



# Epi Research Report

New York City Department of Health and Mental Hygiene

September 2012

## Methodology Updates to the New York City Community Health Survey

*The Community Health Survey (CHS) is an annual telephone survey that provides essential data used by the New York City Department of Health and Mental Hygiene to monitor the health of New Yorkers, evaluate the outcomes of public health initiatives and guide policy decisions. With the release of CHS 2011 data, the Health Department has updated its methodology consistent with other large state and national surveys. This Epi Research Report explains these changes in methodology and provides guidance for interpreting trends over time.*

The Community Health Survey (CHS) provides estimates of health indicators and risk factors for New York City overall, each borough and up to 42 neighborhoods. Each year, the New York City Health Department randomly selects approximately 9,000 adults aged 18 and older to participate in the CHS. After the survey is conducted, the data from the random sample of adults are weighted with statistical methods to represent the New York City adult population. The weighting process accounts for the probability of participant selection and reduces bias by adjusting for non-response error (see *Definitions, page 2*).

Starting with CHS 2011, the Health Department is updating its weighting methodology to incorporate Census 2010 population numbers.<sup>1</sup> The weight calculations also now include additional demographic characteristics to best represent adult New Yorkers. The Centers for Disease Control and Prevention (CDC) has recommended similar methodology changes and applied them to its Behavioral Risk Factor Surveillance System (BRFSS).<sup>2</sup>

The weighting updates being implemented with CHS 2011 will be used to calculate estimates that best represent the diversity of New

### Key Findings:

- In 2011, the New York City Health Department changed the weighting methodology of the Community Health Survey (CHS) to incorporate Census 2010 data and additional demographic characteristics to best represent the population of adult New Yorkers in its health and risk factor estimates.
- The updated weighting methodology has minimal or no effect on CHS health estimates and does not impact the interpretation of trends in prevalence (percentages) over time.
- CHS estimates of the number of New Yorkers with a health condition are more sensitive to the changes in methodology than estimated percentages. CHS 2011 estimated numbers should be compared with caution to those from previous years, because changes will reflect not only change in the health indicator, but also population shifts between 2000 and 2010. Trends in health indicators can be best measured using prevalence estimates (percentages).

## Definitions

- **Non-response bias:** Error in estimates that can occur when respondents to a survey differ in their characteristics (such as sex, age or race/ethnicity) from non-respondents.
- **Prevalence estimates:** The estimated percent of adults with a condition at a given time, such as the percent of New Yorkers who smoke.
- **Probability of selection:** The likelihood that any one adult New Yorker will be selected for a survey, such as the Community Health Survey.
- **Raking or iterative proportional fitting:** A repetitive statistical process to adjust survey sample data to match known demographic characteristics of the population. Raking reduces non-response bias in survey estimates.
- **Sampling:** The process of selecting individuals from a population for research to make inferences about that population.
- **Survey weighting:** A value is assigned to each observation in a sample to make the sample comparable to the population it is intended to represent. This value accounts for the probability of selection and corrects for known differences in sex, age, race/ethnicity and other relevant variables between the sample and the study population.

Yorkers. However, changes observed between the CHS 2011 estimates and any previous years of CHS data for a given indicator may be due to real change in the health indicator within the New York City population and/or due to the changes in the weighting methodology. This Epi Research Report compares and explains changes in CHS estimates due to these methodological updates and provides guidance for analyses of CHS trends over time. The key finding of the analyses presented in this report is that the updated methodology has minimal or no effect on CHS health estimates and does not impact the interpretation of trends in prevalence (percentages) over time.

## Community Health Survey Weighting Methodology, 2002-2010

Survey weights are calculated for surveys like the CHS so that over- or

under-represented groups in the survey sample better represent the actual proportions of those groups in the target population (e.g., New York City adults), based on counts from the latest Census. As an example, men aged 18 to 24 comprise 3% of a survey sample, but according to the Census 2010, they make up 6% of the New York City adult population. Each male respondent in that age group would get a larger weight than if the proportion of men aged 18 to 24 in the sample more accurately reflected the proportion in the population.

Three important components used in weighting survey data are (1) the design weight that accounts for the respondent's probability of selection for the survey; (2) demographic characteristics from the survey, such as sex, age and race/ethnicity; and (3) the underlying total population numbers, or "population control

totals," that come from outside sources, such as Census data. All of these components are used to adjust the data so over- or under-represented groups in the sample are accurately represented.

To create CHS weights, the Health Department uses a method called "raking" or "iterative proportional fitting" with certain demographic characteristics (see *Definitions, left column*). Raking makes individual adjustments for each demographic variable in a series of data processing iterations. As each demographic characteristic is included, the weights are adjusted until they are representative of the population.<sup>2</sup> The BRFSS and other national surveys also use this technique.<sup>2</sup>

From 2002 to 2010, CHS data were adjusted using three demographic characteristics: sex, age group and race/ethnicity for each New York City neighborhood. The population control totals came from the Census 2000 throughout this period, since Census 2010 population numbers were not available until after CHS 2010 data were weighted and released. Beginning in 2009, the data were also adjusted at the borough level for telephone usage group (i.e., whether or not sampled households had a landline telephone only, a cell phone only or a combination of landline and cell phone).<sup>3</sup> The CHS has included adults reachable by landline telephone since it began and has included adults who could be reached by cell phone since 2009.

