

**Economic Impact of Lawrence  
Smoke-Free Ordinance:  
Supplemental Report**

**February 2009**

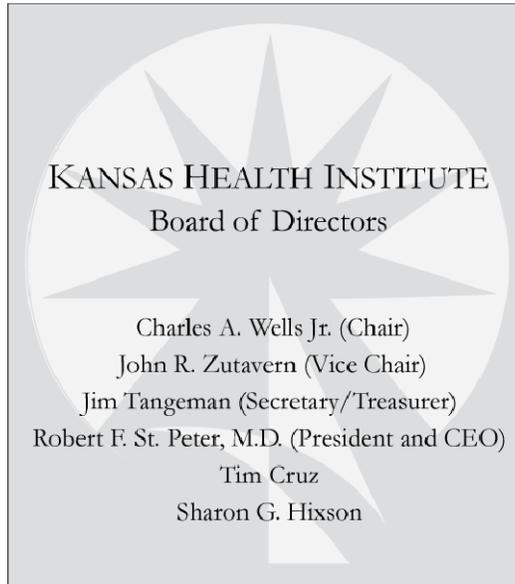
KHI/09-02S

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## **ACKNOWLEDGMENTS**

The authors would like to thank Mr. Steven Brunkan at the Kansas Department of Revenue for his invaluable assistance with the data for this study. We would also like to thank Ms. Jessica Hembree, Dr. Candace Ayars, Dr. Leigh Murray, Dr. Michael Fox, Dr. Melissa Clark, Mr. Ron Liebman and Mr. Nathan Wozny for their assistance with earlier phases of this study.

## INTRODUCTION

In July 2004, Lawrence implemented the state's first comprehensive smoke-free ordinance, prohibiting smoking in all enclosed public places and workplaces, including restaurants and bars.

The intent of the ordinance was to protect both workers and the general public from the dangers of secondhand smoke. A 2006 report of the U.S. Surgeon General summarized these dangers: "Secondhand smoke causes premature death and disease in children and in adults who do not smoke." The report also stated that "there is no risk-free level of exposure to second-hand smoke," and that "smoke-free environments are the most effective method for reducing exposures."<sup>1</sup>

Because smoke-free policies reduce exposure to secondhand smoke, they also reduce the economic burden caused by secondhand smoke. The Society of Actuaries has estimated annual costs associated with secondhand smoke, both direct medical costs and indirect costs, to be more than \$10 billion.<sup>2</sup> However, some researchers and opponents of smoke-free regulation argue that smoke-free policies may impose economic costs on restaurants and bars through reduced sales. For example, a Lawrence bar owner testified in 2008 before the state's Senate Judiciary Committee that a "smoking ban, in my experience, is bad for business."<sup>3</sup>

Economic theory suggests that either a positive or a negative impact on industry sales is possible. For example, some individual businesses may experience a decline in sales under a smoke-free ordinance but other businesses may thrive.

This supplemental report accompanies the KHI issue brief, "*Economic Impact of Lawrence Smoke-Free Ordinance*," which provides a macro-level analysis of annual taxable sales at restaurants and bars in Lawrence. In this report, the authors examine monthly sales in both Lawrence and the comparison community of Manhattan to yield further insight into the potential impact of Lawrence's ordinance on restaurants and bars.

## BACKGROUND

A large literature examines the impact of smoke-free policies, from local ordinances to state laws, on the hospitality industry. Many of these studies have been conducted by consulting firms for local governments, restaurant and bar associations and the tobacco industry. These studies vary tremendously in terms of quality. Because economic impact studies are very difficult to do well, those studies that have been published in peer-reviewed journals and high-quality publications, such as the Centers for Disease Control and Prevention's Mortality and Morbidity Weekly Report, provide a better basis from which to summarize findings about the impact of smoke-free policies.

