disease prevention news

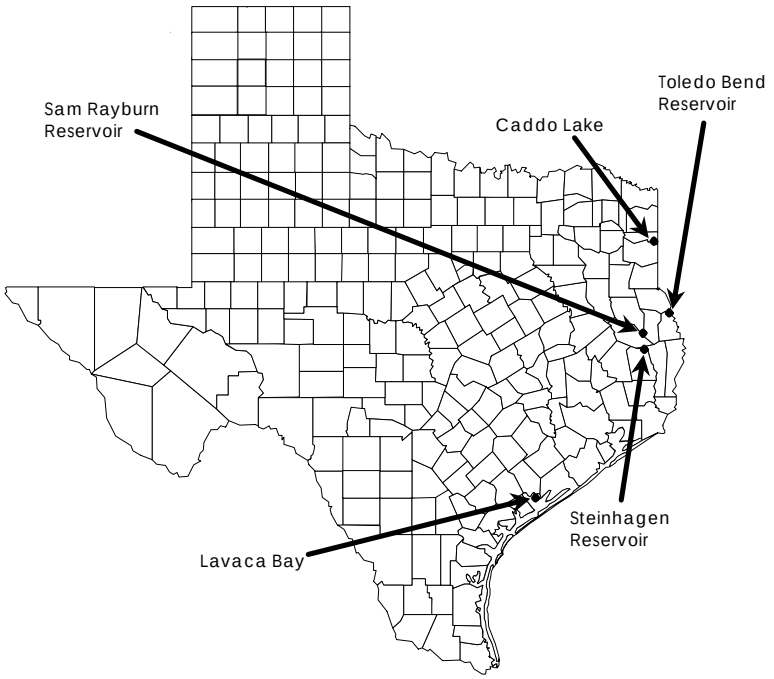
November 25, 1996 Vol. 56, No. 24

Methylmercury in Fish and Crabs in Texas

Acute and chronic methylmercury toxicity can impair most of the senses. Fish or crabs that live in waters containing elevated levels of methylmercury can bioaccumulate this toxin in their muscle tissue at levels that are dangerous when consumed.

The Texas Department of Health (TDH) issued a fish consumption advisory in 1995 for several lakes in East Texas due to elevated levels of methylmercury found in some species of fish taken from these lakes. Similarly in 1988, TDH issued a closure order for a section of Lavaca Bay on the Texas Gulf Coast due to elevated levels of methylmercury in this area. This article describes the Lavaca Bay closure area and elucidates the current East Texas lakes fish consumption advisory. Included in this explanation are the reasons why mercury levels are elevated in these waters and information on the diagnosis and treatment of methylmercury poisoning.

Figure 1. Areas Identified in Fish Consumption Advisory



Fish Consumption Advisory

Physicians should be aware of the potential for mercury poisoning from consumption of contaminated fish and crabs in two areas of Texas:

- Due to unsafe levels of methylmercury in fish, last year the TDH Seafood Safety Division issued a fish consumption advisory for Caddo Lake, including part of Big Cypress Creek and these East Texas reservoirs: Sam Rayburn, Toledo Bend, and B.A. Steinhagen (Dam B) (see Figure 1). Adults who eat fish from these East Texas lakes are advised to eat **no more than two eight-ounce servings per month of largemouth bass and freshwater drum. Children should eat no more than two four-ounce servings per month.**

  Additionally, a person should eat **no more than one meal per month of white bass or hybrid white/striped bass from Steinhagen Reservoir**.

- **Fish and crabs from the closure area in Lavaca Bay should not be eaten**. Lavaca Bay is on the Texas Gulf coast between Corpus Christi and Galveston.

Continued ☞

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Elevated levels of methylmercury in fish and crabs from these bodies of water are due to bioaccumulation along the food chain. Because of bioaccumulation, methylmercury levels in some species of fish and crabs can be more than 100,000 times greater than methylmercury levels in the surrounding water.

