The Newsletter of the Clemson University / MUSC Agromedicine Program

AGROMEDICINE PROGRAM UPDATE

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Program Notes

➢ Lectures

February 11 - Dr. Simpson was the banquet speaker at the annual meeting of the Southeastern Agricultural Aviation Association held in Charleston. He spoke on "Cancer and Pesticide Exposure."

February 13 - Dr. Simpson presented "Pathogens and Parasites" at the 44th Annual Pest Control Operators School held in Columbia.

Second National Report on Human Exposure to Environmental Chemicals

Last month the Centers for Disease Control and Prevention released its *Second National Report on Human Exposure to Environmental Chemicals*. The report focused on 116 chemicals including selected pesticides from the following chemical classes: organophosphate, organochlorine and carbamate insecticides; chlorophenoxy, triazine, and chloroacetamide herbicides; and repellents and disinfectants. Chemicals and their metabolites were measured in blood and urine samples collected from a statistical sampling of volunteers across the U.S. during 1999-2000.

The report is careful to note that improved analytical procedures allow the detection of low levels of environmental chemicals in people. Also noted is that the detection and quantification of a chemical in a human does not suggest that the chemical has caused a health effect. In fact, the report states that it "… does not present new data on health risks from different exposures."

Following are observations on the biomonitoring for pesticides:

- "Compared with levels found in several similar studies of DDT exposure among selected groups in the U.S. before 1990, DDT levels presented in the *Report* are clearly lower."
- "… the *Report* shows chlorpyrifos levels in children that were about twice as high as those found in adults."
- No quantifiable levels of 2,4,5-T, atrazine, alachlor and DEET were found in the study population.

Each discussion section on the various pesticides reminds the reader that it is not known if there is a cause for health concern at the levels detected. More research is needed.

The full report and a summary report are available from the CDC website www.cdc.gov/exposurereport/.

Poultry Plant Workers' TB

by Dr. Stanley Schuman

A cluster of four cases of severe tuberculosis-like illness alerted the Sussex County NJ Health Department to contact CDC, Atlanta for epidemiologic investigation. Two poultry processing plants reported four young workers with severe illness.[1]

Two workers died from meningitis (cases 1 and 2) and two cases (3 and 4) were hospitalized with pulmonary TB. Clinical epidemiologic investigation required analysis of Tuberculin Skin Tests, autopsy findings, tests for HIV (cases 2 and 4); contact investigation of pulmonary exposure to coworkers and household members; and molecular subtyping of the M. tuberculosis isolates (cases 2, 3, and 4). Weighing the clinical epidemiologic evidence, including the lack of match between the M. tuberculosis isolates, the investigators concluded, "this was not a workplace – based outbreak of TB, negating the need for worker's compensation – related activities." In fact, immunosuppression from HIV predisposed case 2 to fatal TB meningitis, and case 4 to pulmonary TB.

Although "poultry workers face numerous pulmonary occupational hazards," and "foreign-born poultry workers make up a high-risk population for TB infection," the authors warn health providers not to overreact or underreact to presumed clusters of TB. Appropriate microbiologic tests must be conducted to confirm the identity of specific TB strains involved in each case.

This investigation reminds us that immunosuppressed patients who work with poultry may be at higher risk of avian pulmonary infection. The list of possible pathogens includes: *Mycobacterium avian; Chlamydia psittaci; Histoplasma capsulatum; Coxiella burnetti*; Avian influenza; and Newcastle virus.[2]

[1] Kim DY et al. Pseudo-outbreak of tuberculosis in poultry plant workers, Sussex County, Delaware, JOcc Environ Med 2002; 44:1169-1172.
[2]Chin J. Control of Communicable Diseases Manual; 17th Ed; 2000, APHA Publication.

Folates Reduce Birth Defects

by Dr. Stanley Schuman

Why is good nutrition (a balanced and affordable diet rich in fruits and vegetables) taken for granted? Many of us associated with agriculture, have to ask that question, when especially good news on health-promoting diet keeps coming out from medical research while alarmist fears keep coming from opponents of agricultural chemicals and biotechnology.

Research from the University of Toronto documents the striking benefits of adding folic acid to Canada's grain cereal products since January 1998.[1] "Among 336,963 women who underwent maternal serum screening over 77 months, the prevalence of open neural tube defects declined from 1.13 per 1,000 pregnancies before fortification to 0.58 per 1,000 pregnancies thereafter [prevalence ratio 0.52; 95% confidence interval 0.40 – 0.67; $p < 0.0001$]."

This latest application of nutritional science reminds us of other advances which, unperceived on a daily basis, we tend to take for granted: iodized salt, preventing goiter and cretinism; vitamin D-fortified milk preventing rickets; fluoridation of water supplies to reduce dental caries; and iron-fortified infant formulas to prevent anemia.

On an international scale, population-based preventive nutrition is being considered promising by the World Health Organization. Agromedicine teamwork is trying to reduce infant and childhood mortality from anemia (iron deficiency) and blindness (vitamin A deficiency) by the introduction of genetically modified iron and carotene enriched strains of rice. Rice is the main staple food for 2/3 of the earth's population.

The Toronto researchers "recommend that other countries consider adopting a program of folic acid food fortification, in addition to encouraging increased use of periconceptional folic acid tablets."

[1]Ray JG, et al: Association of neural tube defects and folic acid food fortification in Canada, Lancet 2002; 360:2047-48.