



# Environmental Toxicology Newsletter

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## **INTRODUCTION**

This issue brings to a close another year of publication of the Environmental Toxicology Newsletter. I would like to particularly thank Sandy Ogletree, Environmental Toxicology Administrative Assistant, for the spectacular job that she has done with the newsletter during the last year (and the last 19 years too!). Sandy is the primary force behind each newsletter and does almost all of the initial "gleaning" for articles of interest, and all of the final formatting. Please join me in thanking her for doing such a great job!

On behalf of all of us here in Environmental Toxicology Extension, I wish you all a joyous holiday season. We will return next year with another volume of the newsletters on a wide variety of toxicological topics of interest. Have a safe and not-overly toxic New Years!

----- ***Art Craigmill***

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## **Mad Cows: New Report Summarizes Current Knowledge on Transmissible Spongiform Encephalopathies in the United States**

A new scientific report characterizes the overall U.S. risk for the occurrence of bovine spongiform encephalopathy (BSE), commonly called "mad cow" disease, as extremely low. The Council for Agricultural Science and Technology (CAST) summarizes the latest information and disease statistics in its new report on transmissible spongiform encephalopathies (TSEs), a unique group of fatal diseases that can affect the nervous systems of animals and humans worldwide.

**No cases of BSE have been found in the United States even though the disease has caused a major cattle epidemic in Great Britain and has been identified in nine other European countries.** In March 1996, the British government announced a potential link between BSE and a new human illness, a variant of Creutzfeldt-Jakob disease (nvCJD). No cases of this unique human neurologic disease have been detected in the United States.

"BSE can be prevented and controlled -- in spite of an incomplete understanding of the disease and the lack of live-animal diagnostic tests," said report co-chair William D. Hueston of the Virginia-Maryland Regional College of Veterinary Medicine. "The cardinal point in BSE control is the willingness of veterinarians and renderers and members of the cattle industry and animal feed companies to implement and carry out measures such as disease surveillance and feed bans. The goal is to prevent BSE from ever entering the United States."

In May 1990, the United States began an aggressive BSE surveillance program to ensure timely detection and swift response in the event that BSE was introduced in the United States. Several government agencies are involved in the surveillance program and more than 250 federal and state regulatory veterinarians are trained to diagnose foreign animal diseases, including BSE.

"The next few years should bring further knowledge on BSE and allow assessment of the effectiveness of public health measures established to prevent human exposure to BSE," said report co-chair James L. Voss of the College of Veterinary Medicine and Biomedical Sciences at Colorado State University.

Other TSE diseases do occur in the United States, including classical Creutzfeldt-Jakob disease in humans, scrapie in sheep and goats, chronic wasting disease in deer and elk, and transmissible mink encephalopathy. U.S. government animal and public health agencies continue major education efforts as well as specific control programs for these diseases. To fight scrapie, the U.S. government and industry have a surveillance program that traces exposed animals back to the farm of origin. The U.S. Department of Agriculture also has proposed new rules to support scrapie control by restricting interstate movement of sheep and goats and with pilot projects to evaluate flock cleanup plans based on testing.

A surveillance program also is in place for chronic wasting disease, which is found in free-ranging deer and elk populations only in 10 counties of north central Colorado and southeastern Wyoming. Transmissible mink encephalopathy is a rare disease, with only five U.S. outbreaks recorded, the last being in 1985. Research and surveillance programs continue for this disease also.

REF: *Council for Agricultural Science and Technology News Release*, October 5, 2000.



## Revisions to the Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000)

EPA is announcing the availability of final revisions to the Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000) (hereafter "2000 Human Health Methodology") published pursuant to section 304(a)(1) of the Clean Water Act (CWA). The 2000 Human Health Methodology supersedes the existing Guidelines and Methodology Used in the Preparation of Health Effect Assessment Chapters of the Consent Decree Water Criteria Documents, published by EPA in November 1980 (USEPA, 1980) (hereafter "1980 AWQC National Guidelines" or "1980 Methodology"). This Notice is intended to support the requirements of section 304(a)(1) of the CWA that EPA periodically revise criteria for water quality to accurately reflect the latest scientific knowledge on the kind and extent of all identifiable effects on health and welfare that may be expected from the presence of pollutants in any body of water, including ground water. These revisions are prompted by the many significant scientific advances that have occurred during the past 20 years in such key areas as cancer and noncancer risk assessments, exposure assessments, and bioaccumulation assessments. These revisions are not regulations and do not impose legally-binding requirements on EPA, States, Tribes, or the public.

For more info, link to: [http://www.access.gpo.gov/su\\_docs/fedreg/frcont00.html](http://www.access.gpo.gov/su_docs/fedreg/frcont00.html)

REF: *Federal Register*, 65(214), November 3, 2000.



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## Outbreak at Milwaukee Sizzler Provides Lessons to Industry

Most foodborne illness outbreaks don't happen easily. In many cases, it takes a series of missteps, mistakes and missed opportunities for a pathogen to make its way from the farm, through the plant, and finally onto someone's plate. A close examination of the events that led to at least 62 people falling ill and one dying from *E. coli* O157:H7 poisoning last summer after eating at a Milwaukee Sizzler restaurant highlights some of the mistakes that companies should be aware of to avoid a similar disaster.