Limiting consumption of fish from the four East Texas lakes to the amounts recommended above, and not eating any fish or crabs from the closure area in Lavaca Bay, will protect everyone, including the most sensitive popuations: babies and developing fetuses. The methylmercury levels in the Lavaca Bay closure area and the East Texas lakes are not high enough to pose any danger to people who may be swimming, boating, skiing, or fishing, or to people who drink water from public water systems that use these lakes or reservoirs as a source.

. . . not eating any fish or crabs from the closure area in Lavaca Bay, will protect everyone . . . .

Human Health Hazards of Methylmercury

- It can damage the nervous system, the brain, and the kidneys in adults and children.
- It can permanently damage the brain or nervous system of a developing fetus or a nursing baby if the mother eats enough fish or crab containing methylmercury.
- It can be especially harmful for young children because more methylmercury passes into the brain of a young child than of an adult.

How does the methylmercury get into the water?

East Texas Lakes. Concern about mercury contamination in fish from East Texas lakes stemmed from recent discoveries of mercury in fish in Louisiana, Arkansas, and other southeastern states. In light of these discoveries, TDH, the Texas Natural Resource Conservation Commission, and the Texas Parks and Wildlife Department jointly collected seafood samples from East Texas lakes. After analyzing the mercury levels in these samples, the fishing advisory for East Texas lakes outlined above was issued.

Methylmercury in the fish and bottom sediments of most lakes and rivers in the Southeast U.S. probably does not come from one single point source. Mercury occurs naturally in the environment and is also released in the production of coal, chlorine, batteries, paint, electrical devices, paper, and in waste incineration. The conditions necessary for the uptake of methylmercury in fish include low pH and substantial organic matter in water or sediment. The pine forests across the Southeastern US, including those of East Texas, can cause higher acidity levels in soil and water. High acidity can accelerate the uptake of methylmercury in fish from these lakes.

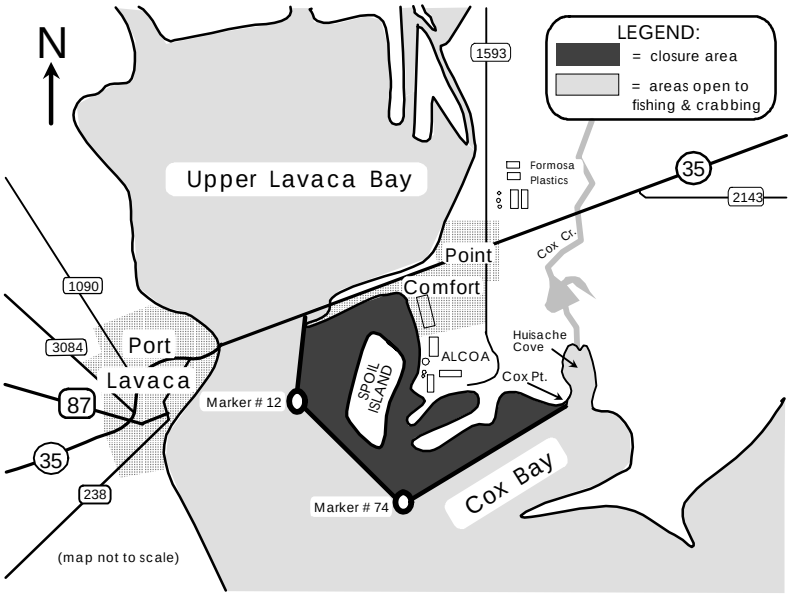
Lavaca Bay. From 1966 to 1970, a local manufacturing plant released wastewater containing mercury into Lavaca Bay. The mercury came from a chlor-alkali unit at the plant; this unit stopped operating in 1979. From 1970 through 1979, waste-water containing mercury was released to onshore lagoons. Sampling of fish and crabs from Lavaca Bay for more than 20 years has shown that fish and crabs with elevated levels of mercury are primarily found in the Lavaca Bay waters around the manufacturing plant. Although some fish with elevated methylmercury levels have been caught outside the closure area (see Figure 2), the chances of catching a fish or crab with a high level of mercury are significantly reduced once one leaves this area.

