

## BACKGROUND

By the end of 2011, 32.3% of adults lived in cell phone only (CPO) households<sup>a</sup>. Multi-mode address-based sampling (ABS) has been assumed to cover CPO households that are missed in traditional landline 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 well does an ABS multi-mode design reach CPO households in a hard-to-reach population?**

- What is the observed distribution of phone ownership?
- Is the observed proportion of CPO adults similar to the proportion of CPO adults in the population?
- Does the inclusion of CPO adults affect the estimates of key health statistics?

<sup>a</sup>Wireless Substitution: Early Release of Estimates From the National Health Interview Survey, July–December 2011.

## 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 (26 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, Haitian, Asian/Pacific Islander, or Native American. REACH U.S. employs an ABS multi-mode design, and this analysis focuses on interviews collected via telephone and mail. Each respondent is asked one or more questions to determine whether anyone in their household has a landline telephone, a cell telephone, or both.

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.

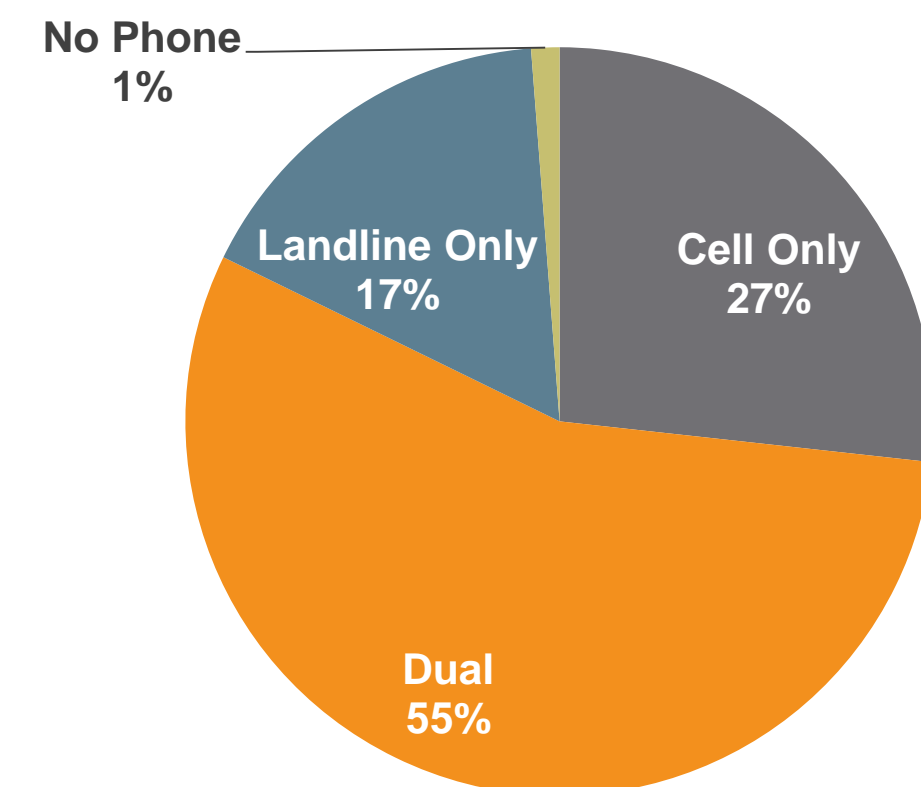
Second, we compare the base-weighted REACH U.S. data to weighted phone ownership data collected by the National Health Interview Survey (NHIS). The NHIS provides telephone coverage estimates of the general population using an area-probability, in-person design. The data collection methodology should 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 neighboring REACH U.S. communities into one community. NHIS state-level estimates were not publicly available by race/ethnic subgroups. Therefore, we used region-level estimates for race/ethnic subgroups to adjust the NHIS state-level estimates for all race/ethnicities<sup>b</sup>. Combined, research questions A and B provide a picture of how well a multi-mode ABS design captures the CPO population.