While the source of the illnesses was ultimately found to be watermelon served at the buffet salad bar, the pathogen is believed to have originated on raw beef that was ground directly next to where ready-to-eat salad items were being prepared. The proximity of the grinder to the salad items provided a perfect opportunity for cross-contamination. That contamination then spread to restaurant patrons over the course of several days, as salad items were recycled and reused. Also, a number of restaurant employees — including a cook — later reported suffering from symptoms consistent with *E. coli* infections. One server at the restaurant even tested positive for the same strain that was found on the contaminated items and in the victims. **All continued working at the establishment despite their illnesses.**

Investigators ultimately concluded that the layout of the Milwaukee restaurant and the practices of its employees probably contributed to the outbreak. Here are some tips from the investigators:

- Provide complete physical separation between meat processing areas and preparation areas for ready-to-eat food.
- Ensure that hand-washing facilities are adequately and conveniently located. This cannot be determined by Code provisions alone. In many cases, it is necessary to observe actual use of the facilities to determine adequacy.
- Ensure that old food in salad bars is not indefinitely recycled by mixing it with new food.
- Ensure that all potentially hazardous foods are held at safe temperatures.

- Monitor the knowledge and skill levels of foodservice workers and provide training to ensure that foods are handled safely and that utensils, equipment and work surfaces are properly cleaned and sanitized between contact with raw and ready-to-eat foods to prevent cross-contamination. Food-handler certification requirements are a step in the right direction, but observing how people actually use their skills and knowledge is much more important.
- Ensure that a HACCP plan or other standard operating procedure is followed.

REF: *Food Chemical News*, 42(41), November 27, 2000.



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## **Declines in Lung Cancer Rates --- California, 1988-1997**

Cigarette smoking is the leading cause of lung and bronchus cancer. During 1988-1997, per capita cigarette smoking in California declined more than twice as rapidly compared with the rest of the country. To characterize lung cancer incidence in California, data from the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) program were compared with data from the population-based California Cancer Registry (CCR). This report summarizes the results of that analysis, which indicated that during 1988-1997, age-adjusted lung cancer incidence rates in California declined significantly compared with stable incidence rates for the combined SEER area of five states and three metropolitan areas (Connecticut, Hawaii, Iowa, New Mexico, and Utah, and Atlanta, Georgia; Detroit, Michigan; and Seattle-Puget Sound, Washington).

Editorial Note: More than 80% of lung and bronchus cancer is caused by cigarette smoking, and former smokers have about half the risk for dying from lung cancer than do current smokers. Compared with current smokers, the risk for lung and bronchus cancer among former smokers declines as the duration of abstinence lengthens, with risk reduction becoming evident within 5 years of cessation. Reductions in the smoking rate in a state could reduce lung and bronchus cancer rates within 5 years of the decline in smoking rates.

The difference in the rate of decline in lung and bronchus cancer incidence rates between California and other U.S. regions may be related, in part, to the significant declines in smoking rates as a result of California tobacco control initiatives. The California Tobacco Control Program was created by Proposition 99 and was approved in 1988. The program emphasized a comprehensive approach to tobacco control, prevention, and education and included strategies to change social norms related to tobacco use. The decrease in per capita cigarette consumption that began in 1990 has been attributed to the \$0.25 increase in the excise tax in 1989. During 1988-1996, California had a more rapid decline in per capita cigarette consumption compared with the rest of the country. This decline has been attributed primarily to a change in the social acceptability of smoking among California residents. However, smoking rates in California were declining more rapidly than the rest of the country since the late 1980s, before enactment of Proposition 99.

Following the California model, aggressive and comprehensive tobacco-control programs have been implemented in other states, including Arizona, Florida, Maine, Massachusetts, and Oregon. Initial results from several states have shown substantial declines in per capita cigarette consumption and/or changes in the prevalence of adult or youth smoking rates. The results of this report suggest that a comprehensive tobacco prevention and education program also may reduce rates of lung and bronchus cancer.

For the entire article, link to: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4947a4.htm>

REF: *Morbidity and Mortality Weekly Report*, 49(47);1066-9, December 01, 2000 .



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## **Pest Control Company Charged With Failing to Ventilate Fumigated Buildings**

SAN DIEGO - Criminal charges have been filed in Superior Court here against a Southern California pest control company, its owner and its manager for health and safety violations that occurred when they allegedly failed to properly ventilate fumigated buildings. The pest control company was charged 33 violations of state law and regulations governing the use of methyl bromide and sulfuryl fluoride (better known by its trade name, Vikane®). These pesticides are used to fumigate buildings infested with termites and other wood-destroying pests.

The most serious violations charged against the company involved failing to adequately clear a residence of methyl bromide before allowing the house to be reoccupied, and for using fumigant without adding chloropicrin as required by federal law and state regulations. (Chloropicrin is tear gas and acts as a chemical warning agent for the colorless, odorless fumigants.)

Methyl bromide and sulfuryl fluoride are fumigants used to treat structures for termites and other wood-destroying pests. Because they are gases, they do not stay on dry surfaces. Therefore, there is insignificant exposure from touching treated surfaces. Symptoms of inhalation overexposure to methyl bromide would be expected to appear within 4 to 12 hours, and can include blurred vision, headache, and nausea. At higher concentrations, methyl bromide can cause tremors, sleepiness, convulsions, and excess fluid in the lungs. Methyl bromide is on the State's Proposition 65 list of chemicals known to cause reproductive toxicity.