In our literature review, we focused on studies published in peer-reviewed journals that examine outcome data such as sales or employment. Because sales and employment data are typically not available to researchers at the level of the establishment, these studies examine the impact of smoke-free policies on businesses in the aggregate. For example, some studies examine the impact of local smoke-free ordinances on total sales at all restaurants in a given community. Other studies examine the impact of statewide smoke-free laws on aggregated statewide restaurant and bar sales. These studies overwhelmingly find that smoke-free policies do not have a negative economic impact on the hospitality industry.<sup>4</sup> A few studies have found inconsistent results for the multiple communities included in the study — a positive impact in some communities, a negative impact in some communities, and no impact in other communities, leading the researchers to conclude that there is no systematic effect of smoke-free policies.<sup>5,6</sup>

One of the limitations to the use of aggregate data is that it does not allow researchers to evaluate the differential impact that smoke-free policies may have on different types of businesses. Other studies, including some that have been published in peer-reviewed journals, have used surveys of businesses owners to assess the impact of smoke-free ordinances on individual businesses. The advantage of these studies is that they provide establishment-level data; the disadvantage is that self-reports from business owners may not be a reliable means by which to evaluate the impact of a smoke-free policy. Largely on the basis of this latter type of

study, some researchers have proposed that smoke-free policies have an impact on bars or alcohol-serving restaurants, but not on the restaurant and bar industry in the aggregate.

We reviewed six studies that have used outcomes data such as sales or employment to examine the impact of smoke-free policies on bars or alcohol-serving restaurants in particular. None of these studies found a long-term impact on bars or alcohol-serving restaurants.

One study examined the impact of both California's 1995 smoke-free restaurant law and their 1998 smoke-free bar law. The authors found that the smoke-free restaurant law was associated with an increase in restaurant revenues. The smoke-free bar law was associated with an increase in bar revenues.<sup>7</sup>

California's smoke-free restaurant law was also the subject of another study. This study found that revenues for restaurants that serve alcohol dipped by about 4 percent in the first quarter after implementation of the law. However, revenues returned to predicted levels immediately after. The same study found no impact on revenues for all restaurants combined.<sup>8</sup>

One study found a short-run decline in bar employment of about 4 percent associated with smoking bans. The study design did not allow the authors to make any firm conclusions about whether this effect persists in the long-run. The study also found a small, but insignificant increase in restaurant employment of about 0.5 percent.<sup>9</sup> Results from the study suggest that there is not an overall impact on employment at restaurants and bars. The restaurant sector employs many more people than the bar sector. If we look at the average annual employment for these two sectors in 2007, the absolute increase in restaurant employment predicted by this study is greater than the absolute decrease in bar employment.

The other three studies found no significant impact of smoke-free laws on bars and/or alcohol-serving businesses, as measured by employment, business openings and closings, taxable sales, or the sales price.<sup>10,11,12</sup>

In conclusion, there is no consistent evidence of long-term negative economic impacts on restaurants and bars as an industry as measured by outcomes such as taxable sales and employment. There is mixed evidence for a short-term, negative economic impact on bars and alcohol-serving restaurants.

## METHODS

### DATA

The Kansas Department of Revenue (KDOR) provided us with monthly tax receipts for food and non-liquor sales, subject to the state's sales tax, as well as liquor sales, subject to the state's liquor excise tax, at restaurants and bars. Tax receipts were aggregated to the city level. Individual business-level data were not made available due to concerns about the ability to identify particular establishments based on levels of tax receipts.

Food and non-liquor tax receipts were obtained for businesses classified as "Food Services and Drinking Places" (FSDP) establishments. FSDP establishments are referred to here as "restaurants and bars." This industry category includes not just full-service restaurants and bars, but also fast-food restaurants, mobile food vendors, and caterers.

Liquor excise tax receipts were obtained for all businesses licensed to sell liquor on-premise. These businesses are also referred to here as "restaurants and bars," although a small number may not be classified as FSDP establishments. The liquor excise tax, also referred to as the "liquor-by-the-drink tax," is levied on those alcoholic beverages sold on-premise and is not levied on liquor and beer sold for off-premise consumption. Cereal malt beverages, 3.2 beer, sold on-premise are subject to the liquor excise tax if the business holds a liquor license; otherwise, it is subject to the sales tax and is included in food and non-liquor sales.

