

Abstracts of current literature

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Effects of air pollution on blood pressure: a population-based approach

Over the last 20 years, much research has been devoted to the effects of air pollution on our health. Many hypotheses have been proposed, but studies directly linking air pollution to blood pressure are rare. The authors of this article attempted to demonstrate such a link.

Presented is a retrospective analysis of data collected during the MONICA project, a project conducted by the World Health Organization to MONitor trends in CARDiovascular diseases in Augsburg, Germany. In this project, data were collected from 1984 through 1985 and from 1987 through 1988. In all, 4022 people were interviewed and examined between 1984 and 1985; 3753 of these people had follow-up examinations in 1987–1988. This current study analyzes data from 2607 of these individuals. Heart rate, blood pressure, and plasma viscosity were all measured on each of the patients. In addition, atmospheric levels of sulfur dioxide, carbon monoxide, and total suspended particulates were obtained.

Gaussian regression models were used to assess for an association between air pollution and systolic blood pressure. Although it was found that systolic blood pressure increased as air pollution worsened, confounding factors blurred the association. When the authors controlled for temperature, barometric pressure, and relative humidity, there was much less of a correlation. After controlling for the meteorological conditions mentioned, there was only a 1- to 2-mm Hg increase in systolic blood pressure attributable to increased levels of sulfur dioxide, carbon monoxide, and total suspended particles. The greatest factor seemed to be the number of total suspended particles on a given day. In individuals with a high plasma viscosity, increased numbers of total suspended particles caused an increase of approximately 7 mm Hg in the systolic blood pressure.

This study provides data that suggest a link between air pollution and increases in systolic blood pressure. It also implicates temperature, barometric pressure, and relative humidity as factors in blood pressure. What this study does not establish, however, is whether such slight changes in blood pressure are at all clinically significant. Also, the results of this study have intrinsically limited power secondary to the multifactorial nature of blood pressure. Long-term prospective trials are needed to further assess the effects of air pollution on blood pressure.

(*Am J Public Health*. 2001;91:571–577) A. Ibaldo-Mulli, J. Steiber, H. E. Wichmann, W. Koenig, and A. Peters.

APPLIED AND ENVIRONMENTAL MICROBIOLOGY

Experimental and field studies of *Escherichia coli* O157:H7 in white-tailed deer

As a result of recent outbreaks of *Escherichia coli* O157:H7, there has been a renewed interest in studying this bacterium. Much research has been focused on cattle, since beef is thought to be the primary source of *E coli* O157:H7, but there have been case reports implicating venison as a source for this disease as well. The authors of this study set out to evaluate the importance of white-tailed deer in the transmission of *E coli* O157:H7.

This study has 2 parts. A controlled laboratory experiment was performed to evaluate the clinical response, fecal shedding, sites of bacterial localization, and associated lesions in deer inoculated with *E coli* O157:H7. In the experiment, 6 deer were orally inoculated with *E coli* O157:H7, 2 deer were orally inoculated with nontoxigenic *E coli*, and 1 deer was not inoculated. The deer that was not inoculated was housed with 1 of the 6 deer that had been inoculated with *E coli* O157:H7. The other deer were also housed in pairs. The deer were then euthanatized and necropsied at various intervals. Serologic and histopathologic studies were performed subsequently. Meanwhile, field researchers collected multiple stool samples from wild deer and nearby cattle across the southeastern United States.

Other than 2 of the 9 experimental deer developing mild nonhemorrhagic diarrhea, there was no apparent clinical response after *E coli* inoculation. The 1 deer that was not inoculated did show fecal shedding of *E coli* O157:H7. It was also noted that fecal shedding decreased with time. Pathologic studies showed high levels of *E coli* in the gastrointestinal tract of all euthanatized deer, but not in the uncooked meat. Field studies found evidence of *E coli* O157:H7 in rectal swabs of 3 (0.5%) of 609 individually sampled deer, but there was no evidence of *E coli* O157:H7 in fecal samples collected from the ground. Evidence of *E coli* O157:H7 was also found in the stool of 13 (4.3%) of 305 nearby cattle. The specific serotypes are included in the results. Studies of fresh venison collected by hunters in the area failed to isolate any *E coli*.

This study provides valuable data concerning the role of wild deer in the epidemiology of *E coli* O157:H7. The experimental portion is small in size, but the results agree with results obtained in similar cattle studies. The field research, on the other hand, is extensive and large scale. Although no *E coli* O157:H7 was obtained from fresh venison meat, case reports of human infection after eating venison have been doc-

umented. Based on the results of this study, deer are not as large a reservoir for *E coli* O157:H7 as cattle, but they likely play an important role in its spread, especially where deer live near cattle.