Symptoms of overexposure to sulfuryl fluoride (expected to appear within 8 hours) include nose and throat irritation, and nausea. At higher concentrations, it can cause excess fluid in the lungs, sleepiness, pneumonia, and convulsions. Sulfuryl fluoride is not considered a reproductive toxin. Neither sulfuryl fluoride nor methyl bromide have been shown to cause cancer when animals were exposed under experimental conditions.

The two chemicals have similar treatment methods. The unoccupied structures are sealed, usually with large tarps. The gaseous pesticide is pumped under the tarp and the structure is left sealed for about 24 hours. Following removal of the tarps, the structure must be ventilated for a period ranging from six hours to seven days, depending on the chemical and whether fans are used to help aerate the structure.

For more info link to: <http://www.cdpr.ca.gov>

REF: CDPR News Release, December 5, 2000 (00-31).



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## **Recommendations for Blood Lead Screening of Young Children Enrolled in Medicaid: Targeting a Group at High Risk**

### *Summary*

Children aged 1-5 years enrolled in Medicaid are at increased risk for having elevated blood lead levels (BLLs). According to estimates from the National Health and Nutrition Examination Survey (NHANES) (1991-1994), Medicaid enrollees accounted for 83% of U.S. children aged 1-5 years who had BLLs >20 µg/dL. Despite longstanding requirements for blood lead screening in the Medicaid program, an estimated 81% of young children enrolled in Medicaid had not been screened with a blood lead test. As a result, most children with elevated BLLs are not identified and, therefore, do not receive appropriate treatment or environmental intervention.

To ensure delivery of blood lead screening and follow-up services for young children enrolled in Medicaid, the Advisory Committee on Childhood Lead Poisoning Prevention (ACCLPP) recommends specific steps for health-care providers and states. Health-care providers and health plans should provide blood lead screening and diagnostic and treatment services for children enrolled in Medicaid, consistent with federal law, and refer children with elevated BLLs for environmental and public health follow-up services.

This report provides recommendations for improved screening strategies and relevant background information for health-care providers, state health officials, and other persons interested in improving the delivery of lead-related services to young children served by Medicaid.

## Conclusion

During 1991-1994, an estimated 535,000 U.S. children aged 1-5 years in the Medicaid program had elevated BLLs (>10 µg/dL). Of children aged 1-5 years with BLLs >20 µg/dL, 83% were enrolled in Medicaid. Because most young children enrolled in Medicaid have not been screened with a blood lead test as required by law, an estimated 352,000 children with elevated BLLs have never been identified or treated. Failure to comply with Medicaid blood lead screening requirements forfeits the opportunity to use this targeted risk group to efficiently identify children with elevated BLLs who could benefit from medical and public health follow-up services.

To improve performance in this area, health-care providers and health plans should provide blood lead screening and diagnostic and treatment services for children enrolled in Medicaid and refer children with elevated BLLs for environmental and public health follow-up services. At the same time, states should ensure that young children enrolled in Medicaid receive the appropriate blood lead screening and follow-up care to which they are legally entitled.

For more info please link to: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr4914a1.htm>

REF: *Morbidity and Mortality Weekly Report*, 49(RR14), December 08, 2000.



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## ***Pseudomonas* Dermatitis/Folliculitis Associated With Pools and Hot Tubs --- Colorado and Maine, 1999--2000**

During 1999-2000, outbreaks of *Pseudomonas aeruginosa* dermatitis and otitis externa (*inflammation of the ear canal wall skin, usually very painful*) associated with swimming pool and hot tub use occurred in Colorado and Maine. This report summarizes these outbreaks and provides recommendations for swimming pool and hot tub operation and maintenance, particularly when using offsite monitoring of water disinfectant and pH levels or when cyanuric acid is added to pools as a chlorine stabilizer.

**Colorado:** In February 1999, the Colorado Department of Public Health and Environment was notified of approximately 15 persons with folliculitis (*infection and irritation of hair follicles*) after they had used a hotel pool and hot tub. The cases occurred among children and adults attending two birthday parties at the hotel and among community residents who entered the pool on a pay-to-swim basis. The patients were treated for suspected *Pseudomonas* skin

infections; one patient tested positive for *Pseudomonas sp.* by culture of a skin lesion. Specimens collected during the environmental inspection in May from the hot tub filter and hand rail base were positive for *Pseudomonas aeruginosa* and other *Pseudomonas* species. The pool and hot tub used separate filtration systems; each had an automated chlorination system that relied on an onsite probe to measure free chlorine and pH levels and deliver set levels of chlorine using calcium hypochlorite tablets and muriatic acid for pH control. A printout of the hourly free chlorine and pH levels in the pool and hot tub revealed that free chlorine levels dropped below state-required levels (1 mg/L) on the evening of February 4 and remained below recommended levels for approximately 69 hours. The decline in pool chlorine levels was the result of a faulty chlorine pellet dispenser. Hotel staff did not perform routine onsite water testing for the pool or hot tub.

