Plasma Homocysteine — Continued

Hcy, starting at plasma Hcy concentrations well within the normal range of the population. The findings in this report also indicate that laboratories performing the same method sometimes vary more among themselves than laboratories performing different methods. The analysis also suggests that improvements are needed in the analytical precision to assure that laboratories in an area can use the same reference intervals. To aid this improvement, researchers need to evaluate individual laboratory performance through a program that includes standard reference materials and comparisons with other laboratories. Such an improvement is needed because Hcy has developed from an esoteric test to a clinical test.

The major limitations of this study were the small number of laboratories using each method and the arbitrary selection of the GC-MS method as a reference method, which may itself be biased. As a result, conclusions regarding interlaboratory variation within a method group and with respect to method-specific bias should be interpreted with caution. A high-quality reference method for Hcy is needed to better evaluate a laboratory's or a method's quality.

CDC is promoting efforts to develop a high-order reference method for plasma Hcy by tandem mass spectrometry, the state-of-the-art methodology for accuracy and precision. This method will be a standard for the development and characterization of reference materials. Future studies will assess the variability between laboratories before and after the introduction of standard reference materials.

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Surveillance for Acute Pesticide-Related Illness During the Medfly Eradication Program — Florida, 1998

The Mediterranean fruit fly (Medfly) (*Ceratitis capitata*, Wiedemann) is an exotic insect that can damage approximately 250 fruit and vegetable plant species and is a serious threat to domestic agriculture. During the spring and summer of 1998, pesticides were used by federal and state agriculture authorities to eradicate Medfly infestations that had been detected in portions of five Florida counties (Table 1). This report summarizes surveillance data, describes probable and possible cases of illness asso-

Pesticide-Related Illness — Continued

TABLE 1. Number of gallons of malathion applied, number of square miles covered, estimated number of persons exposed, and number of persons adversely affected in the Medfly Eradication Program, by county — Florida, 1998

County	Dates of eradication effort	Total malathion volume, excluding bait (gallons)*	Total treatment area (square miles)	Estimated exposed population	Probable and possible cases of illness
Dade†	April 4–24	1.4	0.08	1,500	0
Lake/Marion§	April 30–July 13	2,125.0	35.20	2,500	11
Manatee	May 14–June 26	1,665.0	50.00	120,000	103
Highlands	July 9–Sept 6	2,494.0	42.50	8,000	9
Total		**6,285.4**	**127.78**	**132,000**	**123**

*In addition, small amounts of diazinon, another organophosphate insecticide, were applied from the ground as a soil drench in Dade (0.04 gallon applied over 0.0001 square mile), Lake (0.3 gallon applied over 0.0007 square mile), and Manatee counties (0.1 gallon applied over 0.0003 square mile).
†No aerial application of malathion/bait; ground application only.
§Aerial applications of malathion/bait in Lake County also included small portions of Marion County.

ciated with the eradication effort, and provides recommendations for future Medfly-eradication programs.

The Medfly Eradication Program began on April 4, 1998, with ground applications of malathion/bait* and diazinon, followed by aerial malathion/bait application that began on April 30. All insecticide applications were completed on September 6. The respective county health departments estimated that 132,000 persons resided in the areas treated with these pesticides.

Surveillance for Illness

Reports of potential adverse health effects attributed to the Medfly Eradication Program pesticide applications were solicited by state health and agriculture authorities and collected through telephone hotlines maintained by the Florida Poison Information Network and county health departments. The public was advised of the pesticide use and the hotline number through public meetings hosted by federal and state agriculture department officials, news articles, and radio and television reports. During April 30–September 30, 1998, 230 reports of illness were received from Florida residents and physicians and were investigated by the Florida Department of Health. Reports were classified according to a standard case classification system.† Of the 230 reports, 34 (15%) cases were classified as probable pesticide-related illness based

*Malathion (Fyfanon® ULV, Cheminova Inc., Wayne, New Jersey) combined with a corn protein bait, Nu-Lure® (Miller Chemical and Fertilizer Co., Hanover, Pennsylvania) was applied at a rate of 2.4 fluid ounces malathion and 9.6 fluid ounces bait per acre per week. The reportedly nontoxic bait comprises hydrolyzed corn gluten meal and inert ingredients including corn syrup. Backpack sprayers or truck-mounted pressure sprayers were used for ground applications; UH-1 "Huey" helicopters and DC-3 aircraft conducted the aerial applications. (Use of trade names and commercial sources is for identification only and does not imply endorsement by CDC or the U.S. Department of Health and Human Services.)
†CDC's National Institute for Occupational Safety and Health classifies a case of acute pesticide-related illness and injury as being definite, probable, possible, or suspicious as determined by the level of certainty of exposure, whether health effects were observed by a health-care provider, and whether sufficient toxicologic information supports a causal relation between the exposure and the reported health effects. When toxicologic evidence for an exposure-health effect relation is not present, the case is classified as unlikely.

