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"In This Issue"

TOXICOLOGY TIDBITS

" INTRODUCTION "

Once again, we are living up to our promise to publish the newsletter ***occasionally and at irregular intervals!*** We do promise at least one more issue this year, and most likely two. This issue, like many before it, does not focus entirely on toxicological issues, but also other issues of safety which can provide perspective. The second article for this issue concerns **agricultural-related fatalities,** and mentions that agriculture has the second highest work-related fatality rate. In response to a question about which industry has the highest work-related fatality rate, Sandy Ogletree put on her detective cloak, dove into the web, and found some very interesting sources of information about other hazardous occupations.

A portion of an article published by the Harvard Center for Risk Analysis about the **risks of power-plant emissions** has been included, and it relates directly to the article from the California EPA Department of Pesticide Regulation on 1996 pesticide use data. Pesticide use data is reported as the amount used in pounds, and this is similar to the way that toxic emissions are also reported (on a weight basis). The important point elaborated by the Harvard Center is that the amount of any given emission (or application) must be related to the toxicity of the substance in order to make any assessment of risk. Too often the amount is the only thing reported and there is no way to relate the amount to risk.

The Harvard Center for Risk Analysis article also stepped on another one of my toxicological "pet-peeves"; the relationship of hazard to risk. **Hazard** is best defined as the **potential** of a substance to cause harm, whereas **risk** is the **probability** of adverse effect under specified conditions of exposure. Regulatory agencies utilize experimental data to set exposure doses which are expected to cause no effect even if the exposures last a lifetime. The standard used by the US EPA for non-cancer effects is called the Reference Dose (RfD). The standard used by the World Health Organization is called the acceptable daily intake (ADI). Both are established by taking experimental data, usually a no observable adverse effect level (NOAEL) and dividing it by a safety factor, which may range from 100 to more than 5,000. These are deemed to be "safe" levels of exposure, however they are sometimes used as measures of toxicity. **I would argue that the RfD and ADI are not measures of toxicity, they are in fact measures of no effect.**

Sometimes actual exposures are compared to the RfD and the ratio called a "hazard quotient" (HQ) , but where is the hazard? If the HQ is less than 1, it means the exposure is less than the RfD. If it is 1 or more, it does NOT mean there is a hazard because the RfD is so far below the NOAEL. As presented in the article, the HQ does not tell us anything about the risk associated with a particular exposure. You cannot determine risk by comparing an exposure to the RfD.

It is unfortunate that even within some regulatory agencies, exceeding the RfD is seen as placing an individual "at risk". Exceeding government limits for exposure does not necessarily mean that people are at increased risk of poisoning. **Determination of risk must include the actual exposure, and dose-response information (slope, lowest observable effect level, etc).**

One last thought in relation to predictive risk assessments; they do not tell you anything about your INDIVIDUAL risk, they are measures of population-based risk predictions. Your individual risk may be much more or much less. A predicted risk of 5 additional cancers per million exposed means that in one million exposed individuals you might expect 5 more people to develop cancer as a result of exposure. If you are exposed, it does not mean that your individual risk is increased from 0.30 to 0.300005.

Enjoy this current offering! **~ Art Craigmill ~**

PLAYGROUND SAFETY
United States, 1998-1999

Each year approximately 211,000 U.S. children receive emergency department care for injuries sustained on playground equipment, making the use of this equipment the **leading cause of injuries to children in school and child care environments.** This report summarizes the survey results, which indicate that **playground injuries could be reduced by measures such as resilient surfacing below equipment, better equipment maintenance, improved supervision, and use of age-appropriate equipment.** A total of 1353 playgrounds in 31 states (average: 44 per state) were surveyed.

Most playgrounds comprised stand-alone and composite equipment; the two most common pieces were slides (89% of playgrounds) and swings (73% of playgrounds). Although a wide age range of children used the playgrounds, 42% of playgrounds had a clear separation of equipment intended for ages 2-5 years and ages 5-12 years. In addition, 9% of playgrounds had signs to indicate the age group for which the equipment was designed. While 31% of the surveys were being conducted, children were playing on the equipment. In 23% of these instances, they were playing without adult supervision; 14% of the playgrounds had posted rules emphasizing the importance of supervision.

Appropriate surface materials were found in 75% of the playgrounds; however, 56% had insufficient depths of materials to protect from serious head injury, 38% had failed to provide material in adequate use zones around the equipment, and 20% had exposed concrete footings. Of the playgrounds surveyed, one out of four playgrounds had equipment with missing or broken parts or had equipment that was rusted (37%), splintered (36%), or cracked (11%).

Editorial Note: Although greater than 80% of the playground equipment surveyed was installed in 1981 or after, and therefore should comply with standards set by the U.S. Consumer Product Safety Commission (CPSC), survey results indicated that school, child care, and park playgrounds are deficient in supervision, age-appropriateness of equipment, suitable fall surfaces, and equipment maintenance. Inadequate supervision contributes to playground injuries; children need the attention of an adult as they play. CPSC advises that children ages 2-5 and 5-12 years are safer when equipment is separated and grouped for each age category. Children who play on equipment inappropriate for their size, strength, and decision-making ability increase their injury risk. **Because 70% of playground injuries involves falls to the ground, the amount of area covered beneath equipment, and the type and depth of the surface material, are critical.** Hard surfaces, such as asphalt, concrete, dirt, and grass, should be replaced by shock-absorbent surfaces, such as sand, wood chips, small round gravel, and rubber. Once an adequate zone of material is installed, it must be maintained at a sufficient depth to cushion a child's fall. Poor equipment maintenance also contributes to playground injuries. Continual inspection and regular maintenance and repair of all equipment and surfaces are essential to playground safety.

These survey results should be interpreted cautiously because of at least four limitations. First, interrater reliability is unknown. Second, a single assessment may not reflect accurately seasonal or time-of-day differences in safety. Third, observation of the playground does not measure maintenance and supervision policies, although it does reflect actual practice. However, in a number of schools and child care centers, researchers were not permitted to be in the playground while children were present. Thus, the data on supervision may not reflect true practices. Finally, the sample size is small relative to the total number of playgrounds in the United States.

To provide a safer play environment, playgrounds must have adequate supervision, be maintained continually, and be equipped with age-appropriate equipment and resilient surfaces. Further information about the survey and safer playgrounds is available from the National Program for Playground Safety, telephone (800) 554-7529 or on the World-Wide Web at http://www.uni.edu/playground/.

REF: *Morbidity and Mortality Weekly Report*, 48(16):332-5, April 30, 1999.

