

# BUILDING A NEW FOUNDATION: TRANSITIONING TO ADDRESS BASED SAMPLING AFTER NEARLY 30 YEARS OF RDD

Michael W. Link<sup>1</sup>, Gail Daily<sup>1</sup> Charles D. Shuttles<sup>1</sup>  
Tracie L. Yancey<sup>1</sup>, H. Christine Bourquin<sup>1</sup>

<sup>1</sup>The Nielsen Company, 1145 Sanctuary Pkwy, Suite 100, Alpharetta, GA 30004

## Abstract

Address based sampling (ABS), the use of a comprehensive database of addresses for sampling of residential households, is garnering considerable attention as a potential alternative to random digit dialing (RDD) surveys. In November 2008, the Nielsen TV Ratings Diary moved from a landline telephone frame to an ABS frame, becoming the first major survey research effort to make this important transition. The move was designed to solve three critical problems: (1) increasing noncoverage bias due to the proliferation of cell phone only households, (2) number portability and the associated decline in geographic specificity of the sampled units, and (3) the precipitous decline in representation of key demographic groups, in particular younger adults. We assess the success of this transition by comparing the March 2009 ABS measurement to the February 2008 RDD design. The lessons learned from this pioneering effort will further the understanding the industry has for the potential uses of this new approach.

**Key Words:** Address Based Sampling, random digit dialing, multimode survey

## 1. Background

Address based sampling (ABS), which involves the random selection of addresses from a comprehensive database frame, has been the recent subject of intensive research as a potential alternative to the traditional random digit dialed (RDD) approach for conducting household surveys. The use of ABS as a sampling approach is meant to address three key problems with traditional, landline RDD approaches: (1) increasing noncoverage bias due to the proliferation of cell phone only households and the jump in unlisted landline numbers in zero listed telephone banks, (2) number portability and the associated decline in geographic specificity of the sampled units, and (3) the precipitous decline in representation of key demographic groups, in particular younger adults. Moreover, using addresses as the primary sampling unit opens a range of opportunities for researchers to use different mode of recruitment and interviewing of respondents.

In November 2008, The Nielsen Company became the first organization to move a major, on-going study from RDD to ABS. Nielsen television ratings represent the “currency” for valuing exchanges between television companies and advertisers, as stations use ratings as a means of “selling” audiences to advertisers. In 2008, nearly \$140 billion dollars changed hands within this system of exchange. Small changes in ratings, therefore, can not only potentially lead to cancellation of programs, but can represent millions of dollars gained or lost in the television industry. For many of the smaller and medium sized television markets, the ratings are based on completion of seven day diaries (eight day for those who indicate they have a digital video recorder or DVR).

Diary measurements take place four times a year in these markets, during what are referred to as “sweeps” months: February, May, July, and November. Since 1983, the Nielsen TV Rating Diary Measurement has sampled homes using traditional RDD methodology and recruited these homes using a combination of telephone and mail appeals. After conducting extensive background research and several large, scale pilot studies, the TV Diary measurement design was moved in November 2008 from an RDD approach to an ABS approach with recruitment combining telephone, mail, and Web appeals.

We assess the success of this transition by comparing the most recently completed ABS measurement, March 2009, to the February 2008 RDD design (note that the February 2009 measurement was delayed until March under the assumption that the “digital television transition” would be occurring in the earlier month). First we provide an overview of the ABS sampling and data collection processes and how these differ from the previous RDD approach. Second, we examine study outcomes (participation rates and representation of key groups) at various stages of the data collection process. Finally, we discuss the findings in the context of future potential enhancements to the ABS model. The lessons learned from this pioneering effort will further the understanding the industry has for the potential uses of this new approach.

## 2. Methodology

The March 2009 ABS and February 2008 RDD results are the basis of comparison here for several reasons. First, past experience has shown us that because television viewership and interest are seasonal (both in calendar and television cycle terms), it is often more valid to compare measurements that too place at the same time of year across years, rather than directly comparing two cycles within the same year. Next, we forego analysis of the November 2008 measurement, the first to use an entirely ABS design, as there were tactical changes in incentives to those who refused or were not reached during telephone recruitment which had a larger than anticipated impact on participation. In March 2009, these incentive levels were restored, therefore the March measurement is more reflective of how the ABS strategy is to perform moving forward.

