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Colorectal Cancer Incidence and Mortality in Pennsylvania

March is National Colorectal Cancer Awareness Month

In recognition of March as National Colorectal Cancer Awareness Month, the following statistics were assembled to illustrate the burden of colorectal cancer in Pennsylvania. From 2006 to 2010, the rates of both colorectal cancer incidence and mortality have been on the decline in the state.

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A Review of Breastfeeding in Pennsylvania

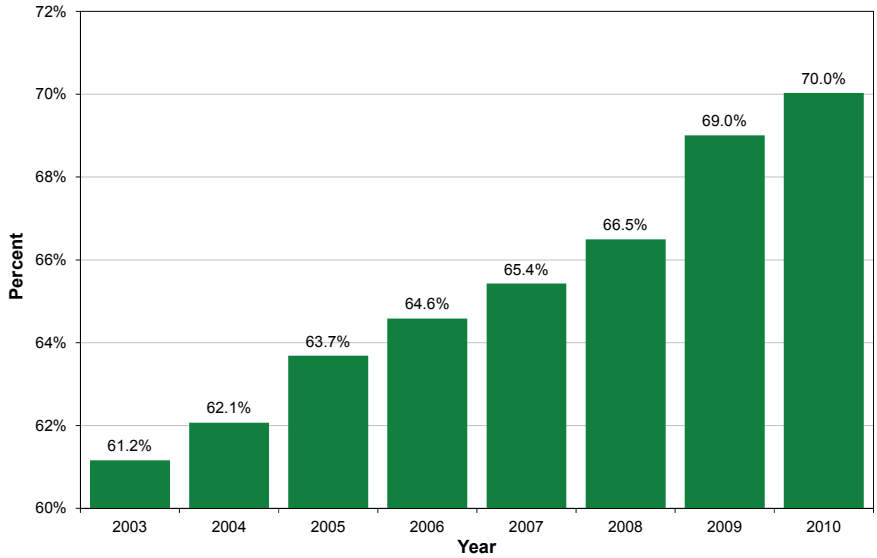
Recent Trends Examined

While social endorsement of breastfeeding has been a recent topic for the media and legislation, growth in the popularity of breastfeeding has been occurring in Pennsylvania since 2003. Breastfeeding on the 2003 revised birth certificate is defined as live birth babies that were fed milk from their mothers either by pumped/expressed milk or direct suckling shortly after birth.

All races and reported age groups in Pennsylvania have increased their initiation of breastfeeding rates since the data have first been recorded by the state. Legislation, media and general public awareness of the benefits of breastfeeding are more than likely the root cause of these higher rates. People are also becoming more aware of the possible negative impacts of processed foods.

There have been several state and federal laws passed within the last six years that promote breastfeeding and protect the rights of mothers who decide to nurse their babies. The Pennsylvania Freedom to Breastfeed Act was signed into law in July 2007. In doing so, Pennsylvania joined 38 other states that had already signed similar state laws at that time. As of today, 45 states and the Virgin Islands have signed similar laws. The Pennsylvania law permits mothers to nurse in public, whether the breast is covered or uncovered, without being accused of indecent exposure, sexual conduct or being a nuisance. Pennsylvania mothers initiated breastfeeding for 65.4 percent of the total live births in the state during 2007, and the rate has increased in every year following that (see Chart 1).

Chart 1
Percent of Mothers Initiating Breastfeeding, Pennsylvania Residents, 2003-2010



On March 23, 2010, President Obama signed the Patient Protection and Affordable Care Act, and on March 30, 2010, he signed the Reconciliation Act of 2010. These laws amend the Fair Labor Standards Act (FLSA) of 1938, requiring employers to provide reasonable unpaid break time for employees to express milk (until the child is 1 year of age) whenever the mother feels she needs to express milk. The employer must also provide a place other than the bathroom for the mother to express milk. Employers of less than 50 employees are exempt from these standards. The District of Columbia, Puerto Rico and 24 other states have additional state laws for expressing milk in the workplace.[1]

Although currently there are no additional state laws in Pennsylvania for expressing milk in the workplace, there are government-funded programs that take a proactive approach to promoting breastfeeding regardless of location. Founded in 2004 by the Pennsylvania Department of Health's Bureau of Family Health, Pennsylvania's Breastfeeding Awareness and Support Program is one of the strongest and most influential proactive breastfeeding groups in Pennsylvania. It offers a wide variety of statistics and information regarding who is breastfeeding, how to properly breastfeed and troubleshooting for breastfeeding mothers. If unable to directly assist those in need, the program is able to direct those people to many other groups for assistance.

