

ASSESSMENT OF KNOWLEDGE AND BEHAVIORS ON HEALTHY INFANT SAFE SLEEP ENVIRONMENT

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Introduction

The Collaborative Improvement & Innovation Network (CoIIN) to Reduce Infant Mortality is a public-private partnership to reduce infant mortality and improve birth outcomes.¹ As a CoIIN participant, the State of Delaware has chosen to focus on infant safe sleep practices as an intervention to reduce sudden infant death syndrome (SIDS), the third leading overall cause of infant mortality within the state and second leading cause of death in Delaware among Black/African-American infants.² The safe sleep intervention involves an education module that was developed by the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) and is based on the State of Delaware's Long Live Dreams safe sleep campaign messaging. This project has the potential to meaningfully impact infant health outcomes statewide given that WIC sees an estimated 20,000 clients per month at 11 Division of Public Health clinic sites.

Methodology

A knowledge and behaviors survey, the Healthy Infant Sleep Environment Questionnaire (see Appendix), was administered to WIC enrollees during the months of May 2015 and August 2015 in WIC sites located throughout the State of Delaware. The WIC staff members were instructed to ideally have the May 2015 enrollees complete the survey at their first postpartum visit. The survey was made available to enrollees in English, Spanish, and Haitian Creole. The May 2015 survey participants completed the survey immediately before starting the safe sleep education module. The August 2015 survey participants completed the survey as part of a routine visit to the WIC site.

Forward Consultants, the evaluation specialist, collected the completed May 2015 and August 2015 surveys in June 2015 and September 2015, respectively. The age of the survey respondent (based on the self-reported date of birth ("DOB") and self-reported survey date), self-reported race/ethnicity, geographic distribution (based on self-reported zip code and segmented into

¹ Health Resources and Services Administration. Collaborative Improvement & Innovation Network. Retrieved from: <http://mchb.hrsa.gov/infantmortality/coiin/>.

² Delaware Health Statistics Center. Delaware Vital Statistics Annual Report, 2011. Retrieved from Department of Health and Social Services, Division of Public Health website: <http://www.dhss.delaware.gov/dhss/dph/hp/annrepvs.html>.

“High-Risk Wilmington”, “High-Risk Sussex”, and “Non-High-Risk Delaware”)³, and infant age (based on the self-reported infant DOB and self-reported survey date) were assessed. Duplicate respondents, which were determined by the responses to questions 2, 4, and 5 of the survey, were omitted from the analysis.

The responses to questions 2, 4, and 5 were also used in combination to match WIC enrollees that completed a survey in both May 2015 and in August 2015. This matching algorithm ultimately resulted in three distinct cohorts of survey respondents: survey respondents who were identified as *only* having completed the survey in May 2015 (“May 2015 Only”); survey respondents who were identified as *only* having completed the survey in August 2015 (“August 2015 Only”); and survey respondents who were identified as having completed the survey in *both* May 2015 and August 2015 (“Matched Cohort”). Among the survey respondents identified in the Matched Cohort, the surveys completed in May 2015 were designated as “pre-tests” and the surveys completed in August 2015 were designated as “post-tests”. All surveys (excluding surveys by duplicate respondents) were analyzed even if the survey was not entirely completed.

The results to question 1 were analyzed for all survey respondents. The results to questions 6 to 16 were analyzed only for Matched Cohort respondents with a self-reported race/ethnicity (question 17) of “Black or African American”, “Hispanic or Latino”, or “White”. Respondents self-identifying as multiple races/ethnicities were not included in the above-mentioned categories. In addition, the results to questions 12, 13, and 14 were compared to the corresponding responses given in the State of Delaware 2011 PRAMS dataset. Finally, the percentage of respondents from each of the three race/ethnicity categories answering questions 6 to 13 all correctly (questions 6 to 11) *and* with health-promoting responses (questions 12 and 13) was determined.

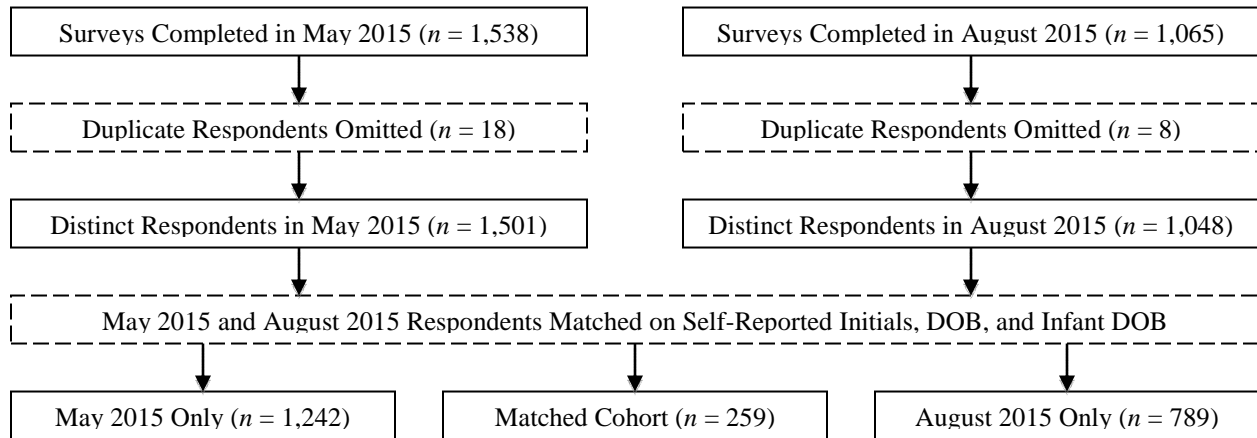
Results

Figure 1 on the following page illustrates the methodology used to generate the three cohorts and corresponding results. In May 2015, a total of 1,538 surveys were administered, of which, 1,501 (97.6 percent) were identified as being completed by non-duplicate (“distinct”) respondents. In August 2015, a smaller number of surveys – 1,065 – were administered, of which, 1,048 (98.4 percent) were identified as having been completed by distinct respondents. Applying the matching protocol using self-reported initials, respondent DOB, and infant DOB, the May 2015 Only cohort totaled 1,242 respondents, the August 2015 Only cohort totaled 789 respondents, and the Matched Cohort totaled 259 respondents. This Matched Cohort corresponded to 16.6

³ These geographic categories are defined by the 2010 State of Delaware Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Needs Assessment.

percent of the WIC enrollees who completed the survey in May 2015 and 24.7 percent of the WIC enrollees who completed the survey in August 2015.

Figure 1. Methodology Used to Generate Cohorts.



Age Distribution. Figure 2A provides the age distribution of the May 2015 Only and Matched Cohort survey respondents reported as being between ages 16 and 44 years at the time of survey completion in May 2015. Figure 2B provides the age distribution of the August 2015 Only and Matched Cohort survey respondents reported as being between ages 16 and 44 years at the time of survey completion in August 2015. Generally speaking, the age distribution of survey respondents aligns with what is expected for the age of postpartum women receiving services through the Delaware WIC program. No statistically significant difference ($\alpha = 0.05$) exists in the age distribution of the May 2015 Only and Matched Cohort ($\chi^2 = 2.07, p = 0.56$) or in the age distribution of the August 2015 Only and Matched Cohort ($\chi^2 = 1.06, p = 0.79$). Accordingly, the respondents in the Matched Cohort generally had a similar age distribution as both the May 2015 Only and August 2015 Only cohorts.

Figure 2A. Age Distribution of Survey Respondents, May Only and Matched Cohort.

