HIV-Related Tuberculosis in a Transgender Network—Baltimore, Maryland, and New York City Area, 1998-2000

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DURING JUNE-AUGUST 1998, THE TUBERCULOSIS (TB) Control Program of the Baltimore City Health Department (BCHD) identified four cases of TB among young black men. Three of these men also had human immunodeficiency virus (HIV) infection. The four reported belonging to a social network of transgender persons (i.e., persons who identify with or express a gender and/or sex different from their biologic sex). By October 1998, test results on Mycobacterium tuberculosis isolates from the four men demonstrated a matching 11-band DNA fingerprint pattern, suggesting that these cases were epidemiologically linked. This report describes the public health investigation of these TB case-patients to identify contacts in Baltimore and the New York City area (NYC); the findings suggest that an interstate outbreak of TB has occurred within a social network that includes transgender persons.

Network Investigation

The four patients were identified as men who have sex with men (MSM) and belonged to a transgender social network. Some network members dressed as women and participated in dance and fashion competitions known as “balls.” These social networks include “houses” (i.e., a guild providing a social framework for young MSM and transgender persons) that exist in many large U.S. cities (house leader, personal communication, 2000). All four also were commercial sex workers.

An additional 22 TB patients were identified and linked to this cluster through interviews, provider and hospital referrals, and contact investigations. Twenty-four of the 26 cases were culture-confirmed, and DNA fingerprinting of 23 isolates demonstrated a matching fingerprint pattern. All isolates were susceptible to first-line anti-TB drugs (e.g., isoniazid and rifampicin). Of the 26 case-patients, 24 were U.S.-born, and 25 were black. The median age was 24 years (range: 20-47 years) and 22 (89%) were men. Sixteen case-patients (62%) were known to have HIV infection or acquired immunodeficiency syndrome (AIDS) when TB was diagnosed.

Baltimore, Maryland

Among the 15 male case-patients in Baltimore, 13 (87%) were epidemiologically linked; 11 (73%) were members of a house; eight (73%) belonged to House A. The index case-patient (patient 1) was a 24-year-old transgender man and a member of House A. Patients 4 and 14 were roommates of patient 1. Patients 6 and 8 shared living accommodations. Despite having isolates with matching fingerprints, patients 18 and 23 had no epidemiologic link to other patients in the outbreak and reported not being MSM (both were HIV-negative). Patient 20 was an HIV-positive man who has sex with men, was not a member of a house, and reported contact with commercial sex workers. DNA fingerprint results are pending for patient 25, a contact of patient 1. The four female patients included an outreach worker (patient 5) who had contact with two case-patients, a physician (patient 10) who spent approximately 1 hour with patient 1 administering medical care, a friend (patient 15) of several House A members, and the biologic mother (patient 16) of patient 11.

Patient 0 had TB diagnosed in the Maryland corrections system in April 1997. He had been incarcerated since May 1996. Patient 0 was not associated with this outbreak until early 1999 when the fingerprint of his isolate was found to match the outbreak strain. During the 2-year period before incarceration, patient 0 lived with patient 11 and frequented balls in Baltimore and NYC.

During BCHD investigations of 105 contacts of these TB patients, 14 persons were named as contacts by 12 infectious TB case-patients. To reach additional persons who may have had contact with infectious persons, a profile of the social network was developed by BCHD and included any history of membership in a house, attendance at particular nightclubs or balls, or cross-dressing. An additional 91 contacts were identified through visits for home-based anti-TB therapy, two location-based screenings at a nightclub, and referrals from HIV clinics. Among all 105 social network contacts, 96 (91%) had a tuberculin skin test (TST), 65 (68%) tests were read, and 24 (37%) were TST-positive. Six of 19 (32%) Baltimore case-patients were detected through the social network. Because one infectious patient traveled with a community marching band, TST screening was offered to all band members. Screening of 83 band members resulted in a TST-positive rate of 7%, significantly lower (p < 0.01) than in the social network screening. These investigations identified 37 contacts (including 14 TST-negative, HIV-positive contacts) as candidates for treatment for latent TB infection, which was initiated in 24 (65%).

New York City Area

Because of the travel by some of the Baltimore case-patients, transmission of the
outbreak strain was suspected in NYC. Patients 9 and 22 had resided for a short time in Baltimore before TB was diagnosed. Identified by a Baltimore case-patient, patient 22 regularly associated with House A members from Baltimore and NYC and participated in balls. Because of the two NYC-diagnosed and reported cases, in late 1999, CDC conducted DNA fingerprint analysis on M tuberculosis isolates from 1998 and 1999 NYC cases among HIV-positive black males aged 15-35 years. Four of 37 (11%) typed isolates matched the Baltimore strain (patients 2, 3, 19, and 21). Interviews of the patients revealed that all four were house members and participated in balls, and all except patient 21 traveled to Baltimore to attend balls.

