Incidence and Impact of Controlled Access Situations on Nonresponse

David Cunningham - RTI International*
Laura Flicker - RTI International
Joe Murphy - RTI International
Jeremy Aldworth - RTI International
Susan Myers - RTI International
Joel Kennet - Substance Abuse and Mental Health Services Administration (SAMHSA)

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Abstract

The term “controlled access” applies to any situation where an obstacle keeps an interviewer from reaching the door of a potential respondent (Murphy et al., 2003). Failure to collect data from controlled access dwelling units may introduce bias through systematic under-representation of certain sub-groups. For example, high-income and urban households are more commonly found in controlled access situations than other sub-groups in the United States population (Blakley and Snyder, 1999).

In recent years, the National Survey on Drug Use and Health (NSDUH), a federally sponsored annual survey that gathers data on substance use and abuse among the non-institutionalized household population of the United States, has seen an increase in the amount of nonresponse attributed to controlled access. Through this experience, NSDUH researchers have developed protocols for overcoming barriers to data collection. However, until 2004 the project had not collected the data necessary to analyze controlled access at the dwelling unit level nor the effect of controlled access on unit or item nonresponse. The NSDUH now systematically captures housing characteristics, controlled access status, and the outcome of all controlled access situations for all housing units in the annual NSDUH sample.

This paper summarizes the incidence of controlled access by dwelling unit type and state for all 169,535 dwelling units, and introduces a model that predicts the effects of controlled access barriers on unit nonresponse and quality of data collected. As predicted, housing units with some form of controlled access were less likely to be successfully screened or interviewed. In addition to discussing these findings, we present
ideas for further investigation of the role that controlled access barriers have on nonresponse error and data quality.

**Introduction**

The National Survey on Drug Use and Health (NSDUH) is a federally sponsored annual survey that gathers data on alcohol and substance use and mental health among the non-institutionalized household population of the United States. This study involves screening approximately 170,000 sampled dwelling units (SDUs) and interviewing approximately 67,500 respondents annually. RTI utilizes many methods to encourage respondent participation, including advance mailings, standardized informational materials, refusal and unable to contact letters, certificates of participation for youth respondents and a $30 interview incentive. These methods consistently lead to reasonably high screening and interview response rates. However, the NSDUH has seen an increase in recent years in nonresponse that interviewers attribute to controlled access. We define controlled access as any situation where an obstacle keeps an interviewer from reaching the door of a potential respondent. Failure to reach controlled access dwelling units could introduce bias through systematic under-representation of certain sub-groups. For example, high-income and urban households are more commonly found in controlled access situations than other sub-groups in the United States population (Blakley and Snyder, 1999). If those households have different rates of alcohol, substance use, or depression, those estimates may be affected.

To further investigate this topic, NSDUH field interviewers (FIs) began systematically capturing housing characteristics and controlled access type for every sampled dwelling unit (SDU) included in the survey during the first visit, beginning with
the 2004 survey. The FI records the first applicable housing characteristic from the frame listed below in a handheld computer:

- Military Base
- Other Apartment/Condo, 2–9 units
- Other Apartment/Condo, 10–49 units
- Other Apartment/Condo, 50+ units
- Other Group Quarters Unit (GQU)
- Other House/Single Unit
- Native American Tribal Lands
- Senior Housing/Assisted Living
- Student Housing

Interviewers also record the controlled access type in the handheld computer to describe anything that might prevent someone from getting to the doorstep of an SDU, regardless of whether the feature actually prevented access. The controlled access types available to field interviewers are as follows:

- None
- Guard/Doorman
- Intercom/Buzzer No Labels
- Intercom/Buzzer w/Labels
- Physical Barrier, Various
- Other Access Issue

With these data available for the first time, we are able to analyze prevalence and correlates of controlled access type and predict field outcomes. This paper provides such an analysis on data collected for the 2004 NSDUH survey.
Methods

We cross tabulated controlled access and housing characteristic data to describe our 2004 sample. We developed regression models to predict unit-level and item-level nonresponse, with the expectation that controlled access and housing units other than single family homes contribute to nonresponse. We developed a linear regression model to predict the following outcomes: screening completed, interview completed, and a logistic model to predict item nonresponse. We hypothesized that controlled access would predict unit-level and item-level nonresponse.