Third, we analyze how key health statistics would change if the CPO adults would have been excluded. Of particular interest are estimates of general health, smoking, cholesterol, and diabetes prevalence.

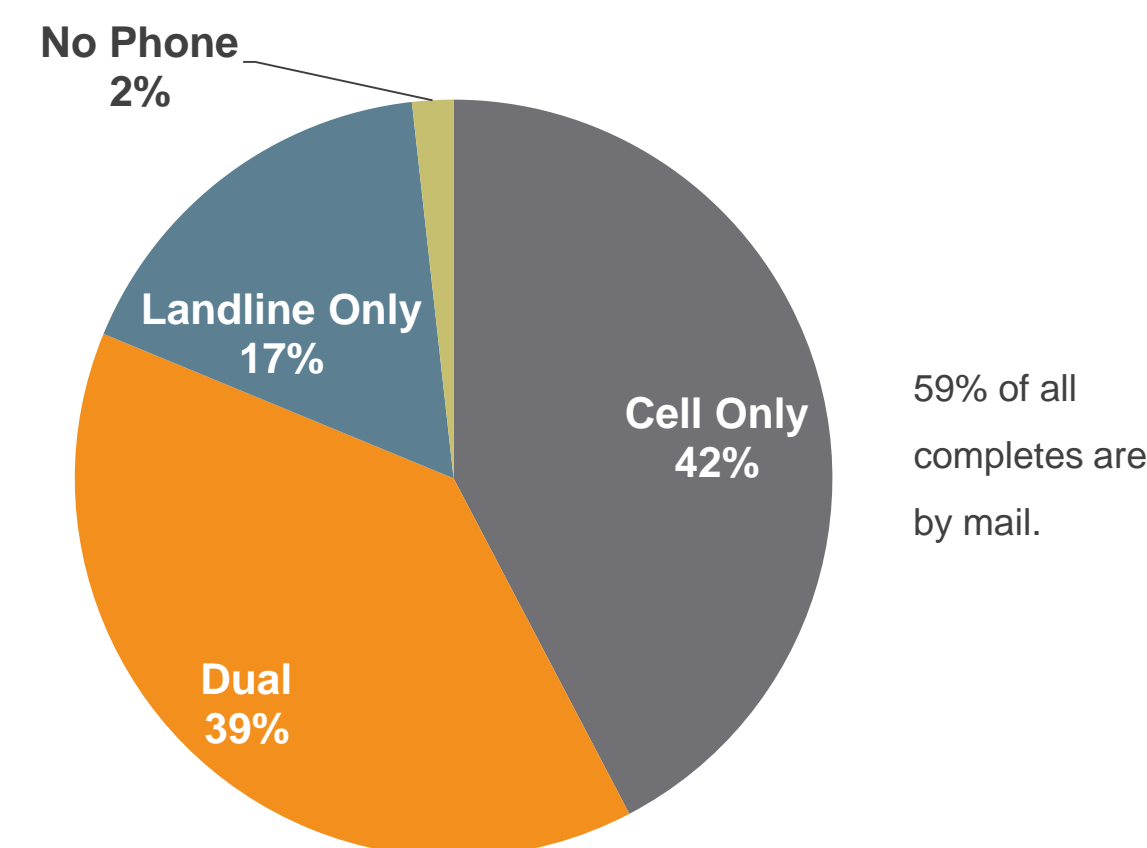
<sup>b</sup>Wireless Substitution: State-level Estimates From the National Health Interview Survey, January 2007–June 2010

