

Institute for Policy and Economic Development

IPED Technical Reports

University of Texas at El Paso

Year 2001

Policy Analysis and Economic Impact
Study of Smoke-free Indoor Air
Ordinances in the Paso del Norte Region

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*Policy Analysis and Economic Impact Study of Smoke-free Indoor
Air Ordinances in the Paso del Norte Region*

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**July 2001
TR-2001-03**

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Introduction

Smoke-free air ordinances were enacted in Las Cruces, New Mexico in March 1995. Since that time very little has been done to evaluate the economic impact associated with implementation of these ordinances. As is often the case, discussions regarding the impact of the ordinance are commonly driven by opinion rather than fact—anecdotal evidence rather than empirical fact. Subsequently, the need for objective data to determine and validate the effects of the smoke-free air ordinances remains. The common assumption is that smoking restrictions drive away smoking customers or reduce the time and money that smoking patrons would normally spend in area restaurants. Several sources of literature confirm that these negative economic impacts may never appear. Instead, most facilities that choose to implement such smoking restrictions on their patrons demonstrate no change at all (Glantz and Smith, 1997). Moreover, the extant literature suggests that, in some cases, such ordinances are likely to increase the overall patronage of these businesses (Bierner and Siegel, 1997).

In this regard, while it is not possible to impose moral and ethical views upon individuals who choose to practice their freedom of choice, it is important to recognize the potential life threatening conditions associated with exercising one's individual freedom. Thus, this research endeavor provides the first credible evidence of the economic impact of the enactment of the smoke-free ordinance on the residents and businesses of the city of Las Cruces and insight into the possible economic consequences of passing a similar ordinance in the city of El Paso. Specifically, this study provides the food service industry empirical knowledge that will enable them to make the most informed decisions regarding the health effects on patrons. This study assists these individuals assess and the economic impacts of creating a smoke-free environment in their establishments. Also, this research will enhance policy makers' options by providing the necessary tools to assess the impacts of second-hand smoke on restaurant customer behavior.

Review of Literature

In a 1994 Texas study, an assessment of impact on public health of tobacco-control programs was conducted (Hwang, et. al, 1995). Although the effects of second-hand smoke are generally undisputed, the statistical information included in this study presents specific risks that are related to the exposure to smoke within eating and drinking establishments.

Although smoking is not reported as the number one cause of death at the U.S.-Mexico border region, within which the Paso del Norte lies, it is, however, considered one of the most significant causes of respiratory-related and heart disease regionally as well as nationwide. In this regard, the literature also informs us that many non-smokers are quite aware of the potential health risks that may harm their families and friends. Corsun, et. al (1996) found that 61.2 percent of smokers acknowledge that second-hand smoke is hazardous.

In 1992, the U.S. Environmental Protection Agency issued a risk assessment entitled, “Respiratory Health Effects of Passive Smoking: Lung Cancer and Other Disorders.” In this report, environmental tobacco smoke (ETS), was defined as a combination of “sidestream smoke” given off by smoldering cigarettes and “mainstream smoke” exhaled by smokers and was determined to be hazardous to the health of all individuals, including those whom choose not to smoke. Furthermore, the assessment concluded that ETS was, in fact, a type of carcinogen that has the potential to cause cancer. ETS causes an estimated 3,000 lung cancer deaths, 12,000 non-lung cancer deaths annually, and impairs the respiratory health of hundreds of thousands of children (USEPA, 1992).

Numerous studies support that exposure to ETS is even more life threatening when exposure is combined with other pollutants in an indoor environment. This particular issue is of greater concern for individuals inhaling second-hand smoke through exposure at home, at work, and in leisure settings. Overall, ETS is estimated to cause 434,000 deaths per year in the United States (USEPA, 1992). More importantly, the effects of ETS on children may result in a life of symptomatic respiratory problems. EPA found ETS to “increase the risk of lower respiratory

tract infections such as bronchitis and pneumonia.” EPA estimates that “between 150,000 and 300,000 of these cases annually in infants and young children up to 18 months of age are attributable to exposure to ETS” (USEPA, 1992). ETS also increases the prevalence of middle ear and chronic middle ear disease. In addition, previously diagnosed children had a greater incidence of asthmatic symptoms when exposed to ETS, making ETS a diagnostic risk factor for new asthma cases. While it is well-known that environmental-borne or second hand tobacco smoke harms people (US EPA, 1992), numerous research efforts have also focused on the economic impacts through health care provisions and regulation costs which supports the need for objective examination of smoke-free air ordinance impacts (Glantz and Charlesworth, 1999; Hwang, et. al, 1995).

Many local governments have enacted smoke-free ordinances for food, drink and tourist establishments and have developed a need to know if restricting smoking in a variety of public-regulated environments results in a decline in revenues from tobacco sales (i.e., tax revenues) or decline in establishments revenues because of the loss of the smoking clientele (Siegel, 1993). In this regard, restaurateurs’ concerns have primarily involved the risk of losing the business of their smoking clientele, resulting in less money spent dining-out. No doubt, some of these concerns are warranted. Corsun, et. al (1996) report 38 percent of non-smokers dine-out more frequently, whereas 40.6 percent of smoking patrons stated they were less likely to dine-out than before smoking ordinances were enacted. Furthermore, 60 percent of the smoking patrons involved in this particular study were found to be spending more time seeking alternative establishments that permit them to smoke. Conversely, it has been documented that many individuals avoid establishments because of second-hand smoke (Bierner and Fitzgerald, 1999).

Restaurant owners have also claimed that the smoke-free ordinances would favorably predisposition many patrons to dine-out more frequently as a result of reduced exposure to secondhand smoke; thereby, arguing that smoke-free areas for patrons do not impose undue economic hardship on proprietors (Novick, 1999). Moreover, restaurant owners report that

smoke-free ordinances would protect them from the liability associated with worker's compensation claims and civil suits (Corsun, et. al, 1996; Bierner and Fitzgerald, 1999; Glantz and Smith, 1997; Bartose and Pope, 1999; Glantz and Smith, 1998). The extant literature also suggests that smoke-free ordinances do not have negative, but rather positive economic effects on businesses; refuting many popular opinions (Bartose and Pope, 1999; Bierner and Siegel, 1997; Glantz and Smith, 1998; Glantz and Smith, 1997). Glantz and Charlesworth (1999) found tourism and hotel localities have experienced increases in revenues, in some cases, with no negative effects recorded. Glantz and Smith (1997; 1998), in their study of bar and restaurant sales, also concluded that sales were not adversely effected. Corsun, et. al (1996) offer that, while the smoker may spend more money per visit, the larger percentage of clientele is made-up of the non-smoker consumer, a group they suggest is 2.5 times larger than the smoking clientele. This obvious demand of the majority would, subsequently, appeal to the food service industry.

Currently, much of the controversy that exists relies on the claim that positive economic impacts may not hold true in all regions. The southern United States clearly includes factions that strongly adhere to smokers' rights, including many establishments and local governments who view restrictions on smoking as anathema to their constitutional and natural rights. In this regard, a cultural link to tobacco remains intact. The Paso del Norte region and its over two million residents, includes well over 70 percent of the population being of Hispanic descent, approximately 20 percent Anglo, 3 percent African-American or Black. This region, on the whole, has a near constant unemployment rate of approximately 8 percent (Texas Work Force, 2000a) in contrast to the state of Texas which holds at or below 5 percent (Texas Work Force, 2000b). According to the U.S. Census Bureau (1995) mid-year census, in El Paso, 30.9 percent of persons fall below poverty level compared to 18.5 percent in state of Texas. Of this El Paso population 41.9 percent are children. Additionally, less than two-thirds of El Paso residents over 25 years of age are high school graduates.

These statistics produce evidence that correlates directly with current health concerns. Research demonstrates that populations with a higher than average rate of poverty, minimal education (without a high school diploma), and of a minority descent are more likely to engage in health threatening behaviors. Consequently, the Paso del Norte region has multiple risk factors that pre-dispose or lend themselves to the likelihood of individuals engaging in smoking, alcohol consumption, drug-use and abuse. Thus, one might also add to the research questions at the forefront of this area and ask, in an area with a cultural diversity that does not match the majority of the nation, such as the population in the Paso del Norte area, is there a divergence from patterns that prevail in other regions. Or put another way, will the majority Hispanic population with a lower than normal use of tobacco create a positive financial impact on businesses adopting a smoke-free ordinance (American Demographic, 2001).