How does the methylmercury get into the fish?

Mercury released into the water settles to the bottom sediment where it can remain for many years. Microorganisms in these sediments can convert it to an organic form called methylmercury. Once in the organic form, tiny organisms and small

Continued ☞

Figure 2. Lavaca Bay Closure Area



fish can absorb or ingest it from the water and sediment. When larger fish eat small fish and other organisms that contain methylmercury, their bodies store most of it in muscle tissue, which is the edible fillet. The concentration of methylmercury increases as it passes from one species to the next up the food chain. Thus, higher methylmercury concentrations are generally found in crabs, older fish, and predatory fish. Shrimp and oysters do not bioaccumulate much methylmercury because of their relatively short life spans.

Those At Risk of Methylmercury Poisoning

Young children and fetuses are especially at risk for methylmercury poisoning. Methylmercury can be carried to an infant through breast milk and to a fetus through the placenta. Subsistence fishers and their families are also more at risk of exposure since their consumption level can be quite high. In addition, subsistence fishers may be less likely to know about advisory/closure information due to linguistic barriers or lack of access to media sources.

Residents in the East Texas Lakes and Lavaca Bay areas have been advised through news releases and news articles. In addition, warning signs are displayed near the Lavaca Bay closure area, and pamphlets have been distributed. However, since some people continue to fish or crab in the closure area of Lavaca Bay, it is possible that they may be eating the fish or crabs or feeding them to their families. While shrimp in Lavaca Bay are not affected by the closure, some shrimpers who drag their nets in the closure area may be keeping the fish or crabs caught in their shrimp nets and feeding these fish or crabs to their families.

. . . higher methylmercury concentrations are generally found in crabs, older fish, and predatory fish.

Symptoms of Methylmercury Exposure

Acute exposure. The neurologic effects of methylmercury ingestion have been well documented after many people were poisoned in Minimata, Japan in 1955 (where fish containing methylmercury were consumed) and in Iraq in 1956, 1960, and 1971-72 (where grain treated with a methylmercury fungicide was consumed). In adults, the earliest signs and symptoms are nonspecific and can take months to develop. These include ataxia; paresthesias; malaise; blurred vision; and impaired hearing, taste, and smell.

Young children and fetuses are especially at risk for methylmercury poisoning.

Chronic exposure. The signs and symptoms of chronic exposure to methylmercury include: a tingling sensation in the extremities; tunnel vision; impaired hearing, taste, and smell; incoordination; tremor; irritability; memory loss; depression; and insomnia. As with acute methylmercury exposure, the effects of chronic exposure may be delayed for months. Chronic exposure to methylmercury may result in permanent central nervous system damage.

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Laboratory Tests for Methylmercury Exposure

Consumption of contaminated seafood is the primary source of exposure to methylmercury in the general population.

Mercury can be measured in blood, urine, and hair. Since organic mercury is usually excreted through the biliary system, urine levels are not useful in evaluating methylmercury exposure. Mercury has a short half-life in blood (three days), so blood analysis should be performed shortly after an acute exposure. For acute high-level mercury exposure, whole blood is a valid indicator of body burden and brain concentration of methylmercury. A blood concentration of 5 micrograms per deciliter or greater is considered the threshold for symptoms of toxicity. Prior to submitting blood samples, contact the laboratory you intend to use to find out the specific procedure for drawing blood and sending in samples for analysis.

Consumption of contaminated seafood is the primary source of exposure to methylmercury in the general population. A mean value of 2 µg/dL in blood is the background level of mercury in persons who do not eat fish. By contrast, individuals eating approximately one 8-ounce meal per day of fish containing one part-per-million of methylmercury can have blood mercury levels as high as 200 µg/dL.