According to the Center for Food Safety and Applied Nutrition, in 2002, a sample of 141 dried infant formulas produced 20 contaminations of Cronobacter sakazakii bacteria. While an infection from the bacteria is relatively rare, it can be fatal when it occurs. According to the World Health Organization (WHO), in the few outbreaks reported, 20 percent to more than 50 percent of

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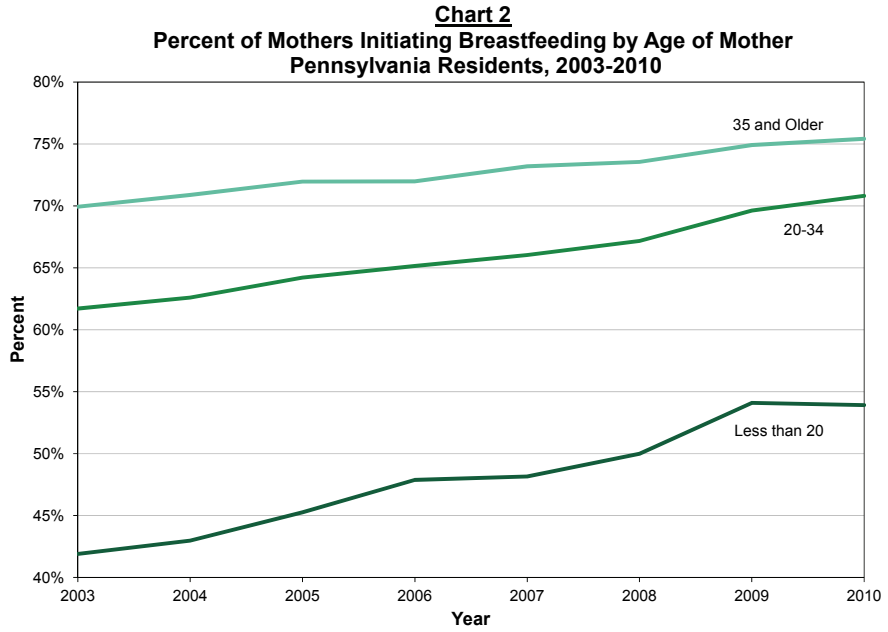
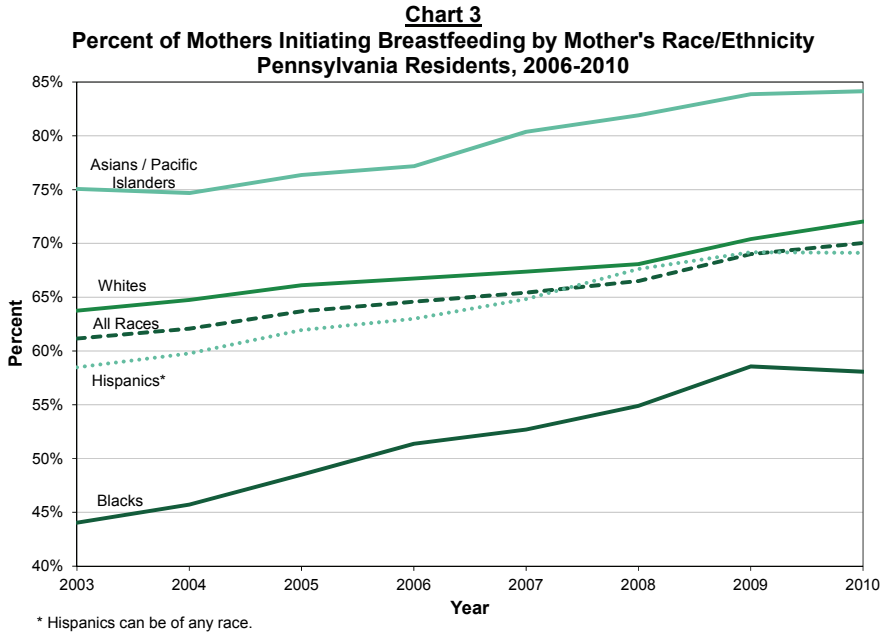
the infants who contracted the disease died. Survivors often have lifelong neurological disorders and other complications. According to the WHO, there have been no reported cases of breastfed-only infants being infected with C. sakazakii bacteria.

Breastfeeding offers health benefits to infants that usually cannot be synthesized through artificial formulas. According to the American Academy of Pediatrics, the WHO and the Centers for Disease Control and Prevention (CDC), a mother must exclusively breastfeed for at least six months to obtain the full benefits for their child. Breast milk contains a balance of fats, proteins, nutrients, vitamins, minerals and antibodies, and it is much easier to digest than formula and milk products obtained from other animals.

Immune systems of both the mother and the infant can be improved through breastfeeding. Breastfeeding mothers have been linked to lower rates of breast cancer, ovarian cancer, type-2 diabetes and postpartum depression. Babies who were breastfed are reported to have lower risks of necrotizing enterocolitis (a gestational complication of preterm births), respiratory infections, asthma, obesity and type-2 diabetes. There are also reported connections to infants having lower rates of type-1 diabetes, childhood leukemia, sudden infant death syndrome (SIDS) and atopic dermatitis (a skin rash).

According to the United States Department of Health and Human Services, if 90 percent of the United States population were breastfed, then nearly 1,000 infant deaths could be prevented annually. This rate would save an estimated $13 billion per year in medical expenses. Even a rate of 80 percent could save an estimated $10.5 billion per year.