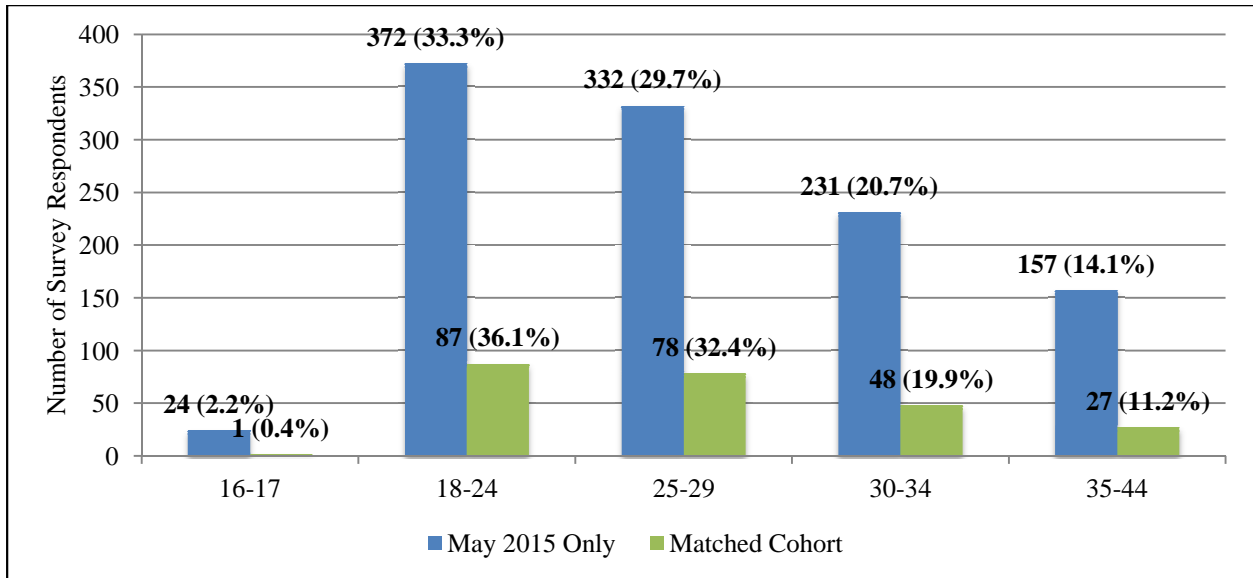
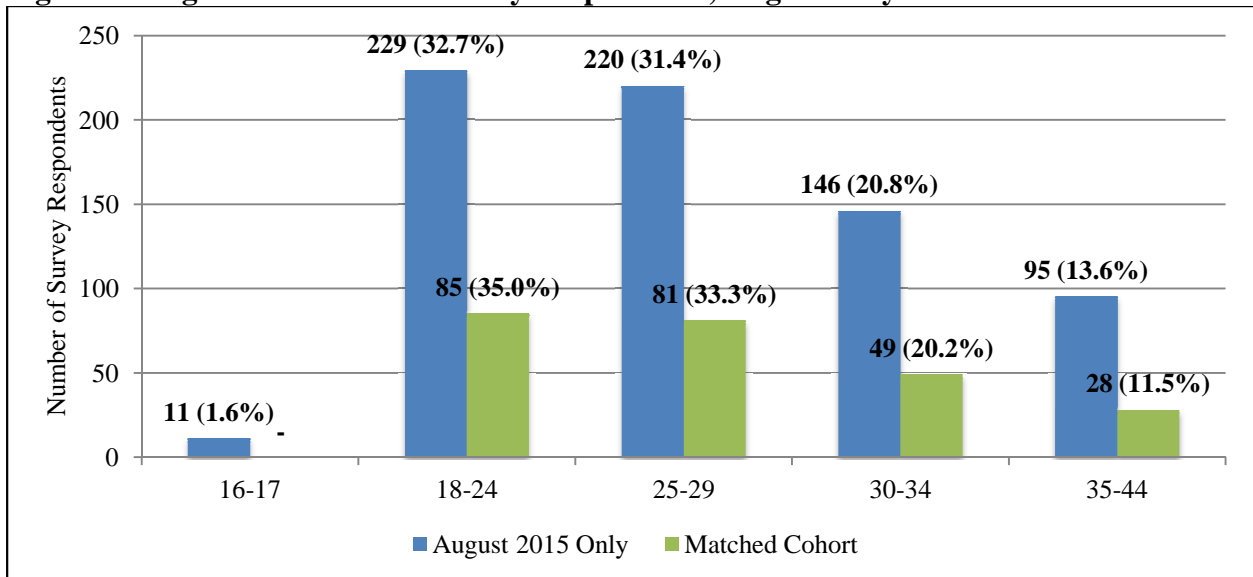
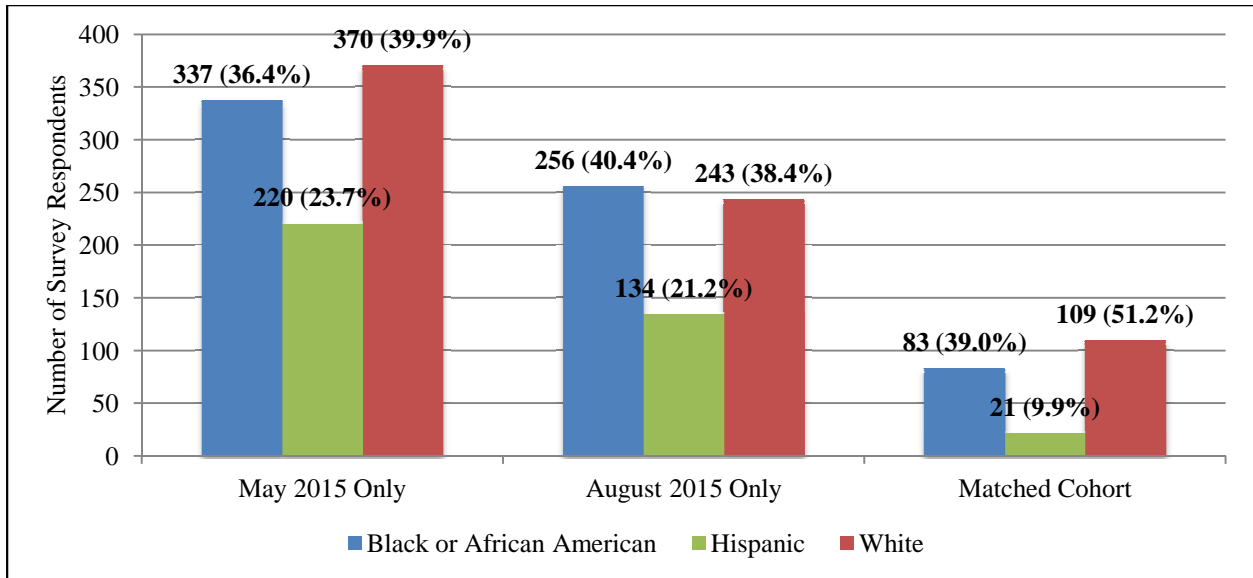


Figure 2B. Age Distribution of Survey Respondents, August Only and Matched Cohort.



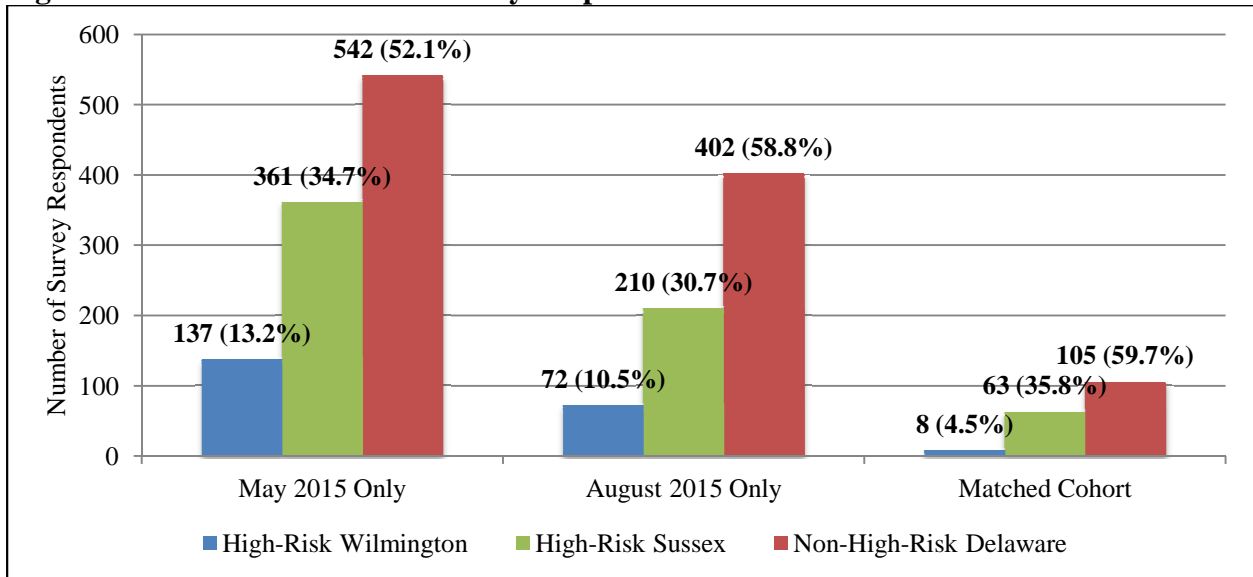
Race/Ethnicity. Figure 3 displays the race/ethnicity distribution of survey respondents. Overall, each cohort featured a fairly similar percentage of Black or African-American respondents and White respondents. However, a higher percentage of respondents identified as Hispanic or Latino in the May 2015 Only and August 2015 Only cohorts (23.7 percent and 21.2 percent, respectively) as compared to the Matched Cohort (9.9 percent). The composition of the Matched Cohort was significantly different than the other two cohorts (May 2015 Only: $\chi^2 = 21.32, p = 0.00$; August 2015 Only: $\chi^2 = 17.47, p = 0.00$). The composition of the May 2015 Only and August 2015 Only cohorts were not significantly different from each other ($\chi^2 = 2.97, p = 0.23$).

Figure 3. Race/Ethnicity of Survey Respondents.



Zone of Residence. Figure 4 displays the geographic distribution of the three cohorts based on the zone of residence (as previously mentioned, each respondent is assigned to one of three geographies based on her self-reported zip code). For the Matched Cohort, the survey respondent must have resided in the same geographic zone in both May 2015 and August 2015 in order to be included in this analysis.

Figure 4. Zone of Residence of Survey Respondents.



As evidenced by this graph, slightly more than half (52.1 percent) of the May 2015 Only cohort resides in Non-High-Risk Delaware as compared to 59.7 percent of the Matched Cohort survey respondents. Conversely, 13.2 percent of the May 2015 Only cohort reported living in a zip code in the High-Risk Wilmington geography as compared to only 4.5 percent of the Matched Cohort.

Given these discrepancies, the geographic distribution of the May 2015 Only and Matched Cohort were significantly different from one another ($\chi^2 = 11.06, p = 0.00$). In addition, the composition of the August 2015 Only cohort was significantly different than both cohorts as well (May 2015 Only: $\chi^2 = 7.73, p = 0.02$; Matched Cohort: $\chi^2 = 6.55, p = 0.04$).