Pesticide-Related Illness — Continued

on abnormal medical signs compatible with malathion/bait or diazinon toxicity observed by a licensed health-care professional, and 89 (39%) were classified as possible based on symptoms compatible with malathion/bait or diazinon toxicity reported to health-care providers or a state health authority. Of the remaining 107 (47%), 24 were excluded because of insufficient information, 32 were asymptomatic or had symptoms unrelated to exposure, and 51 were classified as unlikely. No reports were classified as definite cases of pesticide-related illness because this category requires confirmation by laboratory testing of clinical or environmental samples that were not available.

The 123 probable or possible cases represent a crude rate of nine cases per 10,000 residents in the exposed areas. Of the 123, 89 (72%) occurred in females; the median age was 46.5 years (range: 6 months–82 years). Eight reports (7%) involved children aged ≤5 years, and 20 (16%) involved persons aged ≥65 years. Four reports (3%) described persons whose illnesses were considered work-related (i.e., Medfly Eradication Program pesticide applicator, lawn-care worker, health department hotline worker, and hotel worker).

Among the 123 cases, signs and symptoms for 87 (71%) were respiratory (e.g., dyspnea, wheezing, coughing, and upper respiratory tract pain/irritation); 77 (63%) involved the gastrointestinal system (e.g., nausea, vomiting, diarrhea, melena, and abdominal cramping); 74 (60%) involved the neurologic system (e.g., headache, vertigo, ataxia, peripheral paresthesia, disorientation, and confusion); 28 (23%) involved the skin (e.g., erythema [with or without maculopapular rash], pruritis, and burning sensations); and 23 (19%) involved the eyes (e.g., lacrimation, conjunctivitis, blepharitis, and blurred vision)[§].

Case Reports

Case 1. A 49-year-old man experienced dyspnea, upper respiratory irritation, and headache after being exposed to aerial malathion/bait applications while working on the roof of his house. His physician diagnosed severe bronchitis and reported that the illness probably resulted from malathion/bait exposure.

Case 2. A 31-year-old man reported a blistering rash over his arms, legs, and neck following an aerial application of malathion/bait. He was exposed to malathion/bait while conducting his lawn maintenance business. He reported that the rash developed where grass trimmings coated with pesticide stuck to his skin. His physician diagnosed allergic contact dermatitis secondary to malathion/bait exposure.

Case 3. A 35-year-old man reported a pruritic rash on exposed skin surfaces. He had covered his pool in accordance with recommendations and was exposed to malathion/bait while removing the cover, which he had folded and carried under his right arm. He was not wearing a shirt, and the rash developed at those points where the pool cover had contacted his arm and torso. His physician diagnosed allergic dermatitis.

Case 4. A 32-year-old woman with a history of asthma complained of multiple symptoms in reaction to ground applications of malathion/bait and diazinon in her neighborhood. Symptoms included nausea, diarrhea, abdominal cramping, cough, upper respiratory irritation, dyspnea, wheezing, headache, and fatigue. Her physician diagnosed acute aggravation of asthma secondary to pesticide exposure from the Medfly Eradication Program.

[§]Total is 289 cases because some persons experienced signs and symptoms in more than one system.

Pesticide-Related Illness — Continued

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Editorial Note: The Environmental Protection Agency (EPA) classifies malathion as an acute toxicity category III compound¶, and it is considered safer than many other organophosphates because it is rapidly detoxified by the body. Nevertheless, adverse health effects have been reported by persons exposed to malathion (*1*). Self-reported health effects previously associated with aerial spraying of malathion/bait include respiratory symptoms (particularly among persons with pre-existing respiratory conditions), gastrointestinal symptoms, neurologic symptoms, contact dermatitis, and conjunctivitis (*2–4*). These effects may represent irritant or allergic responses to either component of the malathion/bait formulation (*5,6*). Cholinesterase inhibition (*3*) or anxiety about aerial malathion/bait application (*2,7*) also may be responsible for some symptoms.