(*Appl Environ Microbiol.* 2001;67:1218–1224) J. R. Fischer, T. Zhao, M. P. Doyle, et al.

AVIATION, SPACE, AND ENVIRONMENTAL MEDICINE

Effect of daily versus intermittent exposure on heat acclimation

Anyone who has ever participated in an outdoor activity on a hot humid day understands the benefits of heat acclimation. Many studies that define the physiological changes that take place during this process have been reported. There is less literature, however, describing the best method with which to become heat acclimated. The authors of this study test the hypothesis that daily exposure to heat is more efficacious for heat acclimation than intermittent exposure.

Fourteen healthy athletes (mean age 23.5 years) were randomized into 2 groups of 7 subjects. Each group contained 5 females and 2 males, and there were no significant differences between the groups. Before the sessions started, the maximum exercise capacity of each subject was determined by measuring peak oxygen consumption, VO_2 , while exercising on a rowing ergometer. Each subject then exercised on the rowing ergometer at a power output equal to 70% of their maximum ability. One group exercised for 30 minutes per day for 10 consecutive days. The other group exercised for 30 minutes per day every Monday, Wednesday, and Friday for a total of 10 sessions. All sessions took place in an environmental chamber set at 38°C and 70% relative humidity. Rectal temperature, skin temperature, heart rate, ratings of perceived exertion, and sweat rate were all recorded.

Results show consecutive exposure to be superior to intermittent exposure in nearly every category. Rectal temperature decreased significantly in both groups by day 5, but fell to 96% of its predicted plateau value in the consecutive exposure group and to only 26% of the predicted plateau in the intermittent exposure group. Heart rate decreased to 63% of the predicted plateau in the consecutive exposure group compared to only 16% in the intermittent exposure group. Skin temperature was also significantly lower in the continuous exposure group. Ratings of perceived exertion and sweat rate were not significantly different between the groups.

The main limitation of this study is the small sample size. Otherwise, the methods are clear and consistent, and the statistical analysis seems sound. In addition, the authors of this article present a very thorough review of relevant literature, which adds to the validity of the design and the results. Despite

the study's small size, the results of this study agree with the results of previous similar studies. Larger studies should be done to confirm these results.

(*Aviat Space Environ Med.* 2000;71:385–390) N. Gill, B. Phed, and G. Sleivert.

CLINICAL INFECTIOUS DISEASES

Risk factors for severe pulmonary and disseminated coccidioidomycosis: Kern County, California, 1995–1996

In most cases, patients with coccidioidomycosis (CM) suffer nothing more than mild, influenza-like symptoms, but in severe cases, this disease can be fatal. As with many diseases, knowing who is at risk to develop severe complications can help direct management decisions. It is well known that the San Joaquin Valley in California is hyperendemic for CM, and much of our data about CM comes from research done in this area. This article provides a recent update of CM in Kern County, which is located within the San Joaquin Valley.

The authors conducted both a 2-year population-based surveillance program for CM and a retrospective case-control study of patients with CM. The surveillance program identified all the individuals between January 1, 1995, and December 31, 1996, in Kern County who were older than 18 years and had culture, histopathologic, molecular, or serological evidence of *Coccidioides immitis*, the fungus that causes CM. From this data set, patients with positive diagnoses between January 1, 1995, and September 30, 1996, were classified as having mild CM, severe pulmonary CM, or disseminated CM. Mild CM was defined as a mild flulike illness. These patients served as case controls. For someone to be classified as having severe pulmonary CM, there had to be radiographic evidence of pneumonia that resulted in hospitalization. Patients classified as having disseminated CM were those with extrapulmonary or miliary CM. Enrolled patients were then contacted by telephone and asked to complete a standard questionnaire. Data on demographic characteristics, outdoor activities, dust exposure, past medical history, tobacco and alcohol use, occupation, socioeconomic status, and antifungal treatment for CM were obtained. Also recorded was the number of days missed from work or school as a result of having CM.

The surveillance program identified 905 persons newly diagnosed with CM. Of these, 682 met inclusion criteria for the case-control study, and 380 were enrolled. Both univariate and multivariate analyses were performed. Univariate analysis revealed several risk factors for severe pulmonary CM and disseminated CM. Patients who acquired severe pulmonary CM were more likely to be older, more likely to be agricultural workers, and more likely to have a longer disease course. Risk factors for disseminated CM were being male, being black, being pregnant, or having a longer disease course.

Multivariate analyses showed slightly different results. Risk factors for severe pulmonary CM, as defined by an odds ratio