Time Between Surveys (Matched Cohort). Among the Matched Cohort respondents, the average time passed between the completion of the pre-test (May 2015 survey) and the post-test (August 2015 survey) was approximately 92 days (95% CI: 91.4, 93.1).

Postpartum Time Frame (Matched Cohort). Of the 259 Matched Cohort respondents identified, 185 respondents (71.4 percent) reported an infant birth date on both the pre-test (May 2015 survey) and post-test (August 2015 survey). Of these 185 respondents, 116 respondents (62.7 percent) completed the survey more than six months after the infant birth date while 69 respondents (37.3 percent) completed the pre-test within six months of the infant birth date (i.e., postpartum). Of these 69 postpartum respondents, 37 respondents (53.6 percent) completed the pre-test within three months postpartum while the remaining 32 respondents (46.4 percent) completed the pre-test between four and six months postpartum.

Results to Survey Questions (Matched Cohort). The graph on the top of page 10 (“[May and August] Q1”) provides the responses to question 1 for *all* of the May 2015 survey respondents and *all* of the August 2015 survey respondents. As evidenced by this graph, compared to the May 2015 respondents, a slightly higher percentage of respondents in August 2015 circled each of the items displayed on the survey (the “Long Live Dreams Infant Onesie”, the “Safe Sleep Door Hanger”, and the “Safe Sleep Pocket Reference Card”). This finding may suggest that WIC staff members have improved their distribution of these items between May and August 2015. However, it is essential to note that the percentage of respondents circling these choices in either month was relatively low; in fact, the highest percentage reported was 7.0 percent of August 2015 respondents stating that they were given a “Long Live Dreams Infant Onesie”. One explanation for the relatively low percentages may be due to the statement “Think back to your last appointment at WIC.” This statement may have encouraged WIC enrollees who may have received one or more of these materials at a *previous* appointment – but not the *last* appointment – to not circle one or more of these choices.

The graph on the bottom of page 10 (“[Matched Cohort] Q1”) displays the responses to question 1 for the Matched Cohort respondents only. It is important to note that the denominator in each of the three categories is less than 20, which may lead to tenuous results. For each of the three items illustrated on the survey, the percentage of respondents circling the item was lower in

August 2015 than in May 2015. Since these respondents were identified as having received a WIC visit in both May and August 2015, it is likely that these respondents received one or more of these items at a *previous* appointment well before August 2015, which may not necessarily have been their *last* appointment. Nonetheless, the percentages reported in this graph are low, and in fact, are lower than the percentages reported in the “[May and August] Q1” graph.

The graphs on pages 11 to 17 show the percentage of Matched Cohort survey respondents by race/ethnicity answering the question correctly (questions 6 to 11) or with a health-promoting response (questions 12 to 15). In each graph, the “pre-test” percentages are taken from the May 2015 survey responses and the “post-test” percentages are derived from the August 2015 survey responses. For questions 12, 13, and 14, the corresponding responses given in the State of Delaware 2011 PRAMS dataset are provided in successive graphs. The percentage of Matched Cohort survey respondents from each of the three race/ethnicity categories answering questions 6 to 13 all correctly (questions 6 to 11) and with health-promoting responses (questions 12 and 13) is given in the graph titled (“Percentage of Respondents with Correct/Health Promoting Responses for Questions 6-13”).

Based on the results given in these graphs, respondents who self-identify as Hispanic or Latino generally tended to not answer the knowledge questions (questions 6 to 11) correctly as compared to Black or African American respondents and White respondents in both the pre-test and post-test. With that said, the percentage of Hispanic or Latino respondents answering each question correctly was not significantly different than the other two race/ethnicity categories assessed; this is likely due to the relatively small number of Hispanic or Latino respondents to many of the questions. It is worth noting that the percentage of correct responses to question 7 (infant sleep environment) by Hispanic or Latino respondents increased considerably between the pre-test and post-test. However, the percentage of correct responses to question 6 (infant sleep position) and question 9 (co-sleeping) by Hispanic or Latino respondents lagged behind the other two race/ethnicity categories in both the pre-test and post-test. Generally speaking, at least 80 percent of the Black or African American respondents and White respondents answered each of the knowledge questions correctly in both the pre-test and post-test.

Overall, for the health-promoting responses related to safe-sleep (questions 12 and 13), fewer Hispanic or Latino respondents reported proper safe-sleep practices as compared to Black or African American respondents and White respondents.⁴ However, the difference between Hispanic or Latino respondents and Black or African American respondents for co-sleeping

⁴ It is essential to note that the number of Hispanic or Latino respondents was small (less than 20) to each of the health-promoting questions, and therefore, caution should be exercised when interpreting these results.

behaviors (question 13) were similar in the post-test (Black or African American: 72.6 percent; Hispanic or Latino: 70.6 percent). In question 13, less than half (41.2 percent) of Hispanic or Latino respondents stated in the pre-test that [their] new baby never sleeps in the same bed with [them] or anyone else. This percentage increased to substantially to 70.6 percent in the post-test, which is an encouraging finding. Despite the adverse results among Hispanic or Latino respondents to many of the questions in the survey, the Hispanic or Latino respondents tended to report more health-promoting responses to the questions related to smoking exposure (questions 14 and 15). Conversely, the results related to smoking exposure among White respondents were less favorable than the other two race/ethnicity categories.

It is evident that the responses to questions 12, 13, and to a lower extent 14, do not align well with their corresponding percentages in PRAMS. This may be due to the weighted average scheme used to generate these PRAMS responses, the difference in time frame between PRAMS (2011) and this survey (May 2015 and August 2015), and the definition of race/ethnicity categories (e.g., “Black or African American” as compared to “Black non-Hispanic”).

Finally, the percentage of respondents who provided a correct or health-promoting response to every question (questions 6 to 13) increased between the pre-test and post-test. This was true in each of the race/ethnicity categories although the percentages among the White respondents were higher than the Black or African American respondents, which in turn, were higher than the Hispanic or Latino respondents.

Discussion

Generally speaking, each of the race/ethnicity categories had a higher percentage of correct or health-promoting responses in the post-test as compared to the pre-test, which is a promising finding. This may indicate that the knowledge and behaviors presented in the safe sleep education module may have had a favorable and lasting impact on the infant safe sleep practices for WIC enrollees who received the module.

With that said, it is essential to note that Hispanic or Latino respondents tended to report less knowledge regarding what comprises a healthy infant sleep environment as compared to Black or African-American respondents and White respondents. Given these facts, it may be worth strengthening the knowledge component of the safe sleep education module for the Hispanic population within Delaware so that this race/ethnicity category provides correct responses on par with the other two race/ethnicity categories assessed.

Given the priority on proper safe sleep practices as a method to mitigate the potential for SIDS-related infant deaths in Delaware, messaging on back-to-sleep (question 12) and co-sleeping (question 13) should continue to be emphasized for all WIC enrollees. In addition, based on these survey results, health promotion efforts related to reducing smoking exposure should be particularly emphasized among White WIC enrollees.

Limitations

It is essential to note that the results presented in this assessment have several limitations. Foremost, it is worth noting that the Matched Cohort assessed did not adequately represent the demographic characteristics of the WIC enrollees who completed the surveys in May 2015 only or August 2015 only. Although the Matched Cohort had a similar age distribution as the other two cohorts (Figures 2A and 2B), this cohort had a higher percentage of White respondents (Figure 3) and lower percentage of respondents residing in the High-Risk Wilmington geography (Figure 4). Therefore, it is difficult to extrapolate these results onto how the May 2015 Only or August 2015 Only cohorts would have responded on a follow-up survey.

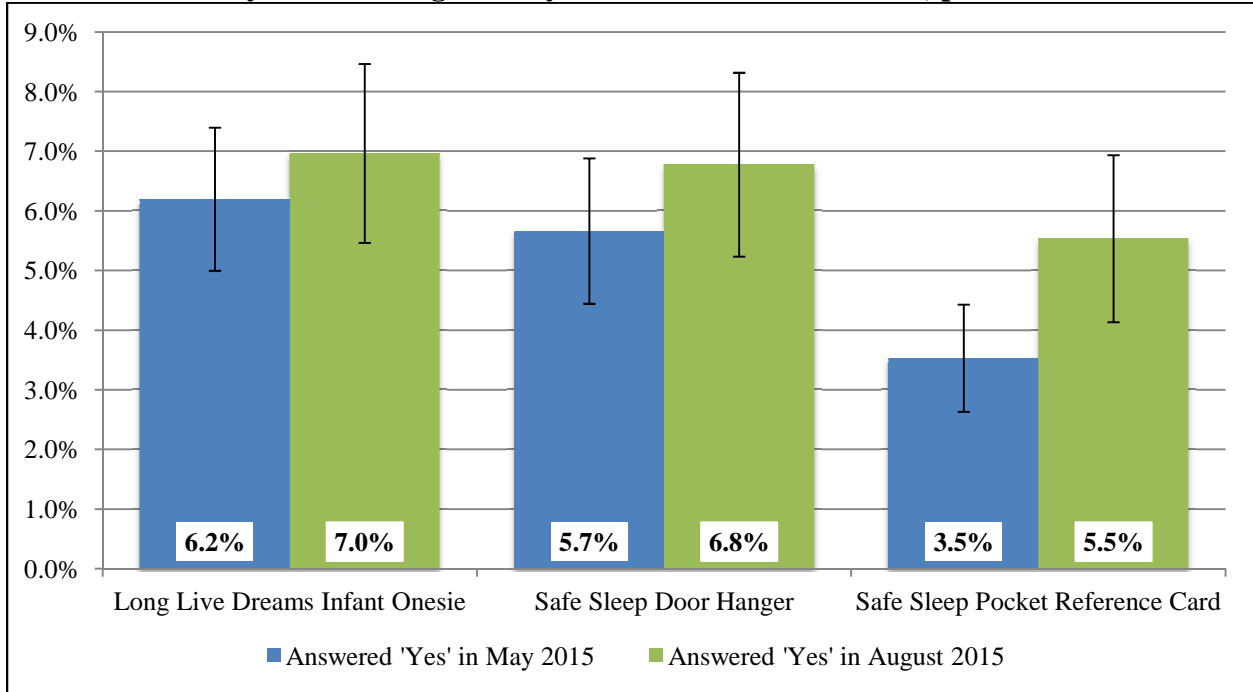
In addition to this limitation, the results are based on self-selected participants who could only complete the survey if the participant chose to receive postpartum services at a Delaware WIC site in May 2015 and/or August 2015. The survey results in this assessment also make use of almost all surveys, regardless of whether the survey was completed fully. The translated versions of the survey may have affected the interpretation of the questions, which may have particularly affected the results of the Hispanic respondents. Finally, only survey respondents who chose one race/ethnicity category were analyzed; therefore, a respondent who self-identified as both White *and* Hispanic or Latino, for example, was not included in either race/ethnicity category in this analysis.