In this regard, in order to support of the Center's goal to expand and coordinate health research efforts, policy analysis and economic impact study of smoke-free indoor air ordinances in the Paso del Norte Region, this research focuses upon the following activities:

- analyzes the Las Cruces economic status as a result of its smoke free policy in food service establishments and bars using research methods that will effect reliable and objective data. These data include gross receipts tax revenues from the city of Las Cruces before and since the introduction of a smoke-free ordinance to determine impacts at various time periods;
- assesses the general attitudes and perceptions of the area's residents concerning a smoke free indoor air ordinance using intercept surveys at both smoke-free and smoke-tolerant locations, documenting individual characteristics (i.e., demographics) thereby allowing for determining potential sources of variation in attitudes based on individual characteristics (i.e., age, ethnicity, education levels, etc);
- evaluates the public attitudes and readiness to accept smoke free legislation using customer surveys in a stratified sample; and

- analyzes the potential economic effects in El Paso in regards to the implementation of a smoke-free mandate for food service establishments using appropriate objective research methods..

Research Methodology and the Data Analysis—Phase I

Review of Data

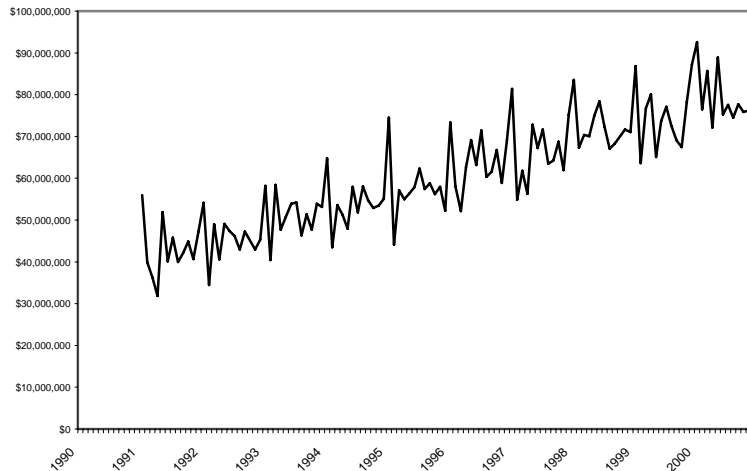
This specific empirical research question of this portion of the study is whether the enactment of the smoke-free policy by the City of Las Cruces created a significant economic impact on the restaurant/food service sector of that city. The first research design is an aggregate objective analysis of the monthly gross receipts taxable restaurant revenues for the City of Las Cruces from January 1991 through December 2000 for statistically significant changes around the enactment of the smoke-free ordinance. New Mexico Taxation and Revenue Department (NMTRD) Gross Receipts from Retail Trade data is used for this study. The total retail trade data is the aggregate of the seventeen business sectors:

Building Materials,
Hardware Stores,
Farm Equipment Dealers,
General Merchandise, except Department Stores,
Retail Food Stores,
Motor Vehicle Dealers,
Gasoline Service Stations,
Mobile Home Dealers,
Miscellaneous Vehicles and Auto Accessory Dealers,
Apparel and Accessory Stores,
Furniture, Home Furnishing and Appliance Stores,
Eating and Drinking Places,
Liquor Dispensers by the Drink,
Drug and Proprietary Stores,
Package Liquor Stores, and
Miscellaneous Retailers.

NMTRD provides this data for the entire state, for each county and for the four largest metropolitan areas of the state, including the city of Las Cruces in annual, quarterly and monthly series. Retail trade from eating and drinking places for the city of Las Cruces is the data series on

which the impact of the smoke-free ordinance would most likely occur. This nominal monthly series for the city of Las Cruces for January 1991 through December 2000 is shown as the top line in Figure 1. (The complete data set for this study is shown in the Appendix.)

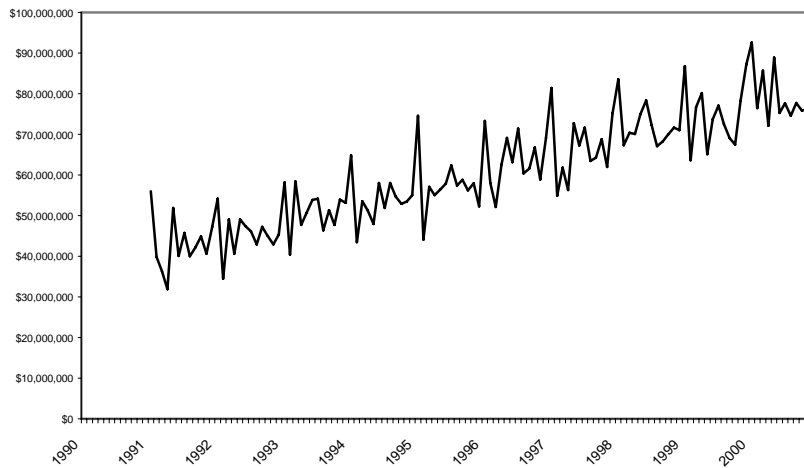
Figure 1
Gross Receipts from Eating and Drinking Establishments
for Las Cruces



An examination of Figure 1 indicates that nominal Gross Receipts from Eating and Drinking Establishments for the City of Las Cruces have a positive or upward trend over the ten-year period in question. In absolute terms, gross receipts from eating and drinking establishments began the period at \$4.2 million in January 1991 and achieved \$6.9 million for December 2000 representing an average annual rate of growth of 5.46 percent. The series maximum occurred in June 2000 at \$8.3 million. However, a portion of the growth in this series would be due to the continued upward pressure on prices, or inflation.

Total nominal gross receipts, for all seventeen categories, for the city of Las Cruces are shown in Figure 2. Figure 2 also reflects a positive, or upward trend in nominal total gross receipts from retail trade at a nominal annual rate of growth rate of 10.69 percent. Figures 1 and 2 indicate strong seasonality—that is, the series appear to cycle every twelve months.

**Figure 2
Total Gross Receipts
for Las Cruces**



The relationship between eating drinking gross receipts and total retail sales for Las Cruces and New Mexico is shown in Table 1. The top portion of the table provides the reported annual total retail sales and revenues from eating and drinking establishments in aggregate and on a per capita basis for the city of Las Cruces.

Table 1

<u>City of Las Cruces</u>	1991	1992	1993	1994	1995
Total Retail Sales	\$516,604,458	\$544,386,013	\$615,955,156	\$645,058,353	\$682,454,964
Per Capita	\$7,994	\$8,076	\$8,754	\$8,957	\$9,373
Eating and Drinking	\$52,836,120	\$56,781,843	\$64,013,486	\$70,092,477	\$67,645,567
Per Capita	\$818	\$842	\$910	\$973	\$929
Population	64,626	67,408	70,360	72,017	72,814
Percentage	10.23%	10.43%	10.39%	10.87%	9.91%
<u>State of New Mexico</u>					
Total Retail Sales	\$9,703,582,000	\$10,513,402,000	\$11,812,520,000	\$12,638,427,000	\$13,294,878,000
Per Capita	\$6,272	\$6,651	\$7,315	\$7,644	\$7,902
Eating and Drinking	\$937,814,000	\$997,059,000	\$1,090,579,000	\$1,191,993,000	\$1,223,119,000
Per Capita	\$606	\$631	\$675	\$721	\$727
Population	1,547,115	1,580,750	1,614,937	1,653,329	1,682,417
Percentage	9.66%	9.48%	9.23%	9.43%	9.20%

<u>City of Las Cruces</u>	1996	1997	1998	1999	2000
Total Retail Sales	\$766,500,806	\$778,301,247	\$865,013,155	\$914,097,658	\$946,424,760
Per Capita	\$10,358	\$10,356	\$11,450	\$12,062	\$12,453
Eating and Drinking	\$72,033,432	\$68,306,152	\$70,443,253	\$79,843,433	\$83,881,614
Per Capita	\$973	\$909	\$932	\$1,054	\$1,104
Population	73,999	75,157	75,545	75,786	76,000
Percentage	9.40%	8.78%	8.14%	8.73%	8.86%

State of New Mexico

Total Retail Sales	\$13,953,280,000	\$14,728,662,000	\$15,208,300,000	\$15,774,876,000	\$18,433,196,000
Per Capita	\$8,178	\$8,549	\$8,773	\$9,067	\$10,133
Eating and Drinking	\$1,246,666,000	\$1,293,290,000	\$1,334,037,000	\$1,422,069,000	\$1,517,852,000
Per Capita	\$731	\$751	\$770	\$817	\$834
Population	1,706,151	1,722,939	1,733,535	1,739,844	1,819,046
Percentage	8.93%	8.78%	8.77%	9.01%	8.23%

Source: New Mexico Taxation and Revenue Department and the Bureau of Business and Economic Research at the University of New Mexico

In 1991, retail sales in the city of Las Cruces was \$7,994 per capita and revenue from eating and drinking establishments were \$818 per capita. Each series has grown annually over the ten-year period reaching \$12,453 and \$1,104 in 2000. In 1991, eating and drinking gross taxable revenue was 10.23 percent of total retail sales. This proportion peaked in 1994 at 10.87 percent and never reached 10 percent throughout the remainder of the decade.