*Maine:* The Maine Bureau of Health was notified of several cases of dermatitis/folliculitis among persons who had stayed at Hotel A in Bangor, Maine, during February 18-27, 2000. Case-patients had a rash for <7 days or draining otitis externa with onset during February 18-March 3. Four of the nine persons were seen by a health-care provider. The indoor pool and hot tub were located within 5 feet of each other and had separate filtration systems. Pool disinfectant and pH levels were monitored by an offsite contractor. The pool had an automated chlorination system that relied on an onsite probe to measure chlorine and pH levels and to deliver a set level of chlorine using calcium hypochlorite tablets and muriatic acid for pH control. Chlorine and pH levels were maintained manually in the hot tub. To stabilize chlorine levels, 40-60 mg/L cyanurates were used. During the outbreak, free chlorine levels were tested daily and repeatedly registered <1.0 mg/L, less than the state-required level of 1-3 mg/L, in the pool and hot tub. The pool and hot tub were crowded during the outbreak, and free chlorine levels were very low to zero after the February 25-26 weekend; no measurements were recorded over the weekend. The facilities had been cleaned thoroughly before the environmental investigation in March. *Pseudomonas aeruginosa* was isolated from the top of the pool filter and from the draining ear of a child aged 6 years who used the pool. Although the pulsed field gel electrophoresis patterns of the two isolates did not match, the pool isolate was obtained after the facilities had been cleaned and may not have reflected the bacterial environment of the pool during the outbreak.

Editorial Note: *Pseudomonas aeruginosa*, a gram negative rod, is ubiquitous and can cause various mild to severe symptoms. *Pseudomonas* dermatitis and otitis externa outbreaks associated with swimming pool and hot tub use are well described; at least 75 cases during six outbreaks occurred during 1997-1998. Dermatitis outbreaks usually occur as a result of low water disinfectant levels, a condition that also increases the risk for transmission of other chlorine-sensitive pathogens (e.g., *escherichia coli* O157:H7 and *Shigella sonnei*) that may cause severe health consequences.

In this report, factors that may have resulted in inadequate disinfectant levels included the use of an offsite contractor who could monitor and alert pool staff to low free chlorine or pH levels but could not change free chlorine or pH levels, and hotel employees with a minimal understanding of the offsite monitoring and alert system, pool maintenance, and the link between inadequate water disinfection and disease transmission. In addition, pools and hot tubs were not monitored routinely onsite to adjust to high bather loads that can lower free chlorine levels. In Maine, cyanuric acid was added to the indoor pool and hot tub. However, cyanuric acid, which is used to reduce chlorine loss as a result of ultraviolet light exposure, is not recommended for indoor pools or hot tubs and is prohibited in two states; adding this chemical reduces the antimicrobial capacity of free chlorine.

To reduce the risk for *Pseudomonas* dermatitis and the transmission of other waterborne pathogens, pool and hot tub operators should 1) adhere to pool and hot tub recommendations and regulatory requirements for pH and disinfectant levels; 2) have a thorough knowledge of basic aquatic facility operation; 3) provide training for pool staff on system capabilities, maintenance, and emergency alert procedures of remote monitoring systems; 4) closely monitor pool and hot tub free chlorine measurements during periods of heavy bather loading; 5) monitor hot tub disinfectant levels closely because the higher temperatures maintained serve to dissipate chlorine rapidly; and 6) understand appropriate use and effects of cyanurates on disinfection and testing. In addition, remote-monitoring companies should be timely in notifying swimming-facility staff about low disinfectant levels. Swimmers should be educated about the potential for waterborne disease transmission in pools and hot tubs, which could increase advocacy for improved maintenance and monitoring by pool operators.

REF: *Morbidity and Mortality Weekly Report*, 49(48), December 08, 2000.





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## **Houseboat-Associated Carbon Monoxide Poisonings on Lake Powell --- Arizona and Utah, 2000**

During August 2000 at Lake Powell in the Glen Canyon National Recreation Area on the Arizona-Utah border, two brothers died of carbon monoxide (CO) poisoning as they swam near the stern of a houseboat while the onboard gasoline-powered generator was operating. As a result of these deaths, an investigation was initiated by the U.S. National Park Service (NPS) with assistance from the U.S. Department of the Interior, CDC's National Institute for Occupational Safety and Health, and the U.S. Coast Guard. In addition to investigating the deaths of the two brothers, the multiagency team evaluated visitor and worker boat-related CO exposures at Lake Powell. The study identified nine boat-related fatal CO poisonings since 1994 and approximately 100 nonfatal poisonings since 1990. This report describes the preliminary results of an ongoing investigation of watercraft-related CO poisonings on Lake Powell.

*Incident 1.* On August 2, 2000, two families vacationing on a houseboat on Lake Powell started the boat generator to cool the boat interior and operate the television. About 15 minutes later, two brothers (aged 8 and 11 years) swam into the airspace beneath the swim deck enclosed by the swim platform that was near water level into which the exhaust of the generator was directed. Within an estimated 1-2 minutes, one boy lost consciousness and the other began to convulse before sinking underwater. The brothers' bodies were retrieved the next day. Autopsy results showed that the boys had been overcome by CO and subsequently drowned; autopsy carboxyhemoglobin (COHb) levels were 59% and 52%. (**Normal COHb concentrations are less than 2% in nonsmokers and 5%-9% in smokers.**)

*Incident 2.* On August 18, 1994, three teenaged boys were swimming off the stern of a houseboat similar in design to that in incident one. The houseboat generator was operating. The boys were climbing up the back of the houseboat and sliding down a rear-mounted slide into the water. After several minutes, one of the boys developed a headache and went inside the boat cabin. While in the water, another boy commented that his legs felt numb and that he was dizzy. He climbed back onto the boat and is believed to have collapsed and fallen back into the water. Approximately 1 hour later, his body was recovered from the bottom of the lake. An autopsy revealed a COHb level of 53.9%.

