disease prevention news

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Emerging and Reemerging Diseases in Texas

Every year more Texans are exposed to new and old health threats. Diseases unanticipated 20 years ago include cryptosporidiosis, dengue fever, hantavirus, and Escherichia coli *O157:H7 infections. Some strains of bacteria have become resistant to commonly used antibiotics and authorities caution that we may soon be entering a "postantibiotic" era in which many drugs used to fight infectious diseases no longer work. Additionally, populations are exposed to toxic substances in an ever-increasing variety of ways, raising the specter of adverse health effects.*

New diseases have emerged and will continue to emerge for a variety of increasingly common reasons. A few emerging diseases appear to be due to truly new agents (at least from the host's immunologic perspective). A great many more diseases appear to be due to agents that probably caused severe morbidity for decades to centuries, but which went unrecognized because they were either rare or because sophisticated diagnostic tests lay far in the future. Some emerging diseases are the product of behavioral change and some, the result of environmental changes. For many emerging diseases, a complex interplay of a number of the above factors is necessary for their emergence.

Although "the flu" may seem to be a rather mundane illness, it causes significant morbidity and mortality in any given year. For instance, in "normal" years there are about 20,000 influenza-associated deaths in the US; in bad years, as many as 40,000 Americans die because they catch "the flu." Influenza actually is, in effect, a **genetically new** disease, most years. Through elegant biochemical mechanisms called genetic "drift" and "shift," the influenza virus continually puts on a new protein coat that allows it to elude last year's antibodies. When "drift" occurs, the host's antibodies may partially recognize the virus and be somewhat protective. When an actual "shift" occurs, the coat is unrecognizable, and old antibodies are useless. Such a genetic shift occurred in the 1918 worldwide pandemic, which resulted in 500,000 deaths in the US alone and 20,000,000 deaths worldwide.

Historically, shifts occur every 10 to 12 years. The last shift occurred in 1968 with the Hong Kong flu; the next is overdue. Virus surveillance is particularly important in Texas because Texas has the rather dubious distinction of being a site from which new virus strains are often recognized. The 1996-1997 influenza vaccine contains an influenza virus strain first isolated in Texas--A/Texas/36/91-like (H1N1). Shifts must be recognized as soon as possible to allow time to change vaccine components and gear up vaccine production to prevent a pandemic.

Exposure to animals, animal products, or the insects they carry also leads to many diseases. The animals need not be "wild." Pet iguanas and African pygmy hedgehogs have recently been recognized as a source of *Salmonella*, much like pet turtles were in the 1970s. Hantavirus pulmonary syndrome, a more serious disease, was first recognized in the US in 1993 after unusual weather patterns contributed to a population explosion of deer mice in the Four Corners area of the US. Since then, more than 150 cases have been reported in the US; 8 of these have been from Texas.

Behavioral change contributes to emerging diseases. For instance, until around 1970 only two sexually transmitted diseases, syphilis and gonorrhea, were considered to be of importance in the US; 25 years later, the Centers for Disease Control and Prevention recognizes 22 sexually transmitted diseases. Over the last few years, users of "black-tar" heroin in Cali-

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fornia have accounted for a significant proportion of the adult botulism cases in the US; since this drug is widely used in Texas, it would not be surprising if similar cases were soon diagnosed in Texas. Societal changes are likewise evident in a variety of health statistic trends. For example, the leading cause of injury death in Texas for 1990-1994 was firearm-related, not motor vehicle crash-related, as it had been for decades.

Changing technologies in the areas of food processing, medical care, and industrial mechanization often contribute to emerging diseases. The ability to distribute food items nationwide expands the potential disease impact of an outbreak on the population. In October 1996 unpasteurized apple juice was linked to an *Escherichia coli* O157:H7 outbreak in 4 states.

