John LOCKE FOUNDATION

SPOTLIGHT

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Check The Facts Next Time

Asserted Ozone-Asthma Link Has No Foundation

Summary: During debates about air pollution in North Carolina, supporters of more regulation have asserted that high rates of childhood asthma are related to increasing exposure to ground-level ozone. Not only has there been no such increase, but a new study shows there is, if anything, an inverse correlation — the higher the ozone level, the lower the asthma rate. Next time, lawmakers and the media should check the facts before repeating unfounded and politically motivated allegations.

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Over the past several years, particularly during debates over the Clean Smokestacks legislation passed by the state legislature during its 2002 session, the citizens of North Carolina have been told repeatedly that high levels of ground-level ozone in the state are a significant cause of asthma problems among children. This message has been hammered home by advocacy groups such as the American Lung Association and the Public Interest Research Group (PIRG), in newspaper articles, and most recently in a report titled "The Energy Working Group Draft Energy Plan" produced at Appalachian State University.[1] This document is being proposed as a basis for developing an energy policy for the state.

The ASU report claims that the number one child illness in the state is asthma and it is strongly suggested, without evidence, that the cause is ground-level ozone. The only reference is to the results of a study commissioned by the environmental advocacy group Clear the Air.[2] According to the ASU report, the Clear the Air study claims that "in 1998, 240,000 asthma attacks statewide were triggered by ozone."[3] First, the Clear the Air "study" focused on 1997 and not 1998. More importantly, it used no real asthma data from North Carolina. In fact, the study made no attempt to show any correlation between incidences of asthma and ozone levels based on actual data. Instead it speculated about how many asthma cases were the result of ozone based on 1997 ozone monitor readings and previous statistical analysis that was not North Carolina-related.

Published here, the John Locke Foundation's analysis of actual ozone and asthma data for a period of four years, which includes the one year studied by the Clear the Air organization, suggests that the group's conclusion is very unlikely.

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In this analysis we correlated ozone exceedence days and asthma hospitalizations for children 14 years old or younger on a county-by-county basis. An "exceedence day" is a day that ozone monitors register as a Code Orange or greater. This is what the state of North Carolina considers to be an "ozone action day."[4] We used data made available to the public by the N.C. Division of Air Quality and the State Center for Health Statistics.[5] Our report focuses on the years 1995-1997 and 2000. These are the only years for which asthma hospitalization data are available.

An Overview of Results

If ozone were the cause of increased asthma among children in the state, one would expect to find a positive relationship between counties with the highest number of ozone exceedence days and counties with the highest rates of childhood asthma (the greater the number of ozone exceedences the greater the number of hospitalizations). What we found was quite surprising. Not only was this not the case but if there was any detectable relationship, it was *negative*. That is, the greater the number of ozone exceedences the *lower* the rate of asthma hospital admissions. This negative result was found for all four years. For example, during 1997 — the year studied by Clear the Air — the relationship suggested by the conventional wisdom was turned completely on its head. Swain County, which had no ozone exceedence days for the entire year, had the highest rate of asthma hospitalizations while Caswell County, which had the highest number of ozone exceedence days, had the lowest rate of hospitalizations. With respect to Swain County this relationship was true for the entire 1995-1997 period.

Another result that flies in the face of conventional wisdom relates to the North Carolina mountains and the Asheville area in particular. It has often been suggested that high rates of asthma hospitalizations in this region are due to high levels of

Childhood Asthma Hospitalizations per 100,000 (highest to lowest) and Ozone Exceedence days in All Measured North Carolina Counties*

1995-1997		
County	Asthma	Ozone
Swain	1261.1	0
Pitt	701	5.3
Haywood	670.4	6.3
Buncombe	649.1	0
Rowan	610.7	9.1
Johnston	593.3	4.3
Durham	518.4	3
Cumberland	513.2	4.9
Guilford	376.7	4.2
Rockingham	375.5	5.7
Granville	374.2	3.3
Duplin	359.5	0.3
Forsyth	345.3	5.1
Mecklenburg	324.3	11.4
Wake	288	6
Yancey	236.4	4.7
Franklin	210.5	9.3
Chatham	174.1	5
Caswell	132	9.3

1997		
County	Asthma	Ozone
Swain	856.5	0
Camden	508.5	1
Northampton	442.8	5
Cumberland	406.9	4.5
Martin	404.6	0
Johnston	384.2	12
Pitt	361.2	11
Buncombe	353.8	0
Rowan	349.7	10.5
Edgecombe	338.2	8
Durham	311.8	3
Caldwell	294.9	1
Mecklenburg	250.6	15
Forsyth	241.8	7.7
Haywood	235.2	5.5
Guilford	234.3	3
Wake	228.7	10.8
Duplin	218.9	1
Lincoln	217.7	4
Person	209	5
Rockingham	189.3	11
New Hanover	183.2	3
Granville	159.6	17
Yancey	141.4	0
Franklin	112.3	14
Chatham	81.6	8
Caswell	48.9	17

2000		
County	Asthma	Ozone
Lenoir	547.1	2
Edgecombe	484.6	4
Swain	471	0
Yancey	409.2	4
Caldwell	356.6	4
Person	353.3	1
Jackson	286.5	4
Union	284.7	4
Cumberland	283.4	3.5
Haywood	275.2	4
Northampton	272.4	1
Pitt	265.8	3
Duplin	256.8	2
Johnston	252.9	3
Rowan	224.6	9.5
Franklin	207.4	5
Alexander	201.3	9
Buncombe	191.6	7
Rockingham	187.9	3
Mecklenburg	186.6	11
Durham	179.6	7
Lincoln	177.4	15
Granville	175.9	10
Avery	144.7	0
Guilford	138.7	8
Wake	123.2	5.3
Martin	111	2
Davie	98.2	17
Chatham	95.6	0
Forsyth	90.6	5.3
New Hanover	79.8	2
Camden	71.7	0
Caswell	22.2	9

* The counties listed in these three tables are the only ones for each of the listed periods for which data on both asthma hospitalizations and ozone exceedence days are available.