## Updated CHS 2011 Weighting Methodology

Starting in 2011, CHS data are being weighted to the Census 2010 population control totals, which are the most up-to-date population numbers. With this update, the Health Department is also excluding from the population control totals the approximately 3% of adult New Yorkers living in non-residential group quarters (such as nursing homes, college dormitories and correctional facilities). Adults living in group quarters are not eligible to participate in the CHS, so limiting the population control totals will result in a better match between the sample and the actual adult residential population.

In addition to updating to Census 2010, the CHS 2011 weighting process now uses borough-level control totals for four new demographic characteristics: marital status, education, the number of adults in the household and the presence of children in the household. Adding these demographics to those previously used (sex, age and race/ethnicity) reduces non-response bias and increases the representativeness of the data.

## Assessment of CHS Weighting Changes

To evaluate possible changes over time in CHS estimates as a result of the methodological

updates, this report first presents the CHS 2010 and 2011 estimates for select demographics and health indicators. Next, two comparisons examine change caused by:

1. updating the population control totals from Census 2000 to Census 2010; and
2. adding the new demographic characteristics to the weighting process: education, marital status, number of adults in the household and presence of children in the household.

The report also analyzes trends over time for the selected health indicators and offers guidance for evaluating CHS trends, including how to highlight the methodological changes and interpret findings for program and policy decision-making.

Four estimates for each health indicator were created to evaluate any potential influence of the methodological changes (*Table 1*). Two of the estimates use the “official” CHS 2010 and CHS

2011 weights. Two “evaluation” weights for CHS 2010 and CHS 2011 were used to create the additional estimates, using the Census 2010 population control totals with the original demographic characteristics of sex, age and race/ethnicity. These evaluation weights demonstrate changes to CHS 2010 and 2011 estimates if only the population control totals were updated without the other weighting changes.

To determine the effects of the changes to the CHS methods, this report examines six key health indicators, chosen for their importance in tracking the health of New Yorkers: general health status, health insurance status, obesity, daily consumption of sugar sweetened beverages, exercise and current smoking. The CHS is designed to provide estimates of health indicators like those selected and uses demographic variables (i.e., race/ethnicity) to understand health patterns among the diverse groups of New Yorkers. The best

**Table 1 Official and evaluation weights for the Community Health Survey 2010 and 2011**

	Official CHS 2010	Evaluation CHS 2010	Evaluation CHS 2011	Official CHS 2011
CHS year	2010	2010	2011	2011
Population control totals source	Census 2000	Census 2010	Census 2010	Census 2010
Demographic characteristics used	Original*	Original*	Original*	New**

\* Includes demographic characteristics of age, sex, and race/ethnicity.

\*\* Includes demographic characteristics of age, sex, race/ethnicity, marital status, educational attainment, number of adults in household and presence of children.

**Table 2 Percent of adult New Yorkers by age, race/ethnicity, education and marital status, CHS 2010 and 2011**

	Official CHS 2010		Official CHS 2011	
	%	95%CI	%	95%CI
<b>Age group (years)</b>				
18-24	13.3	(11.9, 14.8)	12.9	(11.5, 14.6)
25-44	<b>43.3</b>	<b>(41.6, 45.0)</b>	<b>40.2</b>	<b>(38.3, 42.1)</b>
45-64	<b>28.0</b>	<b>(26.7, 29.3)</b>	<b>31.6</b>	<b>(29.9, 33.2)</b>
65+	15.5	(14.6, 16.4)	15.3	(14.3, 16.4)
<b>Race/ethnicity</b>				
White	<b>39.5</b>	<b>(38.0, 41.0)</b>	<b>35.6</b>	<b>(33.8, 37.3)</b>
Black	22.8	(21.5, 24.1)	22.0	(20.4, 23.6)
Hispanic	25.6	(24.2, 27.1)	26.8	(25.2, 28.5)
Asian/Pacific Islander	<b>10.1</b>	<b>(9.1, 11.2)</b>	<b>13.3</b>	<b>(11.9, 14.8)</b>
Other	2.0	(1.6, 2.6)	2.3	(1.8, 3.1)
<b>Educational attainment</b>				
Less than high school degree	<b>13.7</b>	<b>(12.6, 14.9)</b>	<b>20.4</b>	<b>(18.9, 22.1)</b>
High school degree	23.8	(22.3, 25.2)	24.5	(22.9, 26.1)
Some college	23.2	(21.7, 24.6)	23.2	(21.6, 24.9)
College degree or more	<b>39.4</b>	<b>(37.8, 41.0)</b>	<b>31.8</b>	<b>(30.1, 33.6)</b>
<b>Marital status</b>				
Married/partnered	49.7	(48.0, 51.3)	49.0	(47.1, 50.9)
Separated/divorced/ widowed	<b>19.8</b>	<b>(18.6, 21.0)</b>	<b>18.0</b>	<b>(16.7, 19.3)</b>
Never married	30.5	(28.9, 32.2)	33.0	(31.1, 34.9)