### 2.1 RDD Approach to Sampling and Recruitment (February 2008)

The February 2008 Diary measurement was based on RDD sampling to target households in 197 different markets (each market is treated as a separate, independent study). A total of 3,329,629 telephone numbers were sampled to achieve complete targets and specified demographic indices. This included 1,199,926 regular or initial sample and 2,129,703 over sample numbers (additional telephone numbers screened upon calling to identify households in traditionally under-represented groups – households where the age of the householder is 18 to 34 years, black, or Hispanic). Following traditional RDD practices, the sample of telephone numbers excluded known cell phone exchanges and business numbers. Numbers in zero-listed blocks were also excluded.

In terms of the recruitment and diary-keeping process, sampled telephone numbers are matched to commercial directories to identify addresses, where locatable (47.8% of numbers sent to the phone center for calling). Those with an address are sent an advance letter before commencement of telephone calling. Sampled telephone numbers are called by trained CATI interviewers to “place” the diaries. Households that agree are asked basic demographic information and a series of questions to determine the number of diaries to send (one per working TV up to a maximum of 5) and the amount of incentive to be mailed with the diaries. The cash incentives were mailed with the diaries, not contingent on action by the household, and a differential amount is used across

different groups, with harder-to-reach demographics receiving a larger amount than other households. Diaries are mailed to all households that “accept” the invitation to participate as well as to refusals (excluding “irate refusals” and those that explicitly requested no further contact) and households where no telephone contact was made, but an address is available (these latter two groups receive only 1 diary). The diary mail packet contains a cover letter, frequently asked questions brochure, diary (-ies), and incentive. Households mailed a diary packet receive both telephone and mail reminders during the diary-keeping week. Diaries are returned as self-mailers with postage paid by Nielsen. Diaries are then checked for completeness and data entered for analysis. As a final status, households mailed a diary are given one of three final statuses: “good” - the diary was complete enough to be included for analysis, “no good” - the diary was returned either blank or missing significant information leading to its exclusion from analysis, or “no return,” when a household does not return at least one diary.

## 2.2 ABS Approach to Sampling and recruitment (March 2009)

For the March 2009 Diary measurement, ABS was utilized to identify households. The frame included nearly all address types: city style, PO Box, drop-point units (multiple units with a single street address), and vacant (retained because previous investigation showed that a large enough percentage of these homes did have residents living at the address, with many of these being younger households). Two types of residential households were excluded: (1) seasonal or “vacation” homes (excluded because nearly all individuals identified at these addresses have their primary address included in the sample frame already), and (2) “throw back units” (households that have both a PO box and a city style address, but have indicated that they only want their mail sent to their PO box -- which is already included). Known group quarters (prisons, barracks, and dormitories with a single mailing address) were also excluded. In areas still listed by the USPS as being rural routes (or “simplified addresses”), city-style addresses identified via commercial data bases were sampled to fill these gaps in the USPS frame. In total, 1,256,209 addresses were sampled: 701,195 regular sample and 555,014 over sample for the three hard-to-reach demographics. Individual, representative samples were drawn for each of the 189 markets included in the measurement. Two sample indicators were also added to each sample record to drive the use of differential recruitment approaches for key demographic groups: (1) Hispanic surname and (2) model-based indicators of age of head or house.

In terms of recruitment and data collection processes, sampled addresses are matched to telephone directory and other commercial listings to identify a telephone number for each address. Overall, 54.1% of the sampled addresses were matched to a telephone number. Based on the presence of a telephone number (referred to as “matched” cases) or absence of a number (called “unmatched” cases), recruitment follows one of two paths. For matched cases, the household is sent a prerecruitment letter (if sample indicators determine the householder is likely to be Hispanic or aged 18 to 34 years) or a postcard announcing that Nielsen will be calling in the future about a TV-related survey. Because an address sample is used, all of the matched households are sent this letter. In a similar manner to the RDD approach, recruitment of matched cases is conducted by telephone, using a slightly modified RDD recruitment script. From this point, the mailing and diary keeping processes for matched cases are identical to those used previously for RDD samples, with the exception that there are no longer cases which are not mailed to because no address is available. The mailing materials and incentive structure are identical to the February 2008 diary mailings. Reminder calls and mailings are conducted in similar manner as well. In essence, with the exception of how

the units were sampled, recruitment for the matched cases is nearly identical to that used previously with RDD cases which had both a telephone number and an address.

