

## Executive Summary

On Nov. 7, 2006, 58 percent of voters approved the Smoke-Free Workplace Act, and Ohio became the first Midwestern state and first tobacco-growing state to institute an indoor smoking ban.

The law impacts approximately 280,000 “public places” and “places of employment” in Ohio. These workplaces must prohibit smoking, remove ashtrays and post no-smoking signs with the toll-free enforcement number, 1-866-559-OHIO (6446). The Ohio Department of Health (ODH) was charged with writing enforcement rules and worked with stakeholders to draft rules for the enforcement, which began on May 3, 2007.

In 2011, ODH and its public health partners looked at several sources of data to determine the health impacts of the law. ODH also conducted an analysis of attitudes and behaviors of Ohio adults related to the law and contracted with another researcher to study the economic impact. It is important to note that these studies only represent initial findings on the impact of the law as additional studies are currently underway.

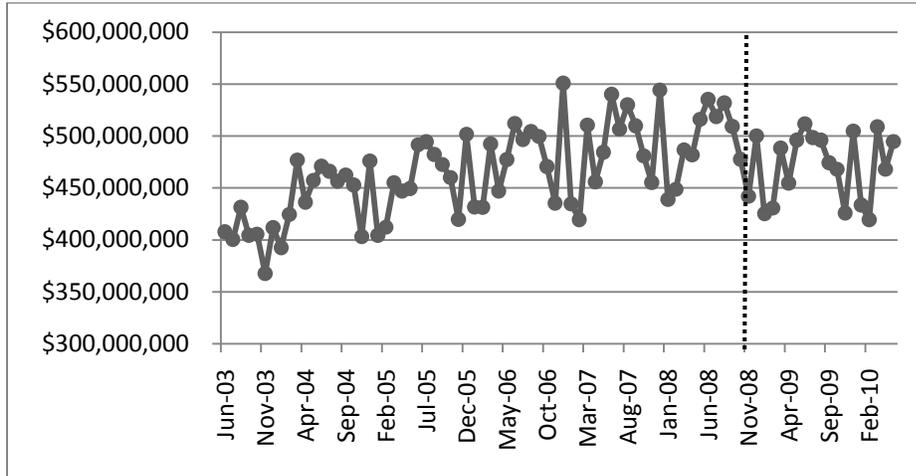
### The Economic Impact of the Smoke-Free Workplace Act

Prepared by: Elizabeth G. Klein, PhD, MPH and Nancy E. Hood, MPH  
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The analysis of the economic impact was conducted using taxable sales from bars and restaurants for the state of Ohio. Sales data from 2003 through 2010 were evaluated for bars and restaurants separately in order to investigate whether the Smoke-Free Workplace Act influenced either business type differently.

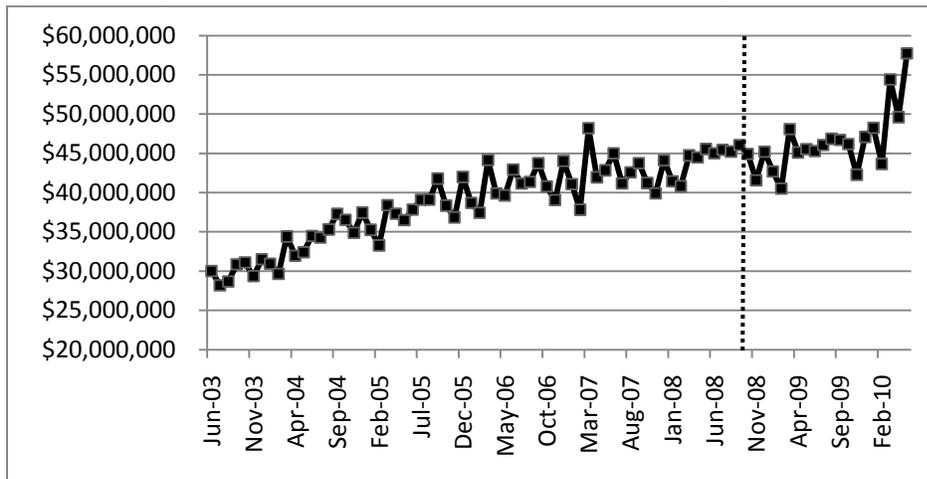
After accounting for unemployment and seasons of the year, there were non-significant increases in taxable sales for restaurants and bars associated with the establishment of the Smoke-Free Workplace Act. (Figures 1 and 2 represent taxable sales but do not account for unemployment and seasons of the year). The analysis found that the Smoke-Free Workplace Act policy did not have a significant economic effect on restaurants and bars in the state as a whole. These findings are consistent with research in other cities, counties, and states.

