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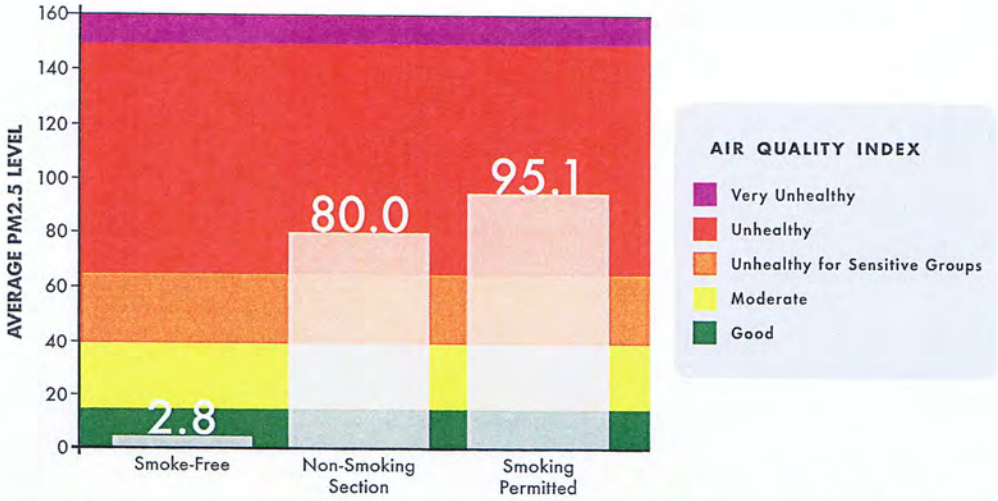
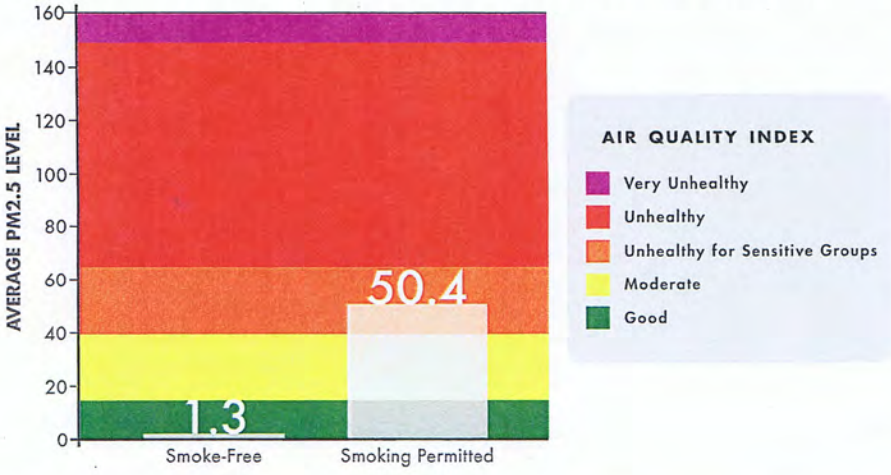
the MISSISSIPPI AIR QUALITY study

AVERAGE LEVEL OF INDOOR AIR POLLUTION IN RESTAURANTS AND BARS



- The average $PM_{2.5}$ level in smoke-free restaurants & bars was 2.8 µg/m3, The U.S. Environmental Protection Agency classifies levels less than or equal to 15 µg/m3 as ***Good***.
- The average $PM_{2.5}$ level in nonsmoking sections of restaurants and bars that also had smoking sections was 80.0 µg/m3. The U.S. EPA classifies levels between 66 and 150 as ***Unhealthy*** and issues the following health advisory, "People with heart or lung disease, older adults, and children should avoid prolonged or heavy exertion. Everyone else should reduce prolonged or heavy exertion."
- The average $PM_{2.5}$ level in restaurants & bars that permitted smoking was 95.1 µg/m3. The U.S. EPA classifies levels between 66 and 150 as ***Unhealthy***.