The new component in the process involves “unmatched” cases, that is, addresses with no identifiable landline telephone number. These cases include households with unlisted landline telephone numbers, those which are cell phone only, and households with no in-home telephone access. For these households, a “prerecruitment survey” is first conducted with the goal of (1) identifying a household telephone number (landline or cell phone), and (2) collecting information needed to drive the diary mailout, including number of diaries required and amount of incentive to be included. These addresses are sent an advance postcard, notifying the home of an impending mailing from Nielsen. Next is a prerecruitment package, which contains a cover letter, survey form, and modest cash incentive. The households are notified that the survey can be completed online (a unique username and password are provided for each sampled address), by returning the paper questionnaire by mail in a postage paid envelop, or by calling into a toll-free number to complete the survey with a trained interviewer. (For more details on this process and the outcomes, see Shuttles, Link et al 2009).

The next step in the recruitment process for unmatched homes is determined by the outcome of the prerecruitment survey. One of four basic outcomes is possible: (1) survey is returned with a valid telephone number, (2) survey is returned but without a valid telephone number, (3) the survey is not returned, or (4) a post office return (POR) is received, indicating that the unit is vacant, the address does not exist as labeled, or some other issue was at play making the mailing undeliverable. No additional action is taken on PORs, which are considered “out of sample” and not included in final response rate calculations. Based on several pilot tests, it was determined that households that did not return a prerecruitment questionnaire were very unlikely to participate in and return a completed diary (less than 2% did so in one test), therefore no subsequent recruitment action is taken on these addresses and they are classified as being “final refusals” for the purposes of response rate calculations (citation). The recruitment process continues for all households that return the prerecruitment survey.

Unmatched households that return a telephone number are contacted by CATI interviewers for diary placement. The call is similar to that received by matched household, except that if information has already been obtained through the prerecruitment survey, that information is simply verified, not re-asked of the responding homes. Once the placement call is made, these homes are handled in identical manner to the matched homes. Finally, matched households that return a prerecruitment survey but do not provide a telephone number are sent diaries and incentives in accordance with their responses to the prerecruitment survey. If key portions of that survey are left blank, the default is to send the household one diary. Unmatched households with a telephone number receive a telephone reminder call during diary week and all cases receive a mail reminder. Returned diaries are processed per usual.

### **3. Results**

#### **3.1 Frame Efficiency**

The address-based frame is considerably more efficient than the landline telephone frame in several respects. First, the amount of sample required was per “intab” home (that is, homes that returned at least one or more “good” diaries that were considered intabulation for analysis), was significantly lower for the ABS approach (10 addresses per intab) compared to the RDD approach (24.0 numbers per intab). While there were significant reductions in the number of addresses needed to obtain a similar number of intab diaries, the greatest reduction was with the amount of oversample

required to ensure to reach the targeted number of intabs among householders less than 35 years old, blacks, and Hispanics. As a percentage of the total sample, the ABS oversample was 44.2% of the total, whereas the RDD oversample was nearly two-thirds (64.0%) of that total sample.

### 3.2 Diary Return Outcomes

In total 145,667 diaries were returned for the March 2009 measurement and 161,928 were returned for the February 2008 period. Of these 85.8% of the 2009 and 85.6% of the 2008 diaries were considered to be “complete” and included in analysis; the remainder were deemed incomplete (or “no good”) and excluded from the analysis database. Overall, therefore, the quality of the diaries in terms of completeness was identical across the two measurements.