Compared with the state of New Mexico numbers in the bottom portion of the table, the city of Las Cruces' per capita total retail sales and eating and drinking revenue averages exceed the state averages for each year considered. Per capita, the citizens of Las Cruces and the surrounding area spend approximately \$2,000 more per year in total retail sales and approximately \$200 per year in eating and drinking establishments. In the early portion of the decade, the percentage that was spent by those in Las Cruces on eating and drinking exceeded the percentage spent by those in the entire state. However, during the second half of the decade, this percentage began to converge. This convergence suggests that eating and drinking in Las Cruces

became relatively less important in terms of contributing to the city's total retail sales over the decade's final five years.

Hypothesis Test

The data review from the previous section suggests that an underlying relationship in the dining habits of the residents of Las Cruces have changed over the past decade. To test whether this change was statistically significant relative to other independent factors, the following empirical approach is employed. The monthly gross receipts from retail trade from eating and drinking places is the dependent variable (EDP_t) in the estimated equation:

$$EDP_t = \alpha_1 DUM + \alpha_2 EDP_{t-12} + \alpha_3 CPI_t + \alpha_4 TRS_t + \varepsilon_t, \quad (1)$$

where DUM is a dummy variable with a value of zero for the period prior to the smoke-free ordinance and one thereafter, EDP_{t-12} is the eating and drinking establishment revenue series for twelve months prior to the current observation (to deseasonalize the data), CPI_t is the consumer price index (to adjust for inflation), and TRS_t is the total retail sales (less gross receipts from eating and drinking establishments) for the city of Las Cruces. This form of total retail sales is used to avoid cross contamination of the dependent variable since total retail sales includes gross revenue from eating and drinking establishments. The parameter coefficients α_1 , α_2 , α_3 , α_4 , and ε_t are estimated using ordinary least squares (OLS). The primary test hypothesis is:

$$H_0: \alpha_1 = 0$$

To reject this hypothesis would indicate that the level of taxable restaurant revenues did, in fact, change when the ordinance was enacted. If α_1 is significantly different from zero, the sign and magnitude of the estimated coefficient will indicate whether the change posed a positive or negative impact on restaurant revenues for the city of Las Cruces. This empirical technique is similar to that used by Glantz and Smith (1997; 1998) and Glantz and Charlesworth (1999).

The ten-year period January 1991 through December 2000 is the timeframe over which this equation is estimated. Table 2 provides the results of this estimation. The overall

explanatory results of the estimation are good with an R-squared of 0.369. The independent variables are significant at the 0.05 percent level with the Dummy variable, the lag variable and total retail sales statistically significant at the 0.01 level. The sign and magnitude of the Dummy coefficient suggest the direction and size of the change in gross receipts from eating and drinking establishments at the time of this smoke-free ordinance. Specifically, gross receipts from the eating and drinking establishments fell by \$659,149 at the time of smoke-free ordinance enactment. This represents a decline of approximately 9 percent in the level of gross receipts from eating and drinking establishments.

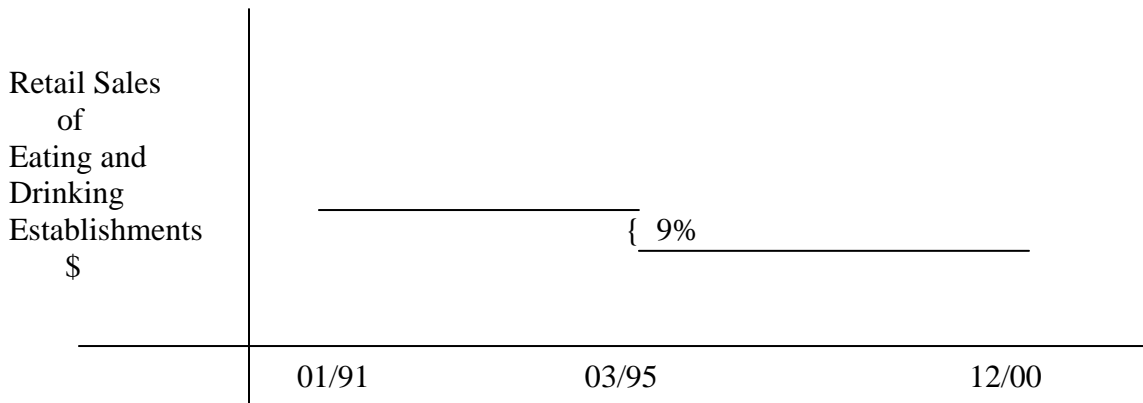
Table 2
OLS Regression of Eating and Drinking Revenues (EDR)

Sample(adjusted): 1992:01 2000:12
Included observations: 108 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	-659149.6	249435.2	-2.642568	0.0095
EDR(-12)	0.265566	0.093301	2.846333	0.0053
CPI	11721.67	5061.062	2.316050	0.0225
TOTAL RETAIL	0.051802	0.012706	4.076858	0.0001
R-squared	0.369027	Mean dependent var		5830023.
Adjusted R-squared	0.350826	S.D. dependent var		1126885.
S.E. of regression	907946.3	Akaike info criterion		30.31209
Sum squared residuals	8.57E+13	Schwarz criterion		30.41143
Log likelihood	-1632.853	F-statistic		20.27495
Durbin-Watson stat	2.410623	Prob(F-statistic)		0.000000

Two other variations in the form of equation 1 were employed with insignificant results. First, an intercept term was added to the equation. Under this formulation, the intercept term and the coefficient for the CPI became insignificant and the overall explanatory power did not increase, thus this form was dismissed. Second, interactive dummy (slope) variables were included in the equation estimation with insignificant results. This form of dummy variable tests whether the slope of the regression changes with the introduction of the dummy. This specification was also rejected. Thus, it can be concluded that Table 2 represents the best empirical representation of the underlying relationship between total retail sales and eating and

dining revenues in the city of Las Cruces over the ten-year timeframe. This regression hyperplane can be visualized in two-dimension space by the following graph:



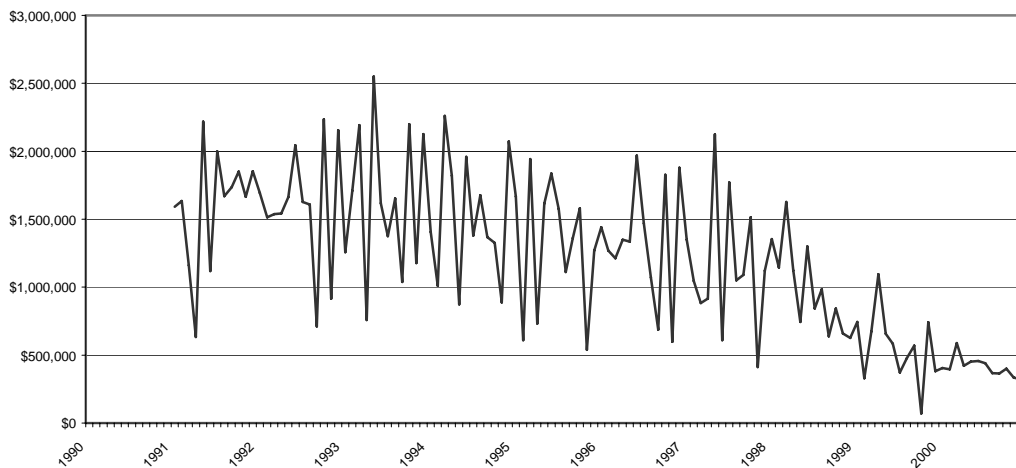
The decline in gross receipts in March 1995 is approximately 9 percent and, in real terms, is a permanent decline. This analysis deals exclusively with aggregate revenues of the businesses of Las Cruces; individual firms may have experience significantly results. Their results are beyond the scope of this study. Also, this study confirms that this significant decline in food and beverage sales coincided with the enactment of the smoke-free ordinance; a direct causal relationship cannot be drawn from this empirical test. No other macroeconomic or cultural factors were found that may contribute to this revenue decline.

Other Specifications

The second item contributing to the total retail sales of Las Cruces that could be affected by the implementation of the smoke-free ordinance is liquor sales dispensed by the drink. Although the smoke-free indoor air ordinance did not apply to bars, the implementation of the restriction could have an adverse effect of total liquor sales. This category is one of the seventeen classifications contributing to the city's total gross receipts from retail sales. Figure 3 shows the reported monthly gross receipts from this category for Las Cruces for the 1991-2000 time frame. Clearly, the figure indicates a substantial decline in the level of gross receipts reported from this item in nominal terms. This general trend is also shown in the values in Table 3. In 1991 total gross receipts from the sale of liquor dispensed by the drink was \$19.1 million. This amount

represented 3.7 percent of total retail sales for Las Cruces for that year and an average per capita rate of consumption of \$296. This rate of reported consumption declines gradually over the first three years of the decade followed by substantial declines in the latter three years of the decade. By the year 2000, reported consumption of liquor dispensed by the drink in the City of Las Cruces had fallen to less than \$5 million, or only 0.52 percent of gross receipts from retail trade. This level of consumptions represented only \$65 per capita for the final year of the study. This considerable decline in liquor consumption by the citizens of Las Cruces could be the result of the implementation of the smoke-free ordinance, due to cultural changes in the consumption of those items included in this category, or some other unknown factor.