The breastfeeding initiation rates for Pennsylvania mothers of all age groups and races increased from 2003 to 2010 (see Charts 2 and 3). Mothers 35 and older were more likely to initiate breastfeeding for their children than any other age group from 2003 to 2010. Mothers less than 20 years old had the lowest breastfeeding initiation rates, compared to older mothers. However,

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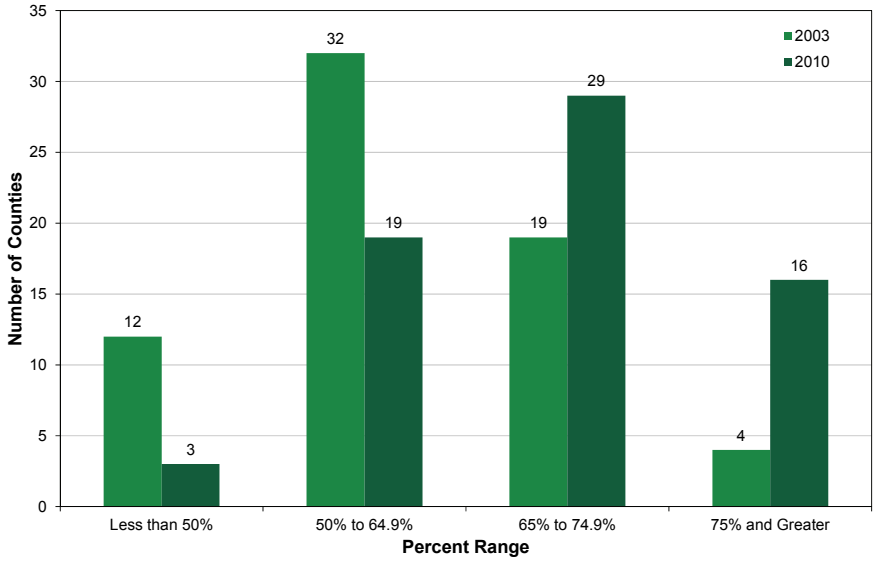
these younger mothers displayed the most improvement between 2003 and 2010. Among the race/ethnicity groups reviewed, Asian and Pacific Islanders had the highest breastfeeding initiation rates, while black mothers had the lowest rates recorded. The greatest increase amongst races between 2003 and 2010 occurred for black mothers.

Every county except for three (Elk, Fayette and Lackawanna) exceeded the 50 percent breastfeeding initiation rate in 2010 (see Chart 4). By 2010, most counties had improved their breastfeeding initiation rates. The most notable change was the number of counties that had a breastfeeding initiation rate exceeding 75 percent. This number quadrupled between 2003 and 2010. The county that has seen the highest rate of change is Cameron, followed by Carbon and Montour counties. Two counties, Forest and Clinton, have actually declined in the breastfeeding initiation rate between 2003 and 2010. Fayette County had the lowest breastfeeding initiation rate, 47.3 percent, while Centre County had the highest rate, 84.5 percent, in 2010.

Chart 4
Number of Counties by Breastfeeding Initiation Percent Range
Pennsylvania Residents, 2003 and 2010



As this article explained, there are quite a few benefits in breastfeeding that extend well beyond the health of the infant. The mothers' health, environmental health, energy consumption and the healthcare system can all benefit if the rate of infants being breastfed continues to increase. The impact of breastfeeding is so important that recent laws have even been created to encourage mothers to breastfeed.

If you have any questions about this article, please contact the Bureau of Health Statistics and Research at 717-783-2548. Additional birth statistics for Pennsylvania can be obtained from the Birth, Death, and Other Vital Statistics Web page and are also available on EpiQMS, our online interactive data dissemination tool.

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[1] "Breastfeeding State Laws." *National Conference of State Legislatures*. National Conference of State Legislatures, May 2011. Web. 11 Oct 2012. http://www.ncsl.org/issues-research/health/breastfeeding-state-laws.aspx

Healthy People 2020: Topic Area FS (Food Safety)