Looking at the ABS completed diaries a bit more closely, 71.5% came from the “matched” sample (those with an address and telephone number), while 28.5% were from “unmatched” sample (those with an address only). This compares to a starting sample distribution of 54.1% matched and 45.9% unmatched records. In terms of base or “regular” sample versus targeted over sample, 88.1% of completed diaries came from the base sample and 11.9% from the targeted over sample (focused on head of householder characteristics: less than 35 years old, black, of Hispanic).

### 3.3 Response Rates and Sample Coverage

Using a calculation which closely mirrors the AAPOR response rate calculation #4 (AAPOR 2008), Table 3 provides response rates for both survey periods. The response rate was much lower for the ABS measurement (17.4%) as compared to the RDD measurement (28.1%). This is not surprising as the types of households included in the ABS frame (particularly the cell phone only households) have been shown to have lower overall response rates than do the typical landline household (Link et al 2008). Moreover, the bases upon which these two response rates are calculated are very dissimilar, reflecting frames with radically different levels of coverage. As noted elsewhere (Hoynoski, Link and Frankel 2009; Ezzati-Rice et al 2000), an accurate interpretation of response rates requires one to look at these rates within the context of frame coverage. Frame coverage for the ABS frame in March 2009 is estimated to be approximately 98% compared to landline RDD in February 2008 at 70% (with 30% undercoverage broken out as 18% cell phone only, 10% unlisted homes in zero listed banks, and 2% homes with no telephone service). In essence, the RDD response rate reflects a 28.1% response rate among the 70% of the total homes covered by the frame. In contrast, the 17.4% response rate for ABS denotes the level of participation among nearly the entire target group.

### 3.4 Characteristics of Householder – Summary Overview

Next, we compare across the demographic characteristics of householders across the two measurements. Table 2 provides comparisons both for regular sample and for the total combined sample (which included regular and over sample completes). As a standard, the “universe estimate” (or population parameter) is provided for each characteristic. The universe estimates presented are averaged across the two measurements (although there was little change across the two time periods).

The most dramatic change between the RDD and ABS measurement approach is, of course, the inclusion of cell phone only homes in the latter measurement and total exclusion in the former. As shown on Table 2, within the regular sample the penetration of cell phone only homes across the 189 markets was 8.7%. For the total sample (which includes both regular and targeted over sample), the penetration moved upwards to 10.5%. Both are well below the national estimate of (20.2%) for cell phone only homes

(note that market level cell phone only universe estimates are not available for a more accurate comparison).

In terms of age distribution for younger households within the regular sample, marked improvement is noted between the RDD sample in 2008 (8.8%) and the ABS sample in (13.6%) – moving closer to universe estimate of 21.6%. This is the highest penetration level for this demographic in the past 5 years, with the previous four years showing a steady erosion in penetration. These gains in proportion came primarily from the reduction in the percentage of those aged 55 or older, a group that was over represented in both measurements. Improvement was also seen in the total sample, when we consider homes from both the regular and targeted over sample. In 2008 the penetration was 16.9% for those homes where the householder was under the age of 35, moving up to 19.1% with the ABS approach in 2009.

The changes in penetration were less dramatic for households with a black or Hispanic householder. Among black households, the penetration increased from 13.5% to 14.7% among regular sample homes, and remained unchanged in the total sample. For Hispanic homes, there was a 1 percentage point increase from 2008 to 2009 (16.7% to 17.7%) in the regular sample, and a more modest change in the total sample (22.2% versus 22.6%). With the inclusion of the oversample component, both measurements actually over represented Hispanics somewhat compared to the universe estimate.

### 3.5 Market Level Changes in Householder Characteristics

Delving into the details of changes at a market level, we examined how the change in penetration of key demographics changed across the two study designs as a function of the relative size of the target demographics within those markets. In other words, we might expect to see less dramatic change in our survey penetrations for these demographics in markets where the universe estimates show a lower overall penetration for that characteristic and conversely potentially larger levels of change in markets where the universe estimate shows higher penetration. As shown on Table 3, the 189 common markets across the two measurements were grouped based on the percentage of householders who are under the age of 35 in the particular market. All comparisons are made with total sample households. Improvements were seen across all three penetration breaks. In markets where the penetration of younger householders is below 20%, there was a 2.1 percentage point improvement in the age penetration moving from RDD to ABS; where the universe estimate is 20% to just under 25%, the increase was 2.2 percentage points; and, for markets with a larger percentage of younger householders, the increase was 3.5 percentage points.