Acknowledgement

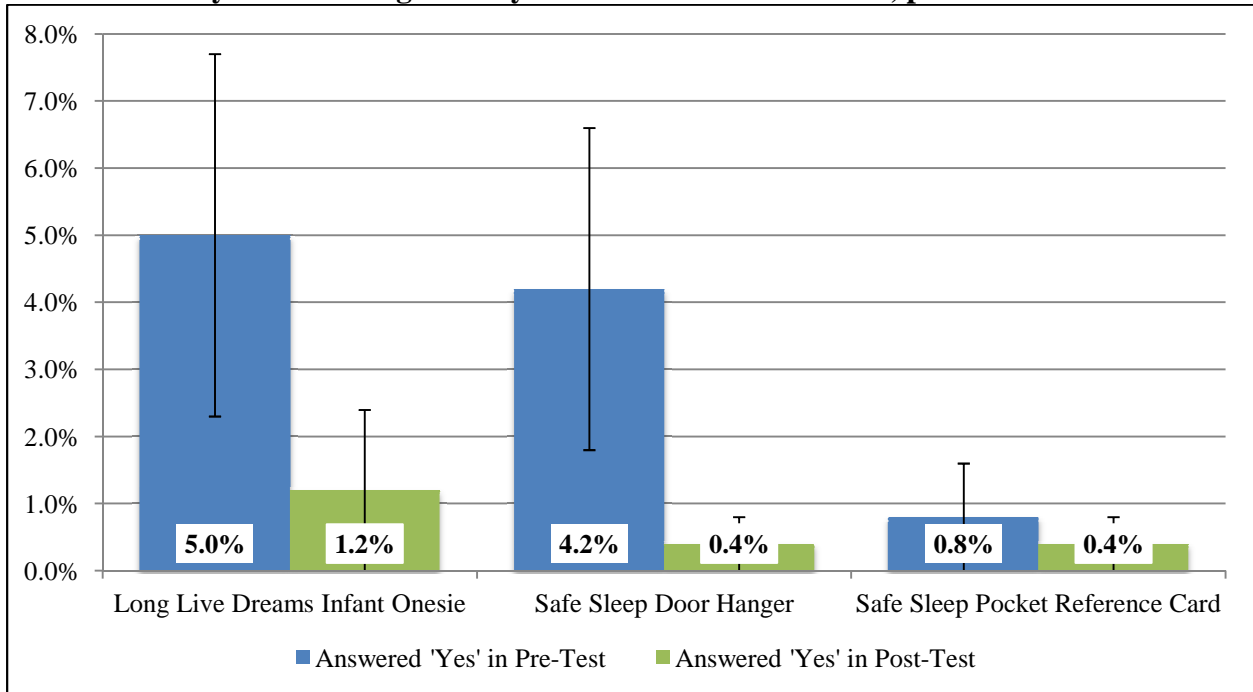
The Delaware Division of Public Health would like to thank the Delaware WIC program for their assistance in survey design and administration.

END TEXT

[May and August] Q1. Think back to your last appointment at WIC. Were you given any of these items? If you were not given any items or do not remember, please leave this blank.

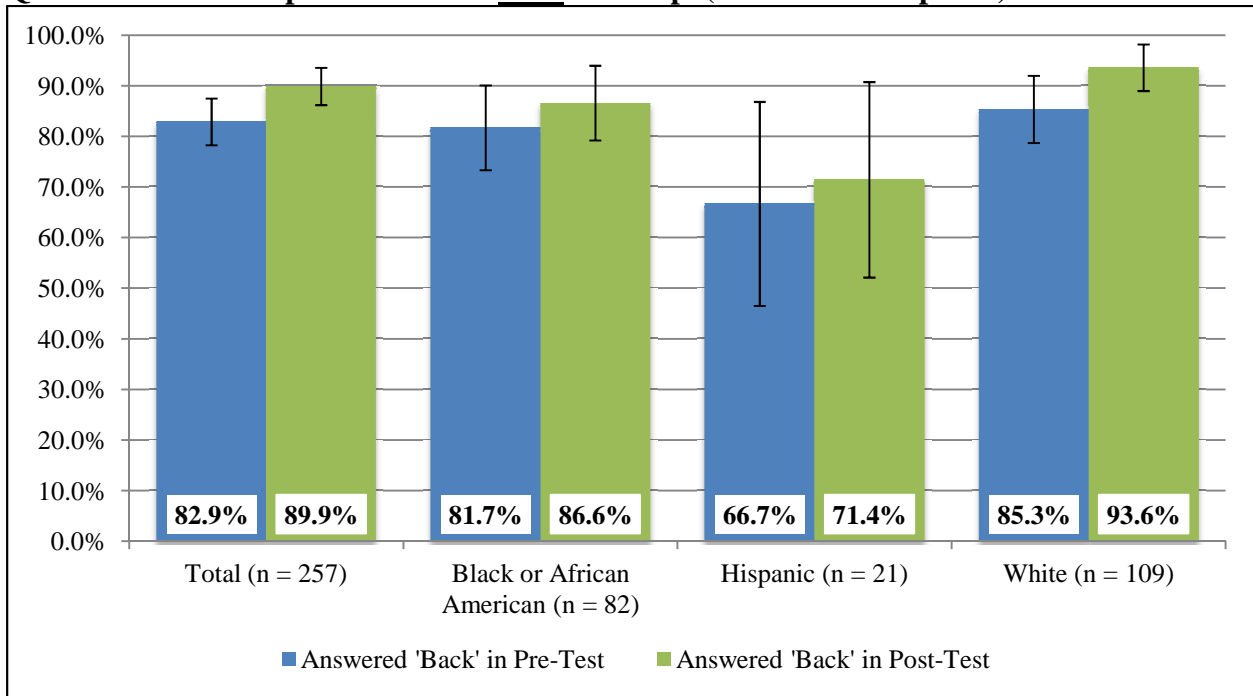


[Matched Cohort] Q1. Think back to your last appointment at WIC. Were you given any of these items? If you were not given any items or do not remember, please leave this blank.⁵

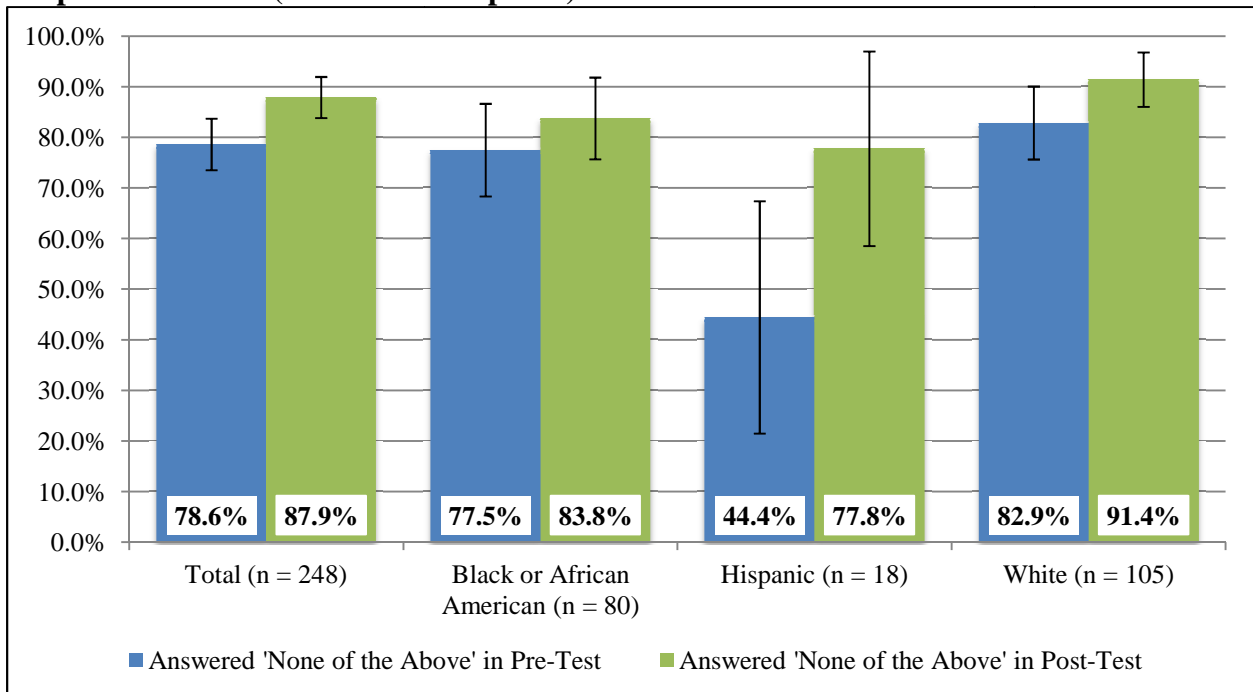


⁵ Caution should be exercised when interpreting the percentages in this graph given that the denominator in each of the three categories is less than 20.