SOURCES: N.C. Division of Air Quality, N.C. Center for Health Statistics

ozone pollution. Again the data suggest that this is very unlikely. As noted above, for the 1995-1997 period Swain County, with the highest rate of childhood asthma hospitalizations (1,261 per 100,000) registered zero ozone exceedence days. Buncombe County and the Asheville area, also with zero exceedence days, ranked 4th in terms of hospitalizations (649 per 100,000). The results for 2000 are similar. Lenoir County reported the highest number of asthma hospitalizations with only two ozone exceedence days for the year and Swain County reported the third highest rate of hospitalizations, once again with zero exceedence days. Clearly, it would appear very unlikely that the asthma problems being suffered by children in the mountain areas are being caused by high concentrations of ground-level ozone (see graphs on page four).

The Data and Methodology

As noted above, the years chosen for this study, 1995-1997 and 2000, were determined by the availability of asthma hospitalization data. The counties studied were limited by the availability of ozone monitoring data. While childhood asthma data are available for all counties, ozone monitors are placed only in those locations where ozone problems are expected to arise. This limited our study to counties where the data overlapped. Also, because the number of counties with ozone monitors grew between 1995 and 2000, we were able to include more counties in our 2000 analysis than in the 1995-1997 analysis. For the same reason, there are more counties represented in the 1997 statistics than in the 1995-1997 statistics, which were limited to only those counties that had complete ozone data for all three years. Again, this was dictated by the way the data for asthma hospitalizations were made available. While we were able to obtain stand-alone asthma data for 2000 and 1997, the rest of the data was obtained from a study published by the N.C. Department of Health and Human Services that dealt with 1995-1997 in the aggregate.[6] To our knowledge, we have included all of the overlapping ozone and childhood asthma hospitalization data that are available.

Conclusion

The idea that high asthma rates among children in North Carolina have been the result of high levels of ozone pollution has been a consistent and unquestioned "given" in debates surrounding air quality regulations. Advocacy groups and politicians from across the state have asserted this proposition as if it were an undeniable fact. And newspapers, either due to laziness or bias, have reported such assertions without question and without conducting any independent investigations of their own.

In previous studies and responses to newspaper articles, the John Locke Foundation has suggested that worsening asthma problems were unlikely to be the result of worsening ozone pollution mainly because there were no data showing that ozone pollution has gotten worse over the last decade. In other words, A can be a cause of B only if A is actually occurring, and it is not.

In this study we have taken this assessment one step further and looked to see if any connection at all could be found that would justify the assertions of the radical environmentalists about the need for more regulation. Like so many of the environmentalist claims in the area of air pollution — from assertions about worsening ozone in the mountains to health problems allegedly caused by "fine particles" — claims regarding the relationship between asthma among North Carolina's children and ground-level ozone have no basis in fact. Unfortunately such phantom-chasing in the media and elsewhere does a great disservice to those who are suffering from asthma-related problems, as it distracts our attention and our resources from more likely causes.

— Dr. Roy Cordato is VP for Research and Resident Scholar at the John Locke Foundation.

NOTES

1. "That Mountain Air," *The (Raleigh) News & Observer*, Feb. 4, 2002.
2. If there is any doubt about the advocacy nature of this document one need only read the title and note the name of the publishing organization. "Out of Breath: Health Effects from Ozone in the Eastern US" Clear the Air, National Campaign Against Dirty Power, October 1999. Found at www.cleanair.org.
3. See the "Executive Summary" found at http://www.ncenergy.appstate.edu/.
4. Ozone is measured in terms of parts per billion (ppb) of ambient air on an average per-monitor basis. An ozone exceedence day in a particular location occurs when a monitor has a reading of 85ppb or greater averaged over an eight-hour period, known as a "Code Orange." The state has determined that at this concentration the air becomes "unhealthy for sensitive groups" (see http://daq.state.nc.us/airaware/ozone/codes.shtml). There has been a great deal of controversy regarding this standard. Even though the EPA has proposed a similar standard at the federal level its own Clean Air Scientific Advisory Committee (CASAC) refused to endorse it. (See "CASAC Closure on the Primary Standard Portion of the Staff Paper for Ozone," Clean Air Scientific Advisory Committee, USEPA, EPA-SAB-CASAC-LTR-96-002).
5. All ozone data in this study are based on ozone monitor readings found at www.daq.state.nc.us/monitor/data. Asthma hospitalization statistics for 2000 were obtained at http://www.schs.state.nc.us/SCHS/healthstats/databook/. The data for 1995-1997 were reported in Paul Buescher and Kathleen Jones-Vessey, "Childhood Asthma in North Carolina," SCHS Studies, A Special Report Series by the State Center for Health Statistics, No. 113, March 1999. Found at http://www.schs.state.nc.us/SCHS/pubs/title.cfm?year=1999. Separate data for 1997 was obtained directly from the State Center for Health Statistics.
6. Buescher and Jones-Vessey.

Plotting Trends in Asthma Hospitalization and Ozone Exceedence