*Incidents 3, 4, and 5.* During August 1998, three CO poisonings occurred on Lake Powell within the span of 12 days. All involved entry of the airspace beneath the swim deck for engine maintenance or clearing ropes from propellers, and all boats had designs similar to those in incidents one and two. Two of the incidents resulted in fatal CO poisonings (COHb levels of 55% and 49%); the third incident involved a concessionaire employee who lost consciousness while in the water but who was retrieved and resuscitated.

*Environmental Sampling.* Maximum CO concentrations measured in the cavity beneath the stern deck on houseboats on Lake Powell ranged from 6,000-30,000 parts of CO per million parts of air (ppm) while the generators were in operation. Oxygen concentrations as low as 12% also were measured. **This oxygen deficient, CO-rich environment in a confined space is lethal within seconds to minutes.** In addition, environmental measurements and case reports indicated that CO concentrations on and near the swim platform can reach life-threatening concentrations (measured as high as 7200 ppm). **CO tends to accumulate above the water near the platform, and CO concentrations as high as 200 ppm were measured at water level 10 feet away from the platform.**

**Editorial Note:** CO poisoning associated with indoor exposure has long been recognized. However, the events described in this report illustrate a more rarely reported phenomenon --- severe CO poisoning occurring outdoors.

The outdoor poisonings at Lake Powell and those reported elsewhere probably represent a larger number of deaths not recognized as CO poisoning. Because symptoms of CO poisoning resemble those of other common conditions (e.g.,

alcohol consumption, motion sickness, heat stress, and nonspecific viral illness), poisonings often go unrecognized. In addition, associating illness with this exposure requires awareness of the problem among EMS staff, hospital emergency department personnel, and coroners.

The preliminary findings of this investigation indicate that houseboats with a rear swim deck and a water-level swim platform are an imminent danger to persons who enter the air space beneath the deck or spend time near the rear deck. The presence of features (e.g., engine propellers, water slides, and swim platform) that attract occupancy of that airspace enhances the risk for severe injury and death. To prevent CO poisonings and deaths, boat manufacturers should immediately devise engineering changes to new and existing boats to prevent the collection of CO in airspaces around the stern deck. Boat manufacturers should evaluate the effectiveness of such controls. Boat owners should contact the manufacturer of their boats to determine whether effective corrective measures have been identified. State and federal agencies that issue boat registrations or that regulate lakes and/or boats in their jurisdictions should assess their legal authority to determine what actions might be taken to prevent these deaths.

Workers also may be exposed to very high CO concentrations. According to the Occupational Safety and Health Administration, the area beneath the swim deck should be designated as a confined space, and confined space entry procedures must be implemented before an employee enters the water to service engine components beneath the deck.

**CO poisonings also occur inside houseboats; 36 of the nonfatal CO poisonings at Lake Powell occurred inside boat cabins, and eight of these were in boats on which CO detectors had been disabled because of repeated alarms. All boats should be equipped with CO detectors, and boat occupants should never disable alarms.**

For the full report link to: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4949a1.htm>

REF: *Morbidity and Mortality Weekly Report*, 49(49), December 15, 2000.



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## **Human Rabies --- California, Georgia, Minnesota, New York, and Wisconsin, 2000**

On September 20, October 9, 10, 25, and November 1, 2000, persons who resided in California, New York, Georgia, Minnesota, and Wisconsin, respectively, died of rabies. This report summarizes the case investigations.

*California:* On September 15, a 49-year-old man visited a neurologist with 2 days of increasing right arm pain and paresthesias. The symptoms increased and were accompanied by hand spasms and sweating on the right side of the face and trunk. After developing dysphagia, hypersalivation, agitation, and generalized muscle twitching, the patient was admitted to a local hospital on September 16. Vital signs and blood tests were normal, but within hours he became confused. The consulting neurologist suspected rabies. Rabies immune globulin, vaccine, and acyclovir were administered. On September 17, the patient was placed on mechanical ventilation and rabies tests returned positive. Renal failure developed and the patient died on September 20. The patient did not report contact with a bat, although his wife reported that in June or July a bat had flown into their house and the patient had removed it.

*New York:* On September 22, a 54-year-old man who had resided in Ghana arrived in the United States, and on September 26, reported discomfort in his right lower back. On September 30, he was admitted to a local hospital. Other symptoms appeared within hours, including dysphagia, dizziness, shortness of breath, and paranoia. The patient became delirious, with frothing and agitation. On October 1, the patient had a cardiac arrest, was resuscitated, and placed on mechanical ventilation. Rabies tests were positive on October 3. After a gradual decrease in respiration, heart rate, and blood pressure, the patient died on October 9. History from the patient's employer in Ghana revealed that the patient had been bitten in Ghana on his thumb and leg by his unvaccinated puppy in May.