. . . chelation is contraindicated for methylmercury poisoning . . . .

A properly handled hair sample can provide evidence of methylmercury exposure because once it accumulates in hair, its concentration remains constant. However, hair mercury levels may be influenced by direct deposition of airborne mercury onto the hair, or by the use of certain hair treatments containing mercury compounds. In general, levels of mercury in hair are not useful in evaluating a patient clinically. In some cases, maternal hair samples have been used to provide an estimate of fetal methylmercury exposure.

Treatment and Management

Although the treatment of inorganic mercury poisoning usually involves the use of chelating agents (ie, Dimercaprol®) **chelation is contraindicated for methylmercury poisoning** because it has been shown to increase the concentration of methylmercury in the brain, and therefore exacerbates symptoms. There is no known antidote for patients poisoned with organic mercury. The source of methylmercury should be identified and removed from the diet and supportive care provided.

If you suspect that a patient is exhibiting signs of methylmercury poisoning, contact Richard Beauchamp, MD, at (512) 458-7268.

Additional Information Available

If you have questions, comments, or requests for materials regarding mercury levels in the water or seafood, call the TDH Seafood Safety Division at (512) 719-0215 or the TDH Health Risk Assessment and Toxicology Program at (512) 458-7269. A more detailed case study on mercury toxicity by the Agency for Toxic Substances and Disease Registry, US Public Health Service, is available from the TDH Health Risk Assessment and Toxicology Program. Pamphlets for the public on avoiding methylmercury exposure at Lavaca Bay are also available.

Prepared by Keith Hutchinson, MA, Nancy Ingram, Susan Prosperie, MS, RS, John Villanacci, Ph.D, and Lisa Williams, MS, TDH Health Risk Assessment and Toxicology Program

Errors in *Identification, Confirmation and Reporting of Notifiable Conditions* Booklet

The TDH booklet, *Identification, Confirmation, and Reporting of Notifiable Conditions*, (Stock No. 6-142) contains errors in the footnotes on page 12 and in the section of the chart regarding legionellosis on pages 8 and 9.

To make reporting easier, a statewide toll-free phone system was implemented in 1995. Health professionals all over the state can report notifiable conditions simply by dialing (800) 705-8868. In case of a public health emergency requiring immediate attention, this number may also be called after hours and on weekends. Please use (800) 705-8868 instead of the phone number listed under footnote "2" in "Methods of Reporting" in the booklet.

Below is the corrected legionellosis text. These sections are formatted so that they can be cut and pasted directly over the incorrect text in the booklet.

Corrected text for the legionellosis column entitled "Confirmatory Laboratory Tests":

Culture: Isolation of *Legionella pneumophila* from a clinical specimen.
Bioassay: A positive urine antigen test indicates current or recent infection.
Serology: A fourfold titer rise between acute and convalescent phase to ≥1:256.
Microscopic examination: DFA of sputum.

Corrected text for the legionellosis column entitled "Other Specimens Or Procedures Requested by TDH":

Urine antigen tests are not available at TDH. A single titer ≥1:256 suggests, but does not confirm, recent infection. Environmental samples are accepted only from health officials investigating outbreaks. Specimens for isolation must be iced but not frozen.

To order this booklet, request Stock No. 6-142 on the Texas Department of Health Requisition for Office Supplies/Forms/Literature (AG-30) form. For ordering instructions, or to obtain an AG-30 form, call (512) 458-7761. The above corrections will be made in an upcoming revision of the booklet.

Apology

DPN staff and the authors of "ACE Implicated in *Mycobacterium Abcessus* Infections" (DPN Vol. 56 No. 22) regret the following important omission in the acknowledgement section. Dr. Edward Goodman, Chief, Section of Infectious Diseases at the Presbyterian Hospital of Dallas and Dr. Eliane Haron diagnosed and reported the case written up in this article. We offer our sincere apologies for this oversight.