**Figure 1: Unadjusted taxable sales for Ohio restaurants: June 2003 – May 2010**



----- Ohio Smoke-Free Workplace Act

**Figure 2: Unadjusted taxable sales for Ohio bars: June 2003 – May 2010**



----- Ohio Smoke-Free Workplace Act

# The Health Impact of the Smoke-Free Workplace Act

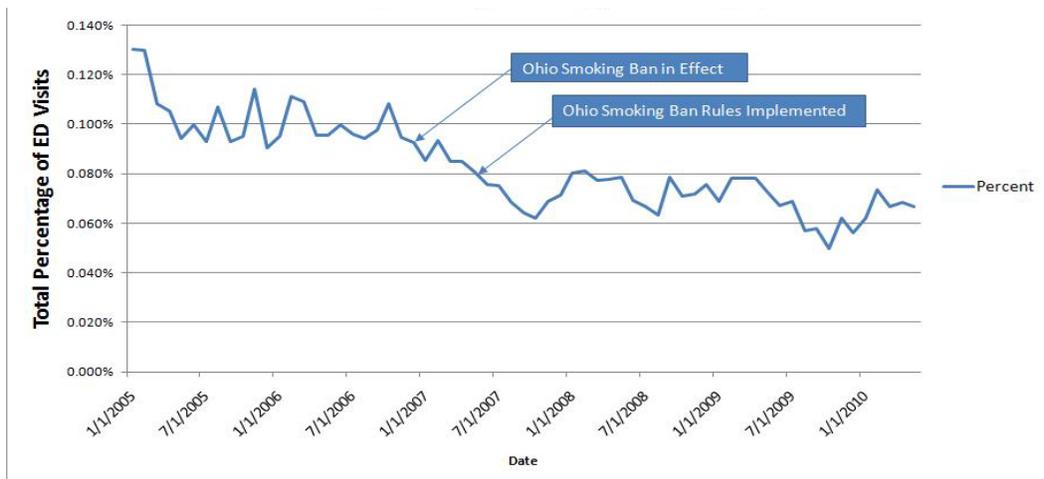
To evaluate whether or not the Smoke-Free Workplace Act has made a positive change in reducing the health effects of secondhand smoke exposure, ODH and its partners looked at four separate data types: patient chief complaint data, hospital discharge data, survey data of Ohio resident mothers and vital statistic birth data.

## Patient Chief Complaint Data

Prepared by: William E. Storm, MPH, Brandi L. Bennett, BA and Brian E. Fowler, MPH  
Ohio Department of Health

Emergency department (ED) chief complaint data are available to ODH in real-time and are frequently used to identify trends in data that need additional investigation. Chief complaint data is pre-diagnostic and describes the primary reason for a person seeking medical attention. ODH compared ED chief complaint data related to acute myocardial infarction (AMI), commonly known as heart attacks, before and after enactment of the Smoke-Free Workplace Act. After enactment, ED visits consistent with AMI declined by approximately 26 percent (Figure 3).

Figure 3: Total percentage of ED visits related to heart attack/AMI in all Ohio counties except Franklin, 2005-2010 by month.



The data for this study were collected and analyzed from Ohio's EpiCenter system from January 2005 through June 2010. Patient visits were included in the study if the chief complaint included a reference to heart attack/pain/problems or specifically mentioned AMI. Residents of Franklin County were not included in this analysis because smoking was banned in the majority of Franklin County's cities and suburbs prior to the Smoke-Free Workplace Act. This study was presented at the 2010 International Society for Disease Surveillance Annual Meeting and published in the Emerging Health Threats Journal as a supplement to the 2011 edition.

Because chief complaint data is preliminary and pre-diagnostic, an additional study utilizing hospital discharge data was necessary to confirm the decline in AMI seen in the chief complaint data and to ascertain whether that decline was associated with the enactment of the Smoke-Free Workplace Act. A summary of this study can be found below.