CHILDHOOD WORK-RELATED AGRICULTURAL FATALITIES

Minnesota, 1994-1997

Agriculture is one of the most hazardous industries in the United States, with the second highest work-related fatality rate during 1992-1996 (21.9 deaths per 100,000 workers). (Mining is the first.) **During 1992-1995, 155 deaths were reported among agricultural workers aged less than or equal to 19 years; 64 (41%) of these youths were working in their family's business.** In Minnesota during 1992-1996, agriculture had the highest fatality rate of any industry (21.3 per 100,000 workers). To characterize agriculture work-related deaths among youths in Minnesota during 1994-1997, the Minnesota Department of Health (MDH) analyzed data from the state's Fatality Assessment and Control Evaluation (FACE) program. This report presents five cases of agriculture work-related fatalities among youths in Minnesota.

Case Reports

Case 1. On June 3, 1994, a 13-year-old boy died while attempting to divert a runaway farm wagon. A farmer was using a tractor to pull a forage chopper with the wagon hitched behind. When the tractor turned, the quick-release hitch connecting the wagon to the chopper unlatched. As the farmer maneuvered to reattach the chopper and wagon, the wagon rolled toward a garage. The boy ran in front of the wagon and attempted to pick up the wagon tongue to steer it. He was caught between the wagon and the garage wall and sustained severe chest injuries.

Case 2. On July 30, 1994, a 10-year-old boy died when the tractor he was driving overturned while turning off a public highway onto a gravel road. The tractor was towing a hay baler and loaded hayrack and was not equipped with a rollover protective structure (ROPS) and seat belt. He died from acute laceration of the brain with multiple skull fractures.

Case 3. On July 11, 1995, a 13-year-old boy died after being engulfed by corn inside a grain bin. The boy and his father were using a portable auger to unload corn from the bin into a truck. The youth uncovered the bin roof access opening and sat on the roof ladder to monitor the flow of corn. Fifteen minutes later, his father noticed the boy was no longer on the roof. He climbed to the roof but was unable to locate the boy. He shut down the auger and attempted to break open the bin with a loader-equipped tractor. Emergency personnel cut holes in the bin with power saws and extracted the youth. He was transported to a medical center but died two days later from complications of anoxic encephalopathy.

Case 4. On August 17, 1995, a 17-year-old boy died after he was struck by a front-end loader bucket. The boy was riding in a tractor with the farmer and dismounted the tractor to open a gate to allow the farmer to drive through. He then climbed into the bucket, which had been improperly secured. The farmer raised the bucket and proceeded down the driveway. The tractor struck a bump, bouncing the loader arms and disengaging the bucket. The boy fell and was struck by the falling bucket. He died from skull fracture and massive fracture of the cervical spine.

Case 5. On September 13, 1997, a 13-year-old boy died when he was run over by a grass seeder being towed by a tractor on sloped land. The youth was riding on the frame of the seeder and using his hand to ensure even seed flow when he lost his balance, fell from the seeder, and was run over. He died from severe chest and head trauma.

Editorial Note: The fatalities described in this report represent common farm injuries and indicate that children who work on farms are exposed to the same injury risks as adults. In 1991, an estimated 1.2 million children aged less than or equal to 19 years resided on farms and ranches in the United States. Although the proportion of such children engaging in agricultural work is uncertain, a Minnesota survey indicated that approximately 40% of boys and 10% of girls in grades 10-12 who reside in rural areas had done some type of agricultural work during the preceding year. During 1992-1996, an estimated 300,000 youth aged 15-19 years were employed in the U.S. agricultural production and services sector.

In the agricultural industry, children may perform tasks that are prohibited in other industries, be exposed to workplace hazards at an early age, and perform tasks that are inappropriate for their age. Compared with adults, youth may lack work experience, physical size, and attention to task. The ability of youth to operate equipment safely may be compromised by cognitive abilities that are less well developed than in adults, by diminished visibility from operators cabs designed for adults, and by control layouts that may not accommodate their reach. In addition, they may have limited influence in business and operational decisions such as equipment purchases, work practices, and work assignments.

Safety requirements of the Occupational Safety and Health Act of 1970 are not enforceable on 95% of U.S. farms. As a result, most farm owners lack the direction provided by mandatory safety standards to address the complex problem of controlling risk for both adult and youth workers. In addition, children engaged in agricultural work as family members are not covered by provisions of the Fair Labor Standards Act of 1938, which prohibits youth aged less than 16 years employed outside their family farm from performing hazardous agricultural tasks such as operating machinery, working from ladders greater than 20 feet high, and working in confined spaces. However, youth aged 14 and 15 years who have received safety training on specific topics through specialized programs may perform work activities otherwise prohibited for minors aged less than 16 years, and youth aged greater than or equal to 14 years may perform tasks other than those declared hazardous. Efforts are under way to develop consensus guidelines for developmentally appropriate tasks for children in agriculture.

The fatalities described in this report could have been prevented by adherence to standard safety practices applicable to workers of all ages (e.g., using of ROPS and seat belts, properly securing attachments, and operating at safe speeds). However, before allowing children to perform farm work, especially tasks involving operation of equipment, parents and farm managers should evaluate additional factors that may expose youth to increased risk for injury. CDC's National Institute for Occupational Safety and Health recommends that parents and farm managers carefully consider the following questions before assigning work tasks to youth:

Does the youth possess the physical capacity to perform the task safely?
Does the youth have sufficient and appropriate training and experience?
Can the youth recognize and control potential hazards?
Can the youth read and understand safety instructions in operating manuals and on signs?
Is the youth mature enough to exercise good judgement?
Has the youth been trained to cope with emergencies?
Do work procedures accommodate physical characteristics of the youth?
Is adult supervision available?

REF: *Morbidity and Mortality Weekly Report*, 48(16):329-332, April 30, 1999.

Web sites of interest about worker fatalities:

http://www.bls.gov/opub/cwc/1998/summer/art2full.pdf
http://stats.bls.gov/opub/cwc/1998/fall/cwcnew.htm
http://www.bls.gov/opub/cwc/1998/Spring/art5full.pdf
http://www.bls.gov/opub/cwc/1998/Winter/art1full.pdf

KNOWLEDGE AND USE OF FOLIC ACID BY WOMEN OF CHILDBEARING AGE

United States, 1995 and 1998

In the United States, approximately 4000 pregnancies are affected by neural tube defects each year; 50%-70% of these **developmental defects could be prevented with daily intake of 400 ug of the B vitamin folic acid throughout the periconceptional period.** In 1992, the Public Health Service recommended that all women capable of becoming pregnant consume 400 ug of folic acid daily throughout their childbearing years to reduce their risk for having a pregnancy affected by neural tube defects. In 1998, the Institute of Medicine recommended that all women of childbearing potential consume

400 ug of synthetic folic acid per day from fortified foods and/or a supplement in addition to food folate from a varied diet. This report summarizes the findings of a survey conducted during July-August 1998 to assess folic acid knowledge and practices among women of childbearing age in the United States and compares these results with those from a similar survey conducted in 1995. **The findings indicate that 7% of women know folic acid should be taken before pregnancy to reduce the risk for neural tube defects.**

In 1998, the March of Dimes Birth Defects Foundation contracted with the Gallup Organization to conduct a random-digit-dialed telephone survey of a stratified national sample of 2115 women aged 18-45 years. The response rate was 52%. The margin of error for estimates based on the total sample size was plus or minus 3%; for comparisons involving subsets of the sample, the margin of error was greater. Statistical estimates were weighted to reflect the total population of women aged 18-45 years in the contiguous United States who resided in households with telephones. The 1998 survey included many of the same questions asked in 1995, and the methods employed were essentially the same.