We calculated taxable sales by dividing tax receipts by the appropriate tax rate for that month. The sales tax increased from 4.9 percent to 5.3 percent in July 2002. The liquor excise tax was 10 percent throughout the study period. We adjusted taxable sales for inflation using the monthly Midwest Consumer Price Index.

The tax receipts provided by KDOR were identified by the month in which the sales occurred. Most businesses file their sales tax receipts on a monthly basis. Business with limited tax liabilities may file on a quarterly or annual basis. For these businesses, sales during the quarter or the year are identified by the tax month prior to filing, not the month in which the sales occurred. In January 2005, the state's threshold for filing quarterly increased from \$1,600 in annual tax receipts to \$3,200, with the result that some monthly filers became quarterly filers. The liquor excise tax, however, must be paid monthly.

KDOR adjusted liquor sales downward for five of 72 months in the Lawrence data and two of 72 months in the Manhattan data to more accurately reflect the level of sales in those months. The inflated sales were identified by KDOR in the individual business-level data as being due to a combination of audits, resulting in back taxes for multiple months recorded in a later tax month, or "account consolidations," caused by data storage limitations. KDOR adjusted sales downward based on the pattern of sales for individual businesses.

## **DESIGN**

The goal of this study was to evaluate whether Lawrence's smoke-free ordinance had an impact on sales at restaurants and bars. In order to evaluate the impact of the ordinance, we:

- 1) Compared sales in Lawrence pre- and post-ordinance; and
- 2) Evaluated changes in Lawrence's sales relative to those in a comparison community.

Food and non-liquor sales as well as liquor sales are proxy indicators for the profitability of restaurants and bars as an industry. We analyzed the two types of sales separately in order to explore the possibility of a differential impact on businesses that sell liquor. However, we were not able to fully differentiate between types of establishments for this study because the liquor data includes sales at both alcohol-serving restaurants and stand-alone bars; some establishments that sell liquor may also generate significant food and non-liquor sales. On the basis of our analysis, it is not possible to draw firm conclusions about the overall impact of the ordinance on alcohol-serving businesses in general or bars in particular.

## Lawrence Sales Pre- and Post-Ordinance

***Research Question #1: Was there a change in average monthly growth in Lawrence restaurant and bar sales and/or a change in the level of sales coinciding with the ordinance?***

In order to address this research question, we analyzed six years of monthly restaurant and bar sales, three years before the ordinance and three years after. This provided us with 72 observations that we analyzed using multiple linear regression techniques. The data were first deseasonalized following Baum (2006).<sup>13</sup> The deseasonalized data were modeled using a time trend variable (TIME), measuring the average monthly growth in sales prior to the ordinance; an indicator variable for the post-ordinance period (BAN); and an interaction term that allowed the time trend to differ in the post-ordinance period (BAN\*TIME). The time trend variable (TIME) was centered with zero at July 2004 to facilitate interpretation of the variables.

This analytic approach assumes that the trend in sales before July 2004 predicts the expected sales trend in the absence of the ordinance. The difference between the predicted trend and the observed trend is a measure of the impact of the ordinance. This design does not take into account factors other than the smoke-free ordinance that might differ between the pre- and post-ordinance period.

## Sales in a Comparison Community

***Research Question #2: Were any changes in the growth in sales or in the level of sales in Lawrence different from changes in a comparison community?***

The previous analytic approach does not take into account factors other than the ordinance that might differ in the pre- and post-periods in Lawrence. One strategy to partially overcome this limitation is to examine the trend in sales in a comparison community that did not have a comprehensive smoke-free ordinance during the time frame examined. A change in sales pre- and post-July 2004 in the comparison community provides a measure of the change that would

be expected in Lawrence in the absence of the ordinance. The difference between the observed change and the predicted change in Lawrence is a measure of the impact of the ordinance.