Figure 3
Las Cruces Liquor Sales
Dispensed By the Drink



The combination of gross receipts derived from eating and drinking establishments and from liquor sales dispensed by the drink represents the majority of revenue generated by those businesses affected by the smoke-free ordinance. This combined revenue stream is represented in Figure 4 in nominal terms. Two characteristics are obvious in the graph. First, the series is highly seasonal and second, there is little net gain in the combined series over the ten-year period.

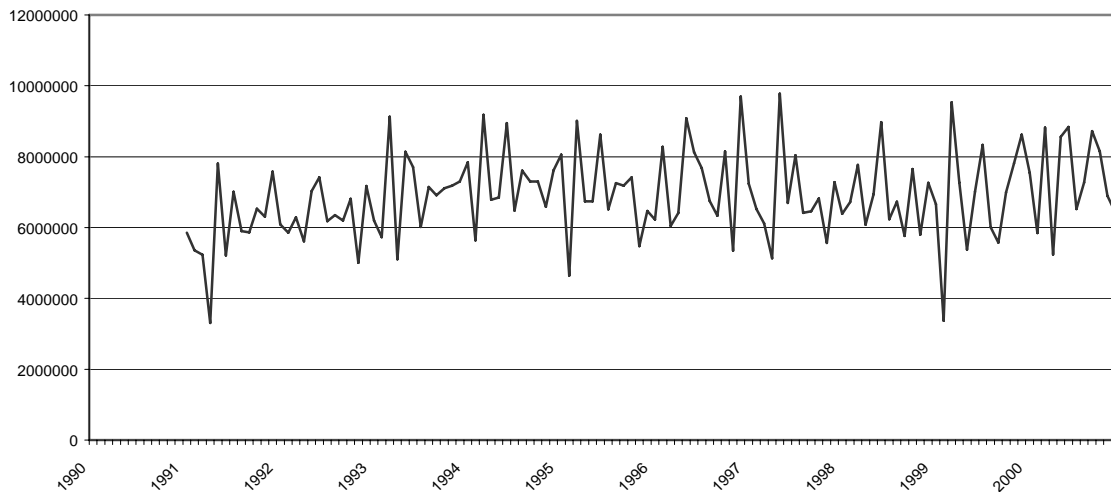
Table 3

<u>City of Las Cruces</u>	1991	1992	1993	1994	1995
Total Retail Sales	\$516,604,458	\$544,386,013	\$615,955,156	\$645,058,353	\$682,454,964
Per Capita	\$7,994	\$8,076	\$8,754	\$8,957	\$9,373
Liquor	\$19,134,174	\$19,245,074	\$19,655,439	\$18,043,519	\$15,840,771
Per Capita	\$296	\$286	\$279	\$251	\$218
Percentage	3.70%	3.54%	3.19%	2.80%	2.32%

<u>City of Las Cruces</u>	1996	1997	1998	1999	2000
Total Retail Sales	\$766,500,806	\$778,301,247	\$865,013,155	\$914,097,658	\$946,424,760
Per Capita	\$10,358	\$10,356	\$11,450	\$12,062	\$12,453
Liquor	\$16,112,967	\$13,886,506	\$11,885,378	\$6,694,713	\$4,948,732
Per Capita	\$218	\$185	\$157	\$88	\$65
Percentage	2.10%	1.78%	1.37%	0.73%	0.52%

Source: New Mexico Taxation and Revenue Department and the Bureau of Business and Economic Research at the University of New Mexico

Figure 4
Gross Receipts from Eating and Drinking Establishment and Liquor Dispensed by the Drink For Las Cruces



Further analysis of this data, shown in Table 4, details the trend in expenditures for eating and drinking and liquor dispensed by the drink for Las Cruces and the state of New Mexico for the ten-year period January 1991 through December 2000. The values are shown in nominal and per

capita terms for each civic region. The total gross receipts from the two categories grew by 2 percent annually for the City of Las Cruces and 3.7 percent for the entire state. The rate of change in per capita expenditure on these items remained flat for the city of Las Cruces but grew at a 2 percent rate for the state overall.

Also shown in the Table is the relative expenditure per capita of Las Cruces' gross receipts from these two categories versus the receipts from the entire state. In 1991, the residents of Las Cruces spent 144.24 percent of the state average per capita in eating and drinking establishments and for liquor dispensed by the drink. By 2000, this ratio had fallen to on 124.54 percent. The figures indicate that the state expenditures are rising faster than Las Cruces' total expenditures.

Table 4

	1991	1992	1993	1994	1995
Gross Receipts From EAD and Liquor for Las Cruces	\$71,970,294	\$76,026,917	\$83,668,925	\$88,135,996	\$84,154,763
Per Capita	\$1,114	\$1,128	\$1,189	\$1,224	\$1,156
Gross Receipts From EAD and Liquor for New Mexico	\$1,194,465,000	\$1,253,349,000	\$1,362,154,000	\$1,465,764,000	\$1,498,401,000
Per Capita	\$772	\$793	\$843	\$887	\$891
Percentage	144.24%	142.25%	140.98%	138.04%	129.77%
	1996	1997	1998	1999	2000
Gross Receipts From EAD and Liquor for Las Cruces	\$88,146,399	\$82,084,393	\$82,328,631	\$82,579,262	\$88,830,346
Per Capita	\$1,191	\$1,092	\$1,090	\$1,090	\$1,169
Gross Receipts From EAD and Liquor for New Mexico	\$1,513,080,000	\$1,545,881,000	\$1,580,135,000	\$1,642,962,000	\$1,707,236,000
Per Capita	\$887	\$897	\$912	\$944	\$939
Percentage	134.32%	121.73%	119.56%	115.39%	124.54%

Source: New Mexico Taxation and Revenue Department and the Bureau of Business and Economic Research at the University of New Mexico

Hypothesis Test

The values in Figures 3 and 4 and Tables 3 and 4 suggest that a substantial change in the consumption patterns of liquor in the city of Las Cruces changed over the last decade; however, an empirical test is required to assess whether this change is statistically significant. For this analysis, the gross receipts from eating and drinking establishments are combined (added) with the taxable gross receipts from the sales of liquor dispensed by the drink. This combined variable ($LIQ_t + EDP_t$) is the dependent variable in the equation specified as:

$$(LIQ_t + EDP_t) = \alpha_1 DUM + \alpha_2 (LIQ_t + EDP_t)_{t-12} + \alpha_3 CPI_t + \alpha_4 TRS_t + \varepsilon_t, \quad (2)$$

where the explanatory variables are similar to those of equation 1. This specification includes a 12-month lagged variable to adjust for seasonalization $(LIQ_t + EDP_t)_{t-12}$, the Consumer Price Index (CPI_t) to remove the impact of inflation, and total gross receipts (TRS_t) excluding the two categories included in the dependent variable. Again, the primary test hypothesis is:

$$H_0: \quad \alpha_1 = 0$$

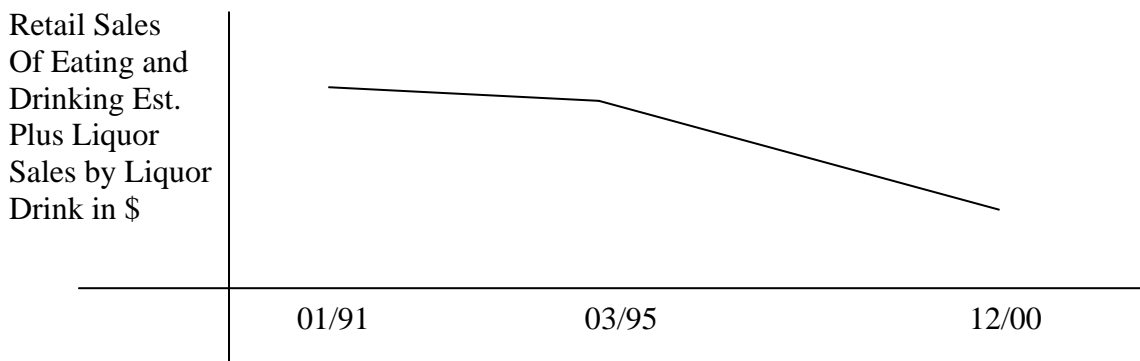
where α_1 is the estimated coefficient of the dummy variable in the regression equation. To reject this hypothesis would indicate that the combined level of taxable liquor sales dispensed by the drink and revenue from eating and drinking establishments did, in fact, change when the ordinance was enacted. If α_1 is significantly different from zero, the sign and magnitude of the estimated coefficient will indicate whether the change posed a positive or negative impact on restaurant revenues for the city of Las Cruces. The results of the estimation are shown in Table 5. The overall explanatory power of the specification is good (F-statistic is significant) but the r-squared is lower than that of estimate of equation 1. The independent variables are significant at the 5 percent level of confidence or better. The specification of this dummy variable differs from that of equation 1. In this case, the dummy variable is an interactive dummy. That is, the variable is computed as the product of the dummy variable in equation 1 (zeros or ones) and the total retail sales variable. The original dummy form was included and found insignificant; the

interactive form was inserted and found to be significant at the 1 percent level. The significance of this dummy form indicates that the slope of the hyperplane changed rather than the absolute level.