Overall, 68% of women reported having ever heard of or having ever read about folic acid, a 31% increase from 52% in 1995. Awareness of folic acid was lowest among women aged 18-24 years (50%) and women who had less than a high school education (40%). Of all women surveyed, 13% knew that folic acid helps prevent birth defects, and 7% knew that folic acid should be taken before pregnancy, compared with 5% and 2%, respectively, in 1995.

In 1998, 32% of women reported taking a vitamin supplement containing folic acid on a daily basis, compared with 28% in 1995. Among women who reported being not pregnant at the time of the survey, 29% reported taking a vitamin supplement containing folic acid, compared with 25% in 1995. The proportion of all women who took a vitamin containing folic acid less frequently than daily remained at 11%. Those who continued to be the most likely to take vitamin supplements containing folic acid on a daily basis include women aged 25-45 years (34%), college graduates (40%), and those with high incomes (e.g., 38% among women whose annual household income is greater than or equal to $50,000).

From 1995 to 1998, the proportion of women who reported obtaining information about folic acid from magazine or newspaper articles decreased from 35% to 31%. However, the proportions that reported learning about folic acid from radio or television and health-care providers increased from 10% to 23% and from 13% to 19%, respectively.

Editorial Note: Although the proportion of U.S. women who were aware that folic acid can prevent birth defects and that folic acid should be taken before pregnancy had increased since 1995, the findings in the 1998 survey indicate that **only a small percentage of women were aware of the potential benefits of periconceptional intake of folic acid.** Health-care providers, who were the source for information for only one in five women surveyed who had heard of folic acid, have an important role in promoting preconceptional health, including daily intake of 400 ug of folic acid throughout the childbearing years among women of childbearing potential.

Results from two surveys suggest that professional education is needed to increase the proportion of health-care providers who recommend their patients of childbearing age consume 400 ug of folic acid daily. Health-care providers need to be aware that each encounter with a woman of childbearing age represents an opportunity to promote preconceptional health. Because approximately half of all pregnancies in the United States are unintended, both the Public Health Service and the Institute of Medicine recommendations emphasize the importance of periconceptional folic acid consumption for all women of childbearing potential.

REF: *Morbidity and Mortality Weekly Report*, 48(16):325-7, April 30, 1999.

OUTBREAKS OF *SHIGELLA SONNEI* INFECTION ASSOCIATED WITH EATING FRESH PARSLEY

United States and Canada, July-August 1998

In August 1998, the Minnesota Department of Health reported to the Centers for Disease Control (CDC) two restaurant-associated outbreaks of *Shigella sonnei* infections. **Epidemiologic investigations implicated chopped,**

uncooked, curly parsley as the common vehicle for these outbreaks. Through inquiries to health departments and public health laboratories, six similar outbreaks were identified during July-August (in California {two}, Massachusetts, and Florida in the United States and in Ontario and Alberta in Canada). Isolates from five of these outbreaks had the same PFGE (pulsed-field gel electrophoresis) pattern identified in the two outbreaks in Minnesota. This report describes the epidemiologic, traceback, environmental, and laboratory investigations, which implicated parsley imported from a farm in Mexico as the source of these outbreaks.

United States

Minnesota. On August 17, the Minnesota Department of Health received reports of shigellosis in two persons who ate at the same restaurant during July 24-August 17. *S. sonnei* subsequently was isolated from stool samples of 43 ill restaurant patrons; an additional 167 persons had probable shigellosis (diarrhea lasting greater than or equal to 3 days or accompanied by fever). Eight (18%) of 44 restaurant employees had a similar illness; five had laboratory-confirmed *S. sonnei* infection. In a case-control study of 172 ill and 95 well restaurant patrons, five items were associated with illness: water, ice, potatoes, uncooked parsley, and raw tomato. In a multivariate analysis, only uncooked parsley and ice remained significantly associated with illness.

California. On August 5, the Los Angeles County Department of Health Services was notified of two persons with shigellosis who ate at the same restaurant on July 31. Stool samples from six ill restaurant patrons yielded *S. sonnei*; an additional three had probable shigellosis (diarrhea, or any loose stools accompanied by fever). All 27 foodhandlers denied illness and had stool samples that were negative for *S. sonnei*. In an unmatched comparison with 10 well dining companions, ill patrons were significantly more likely to have eaten foods sprinkled with chopped, uncooked parsley.

Massachusetts. On August 11, the Massachusetts Department of Health was notified of six persons who reported illness after eating at a restaurant lunch party on July 30. Stool samples from three persons yielded *S. sonnei*; an additional three had probable shigellosis (diarrhea within 4 days of the July 30 meal). Chopped, uncooked parsley was served on chicken sandwiches and in cole slaw served at the lunch. In a cohort study of 23 lunch attendees, illness was significantly associated with eating chicken sandwiches or eating uncooked parsley with any item. All restaurant employees, except one, submitted a stool sample for culture; all were negative for *S. sonnei*.

Canada

On August 10, the Ontario Ministry of Health was notified of a family of three persons with *S. sonnei* infection who attended a food fair during July 31-August 3. Laboratory-based surveillance identified 32 additional persons with *S. sonnei* infection who had eaten at a specific kiosk at the fair or at the restaurant that had supplied the kiosk. Of the 35 persons, 20 were questioned about food history; all reported eating a smoked salmon and pasta dish made with fresh chopped parsley. Stool samples from six (38%) of 16 foodhandlers, including the four who handled the parsley, were negative for *S. sonnei*. One child who had eaten at the kiosk was the index patient at a day care center, from which five secondary cases of shigellosis were reported.

Other Investigations

In addition to these four outbreaks, four additional restaurant-associated outbreaks of *S. sonnei* were identified, involving an additional 218 persons with culture-confirmed or probable shigellosis. Of the 111 persons interviewed, 106 (96%) reported eating chopped, uncooked, curly parsley. Isolates from three of these outbreaks (in Minnesota and California in the United States and in Alberta in Canada) matched the outbreak PFGE pattern. In the fourth outbreak (in Florida), one culture-confirmed case was identified; the isolate was not available for PFGE testing.