Bold estimates indicate a significant difference between 2010 and 2011 (p-value <0.05). Starting in 2011, CHS weighting methods were updated to incorporate Census 2010 data and additional demographic characteristics.  
Source: NYC Community Health Survey 2010 and 2011

**Table 3 Percent of selected health indicators among adult New Yorkers, CHS 2010 and 2011**

	Official CHS 2010		Official CHS 2011	
	%	95%CI	%	95%CI
Fair/poor general health status	20.9	(19.7, 22.2)	21.8	(20.4, 23.3)
Currently uninsured	16.7	(15.4, 18.0)	18.6	(17.0, 20.3)
Obese (body mass index ≥30)	23.4	(22.1, 24.8)	23.7	(22.2, 25.3)
Consume one or more sugar sweetened beverages daily	30.3	(28.8, 31.8)	29.9	(28.2, 31.7)
No exercise in past 30 days	<b>27.3</b>	<b>(25.9, 28.8)</b>	<b>20.6</b>	<b>(19.2, 22.2)</b>
Currently smoking	14.0	(12.9, 15.3)	14.8	(13.5, 16.3)

Bold estimates indicate a significant difference between 2010 and 2011 (p-value <0.05). Percents are age adjusted. Starting in 2011, CHS weighting methods were updated to incorporate Census 2010 data and additional demographic characteristics.  
Source: NYC Community Health Survey 2010 and 2011

source of data on the demographic composition of New York City is the Census, but four demographic variables (age, race/ethnicity, education and marital status) were chosen for this analysis to demonstrate how well CHS estimates of these characteristics represent the city's demographic composition using the updated weighting methods.

**CHS 2010 to CHS 2011: Official Estimates**

Comparison of the official CHS 2010 and 2011 estimates of the demographic composition of New York City adults shows lower percentages of 25- to 44-year-olds, non-Hispanic whites, adults with a college education, and separated, widowed or divorced adults in 2011 (Table 2). There were higher percentages of 45- to 64-year-olds, Asian/Pacific Islanders and adults without a high school diploma.

Looking at the selected health indicators, the percent of adult New Yorkers in fair/poor health, who have no health insurance, who consume one or more sugar sweetened beverages daily, who currently smoke or who are obese did not change significantly between 2010 and 2011 (Table 3). In 2011, adult New Yorkers were significantly less likely not to exercise in the past 30 days than in 2010 (20.6% vs. 27.3%).

## Effect of Update to Census 2010

According to the Census, there were 6,068,009 adult New Yorkers in 2000 and 6,234,317 adult New Yorkers living in non-group settings in 2010. In addition to the population increase, there were changes in the distributions of age and race/ethnicity of New Yorkers. These demographic shifts can be seen by comparing the official CHS 2010 estimates, calculated with Census 2000 population control totals, with the evaluation CHS 2010 estimates, calculated with Census 2010 population control totals.

A comparison of the CHS 2010 official and evaluation estimates shows a decrease in the percent of adults aged 25 to 44 years and an increase in the percent of 45- to 64-year-olds (*Figure 1*). Additionally, the percent of white New Yorkers dropped, while the percent of Asian/Pacific Islanders increased (*Figure 2*). Since the official and evaluation estimates both come from the CHS 2010 but are calculated differently, tests of statistical difference cannot be conducted. Instead, meaningful differences were used to determine the effect on estimates from updating the population control totals (*see Meaningful difference versus statistical difference, right column*). These demographic shifts in the

population demonstrate the importance of updating the population data used to calculate the official CHS 2011 estimates.

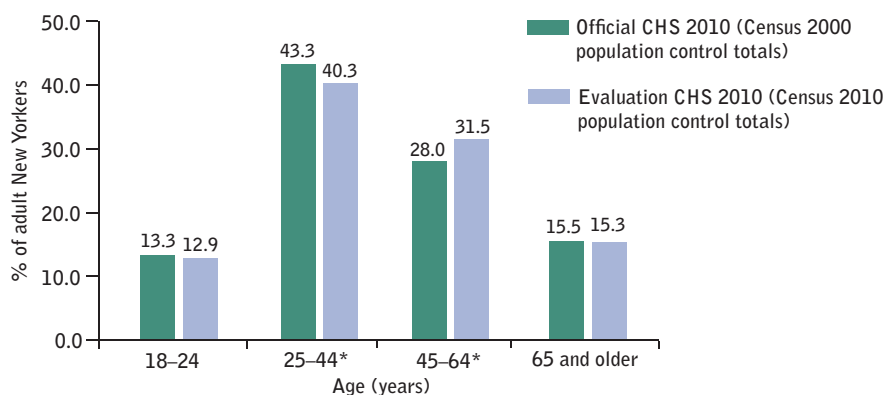
Examination of the selected health indicators found little impact related to updating the CHS population control totals from Census 2000 to Census 2010. Only one health indicator reflected meaningful change: health insurance status (*Figure 3*).