### ***Hospital Discharge Data***

Prepared by: David Bruckman, MS, MT (ASCP)  
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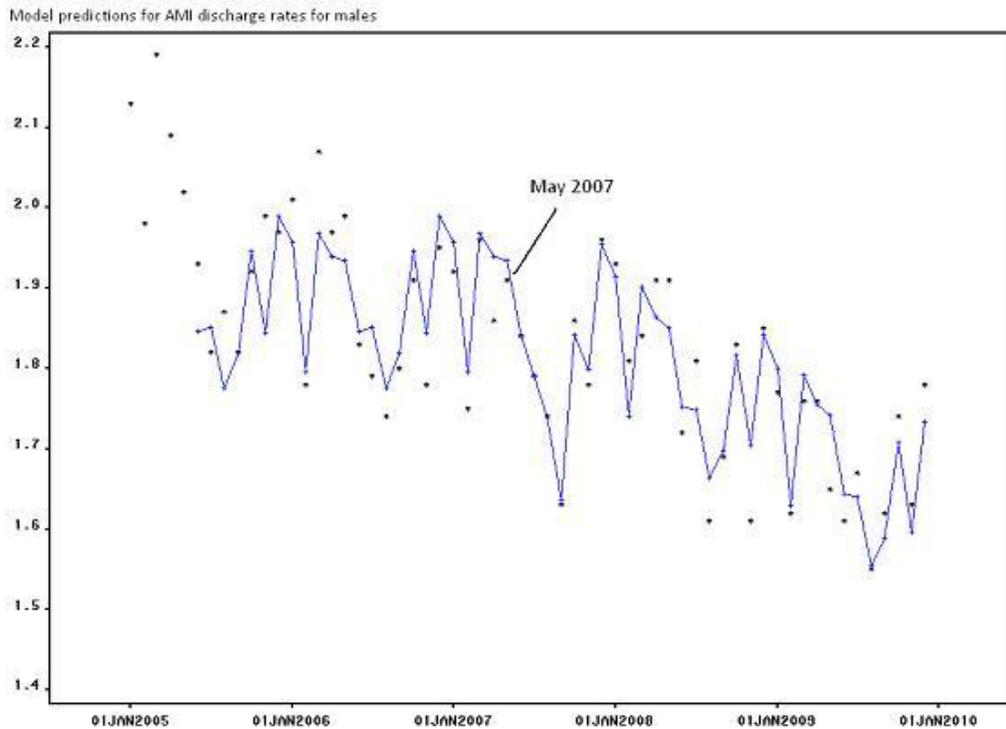
ODH obtained aggregated discharge data from the Ohio Hospital Association to calculate the age-adjusted rates of discharge for acute myocardial infarctions (AMIs) for males and females, separately, across hospitals in Ohio from 2005 through 2009.

The analysis determined a significant change in age-adjusted rates of AMI discharges within one month after the enactment of the Smoke-Free Workplace Act (Figure 4). The sharp drop in rates among Ohio males is seen immediately after May 2007, with rates dropping thereafter. The researchers used two methods to confirm the significance of the enactment on discharge rates for males and females, separately.

This study confirms similar results in New York State after implementation of their statewide comprehensive smoking ban. Our study uses two more advanced methods to show a significant decrease in AMI discharge rates before and after a statewide indoor tobacco smoke exposure ban went into effect.

The research reveals that age- and sex-adjusted discharge rates per 1,000 population for AMI in Ohio hospitals decreased significantly from 2005 through 2009, and that these rates changed significantly over May and June 2007 using two separate modeling methods. On average, about 69 fewer discharges were observed annually through the five year period for males and females combined.

**Figure 4: Time series plot of age-adjusted rates of male acute myocardial infarction (heart attack) discharges from Ohio hospitals, 2005-2009. Data from the Ohio Hospital Association.**



**Ohio Pregnancy Risk Assessment Monitoring System (PRAMS) Data**

Prepared by: Connie Geidenberger, PhD  
Ohio Department of Health

Studies have shown that pregnant women exposed to environmental tobacco smoke (ETS) have 20 percent higher odds of giving birth to a low birth-weight (LBW) infant when compared to women without this exposure. Primary sources of significant ETS exposure to pregnant women are the home and workplace.

The Ohio Pregnancy Risk Assessment Monitoring System (PRAMS) is a representative survey of Ohio resident mothers of live born infants. Data from Ohio PRAMS, covering birth years 2005-2009, were used to compare the odds of having a LBW infant among Ohio resident mothers of singleton (babies born singly, not part of a multiple birth) live-born infants conceived before May 2007 to that of those conceived on or after that date.

Without controlling for other factors, the odds of LBW did not differ between infants conceived before or after enforcement of the Smoke-Free Workplace Act began. In addition, controlling for possible confounding factors (including maternal smoking, age, education, income, stressful events during pregnancy, race/ethnicity, Special Nutritional Program for Women, Infants, and Children (WIC) program participation and body mass index) did not change the results.