Traceback and Environmental Investigations

To determine the source(s) of parsley for the seven outbreaks linked by PFGE, state and provincial health departments, CDC, the Food and Drug Administration (FDA), and the Canadian Food Inspection Agency conducted traceback investigations. Farm A in Baja California, Mexico, was a possible source of parsley served in six of the seven outbreaks; four farms in California were possible sources of parsley in two to four of the seven outbreaks.

Field investigations of farm A by FDA and CDC found that the municipal water that supplied the packing shed was unchlorinated and vulnerable to contamination. This water was used for chilling the parsley in a hydrocooler immediately after harvest and for making ice with which the parsley was packaged for transport. Because the water in the hydrocooler

was recirculated, bacterial contaminants in the water supply or on the parsley could have survived in the absence of chlorine and contaminated many boxes of parsley. Farm workers and village residents served by this water system reported drinking bottled water or water from other sources. Workers had limited hygiene education and limited sanitary facilities available on the farm at the time of the outbreak

Foodhandlers at six (75%) of the eight implicated restaurants reported washing parsley before chopping it. Usually parsley was chopped in the morning and left at room temperature, sometimes until the end of the day, before it was served to customers.

Editorial Note: *S. sonnei* is a common cause of gastroenteritis, accounting for 10,262 (73%) of the 14,071 laboratory-confirmed Shigella infections reported to CDC in 1996. Humans and other primates are the only reservoirs for *S. sonnei*, and transmission occurs through the fecal-oral route. **As few as 10-100 organisms can cause infection, enabling person-to-person transmission where hygienic conditions are compromised.** In the United States, *S. sonnei* primarily infects young children and is a common cause of diarrheal outbreaks in child care centers. Although reported infrequently, foodborne outbreaks of shigellosis have been associated with raw produce, including green onions, iceberg lettuce, and uncooked baby maize.

In the outbreak described in this report, isolates were resistant to many antimicrobial agents, including ampicillin and trimethoprim-sulfamethoxazole, which are commonly used to treat shigellosis. This highly resistant pattern is seen more frequently in countries other than the United States. During 1985-1995, antimicrobial resistance among Shigella increased substantially in the United States: resistance to ampicillin increased from 32% to 67%, resistance to trimethoprim-sulfamethoxazole increased from 7% to 35%, and resistance to both agents increased from 6% to 19%. A history of international travel was the strongest risk factor for Shigella infection resistant to trimethoprim-sulfamethoxazole.

The findings in this report indicate that several changes in food storage and food preparation procedures are needed. In restaurants, foodhandling practices such as pooling large batches of parsley for chopping and holding chopped parsley at room temperature increase the risk that sporadic low-level bacterial contamination will lead to outbreaks of gastrointestinal illness. When fresh produce is chopped, the release of nutrients may provide a favorable medium for bacterial growth. **The risk for outbreaks can be reduced by storing chopped parsley for shorter times, keeping it refrigerated, and chopping smaller batches**. Changes in parsley production on the farm (e.g., the use of adequately chlorinated water for chilling and icing parsley, education of farm workers on proper hygiene, and possibly the use of post-harvest control measures such as irradiation) may be necessary to ensure that produce is not contaminated with pathogens.

REF: *Morbidity and Mortality Weekly Report*, 48(14):285-9, April 16, 1999.

NEW MERCURY SAFETY LIMIT ISSUED BY ATSDR

BACKS FDA's SEAFOOD SAFETY RECOMMENDATION

FDA's position that most consumers are safe from the risk of mercury poisoning when eating commercial seafood was boosted last week when the Agency for Toxic Substances and Disease Registry (ATSDR) revised its health guidelines for methylmercury.

Since the draft guidelines are more aligned with FDA's advisory levels than with EPA's, critics immediately charged that ATSDR was weakening its safety limits and clouding the issue of what constitutes an appropriate safety level for mercury. To resolve a long-standing stalemate between FDA and EPA on the mercury issue, Congress directed the National Academy of Sciences to report back to lawmakers on the health risks posed by exposure to methylmercury. The NAS report is not expected to be released until May 2000.

ATSDR, a sister agency of the Centers for Disease Control and Prevention, revised its 1994 toxicological profile for methylmercury and set a **Minimal Risk Level (MRL) of 0.3 micrograms per kilograms of body weight per day of ingested methylmercury**, an increase from its previous guideline of 0.1 ug/kg/day and three times higher than EPA's limit.

ATSDR's MRLs are used by health professionals as screening tools in protecting human health and are largely used in setting clean-up standards at hazardous waste sites.

"Fish and shellfish are excellent foods, and the new MRL does not change FDA's advice on fish consumption. Eating fish has many health benefits, and the levels of methylmercury encountered in commercial fish are generally low," said ATSDR.

FDA has set a 1 part per million safety standard for consuming mercury in seafood, but most species of commercial seafood tend to have very low levels of the contaminant, ranging from less than 0.01 ppm to 0.5 ppm. Certain fish, such as shark and swordfish, may contain mercury levels of 0.5 ppm or higher and pose greater risks to certain populations. "FDA continues to advise consumers to limit consumption of these types of fish to two servings per week, or 14 ounces. This consumption level is well above average for these species," said the agency. Pregnant women and women of childbearing age who may become pregnant should limit their consumption of the high-risk fish species.

In response to the announcement, EPA issued a statement warning state officials against changing fish advisories currently in place to protect against mercury poisoning. The issue has centered on which mercury study federal agencies use in setting mercury limits. Critics said **ATSDR based its revision largely on the Seychelles Islands study that found no developmental effects among children whose mothers were exposed to mercury above the 0.1 standard when pregnant**. Environmentalists back the results of a study in the Faroe Islands that suggested the opposite. ATSDR maintains that its revision was based both on the Seychelles and Faroe Island data.

REF: *Food Chemical News*, 41(10), April 26,1999.

DRAFT STUDY FINDS CORN CONTAMINANT FUMONISIN CAUSES CANCER IN RODENTS

A two-year National Toxicology Program (NTP) rodent study requested by FDA has found that **fumonisin B1, a mycotoxin in corn, can cause cancer.** The draft study has prompted a detailed review of FDA's policies on fumonisin in corn, both for animal feed and human foods. The study found fumonisin B1 in high doses caused cancer in the kidneys of male rats and in the livers of female mice. Fumonisin causes toxicity in horses and pigs and there are suggestions in epidemiological studies that high doses can cause cancer in people. One study, conducted by South African researchers, suggests an esophagael cancer connection in people who used fumonisin-contaminated corn to make alcoholic beverages.

FDA is preparing a guidance document for release this fall that will establish safety levels for fumonisin B1 in corn. FDA is also conducting a risk assessment on the human health effects of fumonisin.