According to the official CHS 2010

### “Meaningful difference” versus statistical difference

Whenever possible, differences between estimates presented in this Report are evaluated using statistical tests of significance. Any difference with a p-value of less than 0.05 is considered statistically different. However, when estimates from the same data source are calculated differently (for example, two estimates from CHS 2010 calculated using different weights) and compared with each other, it is not possible to conduct statistical tests of differences. Instead, a threshold of “Meaningful difference” was adopted, defined as a percent change between estimates of plus or minus 5% and an absolute difference of one percentage point or greater. The latter criterion was applied because percent change measures can be influenced by the prevalence of the health measure (if prevalence is low, percent changes will appear more extreme).

**Figure 1** Age of New Yorkers: official vs. evaluation CHS 2010 estimates



\* Meaningful difference between official and evaluation estimates.  
Source: NYC Community Health Survey 2010



estimates (calculated with Census 2000 population control totals), 16.7% of adult New Yorkers were currently uninsured versus the evaluation estimate (calculated with Census 2010) of 18.1% — a meaningful increase due to the updated population control totals. For all other examined indicators

(see Appendix for complete data), no meaningful differences could be attributed to the updated Census 2010 population control totals.

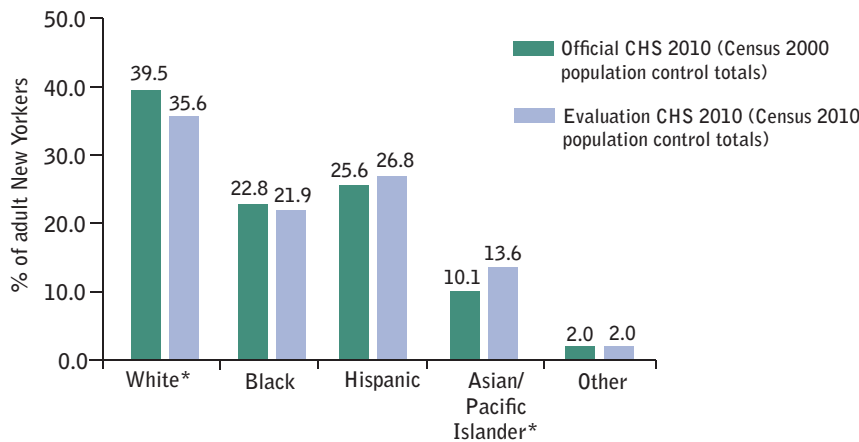
### Effect of Demographic Characteristic Changes for CHS Weighting

The second comparison of estimates determines how they may differ based solely on including additional demographic characteristics in the weighting process (marital status, education, the number of adults in the household and the presence of children in the household).

The official and the evaluation CHS 2011 estimates (see Table 1) were used for this analysis. Since both estimates come from the CHS 2011 but are calculated differently, tests of statistical difference cannot be conducted. Instead, meaningful differences were used to determine the effect of including additional demographic characteristics in the weighting process (see *Meaningful difference versus statistical difference, page 5*).

There were meaningful differences between the official and evaluation CHS 2011 estimates for both education and marital status, as expected with the addition of these variables to the weighting process for the official estimates. The additional demographic characteristics in

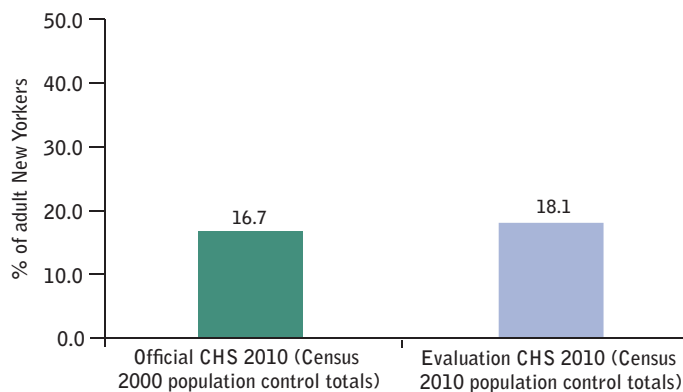
**Figure 2 Race/ethnicity of New Yorkers: official vs. evaluation CHS 2010 estimates**



\* Meaningful difference between official and evaluation estimates.

Source: NYC Community Health Survey 2010

**Figure 3 Lack of health insurance among adult New Yorkers: official vs. evaluation CHS 2010 estimates**



There is a meaningful difference between the official and evaluation estimates. Percents are age-adjusted.

Source: NYC Community Health Survey 2010

the weighting procedure did not result in meaningful differences in age, race/ethnicity or sex.

