to Completing the Next Journal (N=300)

Saliva Sample Participation (ref=comparison group)	
Sample provided	-.35 ** (.12)
Sample not provided	-.18 (.15)
Study Participation Characteristics	
Below average proportion of journals completed	.79 *** (.11)
R ²	.20

Notes: Standard errors in parentheses. Model includes controls for key study measures, sociodemographic characteristics, and sample replicate.

*
p < .05;

**
p < .01;

p < .001 (two-sided tests)