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

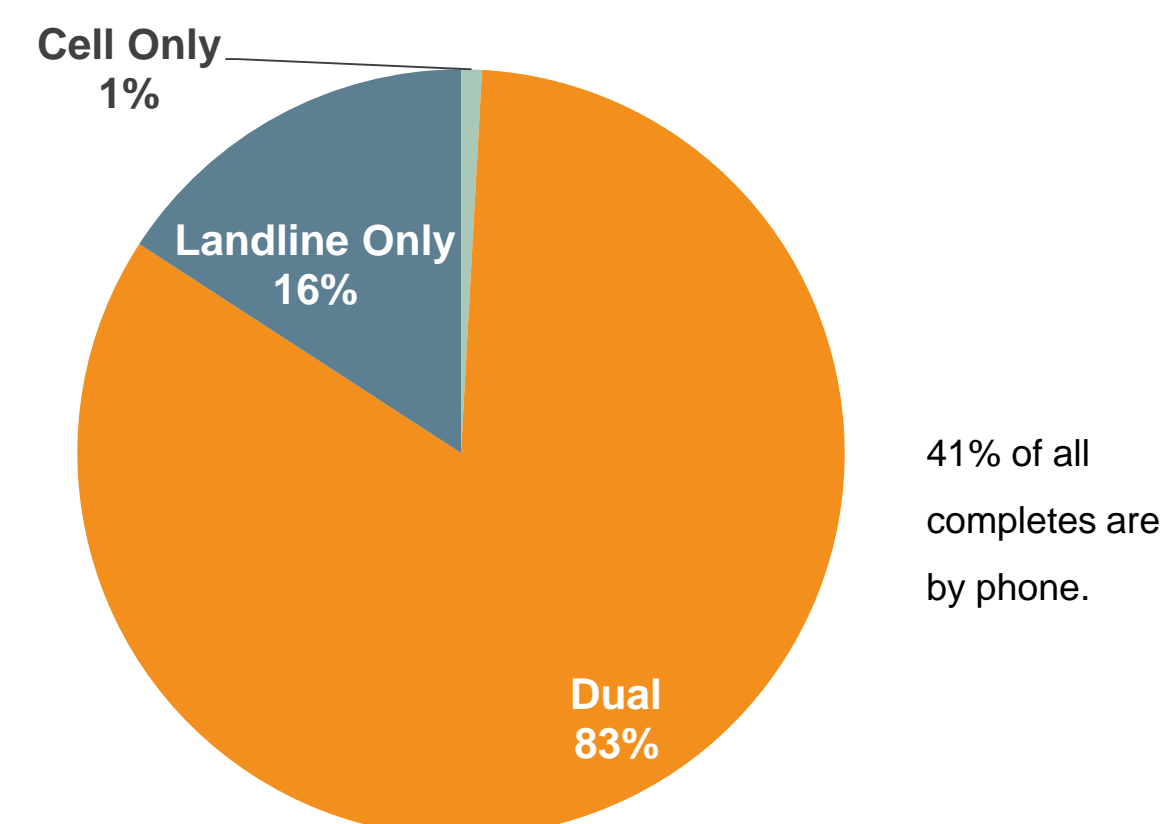
### Overall Distribution of Phone Ownership