Campylobacter Species and Salmonella Incidence on the Rise

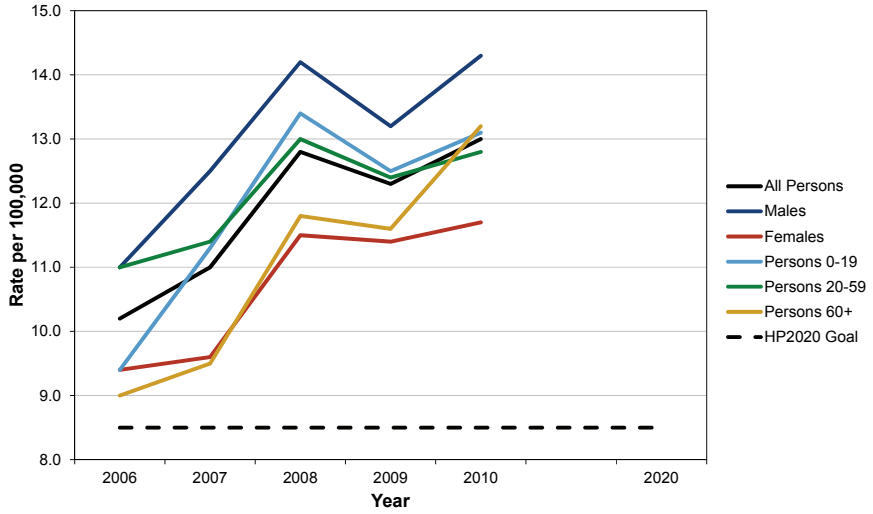
Foodborne illnesses are a burden on public health and contribute significantly to the cost of health care. This is why food safety is so important in production, processing, packing, distribution, storage and preparation of food. Since fewer consumers grow and prepare their own food, they have less control over the safety of their food. This leaves the bulk of the responsibility on the processing and retail food industries. These industries face the challenges of high employee turnover rates, trying to rapidly trace back/forward food items of interest and dealing with new sources of food (such as imports) that introduce new risks. However, there are some habits that the consumer can develop that will decrease their risk of foodborne illness. According to the U.S. Department of Health and Human Services, these include not buying food past its expiration date, washing one's hands before and after touching food, making sure that food is cooked to a safe temperature and keeping cold foods cold and hot foods hot. Due to the importance of food safety, Healthy People 2020 has devoted an entire topic area to this subject. This article will focus on two of the objectives (reducing campylobacter and salmonella incidence rates) in the food safety topic area from a statistical point of view.

Table 1
Objective FS-1.1
Campylobacter Species Incidence*
Pennsylvania Residents, 2006-2010

	2020 Goal	2010	2009	2008	2007	2006
All Persons	8.5	13.0	12.3	12.8	11.0	10.2
Males	8.5	14.3	13.2	14.2	12.5	11.0
Females	8.5	11.7	11.4	11.5	9.6	9.4
Whites	8.5	8.4	7.5	8.5	6.9	6.1
Blacks	8.5	2.3	2.9	2.2	1.5	1.7
Persons 0-19	8.5	13.1	12.5	13.4	11.3	9.4
Persons 20-59	8.5	12.8	12.4	13.0	11.4	11.0
Persons 60+	8.5	13.2	11.6	11.8	9.5	9.0

*reported cases per 100,000 population
Note that the race categories contain a large percentage of unknowns.

Chart 1
Campylobacter Incidence Rates
All Persons and by Sex and Age Group
Pennsylvania Residents, 2006-2010



FS-1.1: Campylobacter Species Incidence Rate
(2020 Target: 8.5 per 100,000)

Campylobacter is one of the main causes of bacterial foodborne disease. According to the PA Department of Health's Disease Fact Sheets, one of the common ways that people become infected is by consuming raw or undercooked poultry. Symptoms of campylobacter include diarrhea, fever, abdominal cramps and blood in the stool. Most people recover on their own from this disease or just need to properly hydrate themselves.

The incidence rate (per 100,000 population) for campylobacter among Pennsylvania residents increased by more than 27 percent from 2006 (10.2) to 2010 (13.0). The national Healthy People 2020 goal is a rate of 8.5 per 100,000, so the

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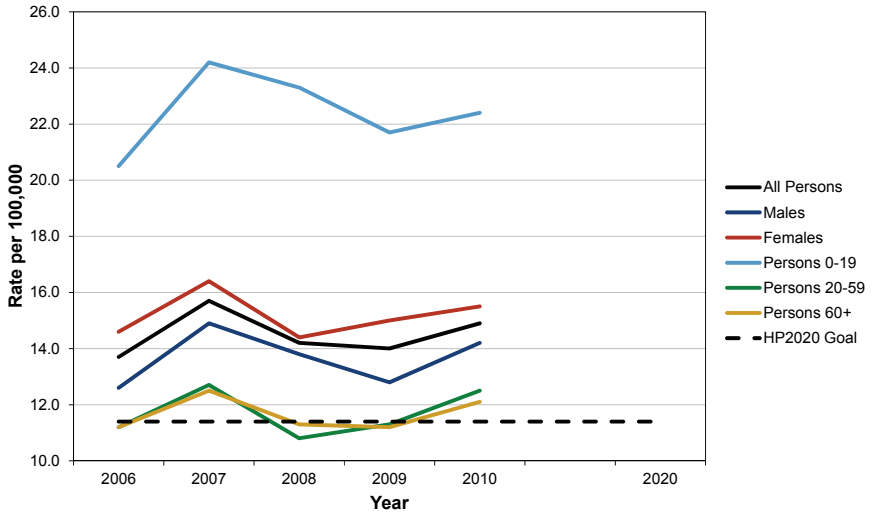
Pennsylvania rate is heading in the wrong direction. The rates for both males (11.0 to 14.3) and females (9.4 to 11.7) have also increased in the past five years (see Table 1, Page 5). During this period, the rates for males have consistently been higher than for females. Looking at the data by race shows that the rates for whites have been at least two and a half times greater than the rates for blacks throughout the five year period. The rates for both whites and blacks met the 2020 goal for each of the five years. However, a very large percentage of unknowns exists when the data is broken out by race. The large percentage of unknowns makes the statistics unreliable for analysis by race. Examining the rates by age shows a general increase for each of the age groups from 2006-2010, with each age group now being well above the 2020 goal of 8.5 per 100,000 (see Chart 1, Page5).

