Hepatitis Control Report

Winter 2001-2002
VOLUME 6, NUMBER 4

The world's only publication devoted solely to news on the control of viral hepatitis. Published quarterly since 1996.

Provided to public health and infectious disease professionals through educational grants from GlaxoSmithKline and Merck & Co., Inc.

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First-person account: How a rural hepatitis A outbreak brought home public health vulnerabilities

Editor's note: In December 2000, I was asked to help assess an outbreak of hepatitis A in Bell County, Texas. This is the story of that outbreak's effects on a small county health department and the ability of our public health system to respond to acute threats. –Frederic Shaw

(Bell County, Texas) – In early December 2000, Caroline Parker sat in her office at the Bell County Public Health District looking at a stack of hepatitis A case reports on her desk. She felt a creeping sense of dread. She had just reviewed the reports for the past five weeks, and they confirmed what she had suspected in November – that the county was in the midst of a nasty hepatitis A outbreak. She winced as she thought about the upcoming holiday season. It was not going to be restful.

Parker, a nurse practitioner with a master's degree in nursing, glanced again at the list of cases on her desk. She counted 17 cases for the month of November and 15 cases for the first week of December. A month ago, Parker had noticed a rise in cases, but now, with 15 in a single week, she was truly alarmed. In the past ten years, the county had never reported more than 40 cases of hepatitis A in a single year. Now, she had received nearly that many in just five weeks.

Parker struggled to find some answers. Why would hepatitis A attack this rural county of 238,000 people 80 miles north of Austin? Epidemics of any kind were unusual here. Could a restaurant or contaminated water supply be the source? Could it be a day care center? This was her first experience with a hepatitis A outbreak.

In November, Parker had begun interviewing the cases and calling in their household and sexual contacts for injections of immune globulin (IG) – to prevent secondary spread of the virus. She and her staff had begun asking each patient whether they worked in food service, because, as Parker knew, a sick food handler could have major ramifications for the community.

It was a lot of work, and she was destined to do most of it herself. As director of nursing at the county health department, Parker had 12 other nurses working under her, but their time was devoted entirely to staffing medical clinics – prenatal, family planning, immunization, STDs, and others. These were the bread and butter of the department. Epidemic investigations were not in anybody's job description, and no one at the department had any training in it.

Parker's boss, Wayne Farrell, the county public health director, also felt stymied. As an experienced sanitarian with a master's degree, he knew the county should pounce on the outbreak. But Farrell was in a bind. The county's $3.7 million health budget

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was devoted almost entirely to providing clinical services. Farrell's contracts with the Texas Department of Health (TDH) provided 75% of his budget. Most of that money was federal (the WIC program alone accounted for $1.6 million) and was dedicated to providing specific medical services. Of the remaining 25% of the budget, nearly all was devoted to paying salaries for environmental health inspectors. Farrell had no budget for epidemiology or disease investigations. If he took nurses away from the medical clinics to track hepatitis A cases, even briefly, he would not reach the quotas required in his TDH contracts.

Parker called TDH's regional office and spoke to Diane Romnes, a disease surveillance specialist. Romnes, eager to assist, provided advice on the collection of data. But she had no previous experience in hepatitis outbreaks, and, as the only disease surveillance specialist in a large region, she did not have time to provide hands-on help.

Romnes called TDH's infectious disease unit in Austin and relayed details of the epidemic. They offered technical advice, but they, too, could not provide personnel. The unit employed just a small handful of specialists to keep track of all infectious diseases in Texas' 20 million people. The masters-level epidemiologist who usually handled hepatitis A had just left TDH for another job. There were a few other epidemiologists within the unit, but they were working on more pressing problems – meningitis, bloodborne pathogens, arboviral diseases, bioterrorism preparedness – and they could not be reassigned.

Cases were coming in at a rate of 15 per week, equating to a short-term incidence rate of over 300 per 100,000 person-years. If that rate held up for very long, I knew it would constitute a serious public health problem.

When Dr. Kate Hendricks, the director of the TDH infectious disease unit, heard about the Bell County outbreak, she called me. I was working at TDH as the assistant commissioner for policy and planning. My work did not include infectious diseases, but Kate knew I had worked at the CDC Hepatitis Branch in the 1980s and had remained active in the field. I also had a lot of experience in investigating hepatitis A outbreaks. Glad for a change of pace, I was happy to look at the Bell County outbreak.