The authors determined that Manhattan provided the best Kansas comparison community; however, there are serious limitations to the use of Manhattan as the comparison city. Like Lawrence, Manhattan is oriented around a large university and therefore shares important economic and demographic characteristics associated with the presence of a large university in a relatively small city. Manhattan, however, is part of a 3-county metropolitan area that includes the U.S. Army installation, Fort Riley. Manhattan's economic growth was likely influenced by the return of troops to Fort Riley starting in 2006. Additionally, Riley County residents voted to eliminate its 30-percent food requirement for liquor-by-the-drink in the same year that Lawrence implemented its smoking ban. While the trend in sales in Manhattan cannot provide a definitive guide as to the trend we might expect in Lawrence in the absence of the smoke-free ordinance, it does provide a valuable context in which to interpret the Lawrence experience.

We analyzed sales in Manhattan pre- and post-July 2004 using the same multiple linear regression techniques described above. These results are then compared to the Lawrence results; this comparison is primarily descriptive.

## **RESULTS**

### **LAWRENCE SALES PRE- AND POST-ORDINANCE**

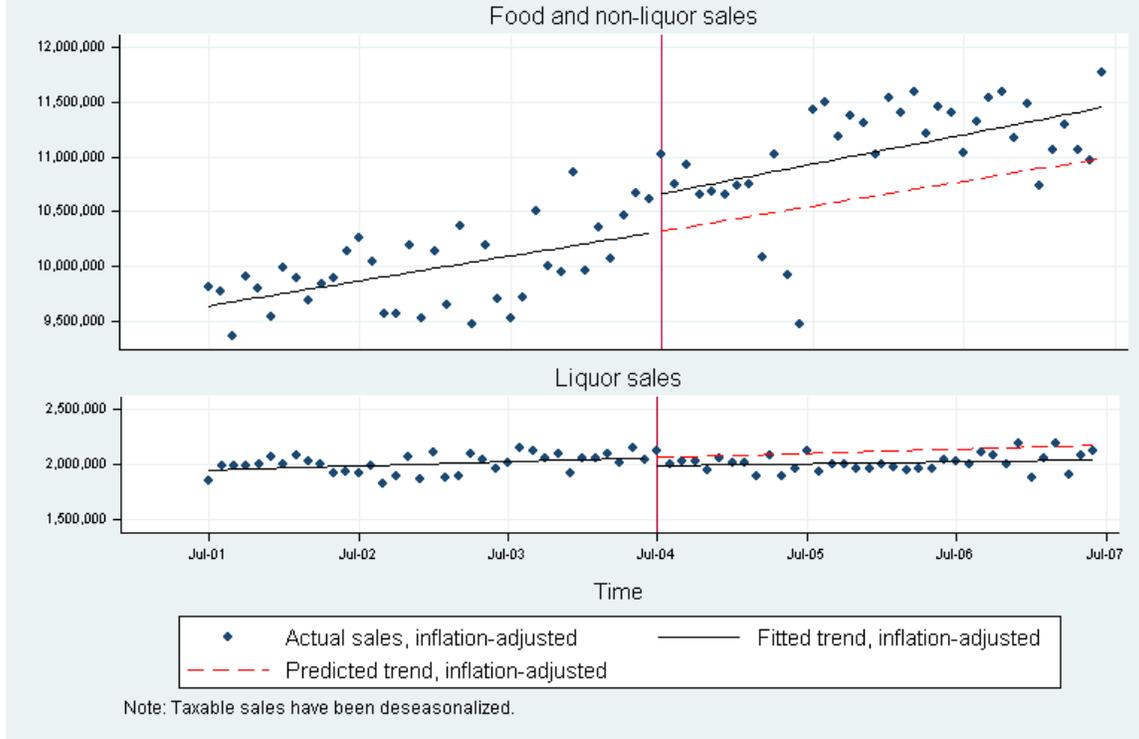
Results from the regression analyses are presented in Figure 1 and Table 1. The regression coefficient for the TIME trend variable estimates the average monthly growth in sales prior to the July 2004 ordinance. The regression coefficient for the BAN variable estimates the net increase in monthly sales in the first month of the post-ordinance period as compared to the predicted sales based on the pre-ordinance regression line (CONSTANT). The coefficient for the BAN\*TIME interaction estimates the change in average monthly growth in sales after July 2004 as compared to growth in the pre-ordinance period.