Table 2
Objective FS-1.4
Salmonella Incidence*
Pennsylvania Residents, 2006-2010

	2020 Goal	2010	2009	2008	2007	2006
All Persons	**11.4**	14.9	14.0	14.2	15.7	13.7
Males	**11.4**	14.2	12.8	13.8	14.9	12.6
Females	**11.4**	15.5	15.0	14.4	16.4	14.6
Whites	**11.4**	8.0	7.0	7.1	8.2	6.8
Blacks	**11.4**	11.8	16.2	17.4	13.2	13.8
Persons 0-19	**11.4**	22.4	21.7	23.3	24.2	20.5
Persons 20-59	**11.4**	12.5	11.3	10.8	12.7	11.2
Persons 60+	**11.4**	12.1	11.2	11.3	12.5	11.2

*reported cases per 100,000 population
Note that the race categories contain a large percentage of unknowns.

Chart 2
Salmonella Incidence Rates
All Persons and by Sex and Age Group
Pennsylvania Residents, 2006-2010



FS-1.4: Salmonella Incidence Rate
(2020 Target: 11.4 per 100,000)

According to the PA Department of Health's Disease Fact Sheets, Salmonella is an infection that generally affects the intestinal tract and occasionally the blood stream and other internal organs. People usually become infected by eating or drinking contaminated food and water, by coming into contact with infected people or animals, or by coming into contact with contaminated environmental sources. Symptoms of salmonella include diarrhea, fever and occasional vomiting. In some cases, salmonella infections can be life-threatening when they spread from the intestines to the blood stream. As with campylobacter, most people recover from salmonella on their own or with proper hydration. However, in bloodstream infections, antibiotics may be necessary.

Salmonella incidence (rate per 100,000) increased by almost 9 percent from 2006 (13.7) to 2010 (14.9) for Pa. residents (see Table 2). The national Healthy People 2020 goal is a rate of 11.4 per 100,000, so Pennsylvania's rate would need to drop by more than 23 percent by the year 2020 in order to meet the goal. The rates for males and females have also been higher than the 2020 goal over

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Healthy People 2020: Topic Area FS (Food Safety)

the past five years, with the rates for females having been consistently higher than the rates for males. The data by race shows that whites have met the 2020 goal every year from 2006 to 2010, while blacks have constantly missed the goal during the same five-year time period. However, as with the campylobacter data, there are a large number of unknown races associated with the salmonella data resulting in the statistics being unreliable for analysis by race. A look at the data by age group shows that young people (ages 0-19) have consistently had the highest rates (see Chart 2, Page 6). The other age groups (20-59 and 60+) have each stayed close to the target of 11.4 in previous years but fell short of the target in 2010. Whereas campylobacter rates have been increasing, salmonella rates have generally been more consistent from 2006-2010.

HP2020 State and County Level Data on the Web

To access the Pennsylvania Department of Health's web page for Healthy People 2020 statistics, go to www.health.state.pa.us/stats and then select "Healthy People." The latest available statistics as well as trend data are shown. Data sets at the state and county level can be viewed and downloaded. There is also a link to the national HP2020 website.

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Changes in the BRFSS Weighting Methodology

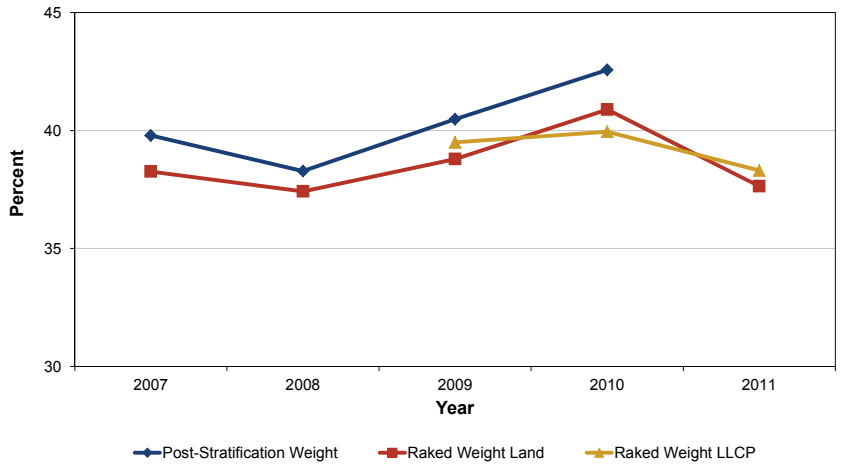
An Explanation of the Effects of the Introduction of Raked Weighting on BRFSS Data in Pennsylvania

The Behavioral Risk Factor Surveillance System (BRFSS) is a cross-sectional telephone survey conducted by state health departments with technical and methodological assistance provided by the Centers for Disease Control and Prevention (CDC). The BRFSS survey consists of telephone interviews using randomly generated telephone numbers. The questions that participants are asked concern the leading causes of death, heart disease, cancer, diabetes, injury and many other health-related behaviors.