Q6. Infants are best placed on their back for sleep. (% Correct Response).

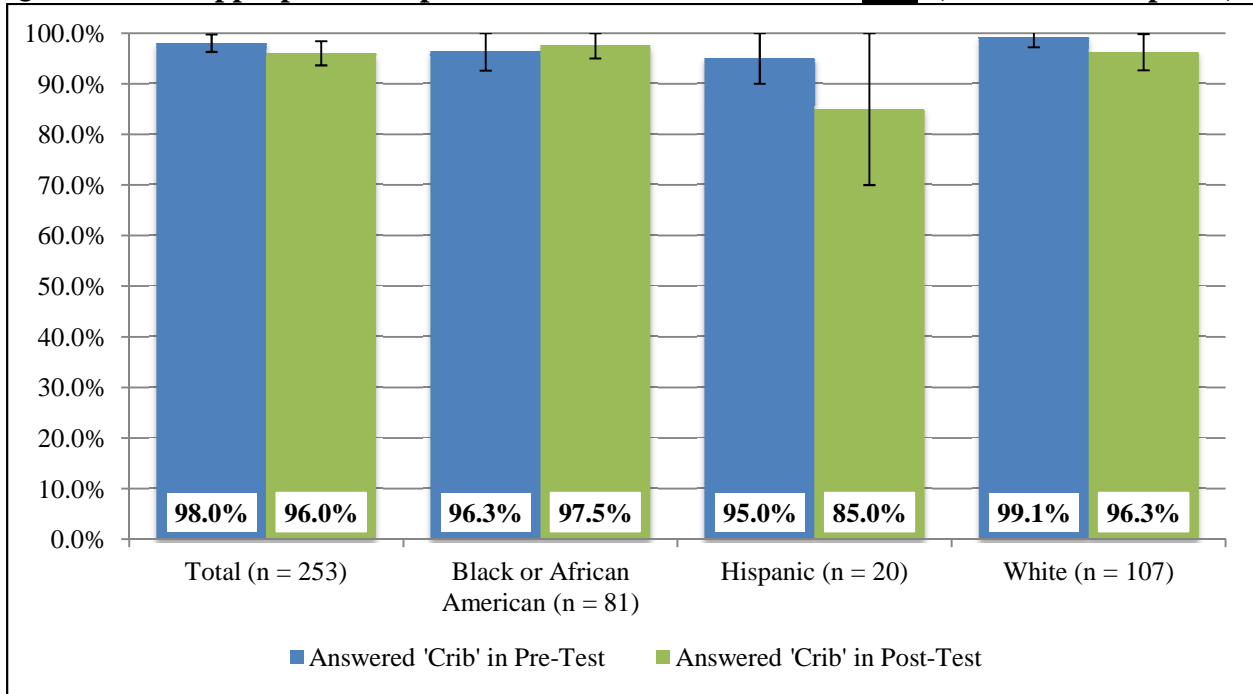


Q7. None of these items – bumpers, pillows, and blankets – should be placed in an infant’s sleep environment. (% Correct Response).⁶

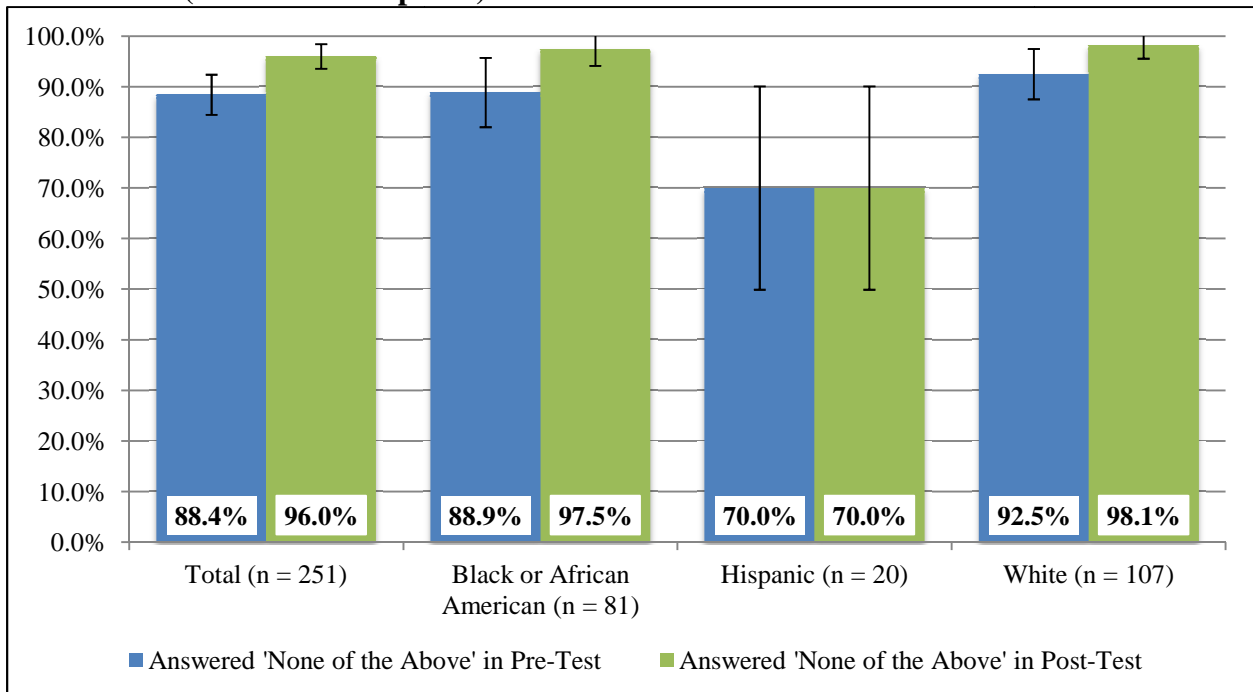


⁶ Caution should be exercised when interpreting the percentages for the Hispanic category in this graph given that the denominator in this category is less than 20.

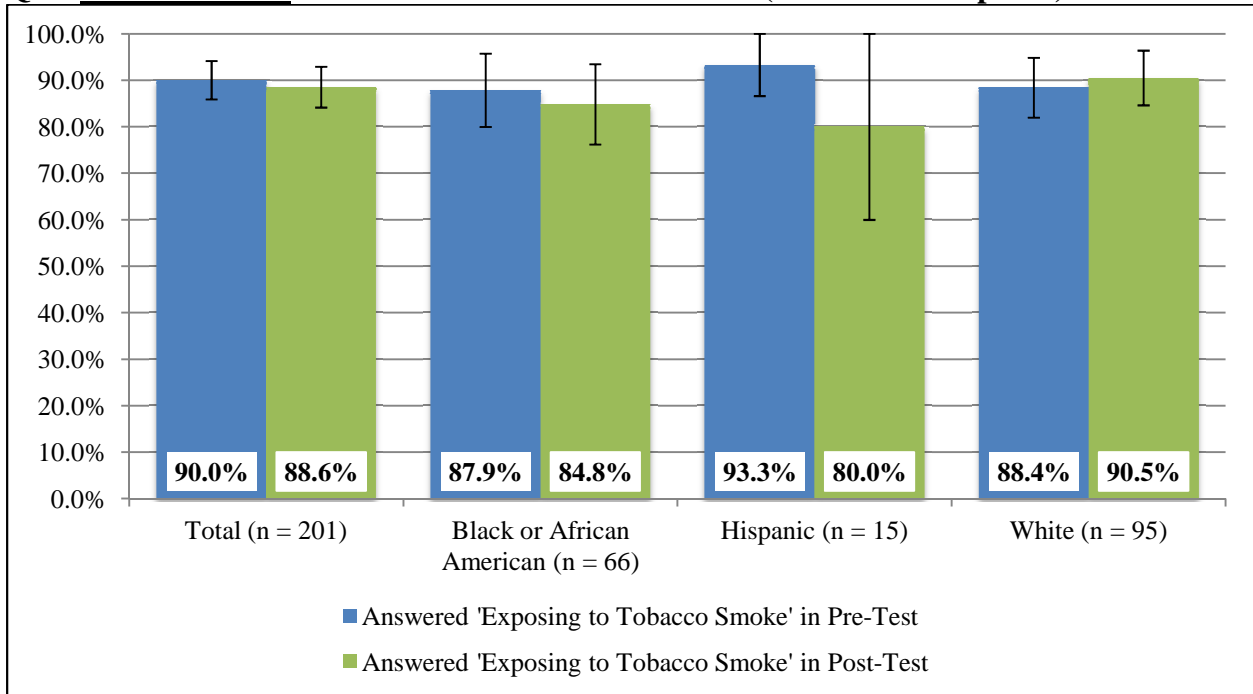
Q8. The most appropriate sleep environment for an infant is a crib. (% Correct Response).