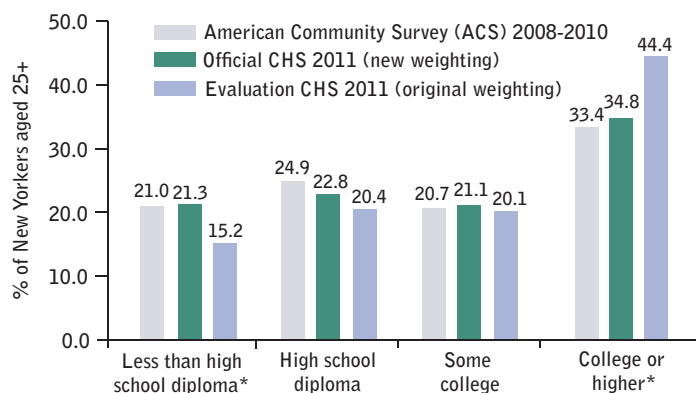
For educational attainment, the official CHS 2011 found that 21.3% of New Yorkers aged 25 years and older do not have a high school diploma (or GED) versus the evaluation estimate of 15.2% (Figure 4). In addition, 34.8% have a college degree or higher versus the evaluation estimate of 44.4%. The official CHS 2011 estimates of educational attainment more closely match the gold standard estimates from the American Community Survey (ACS) (see Technical notes, page 12). For example, the ACS estimates that 21.0% of New Yorkers aged 25 years and older do not have a high school diploma, compared with the official CHS 2011 estimate of 21.3%. In contrast, the original methods underestimate the percent of adults without a high school education and overestimate the percent with a college degree or higher.

For marital status, New Yorkers were less likely to report being separated, divorced or widowed in the official estimate than in the evaluation estimate (18.0% vs. 20.3%) (Figure 5).

Only two of the selected health indicators showed a meaningful difference due to the inclusion of additional demographic characteristics: general health status and health insurance status

(Figure 6). Compared with the evaluation estimates, the official estimates showed higher percentages of New Yorkers with fair/poor self-reported health (21.8% vs. 20.6%) and without

**Figure 4 Educational attainment of New Yorkers aged 25 and older: gold standard ACS estimates and official vs. evaluation CHS 2011 estimates**



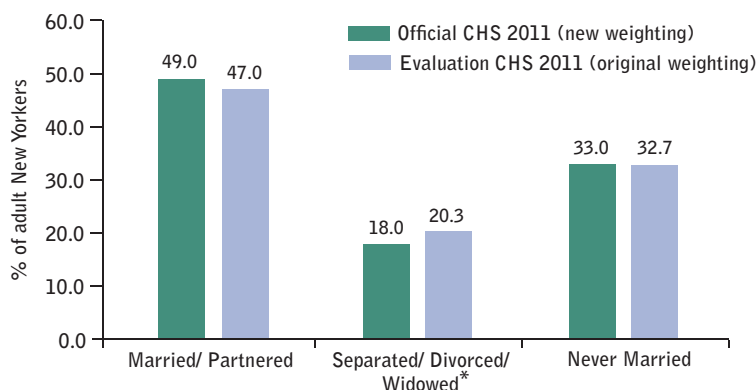
\* Meaningful difference between official and evaluation CHS estimates.

Original weighting included sex, age and race/ethnicity; new weighting added education, marital status, number of adults in household and presence of children. Both estimates calculated using Census 2010 population control totals.

Starting in 2011, CHS weighting methods were updated to incorporate Census 2010 data and additional demographic characteristics.

Sources: American Community Survey 2008-2010, NYC Community Health Survey 2011

**Figure 5 Marital status of New Yorkers: official vs. evaluation CHS 2011 estimates**



\* Meaningful difference between official and evaluation estimates.

Original weighting included sex, age and race/ethnicity; new weighting added education, marital status, number of adults in household and presence of children. Both estimates calculated using Census 2010 population control totals.

Starting in 2011, CHS weighting methods were updated to incorporate Census 2010 data and additional demographic characteristics.

Source: NYC Community Health Survey 2011

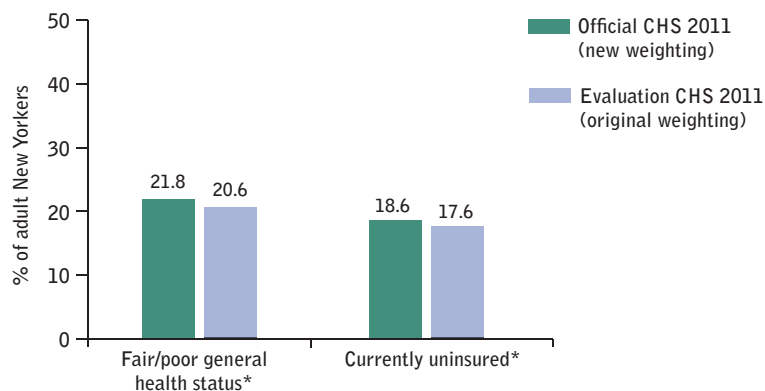
health insurance (18.6% vs. 17.6%). For all other examined health indicators, no meaningful differences could be attributed to the inclusion of the additional demographic characteristics.

### Overall CHS 2002-2011 Trends

The results detailed in this report demonstrate that the 2011 methodological changes to the CHS weights did not have a meaningful impact of the prevalence estimates of most health indicators. Even trends in the estimated percent of uninsured New Yorkers – the only indicator with meaningful differences due to both population control total and demographic characteristic changes – were not affected (Figure 7). Between 2004 and 2010, the prevalence of uninsured ranged from 15.2% to 17.6%. In 2011, the official prevalence was 18.6% and did not differ significantly from the official 2010 estimate of 16.7%. Using the evaluation weights, which both use the same methodology (2010 population control totals and the original demographic characteristics of sex, age and race/ethnicity), there was also no statistically significant difference between 2010 and 2011.