Results

Figure 1 shows the prevalence of controlled access barriers in each of the 50 states and the District of Columbia as recorded for 169,535 SDUs in 2004. Controlled access types varied by state and were more common in the eight states with large samples1 than in the small sample states. SDUs in Washington, D.C. had the highest level of controlled access (61.1 percent) and Mississippi had the lowest level (2.4 percent). At the state level, there was an inverse relationship between the percentage of SDUs with controlled access and SRR. This suggests, although it does not prove, that higher levels of controlled access may cause lower response rates.

Figure 2 shows the proportions of all sampled dwelling units that had some controlled access feature. The majority of SDUs were single housing units (71.7 percent). Next most common were SDUs in apartment/condo buildings of various sizes; they constituted 25.5 percent of the sample. Controlled access features were present in 17.2 percent of all SDUs. The most common feature was an intercom/buzzer system,

1 Large sample states were the 8 U.S. states with the largest populations (CA, FL, IL, MI, NY, OH, PA, and TX), and were sampled at four times the rate of small states in order to allow small area estimation.
encountered in 6.8 percent of SDUs. The next most common controlled access features were physical barriers, such as gates or locked building doors (5.9 percent), and guards or doorpersons (3.7 percent). When present, the specific type of feature present was correlated with the housing characteristic:

- Intercoms were most common with apartments/condos
- Guards were most common with group quarters units
- Physical barriers were most common with units on military bases

Figure 3 shows unweighted screening response rates by controlled access feature. In 2004, NSDUH's unweighted overall screening response rate (SRR) was 91.3 percent.\(^2\) That year we interviewed 67,760 respondents aged 12 and older. SRR varied according to housing type. Household screening response rates were highest when there was no controlled access feature and lowest when there was a guard, intercom, or “Other” access feature. A relatively high SRR was attained for single housing units—92.5 percent. The size of apartment/condo buildings was inversely related to SRR. SDUs in buildings with 50 or more units had the lowest SRR—84.5 percent. SRR was even more varied by controlled access type. It was highest for SDUs with no controlled access—92.7 percent. It was lowest when a guard or doorperson was present (79.4 percent) or when “other access” features were present (78.3 percent).\(^3\)

Figure 4 shows unweighted interview response rates by controlled access feature. The overall unweighted interview response rate (IRR) was 82.7 percent.\(^4\) Their unweighted IRRs ranged from 82.2 percent to 83.3 percent. Less common types of

\(^2\) The weighted SRR was 90.9%. We report unweighted response rates because they directly reflect the experience of field staff.

\(^3\) Other access issues included, among other things, vacant lots. The latter will be represented by a distinct code under “housing characteristic” instead of access feature in the 2005 codes.

\(^4\) Weighted IRR was 77.4%.
housing (other GQU, student housing, military, and Native American tribal lands) had much higher IRRs—between 90.1 percent and 94.4 percent, but combined, they reflect less than 3 percent of the entire sample.

Other summary findings of interest from cross tabulations include the following:

- Language barriers were most frequently encountered in apartment/condo buildings
- Physical barriers were more often associated with screening refusals than interview refusals
- Guards or doorpersons and physical barriers were more common in medium-to-high income areas than low-income areas;
- Large MSAs had fewer single housing units, and more multiple unit buildings—especially apartment/condo buildings with 50 or more units; and
- The prevalence of controlled access is significantly higher in the Northeast region than in the other three regions (23.4 percent vs. 15.2 percent, p-value < 0.0001). It is also significantly higher in the large sample states vs. small sample states (23.1 percent vs. 12.5 percent, p-value < 0.0001).

Next, we modeled unweighted 2004 NSDUH data to assess the impact of controlled access and housing type on unit-level and item-level nonresponse. For unit-level nonresponse, we ran logistic models for two separate dependent variables: screening and interviewing outcomes. The reference group was successful screening or interviewing. For item-level nonresponse, we ran linear models for two separate dependent variables counting the number of blank/refused questions in the CAPI and ACASI sections of the interview. Cases were coded as having controlled access in the presence of a guard/doorperson, intercom, physical barrier, or some other access issue. They were also coded as single housing unit or some other kind of housing unit.
Table 1 shows that single housing units were 61 percent more likely to be screened than other types of housing. SDUs with controlled access were 33 percent less likely to screen than units with no such features.