Improvement in penetration among racial/ethnic groups is assessed only in markets where the penetration of blacks and/or Hispanics is 10% or higher. There were 68 black and 38 Hispanic target markets in common across the two measurement periods. Among black households, where there is greater variation in penetration across markets, a somewhat similar pattern is seen, as there was less improvement (and in some cases modest losses) in penetration in markets where the penetration of black householders is lower. Conversely, more improvement in the measurement penetrations was seen in markets which have higher percentages of black householders. For Hispanic households, with the exception of markets where the penetration of Hispanics is between 30 and 40 percent, there was very little change in penetration between 2008 and 2009.

### 3.6 Universe Estimate Index Changes for Key Householder Characteristics.

An additional way of assessing the impact of the moving from RDD to ABS is to examine how well markets performed vis-à-vis the universe estimate for these demographics in each market. A commonly used index is calculated by dividing the

survey penetration for a characteristic by the universe estimate for that same characteristic within a market. If the survey estimate is the same as the universe estimate, the index is 1.0. Values below 1.0 indicate that the survey statistic is lower than the universe estimate (that is, the demographic characteristic is proportionally under-represented); the converse is true of the survey estimate is higher. From a business perspective, Nielsen attempts to obtain an index rating of at least 0.80 in all markets for householders age less than 35 years, and an index of 0.90 for black and Hispanic householders living in markets where those characteristics have 10% penetration or higher.

The impact of the ABS approach can be seen most dramatically with regards to the age index distribution. In 2008 with the RDD approach, more than half (55.6%) of the markets had an index below 0.80, indicating significant under-representation (in unweighted data) of these younger households. With the ABS approach, however, the percentage with an index below 0.80 dropped to 20.1%. At the other end of the index, in 2008 only 3.7% of markets were at or above the universe estimate for this characteristic, while in 2009 that percentage increased to 16.4% of markets.

For black householders the distribution actually declined somewhat between the two measurement periods. In 2008, 11.8% of markets were below the 0.90 index target, a percentage that increased to 23.5% in 2009. Similar slippage was seen at the top end of the index, with 47.1% of markets being at or above the universe estimate for black householders in 2008, compared to 38.2% in 2009.

Among the 38 markets with high Hispanic penetration, there were improvements at the low end of the index, as the percentage of markets below the 0.90 index decreased from 15.8% to 2.6% across the two measurements. On the high end, the percentage of markets indexing at or above the universe estimate declined from 65.8% to 44.7%.

#### **4. Discussion and Future Enhancements**

At a broad level, the move from an RDD-based system to an ABS-design was conducted to address four critical goals within a fixed-cost environment (that is, without significantly increasing costs): (1) solve the growing coverage problem experienced with use of the landline telephone frame for sampling; (2) improve representation among key under-represented demographic groups, primarily householders age 34 or younger; (3) reduce the reliance on inefficient oversampling approaches to meet key demographic targets, and (4) improve the levels of participation overall.

Comparing the March 2009 ABS-based measurement with the February 2008 RDD approach, we see that several of these goals were achieved -- some in whole, some in part. First, from a cost perspective, the total amount spent to conduct the two measurements was nearly identical (within 3%), satisfying the condition of maintaining a relatively fixed per measurement cost. Second, by moving in full from the landline telephone frame to the address based frame, the issue of frame coverage was solved. While there may be some disagreement among researchers about the exact levels of coverage, Nielsen's internal studies as well as those from the sample frame provider estimate the coverage of residential households using the landline RDD frame (excluding zero listed banks) at approximately 70% in February 2008 and the coverage of the augmented address based frame (including PO Boxes) at approximately 98% in March 2009. The change in design, therefore, successfully addressed the coverage problem created by the proliferation of cell phone only homes and other related issues.