Table 5
 Method: Least Squares
 Sample(adjusted): 1992:01 2000:12
 Included observations: 108 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Dummy	-0.021909	0.005761	-3.803102	0.0002
(EAD + LIQ)(-12)	0.319404	0.087783	3.638577	0.0004
CPI	15792.00	6768.894	2.333025	0.0216
Total Retail Sales	0.057592	0.018174	3.168935	0.0020
R-squared	0.186552	Mean dependent var		6999589.
Adjusted R-squared	0.163087	S.D. dependent var		1182963.
S.E. of regression	1082209.	Akaike info criterion		30.66324
Sum squared resid	1.22E+14	Schwarz criterion		30.76258
Log likelihood	-1651.815	F-statistic		7.950277
Durbin-Watson stat	2.465018	Prob(F-statistic)		0.000080

The coefficient of the dummy (-0.0219) suggests that the rate of decline in dependent variable decline by 2.19 percent at the time the smoke-free ordinance was enacted. This decline is illustrated by the following graph. It appears that the enactment of the smoke-free ordinance or some other event in early 1995 increased the rate of decline in the consumption of food, beverage and liquor in Las Cruces.



Conclusions from Stage One

The results for the empirical tests in the previous section indicate that the gross taxable receipts for eating and drinking establishments declined by a significant amount with the enactment of the smoke-free air ordinance. The model suggests that this decline, approximately \$650,000, was permanent. When liquor sales are included the economic impact takes a different form, but still reflects a significantly negative persistent impact. These results support the contention that there is a measurable economic impact associated with implementation of smoke-free legislation. Also, this impact is borne entirely by the food service industry.

Survey Design, Methodology and Analysis—Phase II

The second phase of this research assesses the probable economic impact of a similar smoke-free ordinance on the business community of El Paso. Although Las Cruces and El Paso are geographic neighbors, many differences exist in the demographic composition and economic structure of the two communities. Included in these differences are relative population bases, levels of educational attainment, income differentials, ethnic and social characteristics, and state and municipal governmental organizations. Thus, the pedagogical design of the study evaluates the relative attitudes and perceptions of residents of each city toward the enactment of a smoke-free ordinance stratified by ethnicity, income and education. Adjustments in the relative weighting of the responses are made to account for the demographic differences.

The following section describes the survey process employed in the city of Las Cruces. Also described in this section are the results of the survey and implications that can be drawn from these results. These findings are then used as the baseline for the El Paso survey process.

Las Cruces Survey

The survey document for the Las Cruces market was designed to assess the awareness of the smoke-free indoor air ordinance and the impact that this enactment had on the individual's dining

habits. A sample copy of the survey document is shown in the appendix. The survey was administered in the Mesilla Valley Mall on Friday February 16th and Saturday February 17th. Mesilla Valley Mall provides a diverse traffic flow that is representative of the Las Cruces general population. Four well-identified Institute for Policy and Economic Development representatives conducted the intercept survey. Individuals entering the mall were asked to participate in the study and 235 surveys were completed. The aggregate responses to the survey are described in the following section.

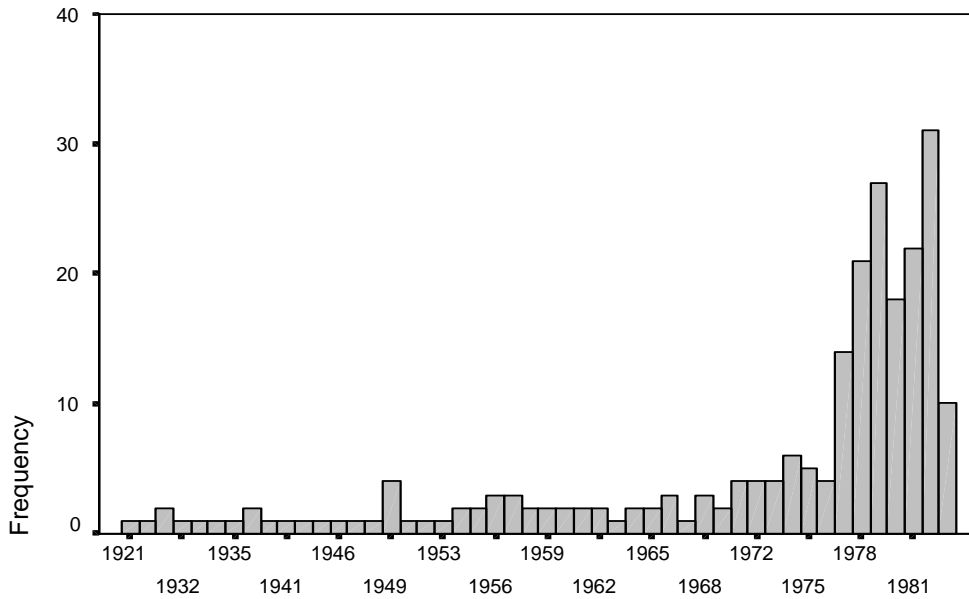
Demographic Profile of the Survey Respondents

The demographic composition of the Las Cruces survey pool is:

Gender:	Male	46 percent
	Female	54 percent
Ethnicity:	Hispanic	57 percent
	Other	43 percent
Smoking Preference:	Smoker	26 percent
	Non-smoker	74 percent
Marital Status:	Married	35 percent
	Not Married	65 percent
Children at Home	Yes	36 percent
	No	64 percent
Average Age:	28 years old	

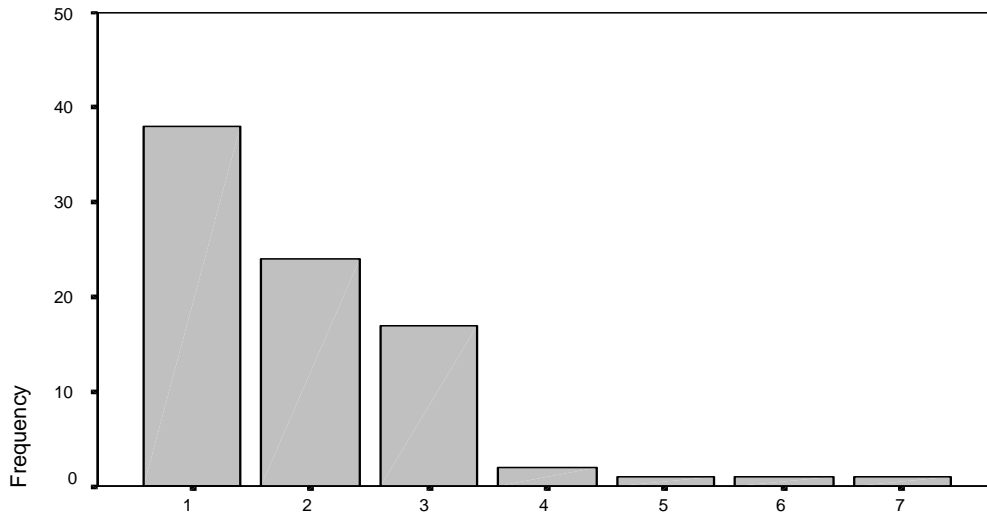
The composite profile of the “average” survey respondent in Las Cruces is a young (under thirty), single, nonsmoking female with no children at home. Although the average year of birth for the survey respondents was 1972, the age range of the survey participants was quite broad. The oldest participant was born in 1921 (79 years old) with the youngest respondent born in 1983 (17 years old). The age distribution of the survey pool is shown in the following chart.

In what year were you born?



Thirty-six percent (85 out of 235) of the respondents had children under 18 living at home. Of these participants with children home, thirty-seven reported only one child at home. The average number of children reported was 1.94. The total distribution of children living at home is shown in the following chart.

If yes, how many children under age 18 are living in your household?



