
Using Table 1 of the report let’s get some confidence intervals. We’ll put all results at 95% confidence. Keep in mind that a percentage (X in the report’s notation) is the same as a proportion ( \( \hat{p} \) from class). A standard error (SE generally; \( S \) in the report’s notation) is nothing more than the appropriate standard deviation estimated from the data. For a proportion \( \hat{p} \)

\[
SE(\hat{p}) = \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}.
\]

Give the CI for the proportion of “mother-only-parent” children who still have asthma.

Point estimate: __________

Error Margin: __________

\[ \underline{_________} < p_m < \overline{_________} \]

Approximately how many children of “mother-only-parent” families were surveyed? __________

Give the CI for the proportion of “father-only-parent” children who still have asthma.

Point estimate: __________

Error Margin: __________

\[ \underline{_________} < p_f < \overline{_________} \]

Approximately how many children of “father-only-parent” families were surveyed? __________

Estimate the ratio of mother-only- to father-only-parent children. __________
State and interpret the CI for the difference between proportions of children of mother-only-parent and father-only-parent children.

Point estimate:__________

Error Margin: __________

__________ < $p_m - p_f$ < __________

Your text would start this exercise by stating something like: 262 of 1957 mother-only children have asthma; 23 of 373 father-only children have asthma. For this situation, the “whole big formula” for error margin is...

$$E = z_{a/2} \sqrt{\frac{\hat{p}_1 (1 - \hat{p}_1)}{n_1} + \frac{\hat{p}_2 (1 - \hat{p}_2)}{n_2}}$$

I am 95% confident that …

Give the CI for the difference between proportions of black and white children who still have asthma.

Point estimate:__________

Standard Error: __________

Error Margin: __________

__________ < $p_m - p_f$ < __________

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1 The text would use the symbol $q$ in place of $(1 - p)$. 
Conduct hypothesis tests to determine if the data supports the following claims. (For each, state the hypotheses, obtain the test statistic, determine the $P$-value, make a conclusion at the 5% level, and report your conclusion in simple nontechnical terms.

The proportion who have asthma in mother-only-parent families is below that for those from neither-mother-nor-father-parent families.

- 262 of 1957 mother-only children have asthma
- 47 of 337 neither-mother-nor-father-parent children have asthma

The proportion who have asthma among Asian Americans is different than that for those who are American Indian or Alaskan Native.

- 5 of 103 American Indian or Alaskan Native have asthma.
- 34 of 398 Asian Americans have asthma.
The target population for NHIS is the civilian noninstitutionalized population of the United States. Persons excluded are patients in long-term care institutions (e.g., nursing homes for the elderly, hospitals for the chronically ill, or physically or intellectually disabled, and wards for abused or neglected children), correctional facilities (e.g., prisons or jails, juvenile detention centers, halfway houses), active duty Armed Forces personnel (although their civilian family members are included), and U.S. nationals living in foreign countries.

Each year, a representative sample of households across the country is selected for NHIS using a multistage cluster sample design.

The interviewed sample for 2010 consisted of 34,329 households, which yielded 89,976 persons in 35,177 families.

The NHIS data are based on a sample of the population and are, therefore, subject to sampling error. Standard errors are reported to indicate the reliability of the estimates.

Standard errors are shown for all percentages in the tables (but not for the frequencies). Estimates with relative standard errors of greater than 30% and less than or equal to 50% are considered unreliable and are indicated with an asterisk (*). Estimates with relative standard errors of greater than 50% are indicated with a dagger (†), but the estimates are not shown. The statistical significance of differences between point estimates was evaluated using two-sided t-tests at the 0.05 level and assuming independence. Terms such as “greater than,” “less than,” “more likely,” “less likely,” “compared with,” or “opposed to” indicate a statistically significant difference between estimates, whereas “similar,” “no difference,” or “comparable” indicate that the estimates are not significantly different.

**Hypothesis Tests**

Two-tailed tests of significance were performed on all the comparisons mentioned in the “Selected Highlights” section of this report (no adjustments were made for multiple comparisons). The test statistic used to determine statistical significance of the difference between two percentages was:

\[
Z = \frac{X_a - X_b}{\sqrt{S_a^2 + S_b^2}}
\]

where \(X_a\) and \(X_b\) are the two percentages being compared, and \(S_a\) and \(S_b\) are the standard errors of those. The critical value used for two-sided tests at the 0.05 level of significance was 1.96.

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2 For large sample sizes such as those generally obtained in this report a T-test is virtually identical to a Z-test.
3 T-tests or Z-tests? See the footnote above!