Patient 24 was from Jersey City, New Jersey, and was linked to this outbreak because M tuberculosis isolates from all TB cases in New Jersey were fingerprint typed through the National TB Genotyping and Surveillance Network. The patient died before the investigation. Medical record review and interviews with relatives indicated the man was transgender and made frequent trips to Baltimore. Five of the seven TB patients identified in NYC were HIV-positive, and three have died.

The findings in this report are subject to at least two limitations. First, the total number of persons within this transgender social network is unknown; therefore, the extent of transmission cannot be determined. Second, although matching DNA fingerprints of M tuberculosis isolates obtained from different patients strongly suggest common chains of transmission, conclusions should not be drawn in the absence of sufficient epidemiologic data. Despite routine DNA fingerprinting of all M tuberculosis isolates within Maryland and New Jersey, with the exception of patients 18 and 23, this particular 11-band fingerprint pattern has been observed only in persons associated with this social network. Epidemiologic links for patients 18 and 23 were not established.

This outbreak strain was detected in 13 (14%) of the 96 culture-confirmed TB cases reported in Baltimore during June 1998-December 1999, and 10 (67%) of 15 culture-confirmed cases reported among U.S.-born black males aged 15-35 years during this period. Frequent travel and social network links identified among the Baltimore and NYC cases have raised concern that this strain of M tuberculosis may be circulating in other cities among young, mobile, transgender persons with HIV infection. One house leader estimated that there are at least 35 houses in major east coast cities. However, three of the more recent Baltimore patients associated with this outbreak did not acknowledge being transgender or affiliating with a house, raising the possibility that transmission may be occurring beyond the transgender community. CDC is working with TB control staff in Baltimore, Boston, NYC, Philadelphia, Washington, D.C., and Atlanta to determine whether additional TB cases are linked to this outbreak. Health-care providers should report cases to local TB control programs. Health departments may contact CDC for technical assistance at (404) 639-8117.

REFERENCES

Escherichia coli O111:H8 Outbreak Among Teenage Campers—Texas, 1999

IN JUNE 1999, THE TARRANT COUNTY Health Department reported to the Texas Department of Health (TDH) that a group of teenagers attending a cheerleading camp during June 9–11 became ill with nausea, vomiting, severe abdominal cramps, and diarrhea, some of which was bloody. Two teenagers were hospitalized with hemolytic uremic syndrome (HUS), and two others underwent appendectomies. Routine stool cultures from eight ill persons failed to yield a pathogen. Stools subsequently were sent to laboratories at the Texas Department of Health and CDC, where Escherichia coli O111:H8 was isolated from two specimens. This report summarizes the investigation of this outbreak.

To identify additional cases, surveillance for non-O157 Shiga toxin-producing E coli (STEC) illnesses in Texas was enhanced by alerting all local health departments, hospitals, clinical laboratories, and physicians about the outbreak. A cohort study of all campers attending the 3-day camp was conducted to identify the source of the outbreak and to collect data describing the clinical illness. Illness was defined as either diarrhea (three or more loose stools during any 24-hour period) accompanied by abdominal cramps or bloody diarrhea alone, occurring within 14 days after the start of the camp. Campers were interviewed for demographic information, medical histories, and symptoms and about their food and beverage consumption during the camp. Sanitarians inspected the cafeteria where meals were prepared and served to campers and the plumbing system in the dormitory where campers resided. Foodhandlers and other kitchen staff were interviewed about food preparation practices, menus, and the delivery schedules and suppliers for food items served to campers. Foodhandlers submitted stool specimens and rectal swabs for testing. Several food items from the cafeteria were cultured.

Of the 650 campers composing the cohort, 521 (80%) were interviewed. Of these, 58 (11%) had illnesses that met the case definition. The median age of the 58 ill persons was 16 years (range: 12–53 years), and 95% were female. The median length of illness was 5 days; four (7%) persons were hospitalized. Two persons developed HUS. In addition to diarrhea, reported symptoms included abdominal cramping (100%), nausea (62%), headache (56%), vomiting (38%), bloody diarrhea (37%), and fever with a median temperature of 100°F (38°C) (29%).

Illnesses peaked on the third and final day of camp. Illnesses with bloody diarrhea peaked on the day after the camp ended. No campers reported having a diarrheal illness or contact with a person with diarrhea during the 2 weeks before the start of camp.

One meal (supper on the first day of camp) and 21 other exposures were significantly associated with risk for developing illness. Of these 21 exposures, 19 were specific food items from among 202 foods and beverages served in the cafeteria during the camp and two were more general exposures. Only the two general exposures were significantly and independently associated with illness: consuming any ice from large trash can-style lined barrels that the camp provided in the dormitory lobby for filling water bottles (73% of ill persons versus 43% of nonill persons; adjusted odds ratio [AOR] = 3.4; 95% confidence interval [CI] = 1.8–6.3; p = 0.0001) and eating any salad from the cafeteria salad bar on at least one occasion (93% of ill persons versus 79% of nonill persons; AOR = 3.5; 95% CI = 1.4–11.8; p = 0.02).