Beginning with the 2011 survey, the addition of the cell phone sample and the use of a more accurate weighting process resulted in more precise estimates of the prevalence of health-related behaviors. The trend toward cell-phone-only households is especially strong in younger age groups and among persons who are in racial and ethnic minority groups. The inclusion of the telephone source (landline or cell phone) in the weighting methodology allows the BRFSS survey to better represent lower income and minority populations, factor in younger age groups and also better represent the lower levels of formal education within a population.

Telephone surveys are weighted to reduce bias caused by non-coverage and non-response. Up until the year 2011, the data from the BRFSS survey were weighted by a standard method called post-stratification. Responses to the surveys were forced to equal the age, sex and race proportions of adults in the household population. To be accurately representative of the adult population of Pennsylvania, all the estimates reported were calculated with weighted data.

Chart 1
Those Who Had a Seasonal Flu Shot in the Past 12 Months, Pennsylvania Adults



Source: Centers for Disease Control and Prevention (CDC) LLCP = Landline and Cell Phone

Post-stratification offered a means of providing the best possible prevalence estimates before 2011. However, societal technological changes often necessitate changes in survey methodology. The advent of extremely fast microprocessors has enabled the routine use of more complex statistical weighting procedures to account for differences between survey respondents and the target population. The continuing trend towards the replacement of household landline telephones with personal cell phones in the United States has made it necessary to introduce new weighting measures.

The accompanying charts show three trend lines. The blue trend line indicates the post-stratification weighting method. The red trend line analyzes the same data but incorporates raking as the weighting method. The yellow trend line is weighted by raking (like the red trend line) but includes both landlines and cell phones (LLCP) in the analysis (2009 was the first year cell phone interviews were included in BRFSS).

Chart 1 displays trend lines from the years 2007 to 2011 of results for Pennsylvania adults ages 18 and older who indicated that they had a seasonal flu shot in the past 12 months. The estimates weighted by raking exhibit a slight decrease in prevalence compared to the post-stratification estimates from 2007 to 2010. The inclusion of cell phones produced a minimal effect on the prevalence estimates shown from the years 2009 to 2011.

As Chart 2 (Page 9) illustrates, raked weighting increased the prevalence estimates for each year from

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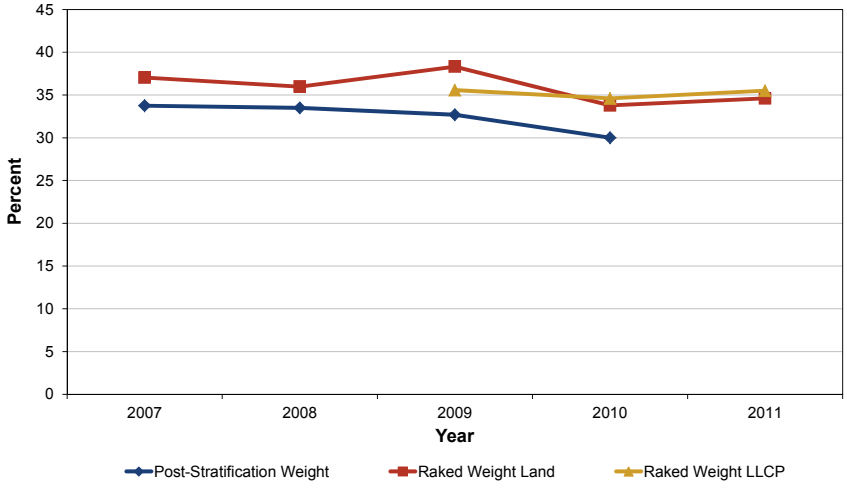
Changes in the BRFSS Weighting Methodology

2007 to 2011 among Pennsylvania adults who indicated they smoke every day. Again, the inclusion of cell phones did not have a major effect on the prevalence estimates from 2009 to 2011.

Chart 3 shows that raking produces higher estimates for people who do not have one person they think of as their personal doctor compared to the post-stratification method. When cell phones are included, the prevalence estimates increase even more for this risk factor. The data shows that young adults and minorities are more likely not to have their own doctor. The cell phone sample provides proportionally more respondents from those populations, and raking seems to have increased their contribution to the estimate.