The push to cut costs through outpatient surgery and home health care can bring with it unexpected problems, particularly in the area of infection control. In 1994, 65 cases of bloodstream sepsis occurred in patients of one Houston home health care agency. Patients with one particular "needleless infusion device" were four times as likely as those with other devices to develop sepsis.

In 1993, 45 of 346 patients who were operated on in a Fort Worth outpatient surgical center were found to be hepatitis C positive postoperatively. Patients who got fentanyl (a commonly used anesthetic agent) were more than ten times as likely as those who did not to be hepatitis C positive. The fentanyl had apparently been contaminated on-site by a scrub technician with a drug problem.

New industrial processes meant to save time and money often contribute to repetitive motion injuries. For instance, such injuries are common among people who process poultry and among people who use video display terminals.

Air travel and global markets also invite emerging diseases. Plague, a flea-borne disease harbored in rats, arose in Mongolia in 1346. Through international trade and travel, it arrived in Europe in 1347. Twenty million persons, or about one quarter of the world's population, died over the next four years. Not surprisingly, travel and commerce continue to bring old diseases to new worlds and visa versa, only much more quickly.

In 1990 and again in 1996, the Reston strain of Ebola was imported into South Texas in Philippine macaques. In 1995, 89 travelers returning to Texas were diagnosed with malaria; 22, with dengue fever; and 2, with cholera. *Aedes albopictus*--a possible mosquito vector for dengue, yellow fever, California encephalitis, Eastern equine encephalitis, and heartworm--first entered Texas through Houston in shiploads of Asian tires around 1985. This mosquito is now well established throughout a fourth of the US.

Numerous multistate outbreaks have been linked to widely distributed imported and domestic products. For instance, in 1989 mushrooms from China were linked to staphylococcal food poisoning and L-tryptophan from Japan was linked to eosinophilia myalgia syndrome; in 1994 ice cream was linked to thousands of *Salmonella* cases; and in 1996 raspberries from Guatemala were linked to *Cyclospora*.

Harmful chemical exposures, are likewise unaware of political boundaries. In 1996 a beauty cream made in Mexico was found to have dangerously high concentrations of mercury; dozens of persons in Texas appear to have been poisoned through use of this product.

One of the best-known examples of how **changes in land use** contribute to emerging diseases is that of Lyme disease. Reforestation and changes in animal control during the first half of the 20th century contributed to a burgeoning population of white-tail deer near the village of Lyme, Connecticut. In turn, the tick population that fed on these deer, and carried Lyme disease, exploded. First

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recognized in the mid-1970s, human Lyme disease how accounts for more than 10,000 cases reported annually in the US. Use of land for industrial purposes has sometimes resulted in contamination of the property with hazardous chemicals. In East Texas, an entire subdivision was located atop an abandoned creosoting plant; an investigation revealed that residents were more likely than nonresidents to have dermatological and fertility problems.

Finally, **cuts to traditional disease control programs** have led to reemergence of old diseases. Money shifted away from tuberculosis and sexually transmitted disease programs in the 1980s significantly contributed to increased rates for these diseases in the late 1980s.

Even when an emerging agent ultimately fails to be identified, the potential often warrants a response. In September 1996, the Department investigated a report of a possible human Ebola fatality. The young woman who died had recently arrived from Africa. Dozens of medical personnel were involved in a resuscitation attempt before the diagnosis was considered. Although the investigation turned out to be a "dry run," a prompt response was required of the Department. In this, as in many other instances, initial investigation must include diagnoses of viral, bacterial, and parasitic origins, as well as noninfectious possibilities such as chemical contaminants of foods or products.

In Texas, our vast geographic expanses and ecologic diversity, our many international ports of entry, and our ever growing ethnically diverse population make us especially vulnerable to new diseases. A thorough and propitious response to identified emergencies requires expanding the resource base for surveillance, investigations, and prevention and control.

This article includes descriptions of the investigations into emerging and reemerging infectious diseases conducted by local health departments and several TDH programs. Investigations into noncommunicable disease threats, as well are described as well.