*Georgia:* On October 3, a 26-year-old man developed intractable vomiting and hematemesis. At a local hospital, he was treated with antiemetic suppositories; that evening he became disoriented, combative, and had difficulty breathing. On October 5, he became hypotensive and hypoxic and was transferred to a referral hospital for ventilatory support. On October 9, the patient developed cardiac arrhythmia, hypotension, and became combative, necessitating sedative and paralytic agent therapies. He developed respiratory and renal failure and died on October 10. Since July, the patient had been renting a room on the upper floor of an old house. He had reported to co-workers that bats from the attic had entered his living quarters and landed on him while he slept. Investigation of the house occupied by the patient since July revealed a colony of approximately 200 Mexican free-tailed bats in the attic and openings between the attic and the patient's bedroom, bathroom, closet, and kitchen.

*Minnesota:* On October 14, a 47-year-old man visited a local clinic with 6 days of worsening right arm pain and paresthesias. On October 19, while traveling in North Dakota, the patient was admitted to a North Dakota hospital. Laboratory findings were normal except a WBC count of  $13.8 \times 10^9/L$ . The patient was placed on broad spectrum antibiotics. On October 20, the patient developed acute respiratory failure and was intubated. He died on October 25. Three days earlier, a friend told the family that during August 11-19, the patient had been awakened by a bat on his right hand. He killed the bat and was bitten in the process. The patient did not seek medical care. Investigation found in the patient's house multiple portals of entry for bats, openings between the attic and living areas, and extensive deposits of guano in the attic and living area.

*Wisconsin:* On October 14, a 69-year-old man with a 2-day history of chest discomfort and numbness, tingling, and tremors of the left arm was admitted to a local hospital for cardiac evaluation. The patient died on November 1, and postmortem examination of the brain revealed *Negri* bodies. Subsequent testing confirmed a diagnosis of rabies. The patient had told a friend that two or three times a year he had removed bats from his house with his bare hands; several other residences used by the patient also had potential portals for the entry of bats. He did not mention being bitten by an animal but had asked a friend a week before admission if rabies could be acquired from an insect bite.

**Editorial Note:** These five cases of human rabies are the first diagnosed in the United States since December 1998, and underscore that rabies should be considered in any patient with progressive encephalitis. The initial presentations of rabies can be diverse and a history of animal contact is rarely obtained. Because the immune response to rabies may not occur until late in the disease, if rabies is suspected, an antemortem examination should include a nuchal skin biopsy, saliva, and cerebral spinal fluid or a postmortem examination of central nervous system tissue.

In the United States since 1990, infection with indigenous rabies virus variants associated with insectivorous bats and infection with foreign canine rabies virus variants have accounted for 30 of the 32 human cases. Although 24 (74%) of the 32 cases since 1990 have been attributed to bat-associated variants of the virus, a history of a bite was established in only two cases. Contact with bats occurred in approximately half of the other cases. These cases represent various bat-contact histories: a bat bite, direct contact with bats with multiple opportunities to be bitten, and possible direct contact with a bat. Canine rabies is prevalent in Africa, Asia, and Latin America. Worldwide estimates of human rabies deaths exceed 50,000 cases each year, and >95% of reported cases occur in regions where canine rabies is endemic.

Although rabies usually is transmitted by a bite, persons may minimize the medical implications of a bat bite. Unlike bites from larger animals, the trauma of a bat bite is unlikely to warrant seeking medical care. Unless the potential for rabies exposure is known to the patient, rabies postexposure prophylaxis (PEP) will not be received. Although bat rabies virus variants can be transmitted secondarily from terrestrial mammals, the lack of other animal-bite histories and the rarity of bat rabies virus variants found in terrestrial mammals suggest that this means of transmission is rare.

For the complete report, link to: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4949a3.htm>

REF: *Morbidity and Mortality Weekly Report*, 49(49), December 15, 2000.



# ♣ Toxicology Tidbits ♣

## **State Health Director Warns Against Eating Wild Mushrooms**

SACRAMENTO - With seasonal rains becoming more frequent, promoting the growth of wild mushrooms, State Health Director Diana Bontá, R.N., Dr.P.H., today reminded consumers of the potential dangers of eating wild mushrooms. **"Some poisonous mushrooms can look identical to non-poisonous mushrooms,"** said Bontá. **"Wild mushrooms should not be eaten unless they have been carefully examined and deemed edible by a recognized mushroom expert."**

Mushroom collectors often overestimate their ability to distinguish deadly mushrooms from edible mushrooms, sometimes with tragic results. Individuals who refer to mushroom guidebooks or have families who have collected mushrooms for many years in their native countries may mistakenly believe that they can distinguish the deadly mushroom found in the Western United States from edible varieties.

In the past five years, there have been at least two deaths, multiple hospitalizations and an unknown number of illnesses in California attributed to the consumption of wild mushrooms, including *Amanita phalloides*, also known as the "death-cap" mushroom. The deaths were reported in Santa Clara and Sonoma counties in the winter of 1996-97. These mushrooms grow in some parts of California year-round, but most commonly are found in the fall and winter months after the rains.

Eating poisonous mushrooms, particularly the "death cap" variety, can cause cramping, abdominal pain, vomiting, diarrhea, liver damage and death. Symptoms tend to occur six to 24 hours after consumption, so individuals may not initially attribute these symptoms to wild mushrooms. After the initial gastrointestinal symptoms subside, patients may feel much better, causing them to ignore these early warning signs. Despite feeling better, however, some individuals may suffer liver damage and may require liver transplantation to survive.

