Methodology for Percent change, for Connecticut Poverty Report:

This note describes (A) <u>types of percent change calculations</u>, and (B) how towns and indicators with <u>Population Cohorts with quite small numbers</u> cause difficulties in assigning percent and percentage point change over the twenty year time span between 1990 and 2010.

(A) <u>Types of Percent change calculations:</u> In developing its perspective for describing the change in the population struggling with the difficulty of insufficient income, the Research Team decided to use one calculation in preference to another.

To describe the change from a previous, known situation, there are two possible ways to calculate a change:
(1) the change as a percent of the previous situation, calculated by taking the difference between two subsequent observations (those at time t and at time t-1) and dividing the resulting number by the value at time t-1, or
(2) the change as the percentage point increase or decrease in the population, which is determined by dividing the number of observations meeting some specific criteria by the total number of possible individuals in the entire population.

Examples of both these calculations are provided below for additional clarity:
(1) A striking example of percent change from the previous time period is that in 1990, a total of 217,347 Connecticut residents were measured by Census as living below the Federal Poverty Line (FPL), and then in 2010, a total of 314,306 were living with this struggle. Thus, the change of 96,959 is 45% higher than the number of persons below the FPL in 1990.
   Formula: [314,306 (2010) - 217,347 (1990)] / 217,347 = 45%.

(2) For the percentage point change of the population experiencing poverty, in 1990, the 217,347 below FPL were 6.8% of the total CT population of 3,188,125, while in 2010, the 314,306 now living below the FPL were 9.2% of the 2010 population of 3,434,901
   Formula: (2010:) 314,306 / 3,434,901 - (1990:) 217,347 /3,188,125 = 2.3% percentage point increase.

(B) <u>Population Cohorts with quite small numbers</u>, or none, at one of the calculation points:

The Research Team's choice of calculating from the initial 1990 PFL Census report did find sufficient numbers to easily calculate percent change within towns for its primary demographic indicators. However, in Connecticut's small towns and in towns where no poverty was reported by Census in 1990, then the change calculation has zero (0) in the denominator, with no possible result from a calculation.

In an attempt to learn how others might handle this situation, CCEA contacted the Census Bureau, and received a reply from Laryssa Mykyta in the Poverty Statistics Branch. Her initial comment was that, "Poverty rates are calculated as the number poor divided by the population at risk. You could discuss changes in terms of the percentage point changes in the poverty rate for a given group." That is, the choice (2) above.

Her recommendation to work with the difference in the population proportion is what we have used for small towns and small cohorts, when the starting point in 1990 was zero.

In the downloadable Data Tables, the percent change calculations that are based on a population percentage point difference are marked with outlined boxes.

Laryssa also encouraged CCEA to confirm the standard error for both years under calculation, particularly for the 2010 year. Since 1990 being zero was the issue rather than small numbers in 2010, CCEA did review some of the ACS Five-year Estimates, particularly in the Age and Race/Ethnicity changes, but found standard errors were within acceptable bounds. Additionally, CCEA reviewed data from the 2000 Census reports, and many of the small towns and small population cohorts were found to also lack poverty in 2000.

From: laryssa.mykyta@census.gov
RE: Poverty Quantitative:query: % increase, when starting cohort pop is zero
To: Coghlan, Jill
Tuesday, February 26, 2013 5:48 PM
Jill,

I am not really sure, from your description, what this issue quite is or why you need to express the change as a percent change.

Poverty rates are calculated as the number poor divided by the population at risk. You could discuss changes in terms of the percentage point changes in the poverty rate for a given group.

In your example, the poverty rate for persons <6y in Sherman, CT was 0% in 1990 and about 8 percent in 2010. That represents an +8 percentage point increase. Now your numbers are small, so the standard errors around that estimate are likely to be quite large, so it isn't clear without the standard errors whether that is a significant increase or not. I would not advise using data from one year if your numbers are that small. You might want to look at multiple years using a weighted average for more reliable estimates.

In your second example, the poverty rate rose 2.3 percentage points between 1990 and 2010, but again, the number of children in poverty may be too small to obtain reliable estimates. Again, you might be better off using multiple years of data, or a broader age group.

I hope this helps. Please do not hesitate to contact me if you need more information.
 Best, Laryssa Mykyta
Poverty Statistics Branch