There is no evidence from this assessment to support a relationship between timing of the Smoke-Free Workplace Act enforcement and odds of LBW. Given that no information was available to assess industry of employment (or any employment) during pregnancy, a relationship between the ban and birth outcomes could not be examined among subgroups of pregnant women most likely to have been impacted by the ban, thereby limiting interpretation of these results.

### ***Vital Statistic Birth Data***

Prepared by: Erinn Hade, MS  
Center for Biostatistics, the Ohio State University

Monthly rates of LBW and preterm birth (gestation less than 37 weeks) were calculated from Ohio's certificates of live birth from the period January 2006 through December of 2009. Statistical modeling was then employed to assess whether rates of these outcomes were lower after enforcement of the smoking ban began in May 2007. Furthermore, individual births were examined using another statistical modeling approach to compare the odds of occurrence of LBW (and preterm birth) before and after the Smoke-Free Workplace Act, while controlling for other factors.

Across the entire period, 8.6 percent (50,185) of babies were born with birth weight classified as low (less than 2,500 grams). A large amount of variability was observed in monthly LBW rates across time. Controlling for a tendency of rates to vacillate between lows and highs approximately every four months, the rate of LBW was found to be similar before and after the law was enacted. Thus, no association was found between the tobacco ban and rates of LBW. Similar findings were observed for rates of preterm births. Furthermore, no associations were observed between the smoking ban and rates of poor outcomes among subgroups, such as women with Medicaid as the principal payment for delivery, those with private insurance, and those with other payment sources. Finally, the model to explore the association between LBW and the tobacco ban at the subject level, found no statistically significant relationship between the adjusted odds of LBW before and after the smoking ban enforcement date.

Statistical modeling of data from Ohio vital birth records produced no evidence of a change in these outcomes attributable to the smoking ban. These results are limited by the fact that the analyses were based on a relatively small number of years of observation, both before and after the ban.

## **Attitudes and Behaviors Related to the Smoke-Free Workplace Act**

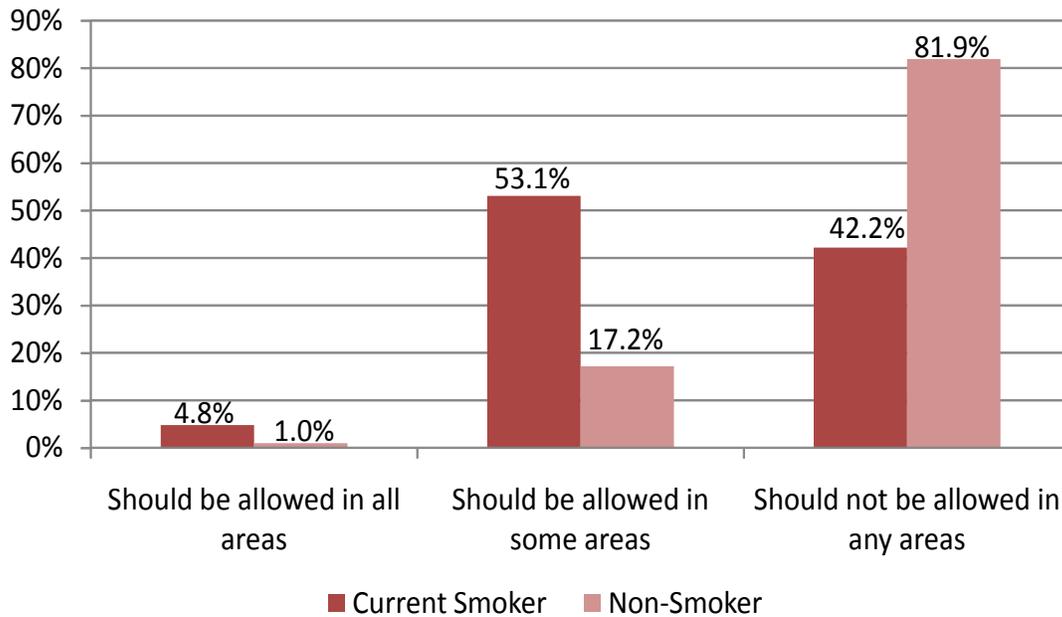
Prepared by: Brandi L. Bennett, BA  
Ohio Department of Health

The Ohio Behavioral Risk Factor Surveillance System (BRFSS), a telephone-based survey conducted since 1984 by ODH, is the primary source of Ohio-specific information regarding diseases, injuries, and health risk behaviors among Ohio residents 18 years and older. Randomly selected household telephone numbers are contacted and surveyed to determine the prevalence of selected diseases, injuries and

associated health behaviors among Ohio’s diverse population. The Ohio BRFSS includes the Adult Tobacco Survey to assess behaviors and attitudes regarding tobacco use. The following analyses of questions related to smoke-free policies were calculated using 2009 data from the BRFSS.