Individuals who develop symptoms after eating wild mushrooms should immediately contact the California Poison Control System at 1-800-8-POISON (876-4766) and seek medical attention.

**For more info, link to:** <http://www.dhs.ca.gov>

REF: *California Department of Health Services Press Release, #58-00, Nov 06, 2000.*



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## **EPA Pesticides and Food**

The EPA's Pesticides and Food page offers information about the regulations of pesticides and how they affect the foods we eat. The site presents explanations of "Integrated Pest Management" and "Organically Grown Foods" as well as health problems pesticides can pose to adults and children. Instructions are also provided on how to select and prepare foods safely.

For more info, link to: <http://www.epa.gov/pesticides/food/>

REF: *EPA Internet Newsbrief*, November 24, 2000



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## **Herbicide Tolerant Genes, Part 2, Giddy 'bout Glyphosate**

(Dr. Allan S. Felsot, Environmental Toxicologist, WSU)

Over the past eight months, I've been using these pages to examine the science behind transgenic crops in light of public perception of the dangers of these technologies. In March, April, May, and June's issues, I looked at insecticidal genes, specifically, the *Bacillus thuringiensis* (Bt) genes that have been incorporated into certain production crops. In September, I turned to focus on crops that have been engineered to contain herbicide-tolerant genes-products like Roundup Ready (RR) corn, soybeans, cotton, and canola. In that essay, I laid out the scientific principles behind the transgenic technology, and addressed three concerns about herbicide-tolerant crops, namely:

- whether engineered RR genes have unintended effects on other plant genes or traits;
- whether plant metabolism is sufficiently affected to produce new toxic proteins or allergens; and
- whether RR crops are nutritionally equivalent to traditionally bred crops.

These three concerns are similar to those expressed regarding the insect-resistant Bt transgenic crops. But herbicide-tolerant crops face another hurdle for public acceptance. If acres of corn and soybeans are bulletproof to glyphosate (Roundup), won't wholesale aerial spraying ensue? And won't that make us all sick? Some claim we just don't know enough about glyphosate. When industry advocates claim we do, the frequent retort is, "Yeah, that's what they said about DDT."

For more info, link to: <http://www.tricity.wsu.edu/aenews/>

REF: *Agrichemical and Environmental News*, Issue No. 175, November 2000.



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## **Herbicide Tolerant Genes, Part 3 "Super Weed" Myths and Kryptonite Remedies**

(Dr. Allan S. Felsot, Environmental Toxicologist, WSU)

If ubiquity on hardware store shelves is any indication of product popularity, then homeowners love Roundup (formulated glyphosate). The ready-to-use formulation has such a low toxicity and hazard for eye and skin irritation that it's hard to believe it can injure anything. Yet, squirt it on young plants growing in the cracks and crevices of your driveway and sidewalk, and you will not have any weed problems for the rest of the summer. Owing to glyphosate's

systemic abilities, it readily moves from the leaves to all parts of the plant, effectively eliminating any regrowth. But glyphosate's effectiveness is deceptive, giving some people the mistaken impression that it will kill every plant it comes in contact with. The truth is, older plants are much less susceptible to the effects of glyphosate than younger plants, and certain plants like mature woody brush may not be effectively controlled. And once glyphosate hits the ground, it tightly binds to soil, and its phytotoxic capabilities disappear.

But the myth of glyphosate as a macho, kill-anything herbicide has crossed paths with the concerns over the planting of millions of acres of Roundup Ready (RR) canola, corn, cotton, and soybeans. One fear, expressed particularly in the United Kingdom, is that glyphosate is so effective at weed control, that all forage plants used by songbirds will disappear in the wake of mass plantings of RR canola.

Meanwhile, the concern expressed most in North America is about glyphosate-susceptible "wimpy" weeds evolving into glyphosate-resistant "super" weeds. In crop rotations, the glyphosate-resistant volunteers will be uncontrollable and will run wild over the susceptible rotational crop. Perhaps songbirds will thrive, but those "uncontrollable super weeds" and resistant volunteer plants will devastate crop production, not to mention out-compete and therefore supplant the native vegetation.

And there are other concerns about herbicide-resistant crops. In a nutshell, they can be boiled down to five broad hypotheses:

1. Changes in landscape ecology will wipe out wildlife (the U.K. concern);
2. Repeated, widespread use of glyphosate will select for resistance in weeds, making them impossible to control;
3. Resistant genes will flow from RR crops to weedy species, creating uncontrollable super weeds;
4. Herbicide-tolerant crops will become weeds in fields where rotational crops are grown; and
5. Glyphosate is so toxic to soil microorganisms and invertebrates that soil fertility will be adversely affected.

For more info, link to: <http://www.tricity.wsu.edu/aenews/>

REF: *Agricultural and Environmental News*, Issue 176, December 2000.