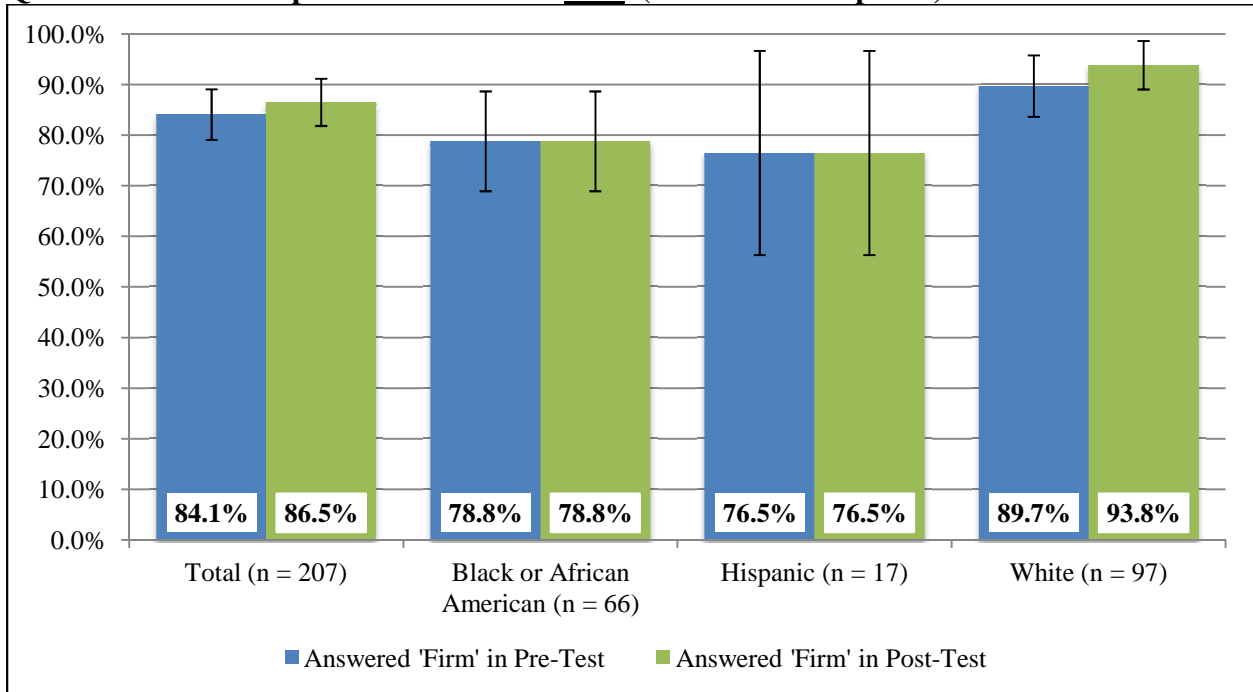
Q9. None of these – adult, another child, or a pet – should sleep on the same sleep surface as an infant. (% Correct Response).



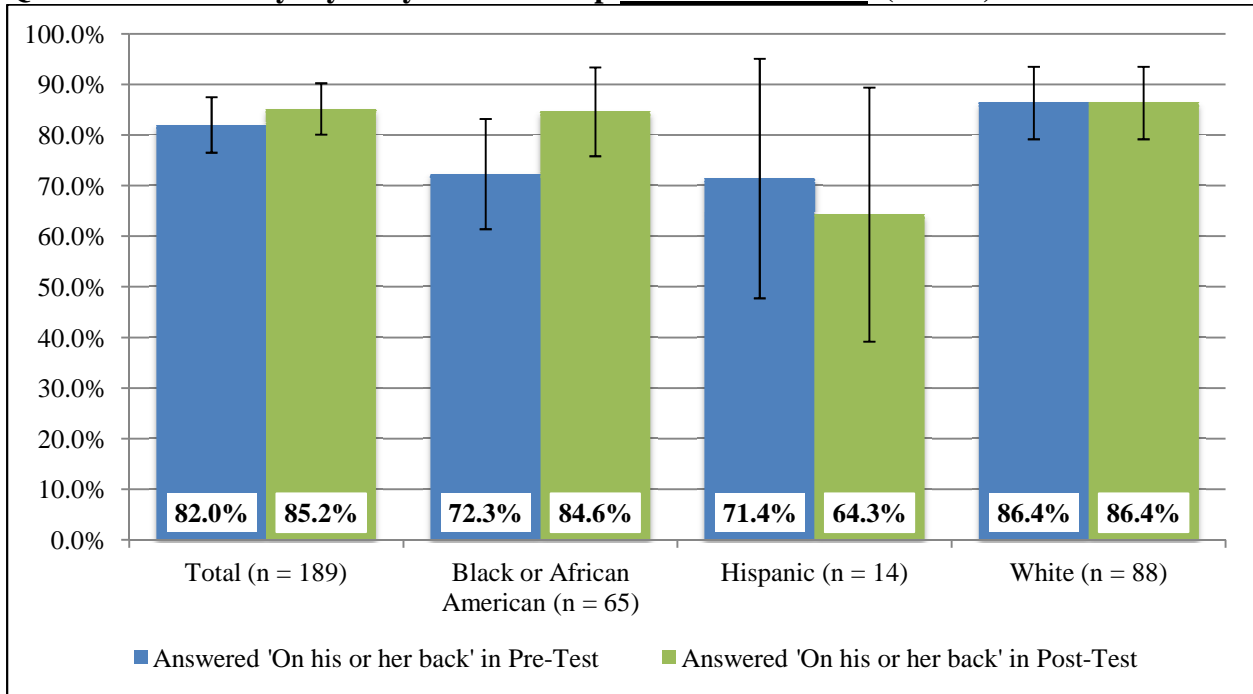
Q10. Tobacco smoke can increase the chances of SIDS. (% Correct Response).⁶



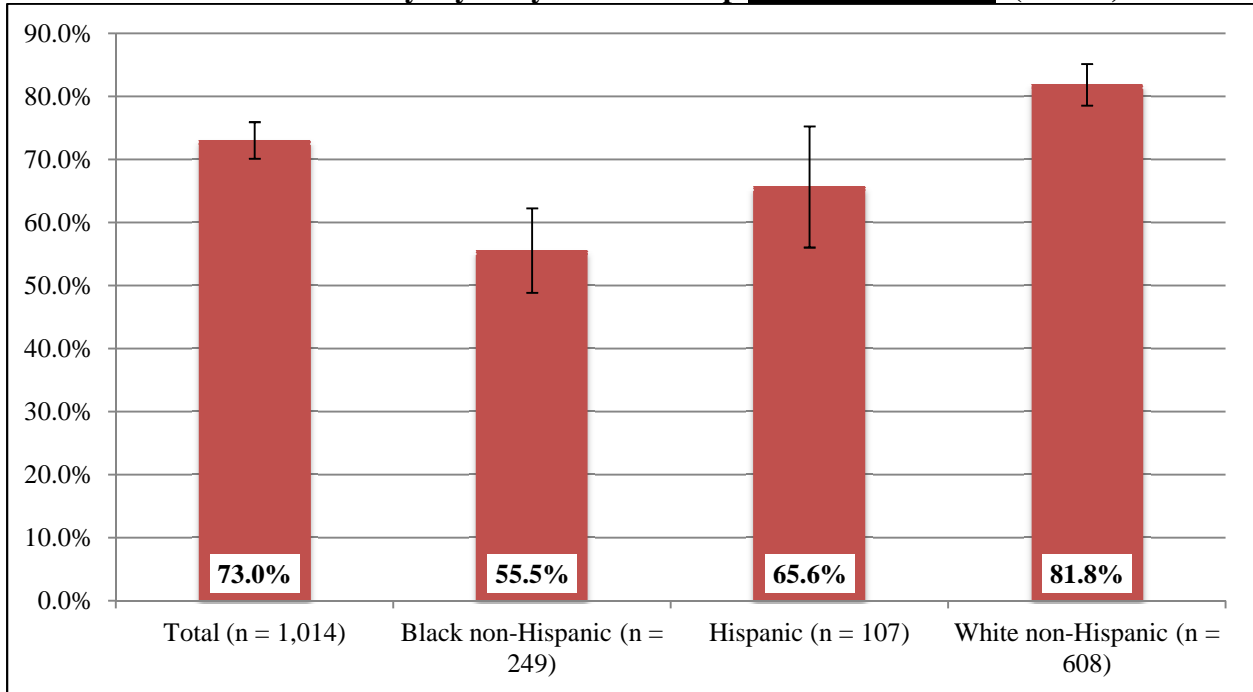
Q11. An infant's sleep surface should be firm. (% Correct Response).⁶