The following three tables provide detailed information on the level of educational attainment, income classification and profession of the pool of respondents. Twenty-eight percent have

(only) graduated from high school, thirty-four percent have attended college, and almost thirteen percent have four-year college degrees. The pool represents a relatively broad distribution of incomes. Almost 19 percent have income levels below \$10,000 while almost 18 percent have total household incomes of more than \$50,000. The survey respondents also represent a wide range of professions (at least thirteen categories). The most popular category is “student” with over twenty percent of the survey pool.

What is your highest level of completed education?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than High School	25	10.6	10.7	10.7
	High School Graduate	66	28.1	28.3	39.1
	Some College	81	34.5	34.8	73.8
	Trade School or 2 Year				
	College Graduate	20	8.5	8.6	82.4
	4 Year Degree	30	12.8	12.9	95.3
	Post Graduate or				
	Advanced Degree	11	4.7	4.7	100.0
	Total	233	99.1	100.0	
Missing		2	.9		
Total		235	100.0		

What is your total family income?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 10,000	44	18.7	19.9	19.9
	10,000 to 14,999	34	14.5	15.4	35.3
	15,000 to 19,999	22	9.4	10.0	45.2
	20,000 to 24,999	16	6.8	7.2	52.5
	25,000 to 29,999	14	6.0	6.3	58.8
	30,000 to 39,999	32	13.6	14.5	73.3
	40,000 to 49,999	17	7.2	7.7	81.0
	50,000 to 74,999	27	11.5	12.2	93.2
	Over 75,000	15	6.4	6.8	100.0
	Total	221	94.0	100.0	
Missing		14	6.0		
Total		235	100.0		

What is your profession?

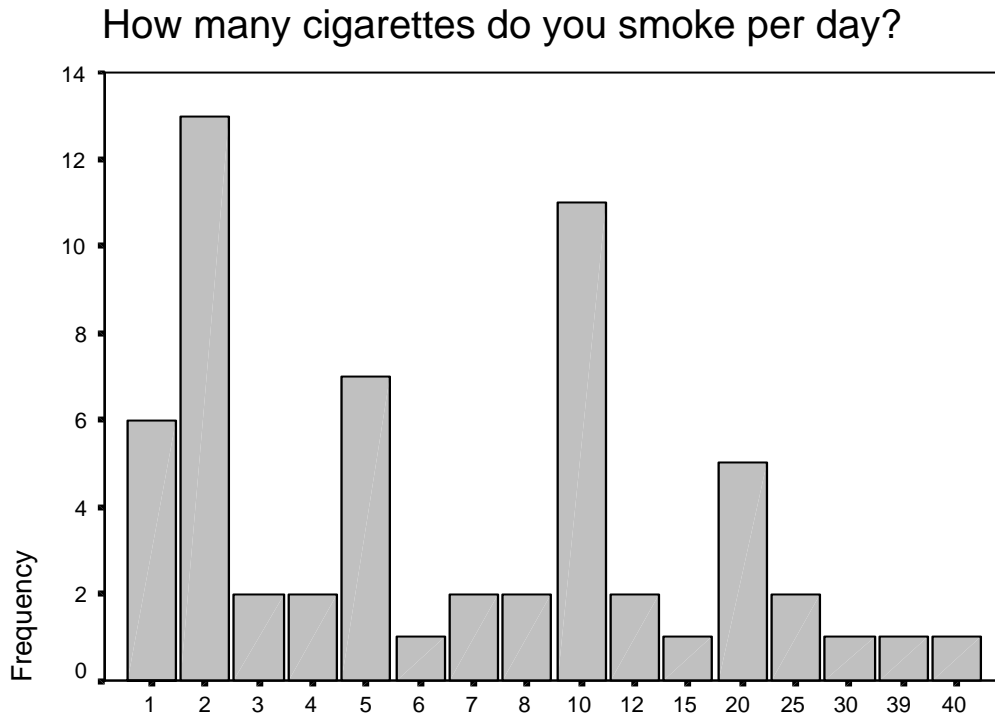
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Professional	25	10.6	11.7	11.7
	Technical Worker	17	7.2	7.9	19.6
	Clerical	7	3.0	3.3	22.9
	Sales Worker	16	6.8	7.5	30.4
	Craftsman	2	.9	.9	31.3
	Machine Worker	2	.9	.9	32.2
	Transporter or Material Worker	3	1.3	1.4	33.6
	Service Worker	19	8.1	8.9	42.5
	Homemaker	4	1.7	1.9	44.4
	Military	5	2.1	2.3	46.7
	Student	61	26.0	28.5	75.2
	Retired	9	3.8	4.2	79.4
	Other	38	16.2	17.8	97.2
	Unemployed	1	.4	.5	97.7
	No Response or Missing	5	2.1	2.3	100.0
	Total	214	91.1	100.0	
Missing		21	8.9		
Total		235	100.0		

The marital status of the survey pool, shown in the following table, indicates that the respondents come from a variety of relationships, formal and informal.

What is your marital status?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Married, living with spouse	75	31.9	32.5	32.5
	Married, not living with spouse	8	3.4	3.5	35.9
	Divorced	12	5.1	5.2	41.1
	Single, living with partner or roommate	53	22.6	22.9	64.1
	Single, living alone	48	20.4	20.8	84.8
	Single, living with parents	35	14.9	15.2	100.0
	Total	231	98.3	100.0	
Missing		4	1.7		
Total		235	100.0		

Approximately 25 percent of the sample indicated that they currently smoke. The graph shows the distribution of responses when asked how many cigarettes they smoked each day. The average number of cigarettes smoked per day by the responding individuals was 8.9 cigarettes per day.



The survey pool provides a highly diverse group of individuals from a variety of backgrounds, income levels and professions; the sample roughly reflects the demographic composition of the city of Las Cruces.

Attitudes and Opinions of Las Cruces Survey Respondents

The following section provides a summary of the responses of the participating respondents to inquiries concerning the smoke-free indoor air ordinance and its impact on their dining practices. The first table provides insight into the public’s perception of the legality of in-restaurant smoking in Las Cruces. That is, are residents aware that restaurants are restricted for

allowing smoking within their businesses? Forty-five percent of the responding sample is not aware of the current smoke-free environment required in Las Cruces' restaurants. Fifty-two percent of the sample understands the current requirements.

Is it legal for restaurants to provide smoking sections in Las Cruces?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Illegal	123	52.3	53.7	53.7
	Legal	58	24.7	25.3	79.0
	Not Sure	48	20.4	21.0	100.0
	Total	229	97.4	100.0	
Missing		6	2.6		
Total		235	100.0		

A question of interest is whether smoking preference and awareness of the ordinance are independent. Decomposing the responses by smoking preference into a contingency table (shown below) provides insight into this issue. The following table indicates which group, smokers or nonsmokers, are aware of the smoke-free ordinance. Responses to the survey suggests that 28 out of the 222, or 12.6 percent, valid answers know that it is illegal to maintain a smoking section of a restaurant in Las Cruces and also smoke. Clearly, the nonsmokers are more informed as to the smoking restrictions than are the smokers.

		Do you currently smoke?		Total
		Yes	No	
Can Las Cruces' resaurants provide a smoking section?	Illegal	28	92	120
	Legal	22	35	57
	Not Sure	7	38	45
Total		57	165	222

The hypothesis test for statistical independence is:

- H₀: The row and column classification criteria are independent.
Smoking preference and ordinance awareness are independent.
- H_a: The row and column classification criteria are dependent.
Smoking preference and ordinance awareness are dependent.

The test statistic is distributed as chi-square (χ^2) with a level of significance of 5 percent and degrees of freedom of (number of rows – 1) x (number of columns –1). Reject the null hypothesis if the computed chi-square statistic exceeds the critical value. For this comparison, the computed value is 7.74 and the table value at 5 percent and 2 degrees of confidence is 5.99. The hypothesis of independence can be rejected—that is, awareness of the ordinance and smoking behavior is related. Interestingly enough, it is the non-smokers who are aware of the ordinance that create this level of significance.

The next table indicates the response of the sample to enactment of the smoke-free ordinance in terms of dining habits. Specifically, did the sample pool and the population of Las Cruces change their dining habits with its implementation? Only 11.1 percent of the sample, or 26 out of 235, indicate that they dine out less often since the passage of the ordinance.

Since the adoption of a smoke-free indoor air ordinance in Las Cruces, do you eat out:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	More	62	26.4	26.7	26.7
	About the Same	144	61.3	62.1	88.8
	Less	26	11.1	11.2	100.0
	Total	232	98.7	100.0	
Missing	System	3	1.3		
Total		235	100.0		

To test whether the smoking habits of the sample have an impact on their dining habits, a similar χ^2 test is conducted on the cross-tabulation. The null hypothesis is independence between smoking behavior and change in dining behavior. To reject would support the contention that smoking behavior and dining behavior are related. The following table shows that relationship. Approximately 11.1 percent of the population dine-out less often, of which 7.1 percent are smokers. The χ^2 test statistic is 24.273 with a critical value again of 5.99—thus the null hypothesis is rejected. There is dependence between the two classifications. This statistical

dependence is centered on two specific groups: those who do not smoke and dine-out more and those who smoke and dine-out less.