The FDA spokesperson dismissed suggestions that the draft report should prompt changes in eating habits or that it proves certain corn products may pose a danger to children or other subpopulations. **It is safe to eat corn, and processed corn products such as corn starch or corn oil, would not be affected by the finding.**

Fumonisin, which is produced by the mold *Fusarium moniliforme* that thrives in warm, wet conditions and is found in the United States, is unlikely to be found in products such as tortillas because the processing involves a lye wash that would reduce fumonisin levels, the agency spokesperson said. The only products that may have low levels of the mycotoxin are milled corn products that include corn bran, corn meal and corn flour, which are used to make grits and corn breads. The mycotoxin is unlikely to pose a hazard in milk or meat because it is poorly absorbed in food animals.

REF: *Food Chemical News*, 41(10), April 26, 1999.

FABRIC DEVELOPED TO DETOXIFY SOME INSECTICIDES

Clothes with built-in pesticide detoxifiers may soon be available to protect agricultural workers from exposure to some carbamate pesticides, researchers with the University of California at Davis said at the American Chemical Society conference in Anaheim, CA. Louise Ko, a University of California-Davis graduate student, developed a treatment for cotton-based textiles based on chlorine and the compound hydantoin, which can decompose up to 99% of methomyl and aldicarb within five minutes. The compound "has the ability to break down the pesticide on contact," Ko said during a poster presentation.

The treatment was less effective for other carbamates, reducing levels of carbofuran by 14% and carbaryl by 8%. The proportion of chlorine in the treatment mixture was the most important factor influencing the effectiveness of the treatment, with a 1:4 or greater pesticide to chlorine ratio working best. The treated clothing can be washed at least 50 times with 0.01% chlorine bleach, which reactivates the treatment. "The small fragments will be washed away during the regular laundry process and, along with that, the active sites will be regenerated by bleach," Ko said.

"Pesticide exposure to humans is most likely to occur through the skin. While pesticide applicators and mixer/loaders are required by law to wear heavy synthetic suits to protect themselves, field workers prefer lighter, breathable, cotton-based fabrics such as jeans and T-shirts. The functional fabrics could be used to manufacture long-sleeve shirts, trousers or gauntlets as protective clothing for agricultural workers or harvesters," Ko said. The clothing could then be laundered and re-bleached on-site so workers would not bring contaminated clothing into their homes.

The treatment also works as an antibacterial agent, which may be useful for treating clothing and bedding in hospitals and other medical settings. The process to create protective clothing has been patented and the technology purchased by Halosource Corp. of Seattle. "I foresee a great demand once it's available," Ko said. (From: *Pesticide & Toxic Chemical News*, 27[22]).

REF: *Kansas Pesticide Newsletter*, 22(4), April 14, 1999.

DPR POSTS 1996 PESTICIDE USE DATA ON WEB

SACRAMENTO -- Cal/EPA's Department of Pesticide Regulation (DPR) has posted statewide summaries of pesticide use in 1996 -- categorized by chemicals and crops -- on its Website at www.cdpr.ca.gov/whatnew.htm. (Pesticide use for 1997 was just recently released and can also be viewed at this same website.)

With corrected data on pesticide applications, DPR scientists then began analyzing pesticide use trends. An analysis of 1991-95 pesticide use and 1991-1996 analysis and trends is available online at http://www.cdpr.ca.gov/docs/pur/purmain.htm. These analyses supplement pesticide use summaries, which have been released for several years.

DPR compiles yearly pesticide use reports from the most extensive database of its kind in the nation. California requires reporting of all pesticides used in agriculture, as well as commercial applications that may include rights-of-way, public health, structural fumigation and pest control. Home and most industrial and institutional uses are exempt from reporting.

Some key facts from the 1996 pesticide use reports and analysis:

Reported pesticide use in California declined from 1995 to 1996. A total of 197.8 million pounds of pesticides were reported in 1996, compared to 205.1 million pounds in 1995. Pesticide use in production agriculture declined to 182.4 million pounds in 1996 from 187.6 million pounds in 1995.

Overall pesticide use also declined as measured by cumulative number of acres treated, and number of applications. (As cited above, pesticide use in pounds includes adjuvants, the ingredients that cause a pesticide to stick, spread, or dissolve as needed. DPR analyses of pesticide use exclude adjuvants.)

DPR's analysis of the 1991-96 data underscores the fact that one year of data does not signify a trend. For

example, pesticide use increased from 1991 to 1995. Pesticide use varies from year to year, depending upon pest problems, weather, crops, and other factors discussed in DPR's analysis.

From 1991 to 1996, the single most-used agricultural pesticide -- in pounds used, applications, and cumulative acres treated -- was sulfur, a natural fungicide favored by both conventional and organic growers.

Sulfur accounted for 36 percent of all active ingredient pounds used, about 9 percent of production agricultural uses, and 11 percent of acres treated. Due to sulfur's irritant properties and extensive use, sulfur is also the most frequently reported source of pesticide-related injury (primarily skin irritation).

Only four pesticides (sulfur, oil, metam-sodium, and methyl bromide) accounted for 68 percent of all pounds applied in production agriculture in 1996. And only 31 agricultural pesticides (out of approximately 800) accounted for 85 percent of all pounds applied.

The same pesticides accounted for most of the increase from 1991 to 1996. While these 31 pesticides range widely in toxicity, a number of them are generally acknowledged as reduced-risk pesticides.

DPR's analysis found that only 19 crops accounted for 83 percent of all production agricultural pesticide use, 71 percent of all applications, and 82 percent of all acres treated in 1996.

Ranked by pounds applied, crops with the highest pesticide use were grapes (wine, table, and raisin), followed by tomatoes, almonds, cotton, oranges, strawberries, carrots, rice, and sugarbeets.

Before 1996, DPR lacked sufficient yearly data to analyze use trends, as well as the computer technology needed to conduct detailed analyses. Once the computer hardware was acquired, DPR then needed to develop custom programming to detect errors in pesticide use data. Error-checking was critical to DPR's use report analysis because even a small percentage of errors can significantly skew the statistics.

Working with agricultural commissioners who review and submit individual pesticide use reports filed in their counties, DPR has significantly improved the accuracy of pesticide use reports. For example, DPR's error-checking programs revealed that use reports had overstated total pounds of pesticide applied statewide from 1991 to 1995. However, the revised data did not alter an overall increase in pesticide pounds applied during the five-year period. (See the attached tables for revised poundage totals for 1991-1995, and for pounds applied by county in 1996.)

The pesticides reported used are only a portion of those sold in the state each year. In 1996, there were 699.5 million pounds of pesticide active ingredients sold in California. Sales figures include not only agricultural chemicals whose use must be reported, but also pesticides used in homes and gardens and in industrial and institutional settings, including disinfectants and other anti-microbials. Among the latter is chlorine used for municipal water treatment. Chlorine products typically account for more than a third of the pesticide active ingredients sold in California. Approximately 10,500 branded products that contained about 800 different active ingredients were registered for sale in California in 1996.