AVERAGE LEVEL OF INDOOR AIR POLLUTION IN CASINOS



- The $PM_{2.5}$ level in the smoke-free casino was 1.3 µg/m3. The U.S. Environmental Protection Agency classifies levels less than or equal to 15 µg/m3 as ***Good***.
- The average $PM_{2.5}$ level in the casinos that permitted smoking was 50.4 µg/m3. The U.S. EPA classifies levels between 41 and 65 µg/m3 as ***Unhealthy for Sensitive Groups*** and issues the following health advisory, "People with heart or lung disease, older adults, and children should reduce prolonged or heavy exertion."

EXECUTIVE

summary

In October through early December, 2012, indoor air quality was assessed in nine Mississippi municipalities. Three of the communities had 100% comprehensive smoke-free ordinances, three had partial smoke-free ordinances, and three had no ordinance regarding smoking.

We used a TSI SidePak AM510 Personal Aerosol Monitor using the protocol developed by the Roswell Park Cancer Institute to measure the concentration of fine particle air pollution, $PM_{2.5}$. Air quality studies typically monitor particles of this size because $PM_{2.5}$ are released in significant amounts from burning cigarettes, are easily inhaled deep into the lungs, and cause a variety of adverse health effects including cardiovascular and respiratory morbidity and death.

KEY STUDY FINDINGS

- In locations that were completely smoke-free the level of fine particle air pollution was very low, $PM_{2.5}$ = 2.8 µg/m3.
- In the two nonsmoking sections within locations that allowed smoking the level of fine particle air pollution was $PM_{2.5}$ = 80.0 µg/m3.
- In the 13 locations with observed smoking, the level of fine particle air pollution was $PM_{2.5}$ = 95.1 µg/m3.
- In the three casinos with observed indoor smoking the level of fine particle air pollution was $PM_{2.5}$ = 50.4 µg/m3.
- In the one casino with a smoke-free policy the level of fine particle air pollution was $PM_{2.5}$ = 1.3 µg/m3.

U.S. ENVIRONMENTAL PROTECTION AGENCY

Health studies have shown a significant association between exposure to fine particles and premature death from heart or lung disease. Fine particles can aggravate heart and lung diseases and have been linked to effects such as: cardiovascular symptoms; cardiac arrhythmias; heart attacks; respiratory symptoms; asthma attacks; and bronchitis. These effects can result in increased hospital admissions, emergency room visits, absences from school or work, and restricted activity days. Individuals that may be particularly sensitive to fine particle exposure include people with heart or lung disease, older adults, and children.

MICROGRAMS PER CUBIC METER (µG/M3)

Air quality is assessed based on Particulate Matter (PM). The size of particles is directly linked to their potential for causing health problems. Very small particles generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. Air quality levels are defined as the mass of particulate matter ≤2.5 microns in diameter in a volume of air: micrograms per cubic meter (µg/m3). A microgram is one millionth of a gram. A cubic meter (approximately 39" X 39" X 39") describes a volume of air that is about the size of a washing machine.