Infectious Disease Investigations

For the following outbreaks, theTDH Microbiological Services Division provided laboratory analysis in support of Infectious Disease Epidemiology & Surveillance Division and Zoonosis Control Division investigations and/or at the request of local health departments and community-based hospitals.

Botulism, Foodborne. The largest botulism outbreak in Texas and the third largest in the US occurred in El Paso in April 1994: 24 cases were reported, with 19 patients requiring hospitalization. Botulism was associated with eating either a garlic and potato dip or an eggplant dip at one restaurant. *Clostridium botulinum* type A was isolated from the implicated food, and from 18 of 24 stools from individuals with probable/possible infections. PFGE analysis showed the isolates to be indistinguishable, affirming that the food caused the illness.

Dengue. In 1995, 7 locally acquired and 22 imported dengue cases were identified in Texas. The Medical Entomology Section and Rabies Arbovirus Section processed and examined approximately 3,800 mosquitoes from the Lower Rio Grande Valley for mosquito typing and presence of dengue virus. No specimens were positive for dengue. *Aedes aegypti* and *A. albopictus* were both present in fairly large numbers throughout the surveillance areas, with the latter species slightly more abundant. Identification of vector species facilitated proper local control measures. TDH Laboratory, ZCD, and Vector Control Division personnel made three on-site visits to consult with field personnel on mosquito collection and abatement procedures.

Cyclospora. Five common-source outbreaks reported in Texas in May 1996 were identified as the first foodborne

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Cyclospora outbreaks ever recognized. Over 80 cases reported statewide were associated with berry consumption. The Medical Parasitology Section analyzed 162 stool specimens; 44 patients infected with *Cyclospora* were identified.

Ebola. In April 1996 Ebola virus caused 2 monkey fatalities in one room of a primate quarantine facility in Alice, Texas; 2 other infected monkeys were identified when the animals in this room were euthanitized. Infection control measures prevented the transmission of virus to other monkeys and to the human caretakers at the facility.

***Escherichia coli* O157:H7, Foodborne.** During August and September 1994, 26 students at a Central Texas university experienced a diarrheal illness caused by *Escherichia coli* O157:H7, the organism associated with hemorrhagic colitis and hemolytic uremic syndrome (HUS). Eight cases were culture confirmed; 6 students were hospitalized. Pulsed field gel electrophoresis (PFGE) analysis of the 8 isolates showed they were highly related to one another and distinctly different from other isolates in Texas. Illness was associated with eating salad bar items in the university cafeterias.

Molecular surveillance of all *Escherichia coli* O157:H7 cases is an ongoing TDH project. In late fall 1995, the Microbiological Investigation Section became one of only four health department laboratories in the US to be awarded a competitive CDC grant to become a regional typing center for this organism.

Hantavirus. The Diagnostic Serology Section tested 1,058 rodent serum specimens in 1995 (60 positives) and 1588 in 1996 (34 positives). The Zoonosis Control Division collected these specimens from possible exposure locations of confirmed or suspected human cases.

Hepatitis C. In early 1995, IDEAS investigated reports of 46 hepatitis C virus infections that occurred among 346 patients who had had surgery at the same center during December 1991 through March 1992. Patients with infections were 10 times more likely than were noninfected patients to have received the anesthetic fentanyl. Apparently a scrub technician who was a hepatitis C carrier contaminated the implicated anesthetic.

Legionnaires' Disease. Legionnaires' disease was diagnosed in 1994 in 3 guests of one hotel; one person died. *Legionella pneumophila* was found growing in the shower heads of the patients' hotel rooms; decontamination efforts were ordered to prevent further infection. Possible outbreaks in a Kerrville long-term care facility and in Granbury were also investigated. Using polymerase chain reaction (PCR) technology the Consumer Microbiology Section analyzed 26 water samples in support of the Kerrville outbreak investigation. All samples were negative for *L. pneumophila*.