In terms of improvement in the distribution of key demographic characteristics, there was clear improvement in some areas and little change or slight backsliding in others. For the first time ever cell phone only households are included in the Diary

measurement with the use of the ABS approach. As shown in other research (Link 2007), this group does tend to have different television tuning and viewing habits. As such, weighting alone is an ineffective means of correcting for the undercoverage of these homes. Including these homes not only makes the resulting sample more representative, but it facilitates more effective weighting (even with standard demographic weighting that does not specifically use cell phone status as a control variable). That said, the penetration in the total sample was just about half of what we might have expected given national estimates of cell phone only penetration. Increasing response among this group is a clear area where the ABS methodology can be improved in future measurements.

With regards to age of householder, the change in design has certainly moved the needle in the correct direction if falling short of providing a complete solution for this issue. The regular sample for March 2009 saw the highest penetration of householders aged 18 to 34 in the past five years. The jump from 8.8% to 13.6% (a 55 percent increase) reversed what had been a steady declining trend. This improvement was seen across a large majority of markets, with larger gains in those areas with the highest penetration of this demographic group. While moving in the right direction there is still a ways to go in terms of improving the distribution across age groups so that they more accurately reflect the universe estimates in each market.

Among markets with higher penetrations of Hispanic and black householders, the level of change was less dramatic. The penetration of Hispanics was largely unchanged in most markets, although there was some encouraging improvement among markets that under the RDD approach failed to achieve a penetration of 90% of the universe estimate or higher. Among black householders while there was improvement in penetration among markets with the highest penetrations of black householders, there was some slippage among markets in the relation of the survey estimate to the universe estimate. This situation could be improved in the future through the development of geo-based indicators added to the sample frame to identify at the outset areas with high penetrations of blacks. This indicator could be used to send more customized materials (cover letters, brochures, inserts, etc), special contacting or calling procedures, and/or higher levels of incentives to these households in an attempt to improve participation.

The ABS approach also moved the diary measurement closer to the ultimate goal of eliminating the need for an oversample (that is, development of an approach in which target proportions of diaries for hard-to-reach groups can be obtained through the regular or base sample only. As a proportion of the total sample required, the oversample was reduced from approximately two-thirds of the total sample records to just over 44%. This reduction has significantly reduced the amount of labor required in the Nielsen call centers to screen sample to identify households in the over sample that met the eligibility requirements. Additional refinement in recruitment methods is required if the remainder of the oversample is to be eliminated.

One area where improvement was not seen was in the overall level of response to the diary survey. Several issues are worth noting here. First, the use of an address-based frame in and of itself should not be expected to improve response rates. Sampling from such a frame is meant primarily to address coverage issues related to the use of the telephone frame. In fact, the inclusion of cell phone only households and unlisted homes with known lower levels of participation would naturally drive the level of response down for an ABS study. It is the data collection design and processes which are built upon the ABS infrastructure that are the basis of any improvement in response. Additionally, the decline in response needs to be evaluated within the context of the expansion to near universal coverage. Numerous studies over the past decade have shown that response rate is actually a poor proxy for nonresponse bias and, therefore, not perhaps the best indicator of data quality. Instead researchers should focus on the other



contributing factor to bias, which is the degree of difference between those who are surveyed and those who are not on variables of interest. By broadening coverage and including homes which have, with landline RDD designs, been here-to-date systematically excluded, we believe the ABS approach has reduced the risk of bias in the diary measurement estimates and thereby increased the overall quality of the data. This is, of course, an observation which can and needs to be shown empirically. Continued analysis and research in these areas is underway.

While several key goals were accomplished and several other saw great progress, the transition from RDD to ABS does underscore several areas where continued improvement is necessary. In an attempt to address some of the issues noted above, testing is currently underway in three key areas to attempt to improve response, refine sampling procedures, and optimize the design: use of contingent incentives, direct mail to all unmatched households, and sample indicator development. First, to make more effective use of the incentive pool used for the diary measurement, experiments are underway with the May Diary measurement to determine if use of larger contingent incentives, that is, incentives paid for performance (i.e., return of diaries) can improve response. Because the current incentive structure is based on sending cash with the diary mailings, a considerable sum is sent to home that never opens and discards the package and those which open the package, but do not respond. Use of larger contingent incentives may be a way of “rewarding” those who complete the diary task, while also improving participation and potentially lowering costs.