RESULTS

	VENUE NUMBER	SIZE	AVG NUMBER OF PEOPLE	AVG NUMBER OF BURNING CIGARETTES	AVG SMOKING DENSITY	AVG PM 2.5 LEVEL
smoke-free restaurants & bars →	1	557	60	0	0.00	3.7
	2	360	30	0	0.00	10.4
	3	446	57	0	0.00	0.6
	4	483	15	0	0.00	1.3
	5	232	12	0	0.00	3.4
	6	316	10	0	0.00	2.8
	7	418	52	0	0.00	1.0
	8	240	6	0	0.00	2.3
	9	552	40	0	0.00	1.6
	10	362	16	0	0.00	3.8
	11	168	10	0	0.00	2.0
	12	119	24	0	0.00	1.6
	13	518	72	0	0.00	1.4
	AVERAGE (N=13)	**367**	**31**	**0**	**0.00**	**2.8**
non-smoking section of restaurants & bars →	14	725	38	0	0.00	34.0
	15	480	30	6	1.25	126.0
	AVERAGE (N=2)	**602**	**34**	**3**	**0.63**	**80.0**
smoking permitted restaurants & bars →	16	560	42	11	1.96	157.2
	17	130	13	3	2.31	75.4
	18	223	11	3	1.35	21.7
	19	1,500	19	8	0.53	17.1
	14	725	38	5	0.69	134.0
	20	500	10	3	0.60	25.0
	21	1,449	33	10	0.69	127.0
	22	360	13	5	1.39	116.0
	23	1,500	40	8	0.53	75.5
	15	480	30	3	0.63	51.9
	24	650	28	5	0.77	96.2
	25	232	11	6	2.59	173.5
	26	464	10	5	1.08	166.3
	AVERAGE (N=13)	**675**	**23**	**6**	**0.85**	**95.1**
smoking permitted casinos →	27	7,786	250	3	0.04	48.4
	28	62,851	250	4	0.01	44.9
	29	16,723	350	6	0.04	57.9
	AVERAGE (N=3)	**29,120**	**283**	**4**	**0.03**	**50.4**
smoke-free casino →	30	9,290	300	0	0.00	1.3
pool hall →	31	150	15	8	5.33	245.3
	31	150	20	9	6.00	104.2

Economic Effects of Smoke-Free Ordinances in Mississippi Communities:

AN EXAMINATION OF TOURISM & ECONOMIC DEVELOPMENT TAX REVENUES

LOCATION	DATE OF ORDINANCE*	% CHANGE IN SMOKE-FREE COMMUNITIES	AVERAGE % CHANGE (DURING THE SAME PERIOD) IN THE AGGREGATED NO-ORDINANCE COMPARISON COMMUNITIES	DIFFERENCE
ABERDEEN	3/22/2007	6.66%	2.63%	4.03%
BATESVILLE	5/4/2010	1.84%	2.75%	-3.28%
CLINTON	8/14/2008	27.12%	-3.52%	30.64%
CORINTH	11/6/2007	-2.93%	0.73%	-3.66%
GREENWOOD	8/17/2007	4.16%	4.55%	-0.39%
GRENADA	1/8/2009	3.29%	-2.31%	5.60%
HATTIESBURG	1/1/2007	-3.31%	-0.71%	-2.60%
HERNANDO	3/8/2007	94.98%	1.15%	93.83%
JACKSON	7/1/2010	-2.96%	2.42%	-2.42%
KOSCIUSKO	11/2/2007	-16.86%	0.73%	-17.59%
LAUREL	12/4/2009	5.60%	-0.27%	5.87%
OXFORD	11/17/2006	-0.44%	-2.41%	1.97%
RIDGELAND	7/19/2007	8.30%	3.41%	4.88%
STARKVILLE	5/20/2006	5.14%	-4.72%	9.86%
TUPELO	10/5/2006	5.58%	-5.91%	11.49%
PEARL	9/1/2010	5.01%	0.92%	4.10%
PONTOTOC	5/1/2008	32.64%	-1.29%	33.93%
TOTAL		**10.22%**	**-0.11%**	**10.33%**

*STUDY PERIOD: 12 MONTHS BEFORE THE ORDINANCE AND 12 MONTHS AFTER THE ORDINANCE

This table presents the inflation-adjusted pre- and post- ban data for the Mississippi communities that have comprehensive smoke-free ordinances, collect a TED tax, and have at least 12 months of post-ban data[1]. The percentage change in revenue for these towns ranges from -17% to 95%. As other researchers have noted , this wide range reflects the volatile nature of the restaurant and hospitality industries, due to seasonality and turnover in businesses. Also, the largest changes occurred in the smaller communities.

For the communities with smoke-free ordinances as a whole, inflation-adjusted TED tax revenue were 10.2% greater in the 12 months following the enactment of a smoke-free ordinance. Conversely, there was no meaningful change in TED tax revenue in the aggregated control communities (-.1%).