Meningococcal Disease. From March 1994 through September 1995, 32 cases of meningococcal meningitis occurred in Gregg County, Texas. The TDH Immunization Division provided over 45,000 vaccine doses to be used at numerous vaccination clinics. Nonvaccination in persons over 19 years of age delayed, but did not prevent, the vaccination efforts from ultimately halting the epidemic. Since 1994 the Microbiological Investigation Section has performed PFGE typing on over 200 *Neisseria meningitidis* group C strains.

Parasitic Infections. From late 1994 through March 1997, the TDH Medical Parasitology Section performed ova and parasite exams on 2,656 stool specimens from refugees: 1,709 specimens were positive; 986 with more than one species. Many of these parasites were "nonpathogens" often found in our nonrefugee population. The most commonly found pathogenic or potentially pathogenic parasites found in this investigation were as follows: *Blastocystis hominis*, 1,218; hookworm, 293; *Trichurus*

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*trichiur*a, 246; *Ascaris lumbricoides*, 198; *Giardia lamblia*, 198; and *Entamoeba histolytica*, 128. This surveillance provides the physicians with information to treat their patients and prevent further transmission.

Plague. The Diagnostic Serology Section tested 2,189 rodent serum specimens in 1995 (17 positives) and 1,622 specimens in 1996 (5 positives). The Zoonosis Control Division collected these specimens as part of ongoing plague surveillance.

Rabies. The Rabies Arbovirus Section examined 9,881 animals in calendar year 1995 and 8,089 animals in 1996. Of these, 506 specimens were positive for rabies in 1995, and 299 were positive in 1996. The strain of rabies virus was determined for each positive rabies specimen by either antigenic typing with monoclonal antibodies or genetic typing by polymerase chain reaction (PCR). In 1995 the fox and coyote strains of rabies predominated, with 210 fox virus and 128 coyote isolates. There were 73 skunk isolates, 64 Mexican freetail bat isolates, and a number of minor types. In 1996 the number of fox virus isolates decreased to 94, and the number of coyote virus isolates decreased to only 18. Skunk and bat rabies isolates continued as in 1995, with 87 skunk virus isolates and 69 freetail bat virus isolates. The remaining isolates were a mixture of minor types.

***Salmonella agona*.** A laboratorian noticed an increase of *Salmonella agona* isolates from a wide area of Central Texas. Further investigation linked 20 cases from different Central Texas communities to improperly prepared beef jerky. The implicated beef jerky yielded the same strain of *Salmonella agona* seen in the human cases. Molecular typing results of the bacteria identified a common source outbreak before the outbreaks was recognized in the community.

Sepsis Associated With Intravenous Therapy. From May 1994 to October 1994, 65 blood stream infections in patients receiving at-home intravenous therapy were reported in Houston. Patients with needleless devices who showered were at risk for infection.

Staphylococcal "Infection." PFGE analysis of *Staphylococcus cohnii* subsp. *urealyticum* isolates identified a "pseudo-outbreak" at a Central Texas hospital. All isolates were indistinguishable as were bacteria isolated from blood pressure cuffs. This finding strongly suggested contamination of the blood cultures during phlebotomy.

Tuberculosis. From 1988 to 1992, 93 Texas cases of tuberculosis (TB) resistant to isoniazid and rifampin were reported. Compared with nonresistant TB, multidrug resistant TB was more likely to be found in persons under 40 years of age, in Hispanics, and in Texas-Mexico border county residents. The first reported tuberculosis outbreak in a Texas prison occurred in the first six months of 1994, when 14 inmates and 1 employee at the same facility developed TB. Failure to conduct annual TB evaluation of identified cases contributed to the outbreak.