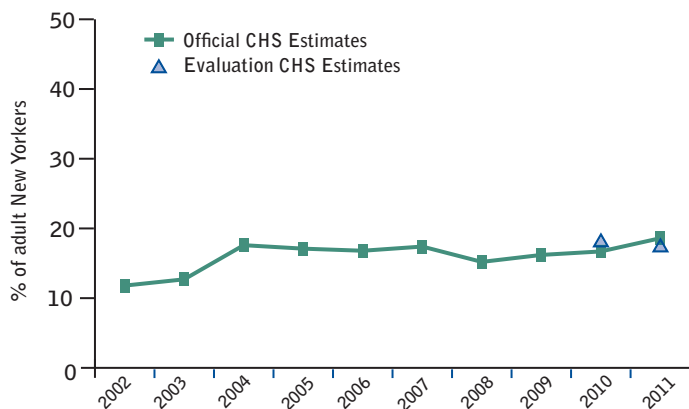
Between 2010 and 2011, the percent of New Yorkers reporting they did not exercise in the past 30 days dropped significantly from 27.3% to 20.6% (Figure 8). The methodological changes in 2011 did not affect the decrease. The 2010 and 2011 evaluation estimates also showed a significant decline in the percent of adults reporting no exercise in the past 30 days.

**Figure 6 Lack of health insurance and general health status among adult New Yorkers: official vs. evaluation CHS 2011 estimates**



\* Meaningful difference between official and evaluation estimates. Original weighting included sex, age and race/ethnicity; new weighting added education, marital status, number of adults in household and presence of children. Both estimates calculated using Census 2010 population control totals. Percents are age-adjusted. Starting in 2011, CHS weighting methods were updated to incorporate Census 2010 data and additional demographic characteristics. Source: NYC Community Health Survey 2011

**Figure 7 Percent of currently uninsured adult New Yorkers, 2002-2011**



Evaluation estimates calculated with weights using Census 2010 population control totals and original demographic dimensions (sex, age, race/ethnicity). Percents are age adjusted. Starting in 2011, CHS weighting methods were updated to incorporate Census 2010 data and additional demographic characteristics. Source: NYC Community Health Survey 2002-2011



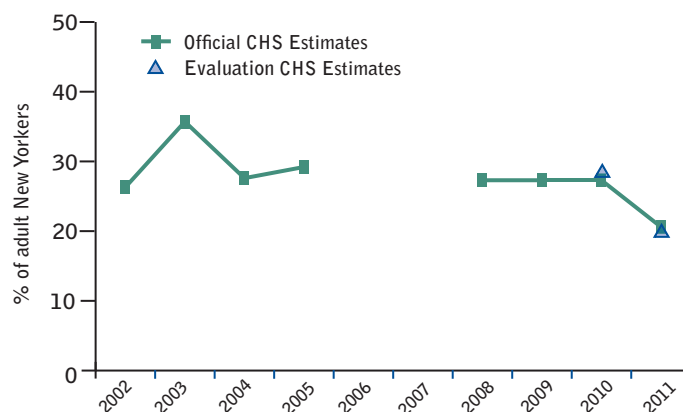
Looking at both the official and the evaluation estimates, none of the other examined health indicators changed significantly between 2010 and 2011, including obesity, daily consumption of sugar-sweetened beverages, smoking and fair/poor general health status (Figures 9–12).

## Interpretation of Community Health Survey Trend Data

The Health Department has found through the analyses presented in this report that interpretation of trends in CHS prevalence estimates can be done directly, with no need for adjustment related to the methodological updates. The weighting changes in 2011 had minimal impact on health estimates, yet produce the most representative estimates for New Yorkers. No individual or unique interpretation of trends in prevalence estimates between 2011 and early years is required.

Any presentation of trends should be accompanied by a note to inform readers about the changes in weighting methodology. All Health Department releases of CHS 2011 or later years of data will include a reference to the methodological changes: “Starting in 2011, the CHS has incorporated Census 2010 data and additional demographic characteristics in its updated weighting methodology.”

**Figure 8** Percent of adult New Yorkers reporting no exercise in the past 30 days, 2002-2011

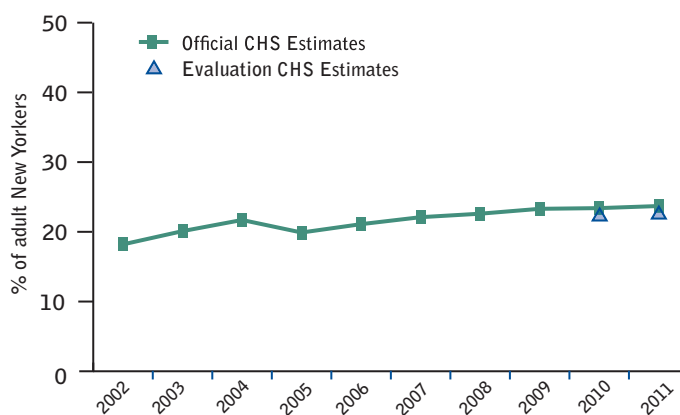


Evaluation estimates calculated with weights using Census 2010 population control totals and original demographic dimensions (sex, age, race/ethnicity). Percents are age adjusted.