Table 1. Predicting Screening Response from Housing Features¹

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>Chi-square</th>
<th>P-value</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1.097</td>
<td>0.014</td>
<td>6538.6</td>
<td>.0001</td>
<td>--</td>
</tr>
<tr>
<td>Controlled access</td>
<td>-0.040</td>
<td>0.010</td>
<td>428.2</td>
<td>.0001</td>
<td>0.67</td>
</tr>
<tr>
<td>Single housing unit</td>
<td>0.48</td>
<td>0.016</td>
<td>952.2</td>
<td>.0001</td>
<td>1.61</td>
</tr>
<tr>
<td>Controlled access*single housing unit</td>
<td>-0.15</td>
<td>0.033</td>
<td>21.70</td>
<td>.0001</td>
<td>0.86</td>
</tr>
</tbody>
</table>

¹ Interview response was coded 1, non-interview coded 0.

Next, we performed logistic regression to predict interview response. Table 2 suggests that controlled access in an SDU reduces the odds of interview by 29 percent, whereas the type of housing unit has no effect on interviewing.

Table 2. Predicting Interview Response from Housing Features¹

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>Chi-square</th>
<th>P-value</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.58</td>
<td>0.012</td>
<td>2268.0</td>
<td>.0001</td>
<td>--</td>
</tr>
<tr>
<td>Controlled access</td>
<td>-0.34</td>
<td>0.019</td>
<td>321.9</td>
<td>.0001</td>
<td>0.71</td>
</tr>
<tr>
<td>Single housing unit²</td>
<td>0.020</td>
<td>0.014</td>
<td>2.2</td>
<td>.1362</td>
<td>1.02</td>
</tr>
<tr>
<td>Controlled access*single housing unit</td>
<td>0.12</td>
<td>0.031</td>
<td>16.1</td>
<td>.0001</td>
<td>1.13</td>
</tr>
</tbody>
</table>

¹ Interview response was coded 1, non-interview coded 0.

Finally, we employed linear regression models to determine whether respondents in SDUs with controlled access were more likely to introduce data quality problems in the form of item nonresponse. For this we created separate variables to count the number of missing responses (either refused or "don't know") recorded in the audio computer.
assisted self interviewing (ACASI) and the computer assisted personal interview (CAPI) sections of the instrument.

The ACASI section collects data about alcohol, tobacco, and substance use, as well as mental health symptoms, substance and mental health treatment, and other topics. On average, respondents are administered 217 ACASI questions. In the CAPI section, the interviewer collects demographic information, such as respondent's educational attainment, employment status, health care insurance, income sources, participation in state or federal assistance programs, and household income. On average, respondents are administered 98 CAPI questions.

The mean number of missing items in the private, ACASI section was 3.50, with a standard deviation of 3.63. About 44 percent of respondents produced missing data for one or more ACASI questions, excluding logical skips. The corresponding mean for missing data in the interviewer-administered CAPI section was slightly higher -- 3.59, with a standard deviation of 8.06. About 74 percent of respondents had missing data for one or more CAPI questions.

Modeling the number of missing items on controlled access and housing type produced interesting results. Table 3 suggests that interviewing a single housing unit decreases nonresponse in the self-administered (ACASI) section. Table 4 suggests that controlled access is associated with higher rates of item nonresponse in the interviewer administered (CAPI) section.
Table 3. Predicting Item-Level Nonresponse from Housing Features in the ACASI Section of NSDUH Interview

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>T-statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>3.98</td>
<td>50.6</td>
<td>.0001</td>
</tr>
<tr>
<td>Single housing unit</td>
<td>-0.52</td>
<td>-6.01</td>
<td>.0001</td>
</tr>
<tr>
<td>Controlled access</td>
<td>-0.15</td>
<td>-1.21</td>
<td>.2267</td>
</tr>
<tr>
<td>Single housing unit with controlled access feature</td>
<td>0.42</td>
<td>2.03</td>
<td>.0420</td>
</tr>
</tbody>
</table>

F= 14.71, Model DF=3, Error DF=67689, p=.0001 , R²=0.0007

Table 4. Predicting Item-Level Nonresponse from Housing Features in the CAPI Section of NSDUH Interview

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>T-statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>3.40</td>
<td>96.2</td>
<td>.0001</td>
</tr>
<tr>
<td>Single housing unit</td>
<td>0.063</td>
<td>1.62</td>
<td>.1047</td>
</tr>
<tr>
<td>Controlled access</td>
<td>0.49</td>
<td>8.73</td>
<td>.0001</td>
</tr>
<tr>
<td>Single housing unit with controlled access feature</td>
<td>-0.54</td>
<td>-5.82</td>
<td>.0001</td>
</tr>
</tbody>
</table>

F= 31.34, Model DF=3, Error DF=67689, p=.0001 , R²=0.0014

Discussion

The vast majority of NSDUH SDUs were single-family housing units with no controlled access. In general, when controlled access was present, screening success was negatively affected. Dwelling units where controlled access features were common, such as multi-unit structures with 10 or more dwelling units and student housing, tended to have lower screening response rates than other dwelling units. Moreover, our screening response rates in areas where controlled access was uncommon, such as single-family housing units and Native American tribal lands\(^5\) were higher than in areas where controlled access was more common. These findings confirm anecdotal evidence we have received from field observations and feedback from field interviewers.