The results for food and non-liquor sales as well as liquor sales indicate that the time trend (average monthly growth in sales) did not change significantly after the smoke-free ordinance. Controlling for the time trend, the *level* of food and non-liquor sales increased by an estimated \$339,413 (or 3.3 percent) after the ordinance ( $p = 0.07$ ). The 3.3 percent is calculated by taking the ratio of the estimated change in intercept at July 2004 (BAN) to the estimated intercept of the pre-ordinance regression line at July 2004 (CONSTANT). Because the time trend is centered with zero at July 2004, the coefficient on CONSTANT provides the July 2004 intercept of the pre-ordinance regression line.

Average liquor sales decreased by \$74,806 (or 3.6 percent), controlling for the time trend ( $p = 0.03$ ). This suggests that the observed change in liquor sales after the ordinance is not due to chance, despite the variability in liquor sales over time. Additional analyses (results not shown) indicate that this finding is robust to various techniques that account for serial correlation in the data.

However, these findings *are* sensitive to the inflation-adjustment of the data using the monthly Midwest Consumer Price Index (results not shown). The Midwest Consumer Price Index measures price changes for a broad range of goods and services in the Midwest region and may not accurately reflect price changes in Lawrence and in the restaurant and bar sector in particular. When food and non-liquor sales are not adjusted for inflation, the positive coefficient on the BAN variable increases to \$451,146 ( $p = 0.02$ ). The positive coefficient on the BAN\*TIME variable increases to \$13,687 ( $p = 0.07$ ). For liquor sales, the negative coefficient on the BAN variable is reduced to \$42,031 (or 2.2 percent), which is not statistically significant ( $p = 0.20$ ). The negative coefficient on the BAN\*TIME variable becomes positive at \$108, but is not statistically significant ( $p = 0.95$ ).

**Figure 1. Monthly Taxable Sales in Lawrence in \$ (Inflation-adjusted)**



**Table 1. Regression results — taxable sales in Lawrence (Inflation-adjusted)**

Dependent variable	TIME	BAN	BAN*TIME	Constant	R-Squared
Lawrence food and non-liquor sales	18,945*** (4,449)	339,413* (181,554)	3,542 (7,335)	10,324,811*** (113,703)	0.7135
Lawrence liquor sales	3,175*** (1,050)	-74,806** (34,374)	-1,654 (1,801)	2,062,160*** (23,345)	0.1045

Notes: Taxable sales have been seasonally-adjusted. Number of observations = 72. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.10

## MANHATTAN SALES

We analyzed Manhattan inflation-adjusted monthly sales using the same model, illustrated in Figure 2 and Table 2. In Manhattan, monthly growth in food and non-liquor sales increased by \$12,967 (or 207.6 percent) after July 2004 ( $p = 0.02$ ). The 207.6 percent is calculated as the ratio of the estimated increase in average monthly growth after July 2004 ( $BAN*TIME$ ) to the average growth before July 2004 ( $TIME$ ). The coefficient on the  $BAN$  variable of \$198,587 indicates that in July 2004, the level of food and non-liquor sales increased by about 3.3 percent, but this coefficient is not statistically significant ( $p = 0.11$ ).

For liquor sales, the growth in sales after July 2004 did not change significantly relative to the pattern of growth before July 2004, as measured by the coefficient on the  $BAN*TIME$  variable ( $p = 0.96$ ). The negative coefficient on the  $BAN$  variable of -\$27,559 indicates that, controlling for the time trend, average liquor sales in Manhattan dropped by about 2.6 percent in the post-July 2004 period, but this is not statistically significant ( $p = 0.46$ ).