The second improvement focused on more effective means of obtaining response from unmatched households, that is, those homes which are now sent a prerecruitment survey to obtain additional contact information. The decline in participation between the prerecruitment survey and the final diary return rate suggests that it might be more effective to not use the prerecruitment approach and, instead, focus on a direct mail approach. The working hypothesis is that those among this group who will participate will likely only do so once and it is better to request they participate in the primary task (keeping diaries) rather than spend valuable time, resources and good will on an interim step (completing the prerecruitment survey). To this end, a direct mail approach is being tested in conjunction with the May 2009 Diary measurement. The test involves the use of an “enhanced diary packet,” sending sampled addresses a package that contains an overview brochure, set number of diaries, and modest incentive. Households are also promised a larger contingent incentive upon completion of the diaries. The approach eliminates the prerecruitment stage, thereby hopefully reducing respondent burden and increasing the household’s willingness to participate. It also has the added advantages of allowing the sample to be drawn closer to the time of measurement and reducing costs.

Finally, research is being conducted on the development of new sample indicators and the refinement of some current indicators. Another important benefit is the rich amount of information that can be matched to an address, facilitating more complex sample designs and providing information for enhanced contacting and recruiting approaches. A majority of addresses can be matched to a landline telephone number via commercial databases, thereby facilitating multiple modes of contact. Survey sample vendors can typically provide case-level variables such as household name, Spanish surname indicator, estimated age of head of household, as well as geocoding and attachment of Census tract information such as the percentage racial/ethnic groups within a particular geography, median household income of the area, and in some cases even email addresses. These variables can be used in a number of ways to enhance the survey design, such as through sample stratification on key variables, advance mailings to households, and tailoring of materials, contact scripts, or incentives based on household characteristics such as likely age, race, or ethnicity of the head of household.

In the end, the decision to move a study from a traditional landline RDD approach to some form of address-based design comes down to how well the potential ABS approach fits the requirements of the research at hand, in terms of cost, quality, and timeliness. What may work well for one research endeavor may not match the needs of another. We believe that ABS is the sampling base upon which such a set of methodologies can be built, providing a stable sampling base, a rich source of characteristic and geographic data for facilitating sophisticated designs, and an opportunity to utilize multiple modes for contacting and conducting surveys with households. ABS facilitates a number of potential survey designs, including single mode mail surveys to all sampled addresses; or a mail invitation to complete a mail or web survey; or, a dual mode design with mail surveys to all households (or just those with no matched telephone number) and telephone follow-up (or first contact) for those with an identifiable telephone numbers; or a more complex mix of mail, Web, interactive voice response (IVR), and outbound or inbound telephone. This gives researchers greater flexibility to match survey mode with the goals and target population for their study. The approach is still relatively new, but as the conversion of the Nielsen Diary measurement has shown here, it offers researchers a viable option for moving forward in this era of methodological uncertainty.

### References

- American Association for Public Opinion Research (AAPOR). 2008. Standard definitions: final dispositions of case codes and outcome rates for surveys. 5th ed. Lenexa, KS: AAPOR.
- Battaglia, M., Link, M., Frankel, M., Osborn, L. & Mokdad, A. (2008) “An Evaluation of Respondent Selection Methods for Household Mail Surveys.” *Public Opinion Quarterly* (in press).
- Blumberg, S.J., & Luke, J.V. (2008). “Wireless-mostly households: Estimates from the 2007 National Health Interview Survey.” Paper presented at the 63<sup>rd</sup> Annual Conference of the American Association for Public Opinion Research, New Orleans, LA.
- Link, M., G. Daily, C. Shuttles, H. C. Bourquin, & L. T. Yancey (2009). “Addressing the Cell Phone-Only Problem: Cell Phone Sampling Versus Address Based Sampling.” *Survey Practice* (Feb 2009). E-journal article available at: <http://surveypractice.org/2009/02/25/abs-samplin/#more-731>.
- Link, M.W., Battaglia, M.P., Frankel, M.R., Osborn, L., & Mokdad., A.H. (2008). Comparison of address based sampling (ABS) versus random-digit dialing (RDD) for general population surveys. *Public Opinion Quarterly*,
- Link, M.W., Battaglia, M.P., Frankel, M.R., Osborn, L., & Mokdad., A.H. (2006). Address-based versus random-digit dialed surveys: Comparison of key health and risk indicators. *American Journal of Epidemiology*, 164: 1019-1025.
- United States Postal Service. (2009). Delivery Sequence File – Second Generation. Available online at: <http://www.usps.com/ncsc/addressmgmt/dsf2.htm> (accessed May 5, 2009).