Summaries of the 1996 pesticide use report information are available free online or for a nominal charge on hard copy or diskette. Two summary versions of the data -- one indexed by pesticides, the other by crops -- include number of applications, acreage or units (e.g., bins) treated, and pounds of pesticide used. Summaries may be ordered in hard copy ($10 each) or on diskette ($2.50). To order, send payment to: Cashier, State of California; Department of Pesticide Regulation, 830 K Street, Sacramento 95814-3510. The data summaries may be downloaded free from DPR's Web page.

A complete data set of the 2.5 million-plus individual 1996 pesticide use reports is also available on CD ROM at a nominal cost. For information about obtaining the CD-ROM, call the DPR Environmental Monitoring and Pest Management Branch at 916/324-4100. DPR is one of six departments and boards within Cal/EPA.

Listed below are numerical breakdowns and county statistics:

Pounds of Active Ingredients Reported Used, by Year and Category of Use

(Computer analysis used to identify and remove probable errors)

1991 Total 153,159,914 lbs. active ingredient (production agriculture: 132,727,916 lbs.; post-harvest fumigation: 1,362,778; structural pest control: 8,270,772; landscape maintenance: 1,559,383; all other reported uses*: 9,239,065)

1992 Total 180,491,141 lbs. (production agriculture: 156,664,418 lbs.; post-harvest fumigation: 1,811,128; structural pest

control: 5,319,391; landscape maintenance: 1,250,624; all other reported uses: 15,445,580)

1993 Total 188,012,703 lbs. (production agriculture: 172,492,706 lbs.; post-harvest fumigation: 1,703,738; structural pest control: 4,687,296; landscape maintenance: 1,317,791; all other reported uses: 7,811,172).

1994 Total 191,355,369 (production agriculture: 175,408,663 lbs.; post-harvest fumigation: 2,004,123; structural pest control: 5,186,253; landscape maintenance: 1,325,560; all other reported uses: 7,430,770)

1995 Total 205,133,950 (production agriculture: 187,577,922 lbs.; post-harvest fumigation: 3,770,169; structural pest control: 4,839,368; landscape maintenance: 1,382,563; all other reported uses: 7,563,928)

1996 Total 197,828,481 (production agriculture: 182,375,369 lbs.; post-harvest fumigation: 1,847,859; structural pest control: 4,738,168; landscape maintenance: 1,259,332; all other reported uses: 7,607,753)

* The term "pesticide" is an umbrella term for substances that kill or control pests. Therefore, pesticides include insecticides, herbicides, rodenticides, fungicides, and sanitizers. A pesticide active ingredient is the chemical component of any pesticide product that kills, or otherwise controls, target pests. Included in "all other reported uses" are weed control along roads and other rights-of-way; public health applications, including mosquito abatement; vertebrate pest control; fumigation of nonfood and nonfeed materials such as lumber and furniture; pesticides used in research; and regulatory pest control of pest infestations.

TOTAL POUNDS OF ALL AIs USED IN EACH CALIFORNIA COUNTY IN 1996

(Data from DPR's Pesticide Use Report with probable errors removed.)

COUNTY	LBs AI
ALAMEDA	374,138
ALPINE	1,125
AMADOR	120,271
BUTTE	3,867,907
CALAVERAS	37,361
COLUSA	3,059,507
CONTRA COSTA	506,315
DEL NORTE	224,557
EL DORADO	117,287
FRESNO	34,863,191
GLENN	2,406,446
HUMBOLDT	75,505
IMPERIAL	7,720,152
INYO	57,092
KERN	24,673,044
KINGS	6,075,523
LAKE	691,491
LASSEN	240,087
LOS ANGELES	2,303,865

MADERA	8,362,231
MARIN	70,687
MARIPOSA	24,088
MENDOCINO	2,254,149
MERCED	9,007,341
MODOC	228,171
MONO	2,073
MONTEREY	8,844,473
NAPA	2,601,139
NEVADA	90,650
ORANGE	1,751,326
PLACER	426,690
PLUMAS	2,567
RIVERSIDE	4,373,955
SACRAMENTO	2,941,258
SAN BENITO	529,056
SAN BERNARDINO	563,348
SAN DIEGO	1,850,940
SAN FRANCISCO	30,285
SAN JOAQUIN	11,631,196
SAN LUIS OBISPO	2,078,785
SAN MATEO	296,080
SANTA BARBARA	3,578,377
SANTA CLARA	795,041
SANTA CRUZ	1,763,472
SHASTA	258,374
SIERRA	1,711
SISKIYOU	561,753
SOLANO	1,854,178
SONOMA	3,634,670
STANISLAUS	6,663,113
SUTTER	4,138,673
TEHAMA	929,425
TRINITY	5,853
TULARE	16,931,145
TUOLUMNE	37,063
VENTURA	5,905,551
YOLO	3,851,842
YUBA	1,542,887
TOTAL	**197,828,481**

REF: California EPA - Department of Pesticide Regulation.

TOXIC POLLUTION FROM POWERPLANTS

LARGE EMISSIONS, LITTLE RISK

The Toxics Release Inventory (TRI) was established as part of the Emergency Planning and Community Right-to-Know Act of 1986. It requires production facilities in many different industries to report pounds of chemical emissions to air, water, and land of substances on a Federally defined list if releases are above a specified level. The targeted chemicals are so-called "toxics"; the TRI does not include, for example, the criteria air pollutants like sulfur and nitrogen oxides or particles. The annual summaries, posted on the Internet and reported in the news media, often show large quantities of emissions, raising concerns among the public and companies. Proponents of TRI suggest that emissions data can inform citizens about potential risks in their communities and encourage facilities to undertake pollution prevention efforts that will reduce risks.

The apparent success of TRI has stimulated great interest in expanding and increasing right-to-know activities. This issue of *Risk in Perspective* examines the relationship between TRI emissions and risk to human health, focusing on the electric utility industry, which is about to report TRI emissions for the first time. Although this industry will report large quantities of emissions, the resulting risk to public health is minimal. In addition, consideration of exposure and toxicity demonstrates that "pounds of emissions" are a poor guide to risk management.

For noncancer effects, exposure is compared to the reference concentration (RfC) or reference dose (RfD), a level of exposure determined by EPA that is expected to have no adverse effects with lifetime exposure, even among potentially sensitive subpopulations such as children and the elderly. The resulting hazard quotient (HQ) is simply the ratio of exposure to the RfC or (RfD). The HQ is not a probability. It is a ratio of dose to the apparently safe level; its reciprocal is like a safety factor (how many times the exposure is below the safe level). For compounds with carcinogenic potential, exposure is multiplied by a cancer slope factor to yield estimates of increased probability of developing cancer. Standard procedures for cancer risk assessment yield what EPA terms "a plausible upper bound" on risk; reminding us "the true risk is likely to be lower and may be zero."

REF: *Risk in Perspective*, **7**(2), April 1999.

Toxicology Tidbits

Consequences of clean water?