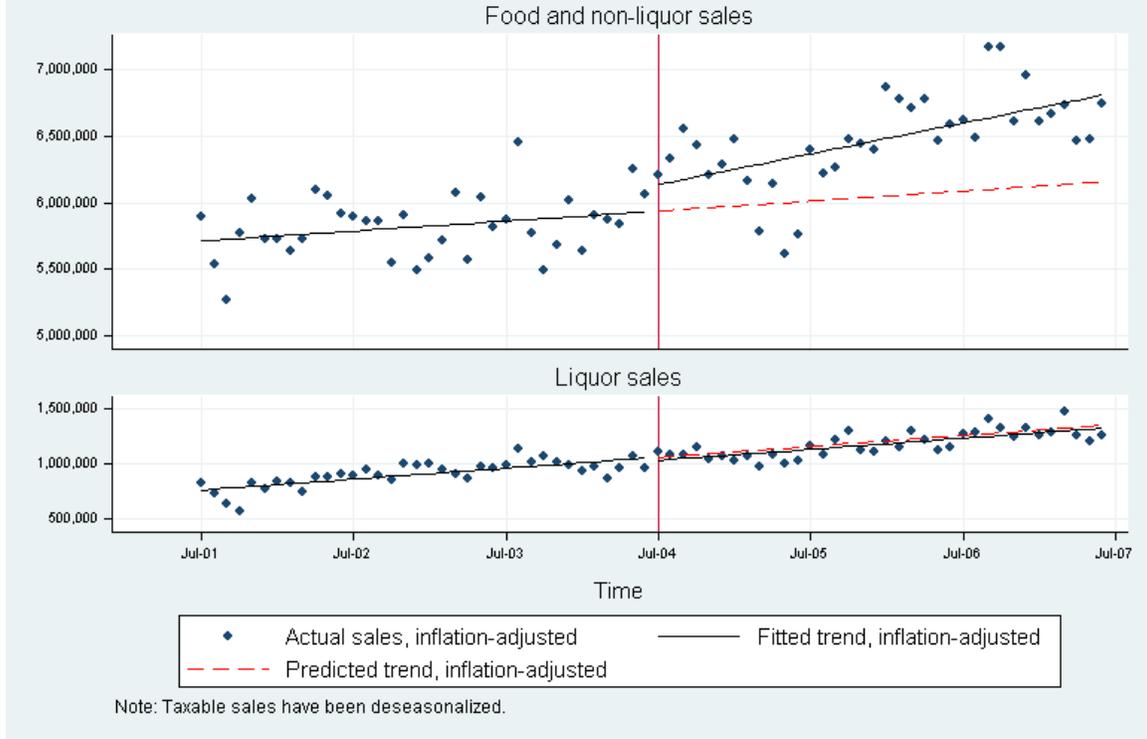
## LAWRENCE COMPARED TO MANHATTAN

These results indicate that the pattern of food and non-liquor sales in Lawrence and Manhattan diverged after Lawrence implemented its smoke-free ordinance. For food and non-liquor sales, the estimated increase in average monthly growth after July 2004 was 207.6 percent in Manhattan and 18.7 percent in Lawrence. Manhattan's post-July 2004 growth appears to have exceeded growth in Lawrence, although the confidence interval estimates are too wide for precise comparison.

The level of food and non-liquor sales increased in July 2004 in both Manhattan and in Lawrence by about the same percentage; the estimated increase was 3.3% for both Manhattan and Lawrence.

Liquor sales in both Manhattan and Lawrence showed no acceleration in growth after July 2004. However, the level of liquor sales in Lawrence dropped by about 3.6 percent after the smoke-free ordinance took effect. The 95-percent confidence interval around this estimate encompasses the corresponding Manhattan point estimate, indicating that the post-July 2004 change in Lawrence is not significantly different from the post-July 2004 change in Manhattan.

