

Bridging Representation Gaps: Community-Driven and Probability Sampling Approaches in the UACC Catchment Area

K. Roberts, N. Mantina, G. Yadav, J. Hatcher

The University of Arizona Cancer Center

1. Background

Understanding health behaviors, cancer screening, and information-seeking patterns is essential for developing effective prevention strategies. Population health assessments such as the Community Assessment of Southern Arizona (CASA) survey offer important insight by capturing the experiences of diverse, underserved communities across the University of Arizona Cancer Center (UACC) catchment area. However, recruitment methods can influence who responds and what patterns emerge. This study examines how probability-based and community-driven convenience sampling shape findings from the CASA survey, with a focus on implications for interpreting health behaviors and cancer-related outcomes.

2. Goals

This project assessed how sampling strategies influenced demographic, behavioral, and cancer-related patterns in CASA data. Differences between probability-based and convenience samples were evaluated using chi-square tests for categorical variables and two-proportion z-tests. The goal was to determine how participant characteristics and behaviors varied by recruitment approach, recognizing that differences in convenience samples may reflect context rather than population-level trends.

3. Solutions and Methods

To promote broad and equitable participation, UACC implemented a dual recruitment strategy: mailed, probability-based sampling, and community-driven convenience sampling led by Community Health Workers (CHWs). CHWs recruited through trusted networks, community events, and bilingual outreach to reduce barriers and engage underserved groups.

4. Outcomes

A total of 1,770 participants completed the survey. Geographic distribution differed significantly by recruitment method ($\chi^2 = 111.1$, $p < 0.001$), with Pima County overrepresented in the probability sample (68.9 percent) and smaller counties such as Yuma and Pinal more represented in the convenience sample. The convenience sample also included higher proportions of Hispanic (61.9 percent vs. 37.6 percent, $p < 0.001$) and Black/African American participants (7.6 percent vs. 2.3 percent, $p < 0.001$). In contrast, the probability sample was older on average (51.9 vs. 46.2 years, $p < 0.001$) and more likely to be retired, insured, and report higher incomes (all $p < 0.05$). Sex distribution did not differ significantly ($p = 0.151$).

Behavioral patterns also varied. Convenience-sample participants were more likely to be current smokers (8.8 percent vs. 5.0 percent, $p = 0.014$), whereas alcohol use was slightly higher in the probability sample (46.1 percent vs. 41.4 percent, $p = 0.048$). Screening behaviors differed as well: colon cancer screening (70.8 percent vs. 58.6 percent, $p < 0.001$) and skin cancer screening (58.7 percent vs. 38.7 percent, $p < 0.001$) were higher in the probability sample. Cervical screening (77.3 percent vs. 76.6 percent), breast screening (82.2 percent vs. 82.3 percent), and HPV vaccination among participants aged ≤ 26 (64.9 percent vs. 56.3 percent) did not differ significantly.

Differences were also observed in cancer risk perceptions. More participants in the probability sample identified obesity as a cancer risk factor ($p < 0.001$), while alcohol-related cancer risk perceptions were similar ($p = 0.183$).

5. Lessons Learned and Future Directions

Recruitment strategy substantially influenced participant characteristics and outcomes. Probability sampling captured older, higher-income, and insured participants, while convenience sampling increased representation of underserved groups. These differences highlight the need for cautious interpretation, as convenience-sample variation may reflect recruitment context rather than population-level effects. Although probability sampling remains the standard for representativeness, combining it with community-driven sampling may enhance inclusion, data equity, and community-informed cancer prevention efforts.