When important errors are identified in print copies of DPN, it is our policy to make corrections in the electronic copies of DPN available on the World Wide Web of the Internet and on the TDH Health People 2000 Bulletin Board. At this time, the above correction has been made (Vol. 56 No. 22, page 3.)

Dear Readers,

Disease Prevention News is the latest version of the TDH epidemiology newsletter first published in 1941. For over 55 years this newsletter has been available upon request and at no charge. However, a substantial increase in demand for print copies of *DPN* and the changing profile of our readership has made it necessary to change this policy so that the newsletter can continue to meet its equally long-standing purpose: to meet contemporary public health information needs of health professionals in Texas.

Recognizing accountability to the taxpayers who fund this effort, we strive to provide the highest quality newsletter at the lowest cost. TDH printing and mailing departments help reduce these costs through increased automation and updated equipment. The highest ratio of benefit to production cost is realized when readers access *DPN* on the World Wide Web of the Internet and on the TDH Healthy People 2000 Bulletin Board. Through electronic access, TDH printing and mailing costs are eliminated entirely, all *DPN* issues for the past two years are readily available, new issues are available more quickly, and they are still free of charge. Although these cost-control measures are effective, further action is still necessary.

An essential component of cost-effective public health efforts is a clearly defined target group. The primary *DPN* target audience has always been health professionals in Texas who are required by law to report adverse health conditions. This group includes primary care physicians, dentists, veterinarians, chiropractors, lab directors, and infection control practitioners. When the purpose of the TDH epidemiology newsletter was expanded to include primary prevention, the target audience was expanded as well. Other health professionals such as physician assistants, nurse practitioners, public health administrators, and school nurses were added. Unfortunately, our current budget is insufficient to provide DPN subscriptions to all members of the target group who need printed copies.

To address this problem, we have developed a plan to add partial recovery of printing and mailing costs to the cost reduction measures already in effect. Beginning in January 1996, all readers will be asked to help defray these costs. Individuals who are not in one of the target groups listed above will be required to pay a $10 subscription fee per year to receive print copies. (*DPN* availability on the World Wide Web and TDH Healthy People 2000 Bulletin Board remains free of charge.) Members of the *DPN* target audience will continue to receive complimentary subscriptions for printed issues upon request. However, all *DPN* readers will be encouraged to donate additional funds toward increasing readership in our target audience. All readers will also be asked to be more active in reducing costs by, for example, reporting mailing / distribution changes promptly.

We value all our readers and hope those required to pay a fee will understand the necessity of this policy change. Since the $10 subscription fee covers only a small portion of current production costs, we also hope that all readers will carefully evaluate *DPN*'s worth and donate additional funds accordingly.

By separate mail, further information will be sent to all current subscribers in early December. Included will be more detailed guidelines regarding who is eligible to receive complimentary print copies. Thank you for your continued support of our effort to provide health professionals in Texas with public health and preventive medicine information.