**Figure 2. Monthly Taxable Sales in Manhattan in \$ (Inflation-adjusted)**



**Table 2. Regression results — taxable sales in Manhattan (Inflation-adjusted)**

<b>Dependent variable</b>	<b>TIME</b>	<b>BAN</b>	<b>BAN*TIME</b>	<b>Constant</b>	<b>R-Squared</b>
Manhattan food and non-liquor sales	6,247* (3,653)	198,587 (120,778)	12,967** (5,522)	5,938,657*** (78,714)	0.6738
Manhattan liquor sales	8,289*** (1,473)	-27,559 (37,187)	109 (1,946)	1,058,269*** (28,913)	0.8181

Notes: Taxable sales have been seasonally-adjusted. Number of observations = 72. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.10

## DISCUSSION

Our research findings indicate that the July 2004 smoke-free ordinance in Lawrence did not have a significant impact on the restaurant and bar industry in Lawrence, as measured by food and non-liquor sales or liquor sales. These results are consistent with other findings reported in peer-reviewed research publications. A review of this literature finds no consistent evidence of long-term negative economic impacts on restaurants and bars as an industry as measured by outcomes such as taxable sales and employment. Some studies have found a significant positive impact on the restaurant and bar industry. There is mixed evidence of a negative economic impact in the short-term on bars and alcohol-serving restaurants.

The analysis of monthly sales data presented in this report provides additional insight into the annual patterns noted in the issue brief, “*Economic Impact of Lawrence Smoke-Free Ordinance.*” The monthly analysis indicates, as did the annual analysis, that *growth* in food and non-liquor sales in Lawrence did not change notably after the implementation of the smoke-free ordinance. The growth in food and non-liquor sales in Manhattan appears to have outpaced the growth in Lawrence after July 2004, suggesting that Lawrence’s food and non-liquor sales might have grown faster in the absence of the ordinance. However, annual analysis (data not shown) indicates that the annual growth in food and non-liquor sales in the two communities diverged most dramatically in the third year after the ordinance. It seems unlikely that Lawrence’s smoke-free ordinance would have had the greatest impact on the growth in sales more than two years after implementation, thus supporting alternative explanations for the different patterns in the two communities.

The monthly analysis indicates that the *level* of food and non-liquor sales in Lawrence increased after the smoke-free ordinance. However, the percentage increase did not exceed the increase experienced by Manhattan, suggesting that the increase in Lawrence sales growth was not associated with the smoke-free ordinance.

For Lawrence liquor sales, the monthly analysis allowed us to identify the pre-ordinance trend, whereas the lack of a clear trend in the annual data made it difficult to assess how liquor sales should have performed in the absence of the ordinance. The monthly analysis indicates that

the monthly *growth* in liquor sales did not change after July 2004 in either Lawrence or Manhattan.

However the monthly analysis indicates that the *level* of sales dropped in Lawrence. This suggests that liquor sales remained lower throughout the study period than would have been expected based the pre-ordinance trend. However, it is not clear that the drop in liquor sales was caused by the ordinance; the decline in liquor sales in Lawrence did not significantly exceed the drop in Manhattan, a community without a smoke-free ordinance during the study period.

In this report we evaluated the economic impact of the Lawrence smoke-free ordinance on sales at restaurants and bars. Because only aggregate sales data were available, the impact of the smoke-free ordinance in Lawrence on individual businesses could not be evaluated, nor were we able to differentiate between restaurants, alcohol-serving restaurants, and stand-alone bars in this study. Future research could attempt to quantify the distinct impact on each type of business as well as examine changes in worker health, business expenses, price-setting, and the overall profitability of restaurants and bars. Future research might also examine additional economic indicators to rule out the possibility that other economic trends affected restaurant and bar sales independently of the smoke-free ordinance.

**To download the data used in this report, visit**

[http://www.khi.org/resources/Other/1265-09-02\\_DATA.xls](http://www.khi.org/resources/Other/1265-09-02_DATA.xls)

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