BACKGROUND
By the end of 2011, 32.3% of adults lived in cell-only (CPO) households*. Multi-mode address-based sampling (ABS) has been assumed to cover CPO households that are missed in traditional random-digit-dial (RDD) designs. The ABS frame covers nearly all addresses, and data collected via mail allows us to capture data from these individuals. No literature, however, has yet to publish statistics on how well multi-mode ABS designs capture the CPO population. We tackle this issue by focusing on the following research question:

How does an ABS multi-mode design reach CPO households in a hard-to-reach population?

A: DISTRIBUTION OF PHONE OWNERSHIP IN REACH U.S.

Overall Distribution of Phone Ownership

<table>
<thead>
<tr>
<th>No Phone</th>
<th>Landline Only</th>
<th>Cell Only</th>
<th>Dual</th>
</tr>
</thead>
<tbody>
<tr>
<td>1%</td>
<td>17%</td>
<td>27%</td>
<td>55%</td>
</tr>
</tbody>
</table>

Distribution of Phone Ownership Among REACH U.S. Interviews Completed by Mail

<table>
<thead>
<tr>
<th>No Phone</th>
<th>Landline Only</th>
<th>Cell Only</th>
<th>Dual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2%</td>
<td>17%</td>
<td>42%</td>
<td>39%</td>
</tr>
</tbody>
</table>

59% of all completes are by mail.

Distribution of Phone Ownership Among REACH U.S. Interviews Completed by Phone

<table>
<thead>
<tr>
<th>No Phone</th>
<th>Landline Only</th>
<th>Cell Only</th>
<th>Dual</th>
</tr>
</thead>
<tbody>
<tr>
<td>1%</td>
<td>18%</td>
<td>38%</td>
<td>44%</td>
</tr>
</tbody>
</table>

41% of all completes are by phone.

METHODS
We use preliminary data from the Racial and Ethnic Approaches to Community Health across the U.S. (REACH U.S.) Year 4 Risk Factor Survey. The data is base-weighted to adjust for probabilities of selection as final weights are not yet available.

REACH U.S. is a health risk factor survey sponsored by CDC. It is conducted in 28 (all are used in the analysis) communities of various sizes across the nation. The target population varies by community and includes one or more of the following racial/ethnic groups: Hispanic, African American, Italian, Asian-Pacific Islander or Native American. REACH U.S. employ an ABS multi-mode design, and this analysis focuses on interviews collected via telephone and mail.

First, we provide base-weighted descriptive statistics on the distribution of adult telephone ownership as observed in REACH U.S. Data is available overall and by mode of completion. It is possible for a case to begin in one mode and complete in another mode. For ease of interpretation, we exclude cases that switched modes from the mode subgroup analysis.

Second, we compare the base-weighted REACH U.S. data to weighted phone ownership data collected by the National Health Interview Survey (NHIS). The NHIS provides telephone coverage estimates of the general population using an area probability, in-person design. The data collected/methodology should not influence bias in the telephone coverage estimates. REACH U.S. geographies were matched as closely as possible to a NHIS geography. In some areas, this involved collapsing in the telephone coverage estimates. REACH U.S. communities within an area are matched as closely as possible to a NHIS geography. In some areas, this involved collapsing in the telephone coverage estimates. REACH U.S. communities within an area are matched as closely as possible to a NHIS geography.

Inclusion of adults living in CPO households is important. The inclusion of these individuals significantly increased estimates of individuals in good general health and the proportion of current smokers and lowered the estimated proportion of diabetics when compared to estimates excluding interviews of CPO adults in the population. REACH U.S. and NHIS.

In the future, we will post-stratify REACH U.S. by demographic variables to create a more robust comparison to NHIS.

CONCLUSION
Multi-mode ABS designs that use a telephone and mail component cover adults living in CPO households in addition to dual-use households, landline only households, and no phone households. REACH U.S. interviews conducted via telephone most likely cover adults living in households with a landline. This is as expected since addresses filtered via telephone are those that were matched to a telephone number; vendor address to telephone services are currently limited to matching to landline telephone numbers. The lack of CPO coverage in the telephone mode is no longer compensated for by interviews collected via mail – 42 percent of adults completing a mail survey live in CPO households. Again, this is a function of address-to-telephone matching capabilities.

*Includes Queens, Kings, Richmond, New York, and Bronx.

**Includes Queens, Kings, Richmond, New York.

*Difference in estimates produced by all phone ownership and estimates produced by excluding CPO is significant at alpha=0.05 level.

Cell Phone Coverage in an ABS Multi-Mode Design
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When comparing the observed proportion of adults living in CPO households in REACH U.S. with the proportion in the population (NHIS), we found that seven of the 17 collapsed community areas were within 5 percentage points of the NHIS adjusted estimates. REACH U.S. underestimated the CPO population in three community areas and overestimated it in the remaining eight community areas. We hesitate, however, in making conclusions based on this analysis. This comparison is limited by geographic and demographic differences between REACH U.S. and NHIS. In the future, we will post-stratify REACH U.S. by demographic variables to create a more robust comparison to NHIS.

Inclusion of adults living in CPO households is important. The inclusion of these individuals significantly increased estimates of individuals in good general health and the proportion of current smokers and lowered the estimated proportion of diabetics when compared to estimates excluding interviews of CPO adults. The inclusion of adults in no-phone households did not have a significant effect on the health estimates, likely because of their small proportion.