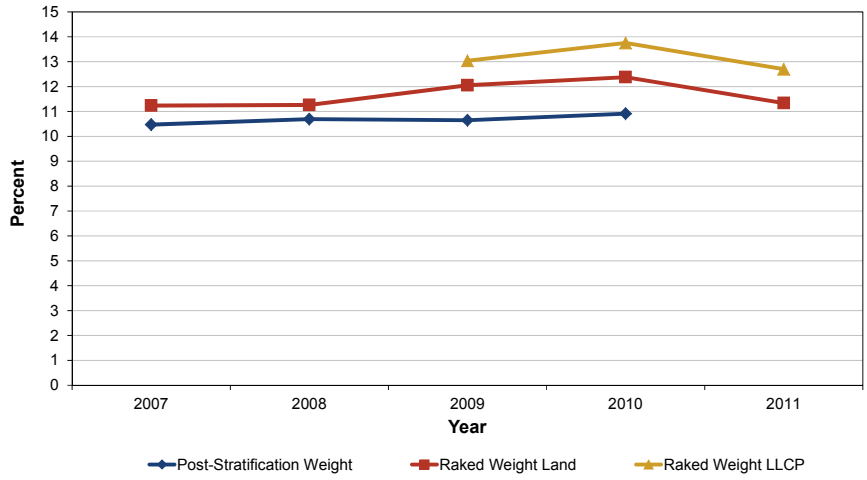
The methodological changes required the CDC program representatives and state BRFSS coordinators and statisticians to work together closely to plan, test and implement these changes. As a result, beginning in the year 2011, the CDC implemented a new weighting methodology known as iterative proportional fitting, or raking. Raking is accomplished by adjusting for one demographic variable (or margin) at a time. For example, when weighting by age and gender, weights would first be adjusted for gender groups, then those estimates would be adjusted by age groups. This iterative process would continue until all of the group proportions in the sample approach those of the population, or up to 75 iterations. Raking allows for the incorporation of cell phone survey data, permits the introduction of additional demographic characteristics and more accurately matches sample distributions to the known demographic characteristics of the populations.

Chart 2
Pennsylvania Adults Who Smoke Every Day
(Among Adults Who Smoked at Least 100 Cigarettes in Their Lifetime)



Source: Centers for Disease Control and Prevention (CDC) LLCP = Landline and Cell Phone

Chart 3
Those Who DO NOT Have One Person They Think of As Their Personal Doctor or Healthcare Provider, Pennsylvania Adults



Source: Centers for Disease Control and Prevention (CDC) LLCP = Landline and Cell Phone

Rather than adjust the survey population to match the overall population on only three demographic variables, raking weights will use the following eight demographic dimensions, some of which are the intersection of two demographic subgroups:

- age group by gender;
- detailed race/ethnicity;
- educational level;

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Changes in the BRFSS Weighting Methodology

- marital status;
- home owner or renter status;
- gender by race/ethnicity;
- age group by race/ethnicity; and
- telephone source (landline telephone only, both landline and cell phone, or cell phone only).

For those states that use regional weighting, such as Pennsylvania's eight health-planning regions, the raking procedures include additional raking dimensions:

- region;
- region by age group;
- region by gender; and
- region by race/ethnicity.

A principle advantage of raking is that it allows the use of many more adjustor variables than post-stratification. Variables include telephone source, detailed race and ethnicity, regions within states, education level, marital status, age group by gender, gender by race and ethnicity, age group by race and ethnicity, and renter/owner status.

Changes in weighting procedures will create some differences in estimates, especially when new variables are introduced. Raking allows a better understanding of the associations between variables, by controlling more factors through the weighting process. Additionally, raking allows for the inclusion of cell phone samples in the data. Raking ultimately reduces non-response bias and has been shown to reduce error within estimates. Overall, differences between the prevalence estimates between post-stratification and raking are small, in most cases. However, these methodological changes will cause breaks in BRFSS trends. Therefore, measures should be re-benchmarked at the 2011 estimate values and not compared to BRFSS estimates from previous years.

For questions regarding the data presented in this article, please contact the Bureau of Health Statistics and Research at 717-783-2548. Additional Pennsylvania BRFSS data are available on EpiQMS, our online interactive data dissemination tool, or from the Behavioral Risk and Injury Statistics section.

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Colorectal Cancer Incidence and Mortality in Pennsylvania

March is National Colorectal Cancer Awareness Month

In recognition of March as National Colorectal Cancer Awareness Month, the following statistics were assembled to illustrate the burden of colorectal cancer in Pennsylvania. From 2006 to 2010, the rates of both colorectal cancer incidence and mortality have been on the decline in the state.

Colorectal Cancer Incidence

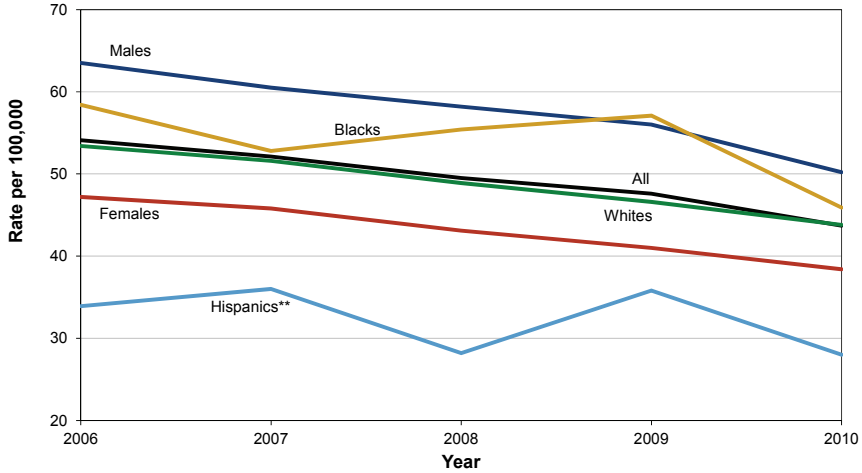
The age-adjusted incidence rate for invasive colorectal cancer among all Pennsylvanians has decreased by 19.2 percent between 2006 and 2010, from 54.1 to 43.7 per 100,000 (see Chart 1). Rates for males have been consistently higher than the rates for females, but both rates decreased in these years. The age-adjusted incidence rate for males decreased from 63.5 to 50.2 per 100,000, and the rate for females decreased from 47.2 to 38.4 per 100,000 from 2006 to 2010.