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



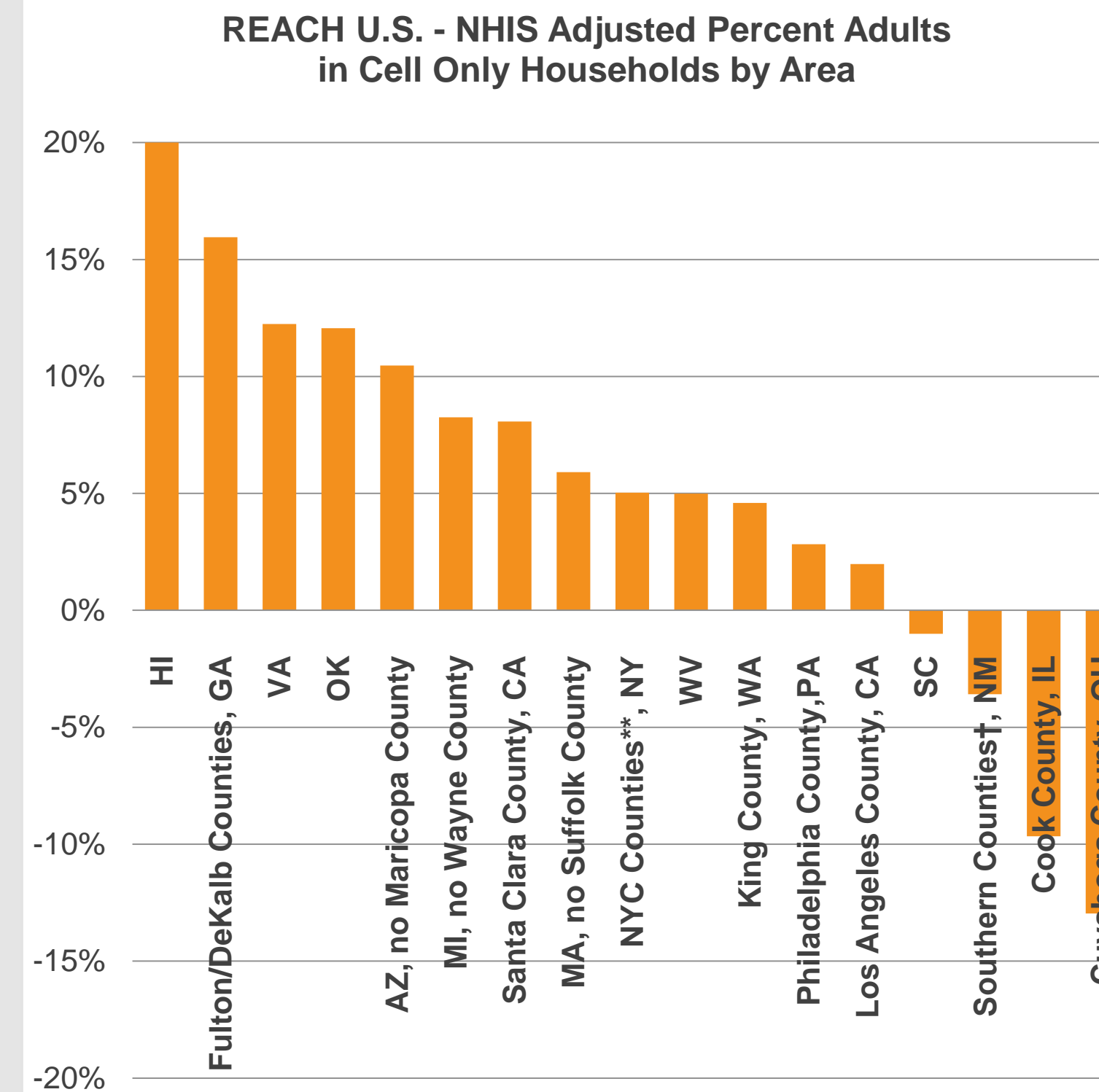
### Distribution of Phone Ownership Among REACH U.S. Interviews Completed by Phone



REACH U.S. cases switch modes from mail to phone or phone to mail when the first contact mode is unsuccessful.

## B: OBSERVED VS. POPULATION: PROPORTION OF CPO ADULTS

### REACH U.S. Has a Higher Percentage of Adults Living in CPO Households than NHIS



Areas are NHIS estimation areas. REACH U.S. communities within an area are grouped together to be more comparable to NHIS areas.

†Includes Chaves, Lea, Eddy, Lincoln, Socorro, Catron, Sierra, Curry, Roosevelt, De Baca, Dona Ana, Otero, Luna, Grant, and Hidalgo.