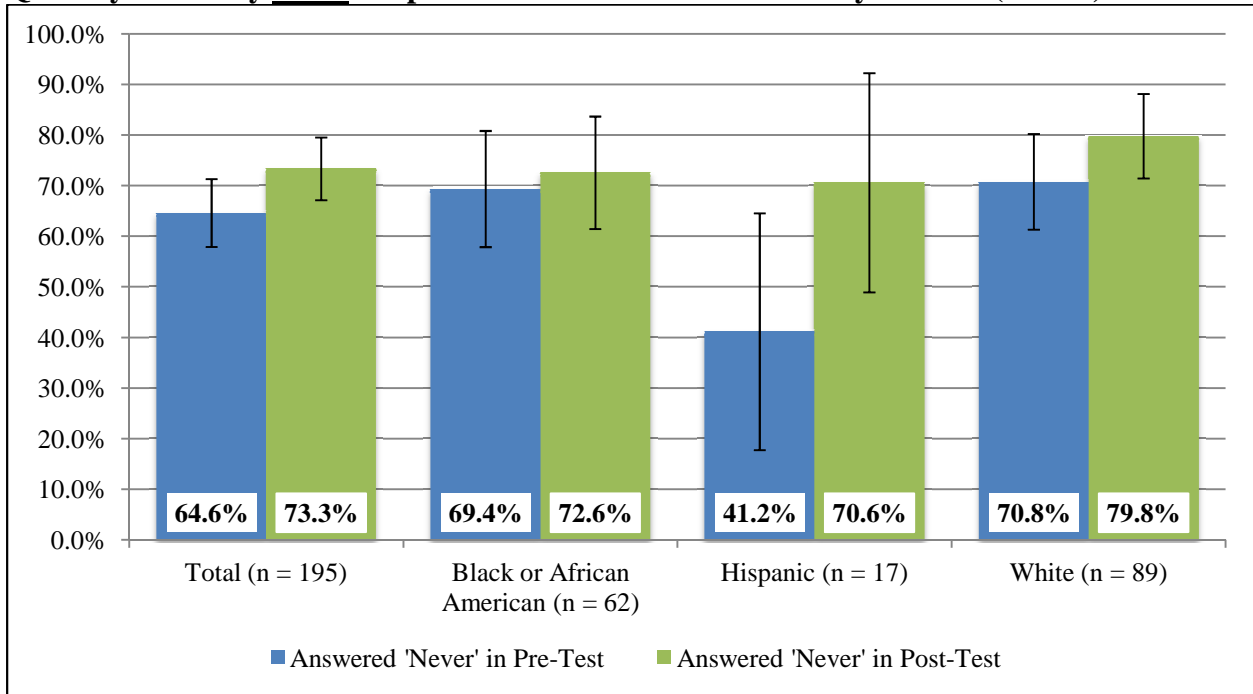
Q12. I most often lay my baby down to sleep on his or her back. (% Yes).⁶



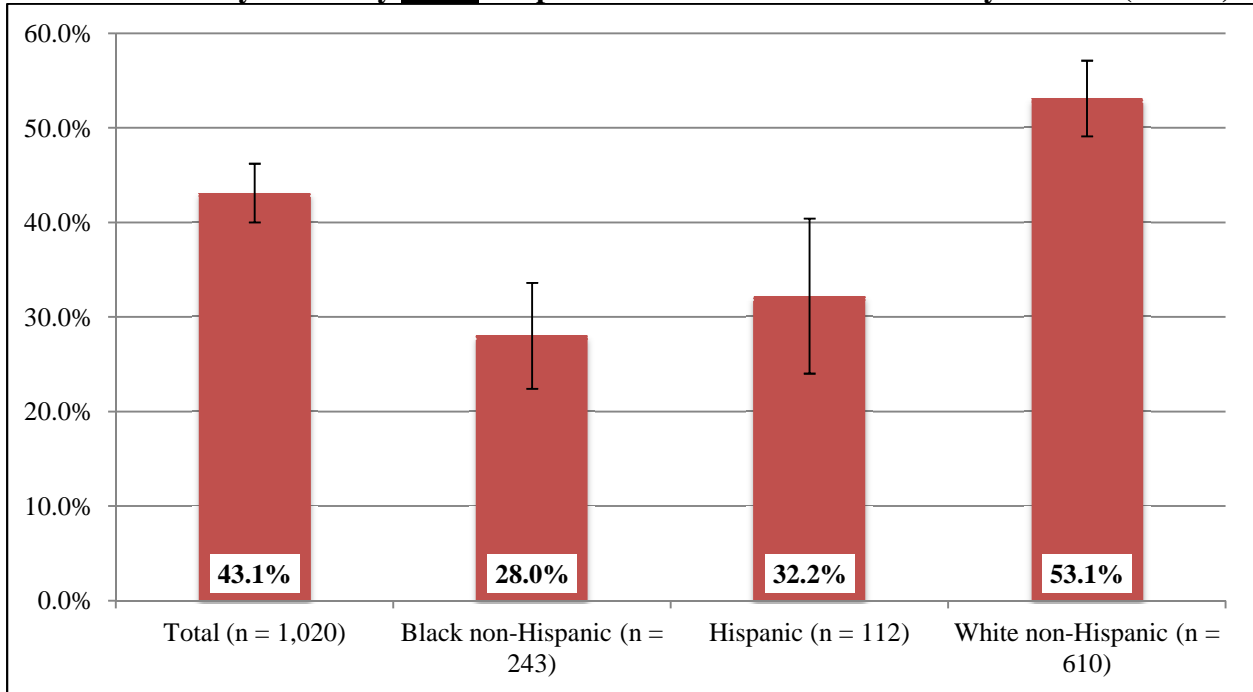
PRAMS 2011. I most often lay my baby down to sleep on his or her back. (% Yes).



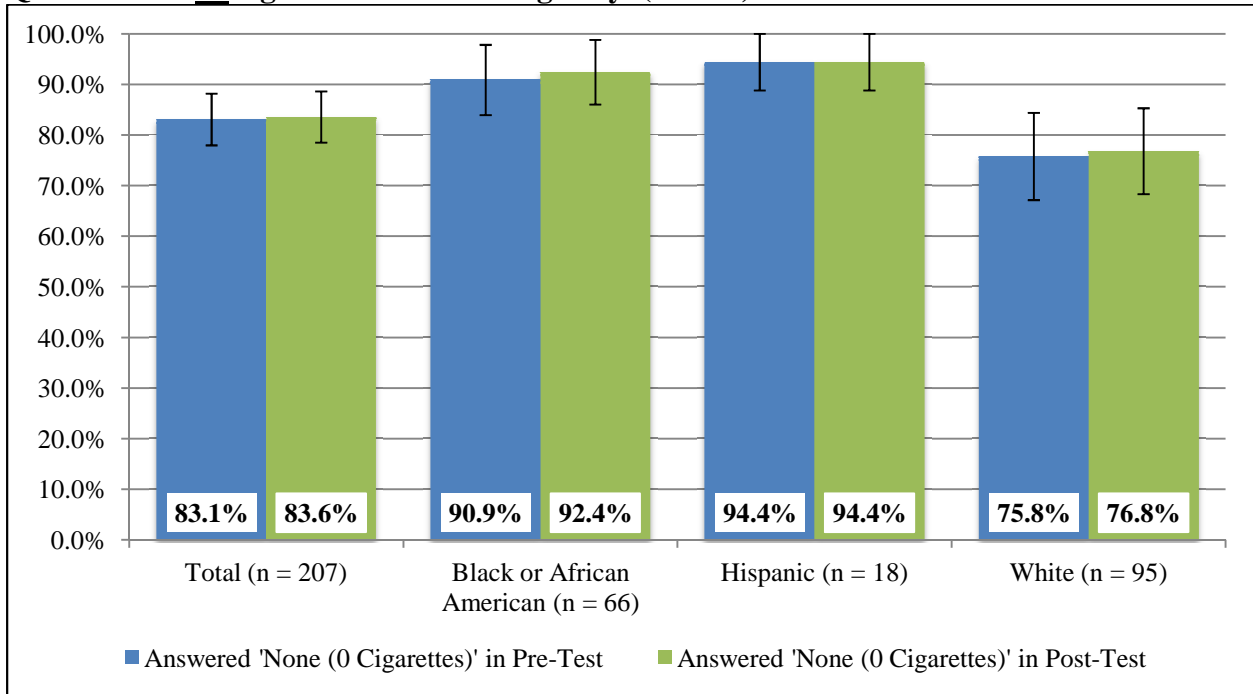
Q13. My new baby never sleeps in the same bed with me or anyone else. (% Yes).⁶



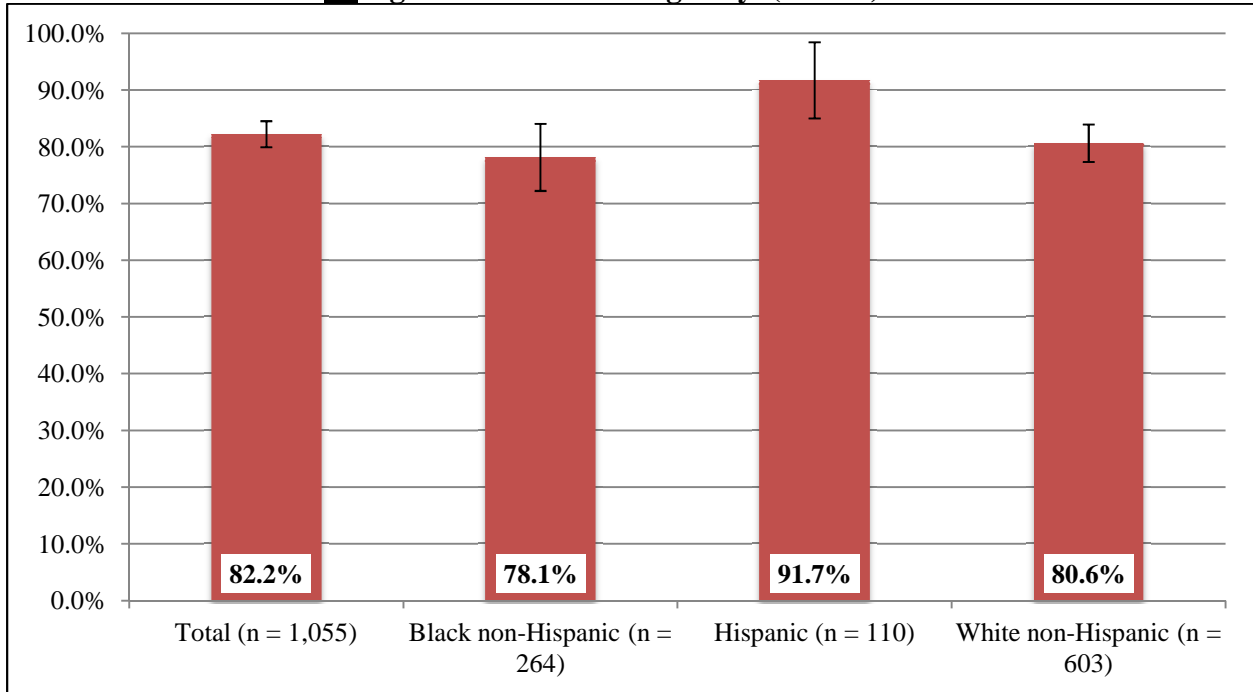
PRAMS 2011. My new baby never sleeps in the same bed with me or anyone else. (% Yes).