Since 2006, the age-adjusted incidence rate for whites has been steadily decreasing, from 53.4 per 100,000 to 43.8 in 2010. The rate for blacks was consistently higher than the rate for whites but has also declined from 58.4 per 100,000 in 2006 to 45.9 in 2010. While the rates for Hispanics have been consistently lower than rates for blacks or whites, they have varied from year to year but have decreased overall, from 33.9 per 100,000 in 2006 to 28.0 per 100,000 in 2010.

Colorectal Cancer Mortality

As with the incidence rate, the age-adjusted death rate for colorectal cancer among all Pennsylvanians decreased by 12.4 percent between the years 2006 and 2010, from 19.4 to 17.0 per 100,000 (see Chart 2).

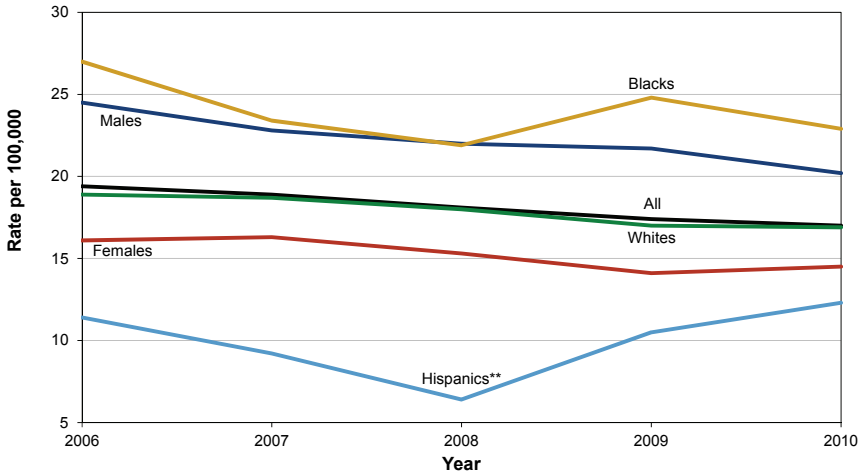
Chart 1
Colorectal Cancer Invasive Incidence Rates* by Sex and Race/Ethnicity
Pennsylvania Residents, 2006-2010



* per 100,000 age-adjusted to the 2000 U.S. standard million population

** Hispanics can be of any race.

Chart 2
Colorectal Cancer Death Rates* by Sex and Race/Ethnicity
Pennsylvania Residents, 2006-2010



* per 100,000 age-adjusted to the 2000 U.S. standard million population

** Hispanics can be of any race.

Rates for males have been consistently higher than rates for females but have seen an overall decline from 2006 to 2010, from 24.5 to 20.2 per 100,000. Rates for females have fluctuated slightly over recent years but declined overall, with 16.1 per 100,000 in 2006 and 14.5 in 2010.

Since 2006, the age-adjusted colorectal cancer death rate for whites has been decreasing, from 18.9 per 100,000 to 16.9 in 2010. The rate for blacks has consistently remained higher than the rate among whites but has varied over recent

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Colorectal Cancer Incidence and Mortality in Pennsylvania

years. While initially declining, there was a slight increase in 2009. Overall, the rate among blacks declined, from 27.0 to 22.9 per 100,000 from 2006 to 2010. The rates for Hispanics have been lower than those for both whites and blacks but have varied during this five-year period. Among Hispanics, the rate decreased to a low of 6.4 in 2008 and then increased to a high of 12.3 per 100,000 in 2010.

Pennsylvania Teams Up With CDC to Fight Colorectal Cancer

Among cancers that affect both males and females, colorectal cancer is the second leading cause of cancer-related death in both Pennsylvania and the United States. In an effort to increase colorectal cancer screening, the Centers for Disease Control and Prevention (CDC) provides funding for the Colorectal Cancer Control Program (CRCCP). By providing funding to select states, including Pennsylvania, the CRCCP aims to increase colorectal cancer screening among men and women ages 50-75 years old to 80 percent by 2014. Objectives of the Pennsylvania program include increasing physicians' knowledge of colorectal cancer screening guidelines and quality improvement strategies, and supporting public education on guidelines and risk factors. According to the CDC, if everyone ages 50 and older were to be screened for colorectal cancer, approximately 60 percent of deaths from this cancer could be avoided.

If you have any questions about this article, please contact the Bureau of Health Statistics and Research at 717-783-2548. Additional cancer statistics for Pennsylvania can be obtained from the Health Statistics web pages at www.health.state.pa.us/stats (select "Cancer"). Pennsylvania cancer statistics are also available on EpiQMS, our interactive data dissemination tool.

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