			Do you currently smoke?		Total
			Yes	No	
Do you eat out	More	Count	8	54	62
		% of Total	3.5%	23.9%	27.4%
	About the Same	Count	35	104	139
		% of Total	15.5%	46.0%	61.5%
	Less	Count	16	9	25
		% of Total	7.1%	4.0%	11.1%
Total	Count	59	167	226	
	% of Total	26.1%	73.9%	100.0%	

These statistics are consistent with the research of Corsun et. al. (1996). Also, the 11.1 percent of the population who dine-out less often represents a large segment of the general population and produces a significant financial impact on the eating and drinking establishments of Las Cruces.

Another issue of interest to policy markers is whether the implementation of the smoke-free indoor air ordinance caused people dining in area restaurants to spend less time and money in eating establishments when they do eat out. Survey respondents were asked if the number of times a week that they choose to eat out has changed since the ordinance was enacted. The following table provides the survey participants aggregate responses.

Since the adoption of the smoke-free indoor air ordinance, do you spend:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	More	49	20.9	21.3	21.3
	About the Same	162	68.9	70.4	91.7
	Less	19	8.1	8.3	100.0
	Total	230	97.9	100.0	
Missing		5	2.1		
Total		235	100.0		

Of the respondents, 8.1 percent (19 of 230) indicated that they spend less dining out than they did before the adoption of the ordinance. The related issue is whether smoking behavior and changes in dining habits are related. The following table shows the relationship between the smoking

habit and whether more or less is spent on dining. Of those who currently smoke, 14 out of 59, or 23 percent spend less when they dine out (these 14 represent only 6.3 percent of the total sample). The χ^2 test statistic for this contingency table is 27.113 exceeding the critical value of 5.99. Again, the null hypothesis of independence is rejected—smoking behavior and change in spending is related and dependent.

			Do you currently Smoke?		Total
			Yes	No	
Do you spend?	More	Count	6	43	49
		% of Total	2.7%	19.2%	21.9%
	About the Same	Count	39	117	156
		% of Total	17.4%	52.2%	69.6%
	Less	Count	14	5	19
		% of Total	6.3%	2.2%	8.5%
Total	Count	59	165	224	
	% of Total	26.3%	73.7%	100.0%	

One alternative that smoking patrons of restaurants have, rather than dining in nonsmoking establishments in the city, is to patronize restaurants outside the jurisdiction of Las Cruces. Survey participants were asked if they dined outside of Las Cruces more often since the enactment of the smoke-free ordinance. The following table provides the aggregate results of their responses.

Since the adoption of the smoke-free indoor air law in Las Cruces, do you dine outside of Las Cruces:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	More Often	33	14.0	14.3	14.3
	About the Same	136	57.9	59.1	73.5
	Less Often	61	26.0	26.5	100.0
	Total	230	97.9	100.0	
Missing		5	2.1		
Total		235	100.0		

The responses indicate that approximately 14 percent of the sample eat outside Las Cruces more often since the adoption of the ordinance; however, 26.5 percent choose to dine outside of Las

Cruces less often since March 1995. Clearly, these individuals offset those who choose to eat outside of the city since the enactment of smoking restriction. Of interest is whether smoking preference and change in dining habits are dependent. The following table shows the distribution of smoking habit and outside dining habits—those who do not smoke dine outside in Las Cruces less often (44 of 223) than those who smoke choose to dine outside the city more often (11 of 223). The test statistic for this comparison is 1.87 relative to the critical value of 5.99. It appears that smoking behavior and dining outside Las Cruces more or less often are independent.

			Do you currently smoke?		Total
			Yes	No	
Dine Outside Las Cruces	More	Count	11	19	30
		% of Total	4.9%	8.5%	13.5%
	About the Same	Count	33	101	134
		% of Total	14.8%	45.3%	60.1%
	Less	Count	15	44	59
		% of Total	6.7%	19.7%	26.5%
Total	Count	59	164	223	
	% of Total	26.5%	73.5%	100.0%	

One impact of enacting smoking restrictions is the possibility of “smoker flight”. That is, the possibility that Las Cruces’ smokers may seek out restaurants outside the city that permit smoking. Our survey was asked whether they do, in fact, seek out restaurants outside the city limits that allow smoking. The following table reflects number of residents of Las Cruces that choose to dine outside of the city in restaurants that allow smoking. Forty-one of the 235 (17.4 percent) respondents stated that they did indeed leave Las Cruces to dine in restaurants that permitted smoking.

Do you ever leave Las Cruces to find restaurants that permit smoking?

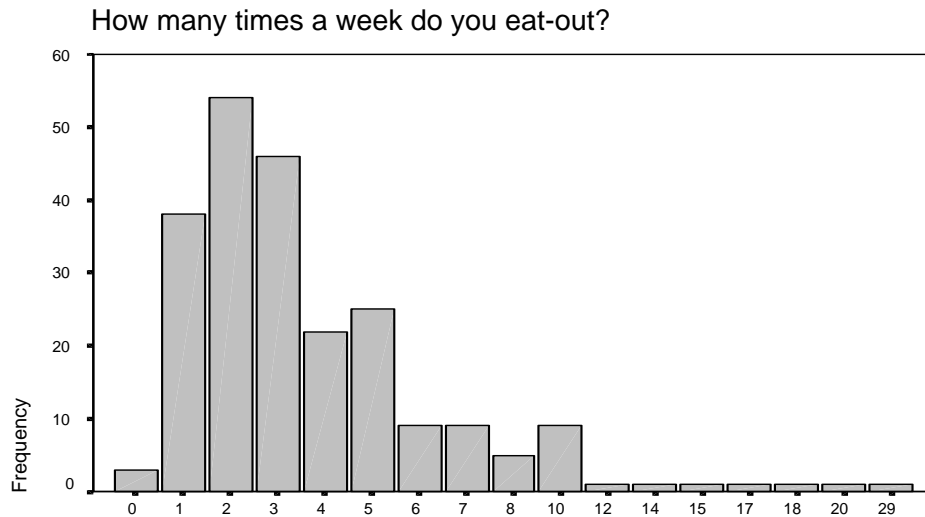
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	41	17.4	17.7	17.7
	No	190	80.9	82.3	100.0
	Total	231	98.3	100.0	
Missing		4	1.7		
Total		235	100.0		

It could be assumed that the smoking public would be the predominate group that leaves Las Cruces for smoke permitting restaurants; however, as the following table reports, a large number of non-smokers “tag along”. In this case, 20 of the 39 restaurant patrons who seek out smoke permitting establishments are nonsmokers. The χ^2 test statistic for this comparison is 12.341 compared to the critical value of 3.84 (only 1 degree of freedom); thus, smoking preference and “seeking behavior” are not independent. These results are not consistent with the findings of Corsun et. al. (1996).

Count

		Do you currently smoke?		Total
		Yes	No	
Do you seek out smoke permitting restaurants?	Yes	19	20	39
	No	40	146	186
Total		59	166	225

A related issue that influences the economic impact of smoking restrictions in restaurants is the possibility that restaurant patrons who smoke eat out more often than those who do not smoke. This question, addressed earlier, is extended by inquiring the specific number of times a weeks that the survey respondent eats out during the week. The following chart illustrates the distribution of responses and provides insight into the dining habit of the respondents and the general population of Las Cruces. The average number of times a week that residents dine out is estimated by the sample to be 3.83 times.



The earlier question that addressed dining habits indicated that the enactment of the ordinance caused a significant change in the dining habits of the residents of Las Cruces. This issue is expanded here through a comparison of dining frequency and smoking behavior. The cross-tabulated responses are shown in the table below. The test statistic for the null hypothesis of independence is 8.719 compared to the critical value of 26.3; thus, the null hypothesis cannot be rejected. There appears to be independence between smoking behavior and dining frequency. One note of caution in interpreting this reason is that 21 of the table cells reported no observations. This lack of responses reduces the effectiveness of hypothesis testing.

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		Do you currently smoke?		Total
		Yes	No	
How many times a week do you eat out?	0	1	2	3
	1	9	27	36
	2	11	40	51
	3	14	31	45
	4	8	14	22
	5	5	20	25
	6	2	7	9
	7	3	6	9
	8	2	3	5
	10	2	7	9
	12		1	1
	14		1	1
	15		1	1
	17	1		1
	18		1	1
	20		1	1
	29		1	1
Total		58	163	221

Policy makers should also be concerned with the possibility that smokers spend more on average dining out than do non-smokers. To assess this possibility, survey respondents were asked how much they spent on average when they do dine-out in Las Cruces. The following table provides their aggregate responses. Forty-four percent indicated that they spent between \$5 and \$10 per person on average when they dine-out. Almost 10 percent stated that they spend more than \$20 per person.