As water quality improves, not all of the returning wildlife is welcome. This article examines New York City's battle with marine borers, tiny organisms that eat the wood pilings holding up piers, riverbanks, and even bridges and roads in the city, causing dangerous structural damage. In the past, pollution in the river and harbor killed many of the borers, reducing the danger to wooden structures. As the water has become cleaner, populations have rebounded, and several piers have collapsed or been closed. Officials say that it could cost millions to repair and prevent damage. Possible solutions include using steel, chemically treated wood, or fiberglass-reinforced polymer pilings. However, these are not without their own hazards, as was discovered when the city's first all-plastic pier melted after being struck by lightning in 1996.

REF: *New York Times,* 28 July 99, A20.

If it sounds too good to be true.....

Although specific products, claims, and practices may have changed over the years, nutrition "quackery" still succeeds because some people believe in the unsubstantiated promise of a better, healthier life. The U.S. Office of Consumer Affairs, lists product statements that should alert consumers to be skeptical:

- Claim to be quick, painless and effortless
- Claim to have special, secret, foreign, ancient, or natural ingredients
- Claim to be effective for a wide variety of conditions
- Rely on personal stories of success rather than on scientific data for documentation
- Claim that the medical community or government agencies refuse to acknowledge the effectiveness of the cure, product or treatment.

The Food Nutrition Science Alliance (FANSA) is a partnership of four professional scientific societies whose members have joined forces to speak with one voice on food and nutrition science issues. Discouraging Americans from overreacting to headlines is FANSA's goal. Ten red flags of junk science:

Recommendations that promise a quick fix
Dire warnings of danger from a single product or regimen
Claims that sound too good to be true
Simplistic conclusions drawn from a complex study
Recommendations based on a single study
Dramatic statements that are refuted by reputable scientific organizations
Lists of "good" and "bad" foods
Recommendations made to help sell a product
Recommendations based on studies published without peer review
Recommendations from studies that ignore differences among individuals or groups

The BOTTOM LINE -- Be suspicious about products promising permanent weight loss, **especially when the products require long-term use (and purchases) for these results.**

For more information.....

The International Food Information Council's "How to Understand & Interpret Food and Health-Related Scientific Studies" at: http://ificinfo.health.org/brochure/ificrevu.htm

Quackwatch at: http://www.quackwatch.com

REF: *Food Insight,* March/April 1999.

VET NOTES

ILLNESS ASSOCIATED WITH OCCUPATIONAL USE OF FLEA-CONTROL PRODUCTS -- California, Texas, and Washington, 1989-1997

Dips, shampoos, and other insecticide-containing flea-control products can produce systemic illnesses or localized symptoms in the persons applying them. Although these products may pose a risk to consumers, they are particularly hazardous to pet groomers and handlers who use them regularly. Illnesses associated with flea-control products were reported to the California Department of Pesticide Regulation, the Texas Department of Health, and the Washington State Department of Health, each of which maintains a surveillance system for identifying, investigating, and preventing pesticide-related illnesses and injuries.* This report describes cases of occupational illnesses associated with flea-control products, summarizes surveillance data, and provides recommendations for handling these products safely.

Case Reports

Case 1. In April 1997, a 35-year-old female pet groomer treated a dog for fleas by placing the animal in a tub containing water to which was added a concentrated phosmet solution. During application, the dog shook and sprayed the product on the exposed hands and arms of the groomer; a nearby open soft drink can, from which the groomer reported drinking, may have been contaminated. Within an hour after exposure, she developed skin flushing and irritation, shortness of breath, chest pain, accelerated heart rate and respiration, abdominal cramping, and nausea. She sought care at a hospital emergency department, where she was released without treatment after her clothes were discarded, and she showered with soap and ethanol. The case-patient had been a pet groomer for 1 year and did not use personal protective equipment (PPE) (e.g., gloves, gowns, or goggles). She reported that she regularly applied insecticides with her bare hands and that her clothing was often wet with water and flea-control dips or shampoos. Previous exposures had not made her ill. No analysis of the concentration of the phosmet product was performed.

Case 2. A female pet store employee (age unknown) became ill and sought attention at a medical clinic in September 1993 after she inadvertently sprayed her face and eyes with a pyrethrin/piperonyl butoxide solution while spraying a flea-infested cat house. Despite immediately flushing her eyes with water, she developed eye irritation with reddened conjunctiva and a burning sensation. Mild, diffuse wheezing was noted on examination, although its relation to her exposure is unknown; information about preexisting asthma or respiratory infection was unavailable. An allergic reaction and chemical conjunctivitis were diagnosed, and she received epinephrine, oral antihistamines, and oral steroids. At the time of exposure, she had not been wearing goggles or other PPE. She had not received training for safe handling of pesticides.

Case 3. A 21-year-old female veterinary assistant became ill in April 1992 after applying a phosmet-containing dip to a dog. She reported using a chemical-resistant apron, but no other PPE. A pruritic rash developed on her hands and arms approximately 2 hours after exposure. Later that evening, she developed systemic symptoms, including malaise, chest pains, nausea, vomiting, dizziness, diarrhea, stomach cramps, tremors, blurred vision, and excess salivation. Approximately 48 hours after exposure, she sought care at an urgent-care facility. Cholinesterase levels were not reported; she was treated with antihistamines. The case-patient had been a veterinary assistant for 8 months and had treated animals daily using several flea-control products. Whether she previously had used phosmet-containing products is unknown.

Surveillance Data

During 1989-1997, 16 cases of pesticide-related illness attributable to occupational use of flea-control products were reported in California (13), Washington (two), and Texas (one). The median age of the case-patients was 26 years (range: 16-73 years). Of the 16, eight (all in women) involved systemic illnesses caused by exposure to phosmet (five cases);

pyrethrin/piperonyl butoxide (two cases); or a product containing carbaryl, malathion, and pyrethrin/piperonyl butoxide (one case). The other eight (four in women) involved localized symptoms (i.e., chemical conjunctivitis) caused by flea-control products splashing into the case-patients' eyes. In seven of these cases the products contained pyrethrin/piperonyl butoxide, and in one case a phosmet-containing product was used.

After receiving these data in 1998, U.S. Environmental Protection Agency (EPA) staff searched for similar cases in the Toxic Exposure Surveillance System (TESS). In 1993, TESS, maintained by the American Association of Poison Control Centers, began collection of poisoning reports that included symptom information submitted by approximately 85% of the poison control centers in the United States (1996 is the latest year data are available.) Poisonings involving intentional suicides, intentional malicious use, nonworkplace exposures, and unknown intentions were excluded from the search.