Starting in 2011, CHS weighting methods were updated to incorporate Census 2010 data and additional demographic characteristics.

Source: NYC Community Health Survey 2002-2011

**Figure 9** Percent of obese adult New Yorkers, 2002-2011



Evaluation estimates calculated with weights using Census 2010 population control totals and original demographic dimensions (sex, age, race/ethnicity). Percents are age adjusted.

Starting in 2011, CHS weighting methods were updated to incorporate Census 2010 data and additional demographic characteristics.

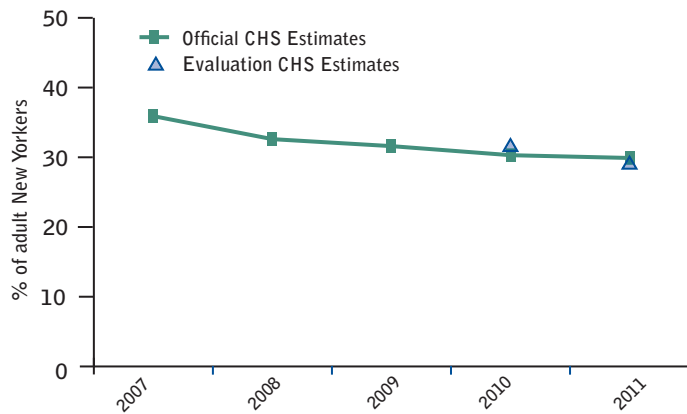
Source: NYC Community Health Survey 2002-2011

**Sample methodological note for CHS trend data**

To be included as a footnote to tables and graphs depicting CHS 2011 data:

Starting in 2011, CHS weighting methods were updated to incorporate Census 2010 data and additional demographic characteristics.

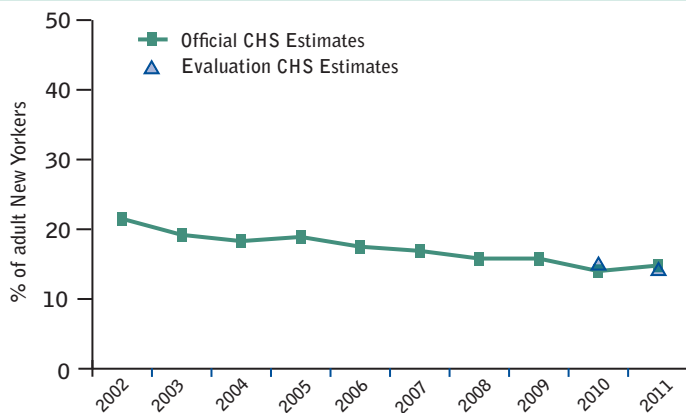
**Figure 10 Percent of adult New Yorkers who report drinking one or more sugar sweetened beverages daily, 2007-2011**



Evaluation estimates calculated with weights using Census 2010 population control totals and original demographic dimensions (sex, age, race/ethnicity). Percents are age adjusted. Starting in 2011, CHS weighting methods were updated to incorporate Census 2010 data and additional demographic characteristics.

Source: NYC Community Health Survey 2007-2011

**Figure 11 Percent of adult New Yorkers who currently smoke, 2002-2011**



Evaluation estimates calculated with weights using Census 2010 population control totals and original demographic dimensions (sex, age, race/ethnicity). Percents are age adjusted. Starting in 2011, CHS weighting methods were updated to incorporate Census 2010 data and additional demographic characteristics.

Source: NYC Community Health Survey 2002-2011

**Interpretation of CHS trends in estimated numbers of New Yorkers**

The estimated number of people with a condition at a given time is useful for understanding the burden of a condition for resource allocation or program planning. For example, if the goal is to order enough nicotine patches so every adult smoker can use them to quit, then it is important to know that there are approximately 930,000 adult smokers in New York City.

Estimated numbers of New Yorkers from the CHS are more sensitive to the methodological changes than prevalence estimates (see *Definitions, page 2*). Therefore, comparisons of estimated numbers of people from CHS 2011 with previous years should be made with caution. For example, if the prevalence of an outcome remained at 10% in 2010 and 2011, the estimated number of people would appear to be larger (16,000 more New Yorkers) due to the increase in the New York City population between 2000 and 2010. This apparent increase would reflect the shift from Census 2000 to Census 2010 data for weighting. (Figure 13).

Observed changes in estimated numbers of New Yorkers will reflect changes in the population control totals. Thus, the Health Department recommends using the change in estimated numbers of people from the CHS between 2011 and previous years with caution, keeping these methodological changes in mind.

Change in health indicators over time is best measured using prevalence estimates. However, when comparing the estimated number of New Yorkers between CHS 2011 and previous years, the result should be interpreted as “up to X-number more” or “at least X-number fewer,” and the following note should be included: “Beginning with CHS 2011, the estimated number of people represent population growth per Census 2010.”