Toxic Exposure Investigations

In 1994 and 1995, TDH responded to 580 requests that it investigate the potential health effects of documented exposures to harmful chemicals, or to evaluate the potential role of environmental exposures in clusters of diseases. Listed below are the 7 most labor-intensive epidemiologic or toxicologic investigations carried out during that time. To conduct and complete these investigations, the Bureau of Epidemiology developed and maintained partnerships with numerous local, state, and federal agencies; hospitals; laboratories; and various branches of the US military. These partners have provided the investigations with unique expertise and knowledge.

Aldicarb Poisoning. In December 1995 several members of a family in Ector County were hospitalized with classic

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pesticide poisoning symptoms; several patients were severely ill and were admitted to intensive care. They had eaten homemade fish soup found to contain granules of aldicarb (a highly toxic insecticide). The contamination source was never determined, but intentional poisoning was not ruled out.

Polychlorinated biphenols (PCBs). An exposure assessment study of congenital defects in South Texas, conducted by state and federal health officials, revealed that a fish caught in an irrigation system in Hidalgo County and intended for human consumption contained PCBs at levels greater than 400 parts per million. A follow-up investigation by the TDH Seafood Safety Division and the TDH Environmental Chemistry Division showed that one of several irrigation systems in the area was contaminated with PCB levels ranging from nondetectable to 24 ppm. TDH immediately issued a public health alert and a ban on consumption of fish from the Donna irrigation system.

Hazardous Waste. After Ellis County residents learned that cement kilns in the area were using hazardous waste as fuel, they became concerned about birth defects and a several other health problems. A variety of related investigations are ongoing.

Mercury Contamination. Decades of industrial pollution have contaminated the Calhoun County bays with mercury and resulted in a ban on fish and shellfish consumption. Consumption of fish and shellfish from this area can result in serious health problems including neurologic disease and birth defects. A federal SUPERFUND Hazardous Waste Site is located in Lavaca Bay.

An investigation into an unidentified source of human mercury poisoning in Texas led to the discovery that a beauty cream (Crema de Belleza Manning™) formulated and sold in Mexico contained toxic levels of mercury. The investigation has widened to other border states where additional cases have been identified. To date, 345 individuals have been identified as having used this cream; 77 of them reside in Texas. Investigation into both the Lavaca Bay SUPERFUND hazardous waste site and the beauty cream are ongoing.

Other Chemical Contaminants. Local concern over autoimmune diseases in Harris county led to a study of possible contamination of waterways and wells near the Brio SUPERFUND site. Further environmental and health studies are in progress to determine the various types of chemicals involved and the definitive source of contamination. Ingestion or absorption of the suspected contaminants can cause liver damage and increase risks for cancer.

Multiple Sclerosis (MS). A report of an excessive number of MS cases in persons who lived in a certain neighborhood in El Paso several decades ago has spurred an epidemiologic investigation. It is currently ongoing.

Nuclear Waste Contamination. The federal government operates a nuclear site in Carson County where concerns of excessive cancer, birth defects, autoimmune diseases, and other conditions have been reported. An assessment of true exposure, as well as an evaluation of the health status of nearby residents is under way.

Lead Exposure in Children. Sources of lead in residences of children with lead poisoning are investigated. Possible sources include vinyl mini-blinds and toys.

Prepared by the TDH Bureau of Epidemiology, the Bureau of Laboratories, and the Infectious Disease Epidemiology and Surveillance Division.