\(^5\) While many Native American tribal lands have no controlled access, we have learned through many years of experience on NSDUH to respect the property and customs of these individuals; therefore, we typically seek permission from tribal leaders before approaching any dwelling units on tribal lands. We believe this approach may have contributed to our success with these dwelling units.
Controlled access contributes significantly to unit level nonresponse at both the screening and interviewing stages. Some specific controlled access features seemed to impede screening success more than others. Dwelling units where access was limited by a guard or door person had a screening response rate almost 12 percent lower than the national average. Also, dwelling units in locked buildings where initial contact had to be made by using an intercom had a screening response rate more than 8 percent below the national average. Given our finding that some controlled access features such as guards or doorpersons and physical barriers were more common in medium-to-high income areas than low-income areas, there is reason to believe that nonresponse due to controlled access leads to higher-income groups being underrepresented in the NSDUH sample. Similarly, the higher prevalence of controlled access in the Northeast region than in the other three Census regions and in large sample states vs. small sample states, possibly due to urban populations representing a larger proportion of the sample in those areas, may suggest that urban populations are underrepresented. We will investigate these issues further with more extensive regression analyses.

Surprisingly, one area with the highest screening response rate was an area where controlled access features were common: military bases. We believe this is due to our approach for gaining access to military bases. Before each survey year, we obtain endorsement letters from all major branches of the U.S. military. A copy of the appropriate endorsement letter is sent to each military base from which dwelling units have been sampled. In addition, we have specific and detailed informational packets tailored to the needs and concerns of military personnel. Finally, we assign SDUs on
military bases to our most experienced, professional interviewers. We believe that these sophisticated approaches enable a high level of success with these dwelling units.

As noted above, we obtained higher screening and interview response rates for dwelling units on military bases, on Native American tribal lands, in student housing and other group quarters structures, and in units where access was limited by a guard or doorperson. Our success may be due in part to residents assuming that if we gained access through the gatekeeper, then the study must be legitimate. Our success may also have been due to the skill of the interviewers. Since we typically assign the cases judged to be most difficult to our most experienced, successful interviewers, these cases may have had higher success rates regardless of the controlled access features. We cite our historical success rates in our controlled access packets to encourage gatekeepers to grant us access.

It is interesting to note that preliminary analyses suggest controlled access may increase item-level nonresponse, especially to the CAPI portion of the survey. This may be due to these respondents or the interviewers completing this work paying less attention to details when completing the interview. For example, because access was difficult and could be revoked, interviewers may feel rushed to complete an interview because they are concerned about being asked to leave. This rushing may lead them to code items as Refused or “Don’t know” without probing adequately. Further research is needed to better understand this finding.

Even when controlled access features were present, our interviewers were very successful at overcoming access barriers. We believe this success is due to refined approaches and targeted training of our interviewers on how to address these situations.
By quantifying the incidence of housing characteristics and controlled access as well as their correlation with screening and interviewing success, we can improve our approaches even further. From a field management perspective, we can use this information to identify situations where we are most successful in reaching dwelling units and then dig further to determine what successful actions can be applied in other situations. In addition, we can use this information to identify interviewers most successful at overcoming access barriers, assess what behaviors contributed to the success, and use that information to train other interviewers. Also, by combining this information with the average number of call attempts required to complete cases, we can calibrate cost per case and response rate goals for different regions of the country. Doing so may enable us to establish more realistic performance goals for areas in the Northeast where multi-unit buildings are very common. From a data analysis perspective, we think the access information could be used in non-response adjustment during the weighting process to reduce the non-response bias. In fact, one of our next steps in this line of research is to investigate further the possibility of using access feature data in this manner.
References


Murphy, J., J. Eyerman, D. Cunningham, and J. Brantley (2003). “An Examination of Controlled Access Housing Units in the National Survey on Drug Use and Health.” Presented at the annual meeting of the Midwest Chapter of the American Association for Public Opinion Research, Chicago, IL.