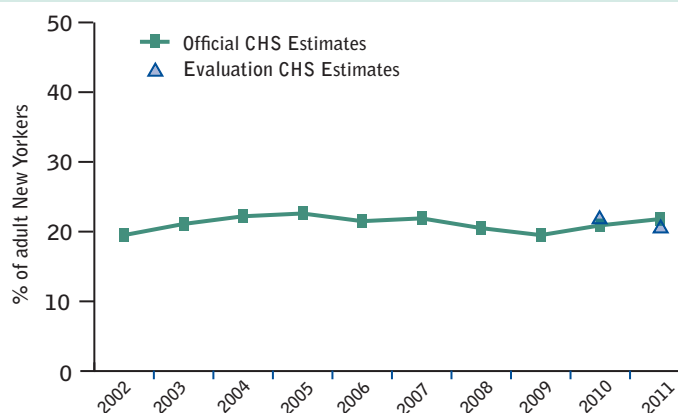
### Conclusion

To make estimates of health indicators more representative and to minimize bias, telephone surveys must periodically revise and update their data collection and weighting methodology. Using Census 2010 for population control totals improves the representativeness of CHS data by using the most valid and recently available population data. The inclusion of additional demographic characteristics in the weighting process also increases representation, reduces the potential for bias and reflects changes in state and national surveys. Together, these methodological changes have resulted in the best possible CHS 2011 estimates of the health of New Yorkers.

The Health Department will continue to use the updated weighting methodology implemented with CHS 2011 with future years of data, using Census 2010 population control totals for the residential adult population and the following demographic characteristics: sex by age and race/ethnicity by NYC

neighborhood and marital status, educational attainment, the number of adults in the household and the presence of children in the household by borough. This updated weighting methodology will ensure the best representation of adult New Yorkers in CHS health and risk factor estimates.

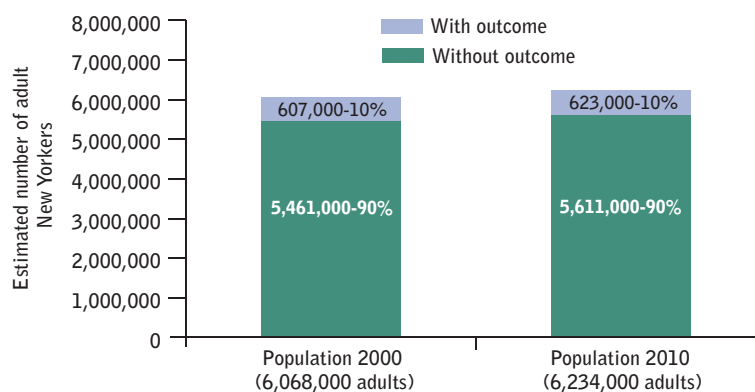
**Figure 12** Percent of adult New Yorkers who report fair or poor general health, 2002-2011



Evaluation estimates calculated with weights using Census 2010 population control totals and original demographic dimensions (sex, age, race/ethnicity). Percents are age adjusted. Starting in 2011, CHS weighting methods were updated to incorporate Census 2010 data and additional demographic characteristics.

Source: NYC Community Health Survey 2002-2011

**Figure 13** Example — change in estimated number of people with no change in prevalence estimate



Sources: Census 2000 and 2010; “outcome” data for illustration only.

## Technical notes

**Age-adjustment:** All CHS estimates of health indicators are age-adjusted to the US 2000 Standard Population. Estimates of demographic characteristics are not age-adjusted.

**Population control total calculation:** Population control totals for these additional demographic characteristics were calculated from Census 2010 data with proportions from the 2008-2010 American Community Survey (ACS) Public Use Microdata Sample (PUMS).<sup>4</sup>

**Imputation:** Imputation is a process that statistically assigns values when information is missing in survey data. An important aspect in weighting survey data is the imputation of missing values for the demographic characteristics that will be used in the raking process. Missing values are the result of respondents not providing an answer to a question, i.e., refusing to give their marital status. Imputed values are assigned to the weighting variables when values are missing, but are not included in the final data set.

**American Community Survey:** The American Community Survey (ACS) is an on-going statistical survey conducted by the US Census Bureau. The ACS collects information on demographics, such as education and marital status, as well as household characteristics, such as home ownership. <http://www.census.gov/acs/www/>

## References

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**Mayor:** Michael R. Bloomberg

**Commissioner of Health and Mental Hygiene:** Thomas A. Farley, MD, MPH

**Division of Epidemiology:** Carolyn Greene, MD, **Deputy Commissioner**

**Bureau of Epidemiology Services:** Tiffany G. Harris, PhD, MS, **Assistant Commissioner**

Donna Eisenhower, PhD	Leena Gupta, MPH
Enver Holder-Hayes, MPH	Stephen Immerwahr, MA
Kevin Konty, MS	Jennifer M. Norton, PhD
Carolyn Olson, MPH	Michael Sanderson, MS

Appendix tables are available online at  
<http://nyc.gov/html/doh/downloads/pdf/epi/epiresearch-chsmethods-appendix.pdf>

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