Jan/Feb 1997

Bimonthly Statistical Summary of Selected Reportable Diseas

	HHSC Region											Selected Texas Counties							
Selected Diseases/Conditions	1	2	3	4	5	6	7	8	9	10	11	Bexar	Dallas	El Paso	Harris	Hidalgo	Nueces	Tarrant	Travis
Sexually Transmitted Diseases[2]																			
Syphilis, primary and secondary	*0	0	*29	10	11	37	*3	1	0	*0	*2	1	*19	*0	25	0	*1	8	*1
Congenital Syphilis	*0	0	*0	0	0	12	*0	0	0	*0	*3	0	*0	*0	12	0	*0	0	*0
Resistant Neisseria gonorrhoeae	*0	1	*0	0	0	0	*0	0	0	*0	*0	0	*0	*0	0	0	*0	0	*0
Enteric Diseases																			
Salmonellosis	11	2	4	1	3	34	10	6	1	0	5	1	2	0	28	1	0	0	5
Shigellosis	1	5	5	5	1	43	11	16	3	0	47	4	0	0	40	0	0	1	6
Hepatitis A	10	4	74	20	3	23	22	30	12	27	102	5	49	27	6	44	18	4	11
Campylobacteriosis	3	0	4	1	4	6	11	4	1	1	8	1	1	1	2	1	4	2	8
Bacterial Infections																			
H. influenzae, invasive	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Meningococcal, invasive	0	0	11	3	1	2	8	1	1	0	2	0	4	0	0	0	1	3	6
Lyme disease	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Vibrio species	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Conditions																			
AIDS[4]	7	2	225	12	6	250	57	29	0	10	24	28	168	10	229	7	5	43	26
Hepatitis B	8	2	8	4	9	6	5	1	2	4	10	0	3	4	1	0	9	1	4
Adult elevated blood lead levels	1	0	36	0	4	1	2	28	0	0	0	27	22	0	1	0	0	0	2
Animal rabies - total	0	12	0	1	0	2	0	2	10	0	4	0	0	0	1	0	0	0	0
Animal rabies - dogs and cats	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Tuberculosis Disease[2]																			
Children (0-14 years)	0	0	4	2	0	5	2	2	0	1	1	1	1	0	4	1	0	3	2
Adults (>14 years)	1	4	36	6	4	101	14	14	5	11	6	6	23	10	90	2	0	7	9
Injuries[2]																			
Spinal Cord Injuries	0	0	16	0	0	2	1	3	1	0	0	0	1	0	1	0	0	8	0

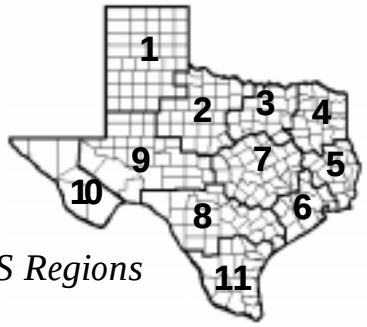
1. Cumulative to this month. 2. Data for the STD's, Tuberculosis, and spinal cord injuries are provided by date of report, rather than date of onset. 3. Voluntary reporting. 4. Al include reported cases from Texas Department of Corrections, which are not included in the regional and county totals. *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

Call 1-800-705-8868 to report

1996 POPULATION ESTIMATES

HHSC REGIONS							
1	760,526	4	947,431	7	1,902,211	10	722,076
2	532,854	5	683,583	8	1,983,995	11	1,574,446
3	4,968,610	6	4,325,854	9	548,963		
STATEWIDE TOTAL 18,950,549							

SELECTED TEXAS COUNTIES			
Bexar	1,308,092	Hidalgo	475,917
Dallas	2,053,859	Nueces	313,907
El Paso	694,878	Tarrant	1,390,298
Harris	3,099,066	Travis	620,718



DHHS Regions

Disease Prevention News (DPN)
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Vaccine-Preventable Disease Update
Reported cases with onset from 1/1/96-2/28/96

Condition	County	Number of Cases	Date of Onset	Condition	County	Number of Cases	Date of Onset
Mumps	Dallas	1	1/20	**Pertussis**	Bexar	1	1/1
		1	2/10			1	1/14
	Ector	1	2/9		Fort Bend	1	1/16
	Harris	1	2/2		Galveston	1	1/1
	Hockley	1	1/5		Henderson	1	1/12
	Lubbock	1	1/13				
	Travis	1	1/7				
	Victoria	1	1/28				

YTD	Measles	Mumps	Pertussis	Rubella
	0	**8**	**5**	**0**