I drove up to Bell County and met with Parker, Romnes, the district's sanitarian, George Highsmith, and Dr. David Lindzey, a local physician who served as the "health authority" for the county, meaning that he was legally empowered to take official public health actions. Lindzey is a popular internist with a bustling practice at the local medical center. He works with the county on a part-time basis. Like the majority of Texas physicians working as local health authorities, he has no training in public health or disease investigation.

Seated around a table in the department's small conference room, we reviewed what was known about the epidemic so far. Cases were coming in at a rate of 15 per week, equating to a short-term incidence rate of over 300 per 100,000 person-years. If that rate held up for very long, I knew it would constitute a serious public health problem. Parker and her staff had tried to fit in some work on the outbreak between medical

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ISSN: 1091-8930

Figure 1
Hepatitis A rate by age group, Bell County Texas, September 2000 to October 2001

clinics, but lacking time, training, and experience, they had not been able to do much analysis.

I told the group intermediate-rate communitywide hepatitis A outbreaks in adults are very common in the U.S. I had seen dozens of them, most associated with drug abuse, particularly with methamphetamine.

Nearly all the cases had been reported from the county's two hospital laboratories, and all were serologically confirmed. Most of the cases were in adults age 25 to 45. Sixty percent were male. They were scattered over several ZIP codes, mostly in lower-income parts of the county. Suspecting a common source, Parker and her staff had interviewed many patients by telephone, asking about restaurant attendance. But they had found no commonalities.

Using Parker's line listing, I sketched an epidemic curve. The onset dates of the cases were spread out over six weeks, essentially ruling out a common source. I realized that this was a classical communitywide outbreak of hepatitis A. In CDC parlance, it would be called "intermediate-rate" (see the latest ACIP recommendations on hepatitis A in *MMWR* 1999;48[No. RR-12]).

I told the group what I knew about intermediate-rate communitywide outbreaks of hepatitis A in adults. These outbreaks were very common in the U.S. I had seen dozens of them – in Oregon, Washington, California, and across the Midwest. Most were associated with drug abuse, particularly with methamphetamine, although a few were associated with male homosexual activity.

There was no apparent connection to gay men. I asked about drug abuse. Parker and her staff had viewed drug abuse mainly as associated with hepatitis B and C, and they had not inquired much about it. Anecdotally, however, Parker said she knew many of the cases were drug abusers.

I told them how notoriously difficult communitywide outbreaks are to manage.

Parker asked what they could do to stop the outbreak. I told them how notoriously difficult communitywide outbreaks are to manage. Widespread administration of IG can reduce the secondary attack rate in households, but it does not affect the overall course of the outbreak.

I explained that some health departments have tried to control these outbreaks using mass administration of hepatitis A vaccine. One department, in Spokane, Washington, may have succeeded in 1998 (see the *HCR*, Spring 1999 issue). But, CDC has always emphasized that vaccinating drug abusers and other high-risk adults is extremely difficult (for a review of adult communitywide outbreaks, see the *HCR*,

Winter 1997-98 issue). Even if they can be accessed, they usually have no health insurance or ability to buy vaccine. Free federal vaccine is available for eligible children in these outbreaks, but no funding mechanism exists for vaccinating adults.

Without funding and personnel, a mass vaccination campaign was out of the question for Bell County. Their only options were to continue using IG to prevent secondary spread of the virus, to emphasize handwashing, and to educate physicians and the public about the disease. The worst thing about these outbreaks, I told them, is that they could last up to three years. I wished I could have offered them better news.

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Over the ensuing months, I spoke to Parker occasionally on the telephone, but my regular work at TDH kept me away from the outbreak. In November 2001, however, I returned to Bell County to learn about the final course of the epidemic and its effects on the department and the community.

The outbreak peaked in December 2000 and early January 2001, and then gradually faded away (see figure 1 on page 3). From a peak of 247 per 100,000 person-years (49 cases) in December, the incidence rate fell gradually to 10 per 100,000 person-years (2 cases) in August. It continued to be based mainly in adults (see figure 2 on page 4).

The connection between the epidemic and drug abuse remained anecdotal – it had been difficult to collect systematic information on this from cases. Parker continues to believe, however, that many patients were using drugs, especially methamphetamine, or had connections to the drug-abusing community. The county jail reported several cases in drug abusers.

