"Influence of Ethanol-Blended Fuels on the Emissions from Three Pre-1985 Light-Duty Passenger Vehicles," *Journal of the Air & Waste Management Association,* Vol. 46, December 1996, pp. 1149-1161, by F.D. Stump, K.T. Knapp, and W.D. Ray, U.S. Environmental Protection Agency.

In order to use more completely these interesting results, which "will be integrated into the EPA's Mobile 5 air modeling program" in other models, could you please ask the authors to publish the NO_x and fuel economy data (72 numbers) as a reply to this letter. Vehicle fuel economy was determined (page 1149) and Table 16 shows more (6/12) statistically significant NO_x emissions increases than CO decreases caused by fuel ethanol (5/12). The results might help to put this matter in proper perspective.

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AUTHOR'S RESPONSE:

Oxides of Nitrogen and Fuel Economy Data, Average of Multiple Tests

Vehicle		BU950B With Catalyst		BU950B With Catalyst		BU950B With Catalyst	
Test Temperature		90 °F		75 °F		40 °F	
Test Fuel		Base	ETOH	Base	ETOH	Base	ETOH
NO_x	g/mi	1.34	1.86	1.26	1.76	1.27	1.28
Fuel Econ.	MPG	18.10	18.16	18.15	17.88	16.79	16.19
Vehicle		BU950B No Catalyst		BU950B No Catalyst		BU950B No Catalyst	
Test Temperature		90 °F		75 °F		40 °F	
Test Fuel		Base	ETOH	Base	ETOH	Base	ETOH
NO_x	g/mi	2.93	2.99	2.40	2.72	1.88	2.19
Fuel Econ.	MPG	18.30	17.75	18.41	18.03	16.90	16.72
Vehicle		CI415G With Catalyst		CI415G With Catalyst		CI415G With Catalyst	
Test Temperature		90 °F		75 °F		40 °F	
Test Fuel		Base	ETOH	Base	ETOH	Base	ETOH
NO_x	g/mi	2.92	2.46	2.50	2.21	1.64	2.18
Fuel Econ.	MPG	22.46	21.67	22.59	21.29	19.78	19.87
Vehicle		MU098B With Catalyst		MU098B With Catalyst		MU098B With Catalyst	
Test Temperature		90 °F		75 °F		40 °F	
Test Fuel		Base	ETOH	Base	ETOH	Base	ETOH
NO_x	g/mi	5.84	8.30	4.91	6.90	2.82	4.31
Fuel Econ.	MPG	12.63	12.39	11.90	12.27	10.77	11.15

F.D. Stump
U.S. Environmental Protection Agency

"Particle Concentrations Inside a Tavern Before and After Prohibition of Smoking: Evaluating the Performance of an Indoor Air Quality Model," *Journal of the Air & Waste Management Association,* Vol. 46, December 1996, pp. 1120-1134, by W. Ott, P. Switzer, and J. Robinson.

The authors are to be commended for their dedication and commitment in returning to the same saloon on numerous occasions, all in the interests of science. Joking aside, the information gathered is useful and pertinent. Perhaps a similar study in a restaurant with "smoking," and "non-smoking" sections would prove equally informative, as I for one can never get far enough away from the smoking section in most establishments to enjoy a smoke-free meal.

I do, however, have a question that perhaps the authors could address. On page 1122, in the discussion of the piezoelectric microbalance, the following statement is made: "As particle mass sticks to the oscillating (electrode) region, the resonant frequency decreases in direct proportion to the mass of the adhering material." In a simple spring-mass system, the natural (resonant) frequency is a function of the square root of the quotient of the spring constant divided by the mass. So the decrease in the resonant frequency of the piezoelectric crystal should be a function of the difference between the square root using the original mass and the square root using the original mass plus the additional mass due to the "adhering material." This is hardly a "direct proportion" relationship. Perhaps the authors could comment?

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The experiment methodology and data processing of this study appear to have several problems, which might just be the way the data were interpreted. Nevertheless, the implications are to accentuate the apparent impact of cigarette smoking on respirable suspended particle (RSP) concentrations indoors.

Average Active Smoking Count

A key parameter of the indoor air model hypothesized to represent the