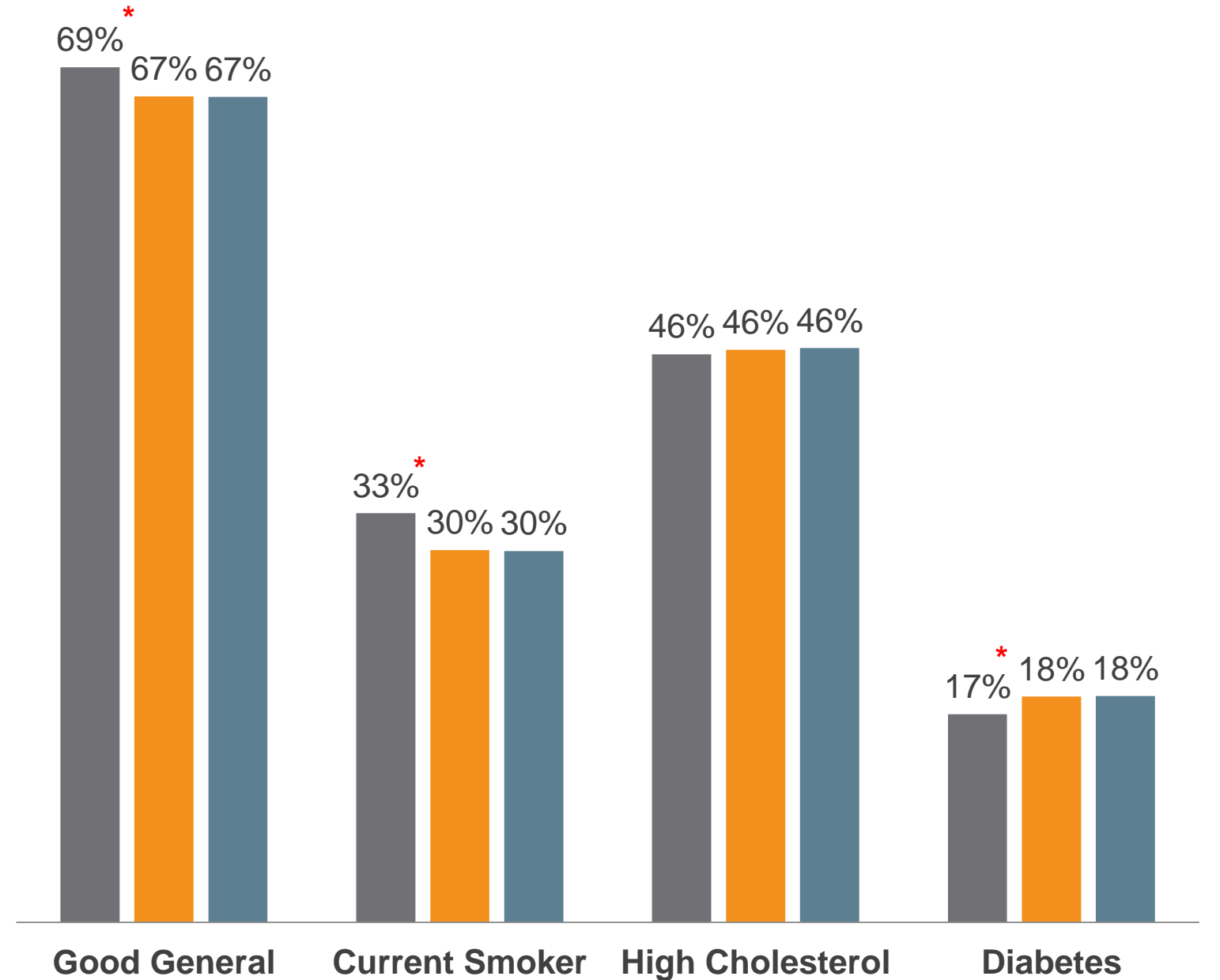
\*\*Includes Queens, Kings, Richmond, New York, and Bronx.

## C: SURVEY ESTIMATES BY PHONE STATUS

### CPO Coverage Changes Estimates; No-Phone Coverage Does Not

#### Health Estimates by Different Coverage of Phone Ownership

- Landline Only + Dual + No Phone + CPO
- Landline Only + Dual + No Phone
- Landline Only + Dual



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

## 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 mostly cover adults living in households with a landline. This is as expected since addresses fielded 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 more than compensated for by interviews collected via mail – 42 percent of adults completing via mail live in CPO households. Again, this is a function of address-to-telephone matching capabilities.

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 estimate. 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.