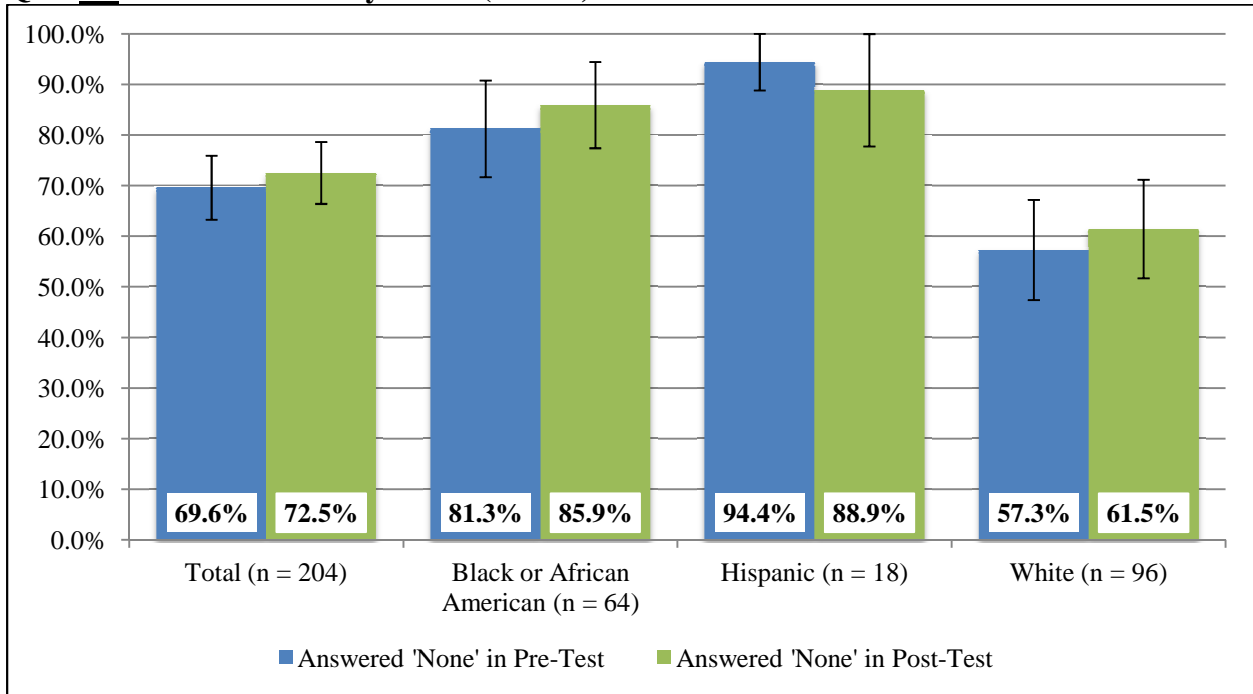
Q14. I smoke no cigarettes on an average day. (% Yes).⁶



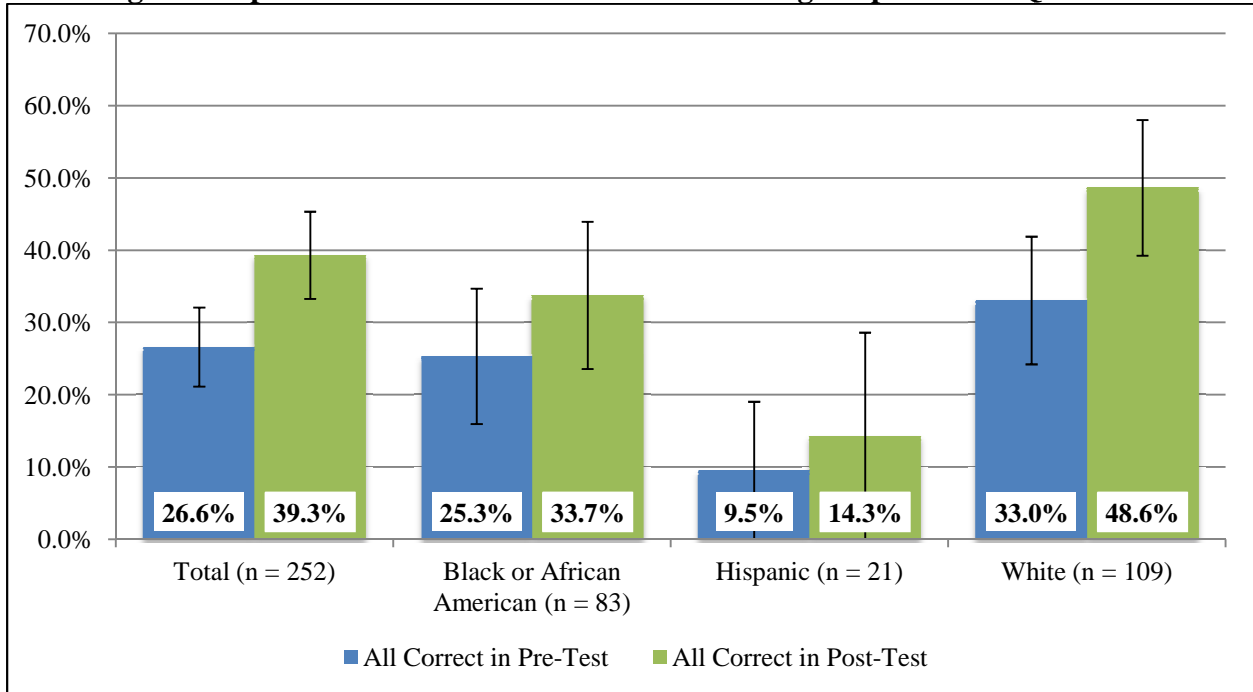
PRAMS 2011. I smoke no cigarettes on an average day. (% Yes).



Q15. No smokers live at my home. (% Yes).⁶



Percentage of Respondents with Correct/Health Promoting Responses for Questions 6-13.



Appendix. Healthy Infant Sleep Environment Questionnaire.

Thank you for taking the time to complete this survey! Please answer each question as best as you can.

1. Think back to your last appointment at WIC. Were you given any of these items? Please circle the items you were given. If you were not given any items or do not remember, please leave this blank.



2. What are your initials? _____ | _____

First Last

3. What is today's date? _____ / _____ / _____

MM DD YYYY

4. What is your date of birth? _____ / _____ / _____

MM DD YYYY

5. What is your infant's date of birth? _____ / _____ / _____

MM DD YYYY

6. Infants are best placed on their _____ for sleep.

- a) Side c) Back
b) Stomach d) All of the above

7. The following are examples of items that should be placed in an infant's sleep environment:

- a) Bumpers c) Blankets
b) Pillows d) None of the above

8. The most appropriate sleep environment for an infant is:

- a) Bed c) Couch
b) Crib d) Swing

9. Of the following, who should sleep on the same sleep-surface as an infant?

- a) Adult c) Pet
b) Another child d) None of the above

10. What item listed below can increase the chances of an infant dying from Sudden Infant Death Syndrome?

- a) Breastfeeding
- b) Offering a pacifier
- c) Exposing to tobacco smoke
- d) Supervising awake “tummy time”

11. An infant’s sleep surface should be:

- a) Soft
- b) Moist
- c) Firm
- d) Cluttered

12. How do you *most often* lay your baby down to sleep now?

- a) On his or her side
- b) On his or her back
- c) On his or her stomach

13. How often does your new baby sleep in the same bed with you or anyone else?

- a) Always
- b) Often
- c) Sometimes
- d) Rarely
- e) Never

14. How many cigarettes do you smoke on an average day *now*? (A pack has 20 cigarettes).

- a) 11 cigarettes or more
- b) 6 to 10 cigarettes
- c) 1 to 5 cigarettes
- d) Less than 1 cigarette
- e) None (0 cigarettes)

15. How many smokers live at your home? _____

16. What is your zip code? _____

If you do not know your zip code or you live in many zip codes, please leave this response blank.

17. What is your race/ethnicity? (Circle all that apply)

- a) American Indian or Alaska Native
- b) Asian-American
- c) Black or African-American
- d) Hispanic or Latino
- e) Native Hawaiian or Other Pacific Islander
- f) White
- g) Some Other Group (please specify):

- h) Refuse to Answer

Thank you for completing this survey!