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## **Disposing of Computer Hardware Components Can Threaten Environment**

School systems across the country are realizing that they may have problems unloading broken or obsolete computer equipment. Environmental experts have already identified toxic material in computers, such as lead, cadmium, and mercury, and they are studying the impact that computer peripherals could have on the environment. Massachusetts and several other states now have laws that ban computer equipment from landfills. As a result, some school districts are stockpiling computers in storage because they do not know what to do with them, while others have turned to auctions, which are not always successful because the computers are often obsolete or have been stripped of their parts. Meanwhile, other schools are refurbishing their computers or recycling old systems. The Silicon Valley Toxics Coalition says only 6 percent of computers on the market in 1998 were recycled, and the number of obsolete computers will swell to more than 315 million by 2004.

For more info link to: <http://www.eschoolnews.com/showstory.cfm?ArticleID=1939>



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## **Coffee Consumption May Protect Against Bladder Cancer, Researchers Report**

Coffee may protect against the development of bladder cancer, especially in smokers, according to a Spanish study reported in the *Journal of Epidemiology and Community Health*. Noting that cigarette smoking is the main risk factor for bladder cancer, the researchers found its damaging effect was more than double among those drinking fewer than two cups of coffee per week compared with regular coffee drinkers.

Smokers who drank coffee were three times as likely to develop bladder cancer as non-smoking coffee drinkers, they said, but smokers who did not drink coffee were seven times more likely to develop the disease. As a result, they said, smoking may be an even greater risk for bladder cancer than previously thought. They also noted previous research showing caffeine's toxic effects may be reduced in smokers, while caffeine may reduce the harmful effects of the cancer-causing agents produced by smoking.

REF: *Food Chemical News Daily*, 3(116), December 14, 2000.



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## **VETERINARY NOTES.....**

### **FDA to Stop Accepting Visual Drug Residue Screening Tests for Milk**

Starting next year, FDA will no longer accept visually determined drug screening tests for milk, citing the varying conclusions that different readers find when interpreting those types of test results and the possibility that the results could be challenged. The agency wants the visual tests to be replaced with "reader/printer" tests that provide records and a reader/printer test would give an electronic reading of whether the milk contains drug residues, whereas a visual test usually changes color and the person administering the test determines if the sample is positive or negative for residues. With the reader there is also a print that can be kept as a record of the test.

Most of the dairy industry is opposed to the idea of completely eliminating the use of visual tests because they think the tests could be effective if those administering the tests receive the proper training and oversight. Some farmers use the visual tests to check their milk before it leaves the farm, and so including readers in the kits and increasing the price takes a tool for testing out of the hands of farmers.

REF: *Food Chemical News*, 42(35), October 16, 2000.



## Residue Testing in Market Dairy Cows

(by Dr. Larry Hutchinson, Penn State)

Several recent and proposed changes in Food Safety Inspection Service (FSIS) testing for drug residues may affect you and your clients. FSIS conducts three types of testing: **Monitoring** - Randomly selected carcasses are selected for sampling to establish a statistically accurate estimate of residues. Carcasses from monitoring samples are not retained pending test results. **Routine enforcement or surveillance** - Samples selected by inspectors as high risk or suspected of having residues; carcasses selected for surveillance testing are retained pending test outcomes. **Special projects** - target compounds of interest to regulatory officials are tested on surveillance samples or on specially selected samples.

Routine enforcement or surveillance sampling has been triggered by antemortem findings such as lameness, visible discharge or debility. In addition to these criteria, inspectors are now selecting surveillance samples based on postmortem findings including pneumonia, peritonitis, mastitis, other infectious processes and evidence of injection site lesions. When both antemortem and postmortem findings are used for selection surveillance testing, the number of retained carcasses and the number of positive antibiotic residues has risen sharply. While this increased surveillance testing started at one PA slaughter plant, FSIS is now extending the same sampling criteria to plants throughout the U.S.

When surveillance samples are taken, an in-plant FAST for antimicrobials is run. The carcass is retained for 6-18 hours pending test results; if negative the carcass is released; if positive, additional testing of kidney, liver and muscle are done at a national laboratory. If these tests show violative levels of an antimicrobial, the affected tissue is condemned. The turnaround time for this testing is about 2 weeks, during which time the packer must retain the carcass. Many of these violative residues (38%) are due to gentamycin. Under proposed rules, if the kidney tissue is violative the entire carcass will be condemned. This constitutes a major added financial burden on the packer, which likely will result in reduced revenue to the producer.

In recent months, FSIS has conducted special projects testing for the presence of phenylbutazone in cattle. There is no approved use of phenylbutazone in food producing animals, but sampling of 285 carcasses revealed 2.8% positive for phenylbutazone. This sampling will be expanded to assess the magnitude of this problem. Phenylbutazone can, in humans, cause aplastic anemia, even at very low exposure levels. Since there is a product, Banamine®, with an approved use in cattle, it is unlikely that there is any justifiable extralabel drug use of phenylbutazone in cattle.

Some suggestions for responsible veterinary consultation with cattle producers:

- Identify potential market-animals and track any injectable drug use to avoid needle site lesions and drug residues
- Maintain written, herd-specific treatment plans; train farm personnel in proper injection techniques, minimizing IM injections, avoiding rear-quarter injections; record all treatments
- Visibly identify all treated animals
- Do not use phenylbutazone in food producing animals
- Avoid injectable, intramammary or intrauterine use of gentamycin and other aminoglycosides in cattle
- Work with your clients to maximize the quality and value of their market cows

REF: *Herd Health Memo*, November 2000.

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