How much do you spend (per person) on average for a meal when you eat-out?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 5	14	6.0	6.0	6.0
	Between 5 and 10	105	44.7	44.7	50.6
	Between 10 and 15	64	27.2	27.2	77.9
	Between 15 and 20	29	12.3	12.3	90.2
	More than 20	23	9.8	9.8	100.0
	Total	235	100.0	100.0	

The following table provides a cross-tabulation of the average amount spent on dining relative to smoking behavior. The χ^2 test statistic for the null hypothesis of independence is 1.525 relative to the critical value of 9.49 (4 degrees of freedom and 5 percent level of confidence). Thus, there is no dependence between smoking behavior and amount sent on dining. That is, smokers may spend more than non-smokers, but the difference is not statistically significant.

			Do you currently smoke?		Total
			Yes	No	
How much on average do you spend per person dining out?	Less than \$5	Count	2	11	13
		% of Total	.9%	4.8%	5.7%
	Between \$5 and \$10	Count	27	76	103
		% of Total	11.8%	33.3%	45.2%
	Between \$10 and \$15	Count	19	44	63
	% of Total	8.3%	19.3%	27.6%	
	Between \$15 and \$20	Count	6	21	27
	% of Total	2.6%	9.2%	11.8%	
	More than \$20	Count	6	16	22
	% of Total	2.6%	7.0%	9.6%	
Total		Count	60	168	228
		% of Total	26.3%	73.7%	100.0%

The following three tables report observed violations of the ban and the responses that were taken as a result of this violation. The next table reports the number of respondents who have observed violations of the smoke-free ordinance in Las Cruces. The survey indicates that approximately 38 percent of the sample has seen violations of the smoking ban.

Have you seen someone smoking in a smoke-free area in violation of the law?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	89	37.9	38.7	38.7
	No	141	60.0	61.3	100.0
	Total	230	97.9	100.0	
Missing		5	2.1		
Total		235	100.0		

Also posed was the question of whether a person, in violation, of the smoking ban, was asked to stop. The following table reports the aggregate survey responses. Of the individuals who observed someone smoking in violation of the ban (89 of 235), 33 people indicated that someone asked the smoker to stop smoking in violation of the ordinance.

If you have observed someone smoking in violation of the ordinance, was the individual asked to stop?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	33	14.0	38.8	38.8
	No	52	22.1	61.2	100.0
	Total	85	36.2	100.0	
Missing		150	63.8		
Total		235	100.0		

Of those 33 people who observed someone ask those in violation of the smoke-free ordinance to stop, 10 of the 33 saw another customer ask the smoker to stop, 18 observed the manager intercede, and 8 saw an employee other than the manager ask the smoker to stop. These responses are shown in the following table.

An individual smoking in violation of the ordinance was asked to stop by:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Another Customer	10	4.3	27.8	27.8
	Manager	18	7.7	50.0	77.8
	Restaurant Employee	8	3.4	22.2	100.0
	Total	36	15.3	100.0	
Missing		199	84.7		
Total		235	100.0		

Four survey questions addressed the respondents' attitude toward the smoke-free ordinance. The first reflects the general opinion of whether the survey participant favors the ban or not. Seventy percent of the respondents favor the smoking ban with ten percent unsure. Only 18 percent clearly oppose the ban.

Do you favor the smoke-free indoor air ordinance?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	165	70.2	70.8	70.8
	No	43	18.3	18.5	89.3
	Not Sure	25	10.6	10.7	100.0
	Total	233	99.1	100.0	
Missing		2	.9		
Total		235	100.0		

Of those who oppose the smoke-free ordinance (43 of the 235), 26 report that they are smokers. Thus, 17 of the 43 individuals (40 percent) who oppose the ordinance are non-smokers. This distribution is shown in the following table. As is expected, there is statistically significant dependence between these two categories (test statistic of 42.7 versus critical value of 5.99). It is clear--smokers oppose the ordinance.

			Do you smoke?		Total
			Yes	No	
Are you in favor of the smoking ban?	Yes	Count	24	139	163
		% of Total	10.6%	61.2%	71.8%
	No	Count	26	16	42
		% of Total	11.5%	7.0%	18.5%
	Not Sure	Count	10	12	22
		% of Total	4.4%	5.3%	9.7%
Total		Count	60	167	227
		% of Total	26.4%	73.6%	100.0%

Another opinion that was asked of the survey participants is whether they felt that the smoke-free ordinance would be repealed. Less than one-half (48.5 percent) felt confident that it would not be repealed. Over twenty percent stated that it would be repealed. These survey results are shown in the next table.

Do you believe the ordinance will be repealed?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	51	21.7	21.9	21.9
	No	114	48.5	48.9	70.8
	Not Sure	68	28.9	29.2	100.0
	Total	233	99.1	100.0	
Missing		2	.9		
Total		235	100.0		

In addition the survey participants were asked whether they favored a similar ordinance for bars. The following table provides their responses to this question. As is shown, a clear majority (57.8 percent) are opposed to an ordinance that restricts smoking in bars.

Do you favor a similar ordinance for bars?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	69	29.4	29.5	29.5
	No	136	57.9	58.1	87.6
	Not Sure	29	12.3	12.4	100.0
	Total	234	99.6	100.0	
Missing		1	.4		
Total		235	100.0		

When asked whether the respondents favored a similar ordinance for other cities, 58.3 percent of those polled replied that they did favor the enactment of a similar ban on indoor smoking in other cities. This response rate is significantly lower than the rate (70.8 percent) of those who favor the Las Cruces ban shown in a previous table. The dependence between smoking behavior and preference for smoking restrictions is statistically significant for both bars and other cities.

Do you favor a similar ordinance for other cities?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	137	58.3	59.6	59.6
	No	61	26.0	26.5	86.1
	Not Sure	32	13.6	13.9	100.0
	Total	230	97.9	100.0	
Missing		5	2.1		
Total		235	100.0		

The final two survey questions are concerned with the relative hazard that second-hand smoke has on restaurant workers and patrons. Specifically, the survey participants were asked whether they thought that second-hand smoke posed a hazard to these two groups of exposed individuals. The following tables reflect the aggregate responses of the sample individuals as well contingency on smoking behavior. In both instances, over seventy-five percent of these respondents are of the opinion that second-hand smoke is hazardous to restaurant patrons and workers. These percentages are consistent with the findings of Corsun et al (1996).

Do you think second-hand smoke is dangerous to restaurant patrons?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	183	77.9	77.9	77.9
	No	36	15.3	15.3	93.2
	Not Sure	16	6.8	6.8	100.0
	Total	235	100.0	100.0	

Count

		Do you currently smoke?		Total
		Yes	No	
Is second-hand smoke dangerous to other patrons?	Yes	34	146	180
	No	19	16	35
	Not Sure	7	6	13
Total		60	168	228

The χ^2 test statistic for independence is 24.3 versus the critical value of 5.99 indicating that the respondent's opinion on the relative risk of second-hand smoke is dependent on the smoking behavior of the individual.

Do you think second-hand smoke is dangerous to restaurant workers?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	185	78.7	78.7	78.7
	No	32	13.6	13.6	92.3
	Not Sure	18	7.7	7.7	100.0
	Total	235	100.0	100.0	

Count		Do you currently Smoke?		Total
		Yes	No	
Is second-hand smoke hazardous to restaurant employees?	Yes	30	150	180
	No	21	11	32
	Not Sure	9	7	16
Total		60	168	228

The results of the question concerning the hazards of second-hand smoke on the health of restaurant employees reflect the responses of the previous question. Smokers believe second-hand smoke is not hazardous to restaurant employees where non-smokers believe the opposite.

One final hypothesis was considered. Specifically, are Hispanics more or less apt to smoke than are other ethnic groups. A recent survey by American Demographic magazine (February 2001) indicates that Hispanics account for only 19.1 percent of all American smokers. The following table supports this contention. Our results suggest that smoking behavior and Hispanic ethnicity are independent. The test statistic did not exceed the critical value (0.82 versus 3.84).

Count

		Do you currently smoke?		Total
		Yes	No	
Are you of Hispanic descent	Yes	34	96	130
	No	21	65	86
Total		55	161	216

Preliminary Conclusions from Las Cruces

It can be concluded that the general population of Las Cruces favors the smoke-free ban in area restaurants; however, a core group of residents, smokers and their supporters, are not in favor of the smoking ban. Of this opposing group, a subset has changed their dining habits—fewer times dining out and less spent when dining. However, a second group, nonsmokers, has increased the number of times that they dine outside their home. The increased dining activity of the second group has not offset the loss of the first group. The result is the net loss of taxable revenue to the restaurant industry of Las Cruces.