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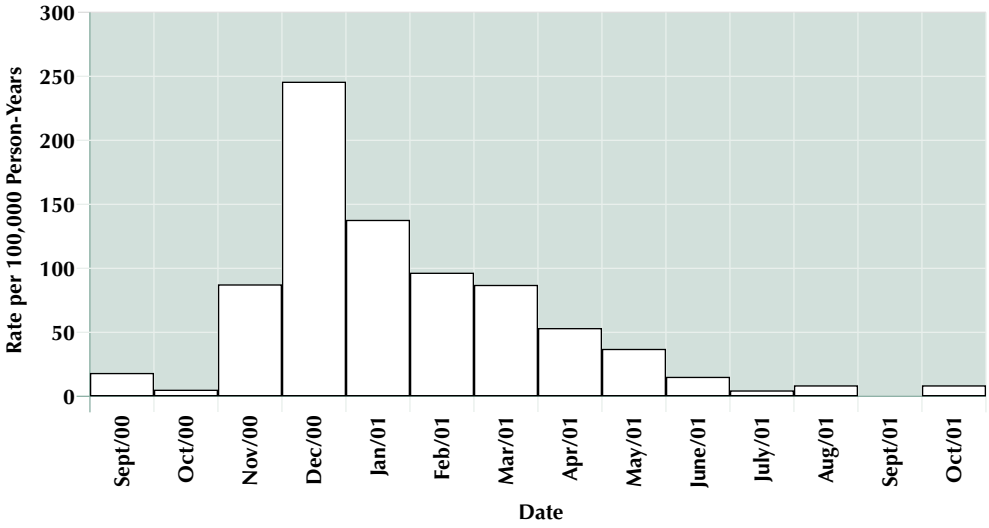
Any possible connection between the outbreak and drug abuse was politically sensitive. After my visit to Bell County, Lindzey sent a letter to all local physicians alerting them to the outbreak and explaining that the virus was spreading through person-to-person contact. He did not mention drug abuse, he said, because he did not want to stigmatize people who were ill with the disease. "The association with drug use was not hard and fast. I was afraid that someone with the disease would automatically be seen as a drug abuser." This can happen easily in a small community, he said. "The important thing was to educate without alarming," Lindzey said, "to draw attention without stigmatizing. That's the tightrope we had to walk."

Figure 2
Cases of hepatitis A by month, Bell County Texas, September 2000 to October 2001



The economic effects of the of the outbreak are impossible to judge without a formal study, but Parker believes they were substantial. Many patients were hospitalized or lost weeks of work because of illness. Other people lost wages because they had to stay home to care for sick husbands, children, or other family members. Over 100 case contacts received IG purchased by the county or TDH because they could not afford to get IG from private physicians, Parker said.

While Parker and her staff worked overtime trying to call cases and give IG to contacts, they also had to keep up their duties in the department's medical clinics. No one, nurses or anyone else, could devote a majority of his or her time to the outbreak.

Many of the patients lived in poor conditions. Parker described visiting a patient's home (some of the facts have been changed to preserve anonymity): "She was a little girl lying on the bed, five years old, sick and jaundiced. The family had no phone. The house had broken windows. There was almost no furniture in the house, and very little food. The mother worked in a hospital and her husband worked as a driver. The mother had to stay home to take care of the little girl, and her employer would not let her back to work until she had gotten a few weeks past her IG shot. They were just surviving."

While Parker and her staff worked overtime trying to call cases and give IG to contacts, they also had to keep up their duties in the department's medical clinics. No one, nurses or anyone else, could devote a majority of his or her time to the outbreak. Visiting cases at home was almost impossible, Parker said. "We had to do it by phone, or we sent certified letters."

Farrell said the outbreak brought home the vulnerabilities of the public health system in Texas (and most other states). The public health system has evolved into providing medical care, not providing public health, he said. "We're under the gun at the clinics. We have to meet the numbers (the quota of patients) or we lose our extremely limited funding. Almost all our money is categorical. One hundred percent of our nurses' salaries are paid through categorical grants from TDH. You can't take that money and divert it into disease investigations. It all goes back to the way the system is designed."

"There is a great need for trained epidemiologists to assist in outbreaks. There are very few at the local level and very few at the state level."

Wayne Farrell
Director
Bell County, TX
Health District

"There is a great need for trained epidemiologists to assist in outbreaks," Farrell said. "There are very few at the local level and very few at the state level. We don't have the personnel. It's a big problem."