**Table 1. Key demographic characteristics of completed diaries (February 2008/March 2009)**

Characteristics of Householder	Regular sample only		Total sample (regular & over sample)		Population parameter / universe estimate
	Feb 08 (RDD)	Mar 09 (ABS)	Feb 08 (RDD)	Mar 09 (ABS)	
Age (years)					
< 35	8.8	13.6	16.9	19.1	21.6
35 – 54	35.1	33.1	33.3	32.0	39.3
55+	56.1	43.2	49.8	48.9	39.1
Black*	13.5	14.7	18.5	18.5	17.7
Hispanic*	16.7	17.7	22.2	22.6	19.4
Cell phone only	0.0	8.7	0.0	10.5	20.2**

\* Note: Comparisons limited to oversample treatment markets

\*\* Based on national estimates; universe estimates at market level not available

**Table 2. Change in Penetration of Key Age of Householder Demographics (February 2008 / March 2009)**

Head of household characteristics	Universe estimate range (%)	Universe estimate Average <sup>1</sup> (%)	Feb 08 (RDD) penetration (%)	Mar 09 (ABS) penetration (%)	Change in penetration (%)	Number of markets (n)
Age < 35 years	< 20.0	18.2	14.8	16.9	+2.1	(53)
	20.0-24.9	22.1	17.3	19.5	+2.2	(122)
	25.0+	27.9	22.2	24.7	+3.5	(14)
	Total	21.4	16.9	19.2	+2.3	(189)
Black	<10.0	7.3	7.8	7.2	-0.6	(8)
	10.0-19.9	13.6	13.7	14.0	+0.3	(26)
	20.0-29.9	25.3	25.5	23.3	-2.2	(21)
	30.0-39.9	35.0	33.6	34.8	+1.3	(10)
	40.0+	47.7	44.0	46.5	+2.4	(3)
	Total	21.1	20.9	20.6	-0.3	(68)
Hispanic	<10.0	6.4	6.7	7.5	+0.8	(8)
	10.0-19.9	14.1	15.2	14.8	-0.4	(9)
	20.0-29.9	24.7	25.2	23.7	-1.5	(9)
	30.0-39.9	36.6	35.8	39.4	+3.6	(5)
	40.0+	63.0	60.1	60.5	+0.4	(7)
	Total	26.9	26.8	27.0	+0.3	(38)

<sup>1</sup> Average of February 2008 and March 2009 universe estimates for markets included in row.

**Table 3. Survey Penetration / Universe Estimate Index: Distribution of Markets (February 2008 / March 2009)**

Head of household characteristics	Index	Percentage of Markets	
		Feb 08 (RDD) %	Mar 09 (ABS) %
Age < 35 years	105.0+	1.6	10.6
	100.0-104.9	2.1	5.8
	95.0-99.9	2.1	13.8
	90.0-94.9	5.8	16.4
	80.0-89.9	32.8	33.3
	<80.0	55.6	20.1
	(n)	(189)	(189)
Black	105.0+	32.4	25.0
	100.0-104.9	14.7	13.2
	95.0-99.9	20.6	25.0
	90.0-94.9	20.6	13.2
	<90.0	11.8	23.5
	(n)	(68)	(68)
	Hispanic	105.0+	47.4
100.0-104.9		18.4	10.5
95.0-99.9		10.5	28.5
90.0-94.9		7.9	23.7
<90.0		15.8	2.6
(n)		(38)	(38)