***DPN* Staff**

Sept/Oct 1996

Bimonthly Statistical Summary of Selected Reportable Diseases

	HHSC Region											Selected Texas Counties								This Period		Cumulative[1]	
Selected Diseases/Conditions	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**Bexar**	**Dallas**	**El Paso**	**Harris**	**Hidalgo**	**Nueces**	**Tarrant**	**Travis**	**1995**	**1996**	**1995**	**1996**
Sexually Transmitted Diseases[2]																							
Syphilis, primary and secondary	0	0	59	19	10	22	23	8	2	0	1	7	40	*0	*11	0	0	19	*1	326	144	1317	756
Congenital Syphilis	0	0	2	3	2	8	0	2	0	4	1	2	1	*4	*8	0	0	0	*0	74	22	181	142
Resistant Neisseria gonorrhoeae	0	0	0	0	0	0	1	0	0	0	0	0	0	*0	*0	0	0	0	*0	34	1	173	50
Enteric Diseases																							
Salmonellosis	18	12	20	6	5	12	43	37	4	9	25	22	1	9	0	0	10	6	22	700	**191	2027	1745
Shigellosis	3	4	21	2	2	12	34	38	2	17	134	32	0	17	0	2	106	3	13	878	**269	2511	1519
Hepatitis A	1	8	33	21	2	17	30	59	11	21	51	45	8	21	8	11	15	11	24	512	**254	2599	2377
Campylobacteriosis	16	3	5	3	0	3	18	6	0	4	5	5	2	4	2	0	4	2	13	154	63	873	626
Bacterial Infections																							
H. influenzae, invasive	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	1	32	5
Meningococcal, invasive	0	0	5	4	0	2	2	0	1	0	1	0	1	0	0	1	0	2	2	23	15	210	178
Lyme disease	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	73	58
Vibrio species	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	4	2	22	11
Other Conditions																							
AIDS[4]	16	9	146	19	27	281	90	88	17	23	53	82	104	23	264	23	10	15	53	636	874	3914	4181
Hepatitis B	3	11	12	3	6	3	6	9	0	5	6	8	0	5	2	0	2	7	5	210	**64	1077	872
Adult elevated blood lead levels	0	2	47	0	1	0	0	17	0	0	2	17	33	0	0	0	0	0	0	88	71	426	328
Animal rabies - total	1	2	3	6	1	8	27	8	3	3	0	5	3	2	2	0	0	0	18	74	61	551	322
Animal rabies - dogs and cats	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	77	23
Tuberculosis Disease[2]																							
Children (0-14 years)	1	0	3	2	0	6	1	2	0	1	1	2	2	1	3	0	0	1	0	33	17	150	118
Adults (>14 years)	6	5	65	12	7	115	26	35	4	21	46	29	40	20	89	15	3	13	14	333	342	1690	1562
Injuries[2]																							
Spinal Cord Injuries	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	1	47	19	299	254

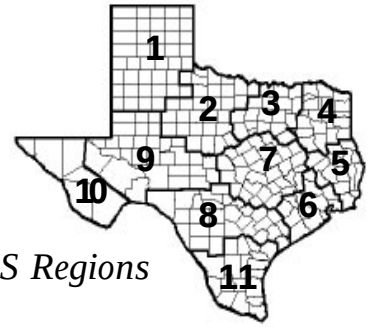
1. Cumulative to this month. 2. Data for the STD's, Tuberculosis, and spinal cord injuries are provided by date of report, rather than date of onset. 3. Voluntary reporting. 4. AIDS totals include reported cases from Texas Department of Corrections, which are not included in the regional and county totals. *October 1996 data not available. **Partial data.

Call 1-800-705-8868 to report

1994 POPULATION ESTIMATES

HHSC REGIONS							
1	751,822	4	931,379	7	1,844,240	10	684,580
2	530,445	5	680,001	8	1,919,939	11	1,499,969
3	4,724,463	6	4,184,163	9	537,820		
STATEWIDE TOTAL 18,286,827							

SELECTED TEXAS COUNTIES			
Bexar	1,268,744	Hidalgo	442,346
Dallas	1,987,680	Nueces	306,499
El Paso	658,498	Tarrant	1,314,613
Harris	3,004,010	Travis	605,804



DHHS Regions

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Vaccine-Preventable Disease Update
Reported cases with onset from 9/1/96-10/31/96

Condition	County	Number of Cases	Date of Onset	Condition	County	Number of Cases	Date of Onset
Measles	Harris	1	9/4	**Mumps**	Travis	1	10/6
		1	9/7				
		1	9/10	**Pertussis**	Bexar	1	9/20
						1	10/4
Mumps	Collin	1	9/9		Brazos	1	9/1
	Dallas	1	9/8		Cameron	1	9/1
	Hidalgo	1	9/6		Jackson	1	9/15
	Jackson	1	10/13		Travis	1	9/1

YTD	Measles	Mumps	Pertussis	Rubella
	49	**28**	**109**	***7***