The majority of adults in Ohio do not believe smoking should be allowed in indoor work areas or in the indoor dining areas of restaurants. Nearly 74 percent of respondents do not believe smoking should be allowed at all in indoor work areas, and approximately 75 percent of respondents do not believe smoking should be allowed at all in the indoor dining area of restaurants. Responses to these questions varied by smoking status, as shown in Figures 5 and 6.

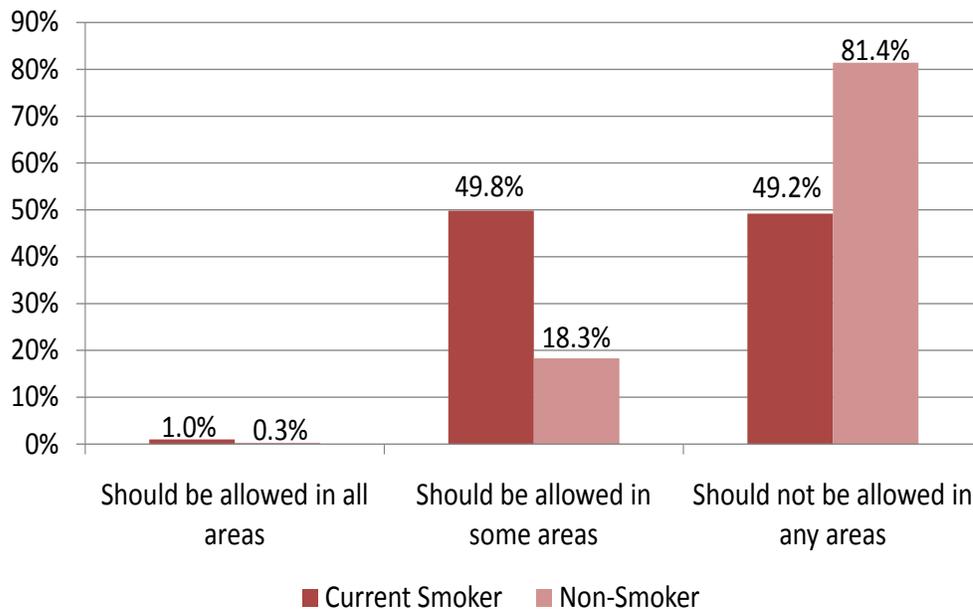
**Figure 5: Estimated Prevalence of Opinions about Smoking in Indoor Work Areas among Adult Ohioans, by Smoking Status, 2009<sup>1</sup>**



<sup>1</sup>Source: 2009 Ohio Behavioral Risk Factor Surveillance System and Adult Tobacco Survey, Chronic Disease and Behavioral Epidemiology, Center for Public Health Statistics and Informatics, Ohio Department of Health, 2010.

In indoor work areas, current smokers were more likely to state that smoking should be allowed in some areas (53 percent) than non smokers (17 percent) (Figure 5). In the indoor dining areas of restaurants, current smokers were more likely to state that smoking should be allowed in some areas (50 percent) than non smokers (18 percent) (Figure 6).

**Figure 6: Estimated Prevalence of Opinions about Smoking in the Indoor Dining Area of Restaurants among Adult Ohioans, by Smoking Status, 2009<sup>1</sup>**



<sup>1</sup>Source: 2009 Ohio Behavioral Risk Factor Surveillance System and Adult Tobacco Survey, Chronic Disease and Behavioral Epidemiology, Center for Public Health Statistics and Informatics, Ohio Department of Health, 2010.

Also according to the BRFSS, 73 percent of adult Ohioans either strongly approve or approve of the Smoke-Free Workplace Act. Eight percent of Ohioans neither approve nor disapprove of the law. Eleven percent disapprove, and eight percent strongly disapprove. Approximately three out of four respondents stated they visit restaurants and bars with about the same frequency as they did before the Smoke-Free Workplace Act went into effect. (Data not shown.)