The findings in this report suggest that for most persons, aerial application of malathion/bait does not pose an acute risk to health; however, at least 123 probable or possible pesticide-related cases of illness were associated with pesticide exposure. Each case-patient had signs and/or symptoms consistent with pesticide exposure, and illness probably resulted from sensitivity to the irritant/allergic effects of malathion/bait. Although ground application of diazinon, another acute toxicity category III organophosphate, was employed in some locations, this agent was considered less likely to be responsible for the observed health effects because it was used in only three counties, was applied focally (without aerial application), and was used in minimal quantities.

The findings in this report are subject to at least three limitations. First, because this was a passive surveillance effort, persons may have become ill who did not seek medical attention or were not reported to the surveillance system. Second, rates of the health outcomes in the exposed population could not be compared with those for the general population because baseline incidence data for many of the effects attributed to the malathion/bait application are not available. Third, the role of cholinesterase inhibition was not determined because blood cholinesterase levels were not obtained.

Certain malathion formulations are registered by EPA for aerial spraying over urban areas in mosquito-control programs. The use of malathion in these programs provides an important public health benefit by controlling mosquitoes that transmit human diseases such as encephalitis, dengue fever, and malaria. Spraying malathion/bait over urban populations for Medfly eradication has generated controversy in part because these applications are directed not at preventing human illness but at eradicating an agricultural pest. Federal law does not permit spraying malathion/bait over urban areas without an emergency EPA exemption**. To reduce the risk for illness among persons sensitive to the effects of malathion/bait applications, federal and state agricultural authorities are encouraged to pursue and enhance alternative methods for Medfly control. These methods include preventing Medfly importation into the United States, quickly detecting Medfly infestations (e.g. through

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

**40 CFR Part 166.

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MORBIDITY AND MORTALITY
WEEKLY REPORT

Reptile-Associated Salmonellosis — Selected States, 1996–1998

During 1996–1998, CDC received reports from approximately 16 state health departments of *Salmonella* infections in persons who had direct or indirect contact with reptiles (i.e., lizards, snakes, or turtles). *Salmonella* infection can result in invasive illness including sepsis and meningitis, particularly in infants. Despite educational efforts, some reptile owners remain unaware that reptiles place them and their children at risk for salmonellosis. This report summarizes clinical and epidemiologic information in four cases and provides information about state regulations to prevent transmission of *Salmonella* spp. from reptiles to humans.

Case Reports

Arizona. During October 1996, a 3-week-old boy was admitted to a hospital emergency department with fever (103.6 F [40 C]), vomiting, and bloody diarrhea of 15 days' duration. Stool and blood cultures yielded *Salmonella* serotype IV 44:z_4,z_{23}-, an extremely rare serotype. The infant was hospitalized for 10 days and treated with intravenous fluids and amoxicillin. To determine the cause of the infant's illness, a stool specimen was obtained from the family's pet iguana, which also yielded *Salmonella* IV 44:z_4,z_{23}-. In an attempt to prevent reinfection, local health officials informed the parents of the importance of the infant avoiding direct and indirect contact with the reptile, and the iguana was moved to a relative's home. One month later, the infant spent 2 days in the relative's home where the iguana was housed; 48 hours after this visit, the infant was again treated at an emergency department for fever and diarrhea. A stool culture again yielded *Salmonella* IV 44:z_4,z_{23}-.

Kansas. During April 1997, a 6-year-old boy had bloody diarrhea of 10 days' duration, abdominal cramps, vomiting, and fever (104.9 F [41 C]). Stool culture yielded *Salmonella* serotype Typhimurium. The child was treated with ceftriaxone and amoxicillin/clavulanate. Nine days after the boy started therapy, his 3-year-old brother also developed diarrhea, and a stool sample yielded *S.* Typhimurium. No other family members became ill. The two boys shared a room with two corn snakes that they handled regularly. Stool cultures from the corn snakes yielded *S.* Typhimurium. The parents reported to health department staff that they were unaware that snakes are a source of salmonellosis.

Massachusetts. During May 1997, an 8-year-old boy with a congenital immune deficiency developed severe vomiting, abdominal cramps, bloody diarrhea, and head-