As I look back on the outbreak, it is clear to me that Farrell is right. He is one of many who have observed that, at local health departments, population-based public health functions are often crowded out by personal medical services. In its landmark 1988 report, *The Future of Public Health*, the Institute of Medicine noted "the tension caused by attempting to provide personal medical services without at the same time depriving other public health functions of an appropriate share of scarce funds…" (p. 109). This outbreak showed the real-life effects of that tension.

This outbreak also illustrates a specific vulnerability in our local public health infrastructure, the insufficient supply of people who have the time and expertise to investigate outbreaks. This is not just a Texas problem; it is a national problem. Thankfully, this outbreak was not lethal and, even with the best epidemiologic investigation and analysis, may not have been very amenable to intervention. This time, the public health vulnerabilities it evinced did not result in grave harm to the public. That might not hold true for another time, place, and disease. ■

Editor's note: Thanks to Caroline Parker, Wayne Farrell, David Lindzey, and George Highsmith for their help in preparing this article.

As polemic continues over thimerosal, ACIP sets new policy in response to IOM report

(Atlanta) Oct 18 – The Institute of Medicine (IOM) has concluded that "the evidence is inadequate to accept or reject a causal relationship between exposure to thimerosal from vaccines and the neurodevelopmental disorders of autism, ADHD, and speech or language delay," although a causal relationship is "biologically plausible." The institute released its conclusions in a 122-page report released October 1.

A report from the Institute of Medicine said the evidence is inadequate to accept or reject a causal relationship between exposure to thimerosal from vaccines and neurodevelopmental disorders.

Thimerosal is an ethylmercury-containing preservative that was used in some U.S. childhood vaccines from the 1930s until last year. A controversy erupted in July 1999 when a researcher at FDA discovered that children receiving recommended immunizations could be exposed to a level of mercury that exceeded a federal guideline (for ongoing coverage of the thimerosal controversy, see the HCR, Summer 1999 and subsequent issues).

U.S. children are, generally, no longer being exposed to thimerosal. Thimerosal-free hepatitis B vaccine became available in September 1999, and FDA approved a thimerosal-free diphtheria-tetanus-acellular pertussis (DTaP) vaccine in March 2001. Even so, the IOM was asked "to resolve whether the past presence of thimerosal in some vaccines could have cause neurodevelopmental problems in some children."

In its report, the IOM recommended the use of "thimerosal-free DTaP, Hib, [and] hepatitis B vaccines in the United States, despite the fact that there might be remaining supplies of thimerosal-containing vaccine available." At the October 17, 2001 meeting of the federal Advisory Committee on Immunization Practices (ACIP), some observers interpreted this to mean an immediate switch to thimerosal-free vaccines, even before all supplies of thimerosal-containing vaccines could be exhausted. Dean Mason, a vaccine specialist at the National Immunization Program, said a recent survey conducted by CDC showed that 5.5% of childhood vaccine doses in stock at provider clinics and offices still contain thimerosal. For monovalent hepatitis B vaccine, 4.6% of doses contain thimerosal, he said.

After an overnight drafting session by a working group, ACIP adopted a statement noting that the IOM report found "no compelling evidence of harm caused by low levels of thimerosal in vaccines" and that the risk from thimerosal was "only theoretical.

A CDC survey showed that 4.6% of childhood monovalent hepatitis B vaccine doses in provider clinics and offices still contained thimerosal.

The ACIP statement continued:

> When the goal to remove thimerosal from vaccines as rapidly as possible was set in 1999, there was an implicit preference for using vaccines which at that time did not contain thimerosal…. The AAFP, AAP, ACIP, and the PHS deliberately chose at that time and on subsequent occasions not to make this implicit preference an explicit one. This was done out of concern not to give the mistaken impression that vaccines with thimerosal were being judged less safe than vaccines without thimerosal.

With the release of the IOM report, however, the committee decided to make the "implicit" preference for thimerosal-free vaccines explicit. The committee decided this, it said, "to avoid any further public confusion" and to successfully conclude the nation's transition to thimerosal-free vaccines.

ACIP members were concerned that an abrupt recommendation to use only thimerosal-free vaccines could cause immunization delays for some children.

The committee said, therefore, that its preference for thimerosal-free vaccines would be phased in over three months.