Symptomatic occupational exposures involving flea-control dips were identified in 20 women and six men. Responsible active ingredients were phosmet (12 cases); pyrethrin/piperonyl butoxide (five cases); rotenone/pyrethrin (five cases); rotenone, malathion, chlorpyrifos, and unknown (one case each). Eight workers developed moderate health effects that required some form of treatment, and 18 developed minor health effects (minimally bothersome symptoms that resolved rapidly). Among the workers with moderate symptoms, the responsible ingredients were phosmet (five cases), rotenone/pyrethrin (two cases), and pyrethrin/piperonyl butoxide (one case).

Editorial Note: Pyrethrins are plant-derived insecticides and are common ingredients in flea-control dips and shampoos. Although pyrethrins have low toxicity in humans (EPA classified as acute toxicity category III compounds**), exposures have caused dermatitis and upper respiratory tract irritation. Allergic contact dermatitis and asthma, sometimes resulting in death, also have been reported. Piperonyl butoxide, an EPA acute toxicity category IV compound, frequently is added to pyrethrins to slow chemical metabolism. No published reports of eye injury involving pyrethrins or piperonyl butoxide were identified.

Phosmet is an organophosphate insecticide and an EPA acute toxicity category II compound. The primary target in humans is the nervous system. Organophosphate exposure is associated with many of the symptoms reported by the first and third case-patients. In animals, phosmet is mildly irritating to the eyes but not irritating to the skin; no published reports of skin or eye irritation in humans after exposure have been identified.

The findings in this report are subject to at least three limitations. First, although 76% of the cases described were in women, evidence suggests that this distribution may reflect workforce demographics (more women than men are employed as pet groomers and handlers) rather than greater sensitivity to these toxins. Second, these surveillance data may not represent all workers with these illnesses. Third, this report describes only workplace-related illnesses following product exposure. Consumers using these products may experience similar illnesses; however, they were not included in this report.

Despite reports of the toxicity of flea-control products, including a high prevalence of symptoms among pet groomers and handlers, illnesses continue to occur among workers using these products. A survey of establishments using flea-control products found that groomers and handlers often were not provided with adequate safety training and PPE. When using pesticide products, label directions should be followed precisely. For phosmet-containing flea-control products, the label cautions users to wear safety glasses, long-sleeved shirts, long pants, elbow-length waterproof gloves, waterproof aprons, and unlined waterproof boots. For eye safety, CDC's National Institute for Occupational Safety and Health recommends goggles designed to provide splash protection.

Although the EPA does not require PPE for toxicity category III and IV compounds, the findings in this report suggest that PPE may be needed during pyrethrin/piperonyl butoxide use. Workers should be trained in the safe handling of flea-control products and in personal hygiene practices (e.g., washing before eating and prohibition of eating, drinking, food storage, and smoking where flea-control products are used), and should be instructed about insecticide dangers and taught to recognize the symptoms of overexposure. In California, agricultural workers who apply organophosphates on 7 days in any 30-day period are required to have plasma and RBC cholinesterase tests before commencing exposure and periodically thereafter. Similar testing of workers handling organophosphate-containing flea-control products may be prudent; substitution of safer, less toxic pesticides also should be considered.

This report provides an example of how state-based pesticide poisoning surveillance systems and TESS complement one another; however, both systems are affected by lack of adequate clinical recognition of pesticide-related illness and injury. A new EPA publication may assist health-care professionals to gain expertise in recognizing and managing these conditions. Free copies are available from EPA; telephone (800) 490-9198.

* These and other agencies, including the U.S. Environmental Protection Agency, collaborate with CDC's National Institute for Occupational Safety and Health in the Sentinel Event Notification System for Occupational Risk (SENSOR), a program that supports the surveillance of acute occupational pesticide-related illnesses and injuries.

** EPA classifies all pesticides into one of four acute toxicity categories based on established criteria (40 CFR Part 156). Pesticides with the greatest toxicity are in category I and those with the least are in category IV.

REF: Morbidity and Mortality Weekly Report, **48**(20);421-425, May 28, 1999.

SCIENTIST SUSPECTS LINK BETWEEN CHEMO DRUG AND BOVINE TB DEVASTATION IN MICHIGAN

Research scientist Anthony R. Paytas said he has data that, according to him, reasonably links a popular chemotherapy drug directly to the bovine tuberculosis virus that has ravaged Michigan's wildlife and cattle population.

Paytas, who currently heads Warreb-based Genesis Laboratories Inc., said he made the discovery as a result of extensive work in the field of alternative cancer research and numerous interviews with a diversified cross section of bladder cancer patients.

According to Paytas, there is a strong possibility that bovine TB is being introduced to Michigan's wildlife and cattle population by bladder cancer patients who were administered a prevalent chemotherapy drug called BCG. BCG is a freeze-dried suspension of a strain of *Mycobacterium bovis* (bovine TB), used to treat cancer inside the urinary bladder. Paytas theorizes that bladder cancer patients who received BCG therapy (which is a widely practiced treatment) may be transmitting bovine TB to deer and cattle via urine.

"Based upon my intensive work in the field of alternative cancer research, medical documentation and dozens of patient interviews, I believe there exists a strong possibility that use of the drug BCG (through its active ingredient *Mycobacterium bovis*) may be responsible for the introduction and spread of bovine tuberculosis in Michigan livestock and wildlife. When one considers the vast number of outdoorsmen, deer hunters, and farmers in the state of Michigan (many of whom have been diagnosed with bladder cancer and have undergone BCG treatment) an immediate correlation can be realized," Paytas said.

Paytas said BCG is so infectious, patients (according to doctor's orders) are to disinfect their urine with bleach for up to six hours after urinating.

"The most tragic thing about this is that patients, according to my interviews, are never told that BCG contains the bovine strain of TB. Without knowledge of what they are urinating, patients have no understanding that all warm blooded mammals can become easily infected if the virus is not destroyed," Paytas said.

REF: *Veterinary Product News*, 11(4), April 1999.

VETERINARY TIDBITS

Pyrrolizidine Alkaloid Toxicosis

Pyrrolizidine alkaloid toxicosis was the probable cause of hepatic atrophy and dissecting fibrosis leading to the death of 100 Holstein heifers that were 7 to 10 months old from a group of 400 over a six month period. Clinical signs included staggering, ataxia and disorientation followed by death within one day. Brain lesions were compatible with hepatic encephalopathy.

REF: Lab Notes (CVDLS, UC Davis), **12**(1), Spring 1999.

Knockdown syndrome

Knockdown syndrome, usually associated with monensin toxicity, was diagnosed in a flock of meat turkeys 5 weeks of age. The birds were submitted due to leg weakness and acute "downer birds." Gross pathology revealed pale streaking of the thigh muscles and histopathology revealed acute skeletal myopathy. Serum chemistry for creatinine kinase and aspartate aminotransferase levels were extremely high and compatible with muscle damage. Toxicological analysis of the feed showed normal levels of monensin. The reason for the muscle lesions remains unknown.

REF: Lab Notes (CVDLS, UC Davis), **12**(1), Spring 1999.

Back to the Beginning