Meanwhile, debate continues over whether the thimerosal issue was handled appropriately two years ago by the AAP and CDC. Two prominent pediatric vaccine experts, Dr. Paul Offit (an ACIP member) and Dr. Stanley Plotkin, have roundly criticized the AAP's 1999 decision to recommend postponing the birth dose of hepatitis B vaccine until age six months for children of hepatitis B surface antigen negative mothers. Offit has said the decision was "flawed because it elevated a theoretical risk above an actual risk." Plotkin called the decision "a model of how not to reach public health decisions" (*JAMA*, April 26, 2000).

The AAP 1999 recommendation caused a dramatic reduction in the number of infants who receive the birth dose of hepatitis B vaccine in U.S. hospitals.

The AAP recommendation caused a dramatic reduction in the number of infants who receive the birth dose in U.S. hospitals. In October 2001, ACIP responded to this problem by expressly recommending, for the first time, that all U.S. infants receive the birth dose of hepatitis B vaccine (see the *HCR*, Fall 2001 issue).

Commenting this year in the journal, *Pediatrics* (May 2001), two pediatricians from the University of Chicago, Drs. John Seal and Robert Daum, renewed criticism of the AAP's 1999 decision, asking, "What happened to *primum non nocere*?" (first, do no harm – a tenet of the Hippocratic Oath). They wrote, "it was probably unnecessary to recommend a delay in initiating the HBV series with such haste," and pointed out that "there was no evidence of harm caused by doses of thimerosal found in vaccines."

But Dr. Neal Halsey, a vaccine safety expert at Johns Hopkins and the principal proponent of the AAP decision, and his colleague, Dr. Lynn Goldman, responded in a subsequent editorial (*Pediatrics*, August 2001) that *primum non nocere* was "too simplistic." Halsey defended the AAP's actions, arguing that the risk from thimerosal was not merely hypothetical and that "the AAP and the USPHS had a responsibility to … provide guidance regarding the reduction of exposures from thimerosal." ■

Hepatitis control notes:

World's first mass vaccination campaign against hepatitis B is a winner

In 1984, Taiwan became the first nation in the world to universally vaccinate children against hepatitis B virus (HBV) infection. Judging by recent data from that country, the program has been a huge success.

In an article published in the *Annals of Internal Medicine* by Dr. Yen-Hsuan Ni and colleagues (2001;135:796-800), in the 15 years after Taiwan began its program of routine childhood vaccination, the prevalence of hepatitis B surface antigen (HBsAg) among persons younger than 15 years of age decreased dramatically – from 9.8% in 1984 to 0.7% in 1999.

In an accompanying editorial, Dr. Miriam Alter, a CDC research epidemiologist, said, in the United States, "transmission of HBV will not be eliminated for decades" unless there is a nationwide program to vaccinate adults at increased risk for the infection. Most HBV transmission and morbidity occurs among older adolescents and young adults, she wrote, but "vaccine is rarely offered in settings that provide health care to adults." ■

Final thoughts from the *HCR*

As we announced in our last issue, after six years, 24 issues, and 100,000 words of news on the control of viral hepatitis, the *Hepatitis Control Report* ends with this issue.

The *Hepatitis Control Report* ceases publication with this issue.

Our reasons for cessation are twofold. First, our sense of independence and balance always dictated that we be a multi-sponsored publication – this underscored that we were not editorially biased to a specific sponsor. With a commitment from only our first sponsor for next year, we could not go forward. Second, our editor and writer, Dr. Frederic Shaw, has accepted a new job at CDC, where he will not be able to continue writing for the *HCR*.

We hope the *HCR* has had a beneficial effect on viral hepatitis control. Over the years, we have heard from readers and hepatitis experts around the country that our publication was indeed helpful.

In six years, we received only one negative letter, from an infectious disease chairman in Texas, who accused us of being a tout for our sponsors. He was mistaken. Our sponsors, GlaxoSmithKline and Merck, never saw the publication nor knew its contents before they received their copies in the mail. And they never once pressured us, even slightly, to run a story or a slant. We are grateful to them for six years of support.

The original idea for the publication came from our observation that people who work every day in viral hepatitis control want and need current news from their field. We believe they need to know not only what is happening, but why it is happening. Our goal was to report the "stories behind the stories" of viral hepatitis control, from CDC policy development to hepatitis C lookback to hepatitis A in frozen strawberries. We hope we succeeded, and we hope the idea that animated the *Hepatitis Control Report* will survive and grow in our absence.

Frederic E. Shaw, MD, JD, Writer-editor
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