Inspection of the camp’s water systems showed no evidence of plumbing cross-connections or failures that might have led to exposures to contaminated water or waste. Coliform testing of ice from the ice machines used to fill the barrels was negative. Campers reported dipping their drink containers and arms, hands, and heads into the ice. They also reported observing floating debris in the ice barrels. Inspection of the cafeteria and kitchen indicated that kitchen staff may have improperly followed cooking times and temperatures recommendations when preparing meals.

The laboratory investigation of stools specimens submitted by 11 ill persons yielded E coli O111:H8 from two specimens. Three enrichment broths prepared from these 11 specimens had detectable Shiga toxin when screened with a commercial enzyme immunoassay (EIA). Two of these three EIA-positive stool specimens yielded colonies of Shiga toxin-producing E coli, which were serotyped as E coli O111:H8. Both isolates contained gene sequences for Shiga toxins 1 and 2 by polymerase chain reaction. E coli O157:H7 was not isolated from any camper, foodhandler, or food or water sample. Samples of the implicated ice and salad items served during the camp were not available for testing.

CDC Editorial Note: This was the first community outbreak of infections attributable to Shiga toxin-producing E coli O111 reported in the United States. The findings of the investigation suggest a point-source outbreak. Although primary infection from eating a contaminated salad item and then secondary spread through the barrel ice is a plausible hypothesis, the original source of contamination and its means of spread are unknown.

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Identification of non-O157 STEC requires techniques not used routinely by clinical laboratories. In this outbreak, a commercially available EIA kit was used to detect and isolate STEC in stool specimens; isolates were then serotyped at CDC.

STEC cause illness in otherwise healthy persons, including severe abdominal cramping (sometimes confused for appendicitis), bloody diarrhea, and HUS. E coli O111 was the second most common non-O157 STEC (after E coli O26) isolated from specimens submitted to CDC for serotyping during 1983-1998 and among isolates from persons with diarrhea collected for an ongoing survey in Minnesota initiated in 1995 (Minnesota Department of Public Health, unpublished data, 2000). STEC cause an estimated 110,000 illnesses each year in the United States, of which greater than or equal to 30% may be attributable to non-O157 serotypes such as O111; the burden of disease attributable to non-O157 STEC is unknown.

Most STEC outbreaks in North America have resulted from infection with E coli O157. A household cluster of E coli O111 infection was reported in 1990 from Ohio, 2 and outbreaks have occurred in Australia, Europe, and Japan. 3, 7 Despite investigations involving large numbers of persons in well-defined settings, the vehicle of transmission has been epidemiologically implicated and microbiologically confirmed in only one 1995 outbreak in South Australia, which was attributable to mett wurst, a dried fermented sausage. 3

As demonstrated by this outbreak, a commercially available kit could be used to screen stool specimens for Shiga toxin and potential STEC. However, culturing and serotyping the causative organism is critical to identify and better understand these emerging pathogens. To facilitate diagnosis of STEC infections, clinicians should inform health departments about clusters of suspected illnesses that could be attributable to STEC (e.g., bloody diarrhea and HUS). Clinical laboratories should screen stool specimens from persons with either bloody diarrhea or HUS for STEC, routinely or when E coli O157 is not isolated, and attempt to isolate STEC from stools that are positive by the screening test and refer isolates to public health laboratories for serotyping. States should consider adding STEC infections to their notifiable disease lists.

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ferred negative evaluations of the public health system. Respondents also were asked whether sufficient resources were being dedicated to public health; 65% said that the United States should do more to protect public health. When asked to compare public health as a spending priority with several other key programs, most said public health was more deserving of additional funds than building roads and highways (80%), missile defense (73%), and cutting taxes (63%). Only education was viewed as a greater priority for additional resources (24%).

When asked about environmental factors (e.g., pollution) and their relation to public health, 85% said they believed that environmental factors are important determinants of disease and health problems. Of these, 38% considered environmental factors very important.

Respondents were asked to indicate how much impact environmental problems have on the public health. Most respondents believed that environmental factors play an important role in causing certain diseases. Sinus and allergy problems (54%), childhood asthma (54%), childhood cancer (39%), colds and influenza (35%), and birth defects (36%) were the health problems seen as most likely resulting from environmental factors.

Respondents were given nine environmental issues and asked what impact each had on the population's health (a great deal, some, not too much, not at all, or don't know). Contaminated drinking water (58%), toxic waste (56%), air pollution (53%), foods contaminated with bacteria (53%), and pesticides in foods (47%) were considered to have the greatest impact.

The findings in the survey indicate that most registered voters believe the environment is an important determinant in maintaining good health. The identification of environmental health issues with public health may enable public health professionals to better inform the public about the importance of a population-based focus on disease prevention.

**REFERENCES**

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**Corporate Action to Reduce Air Pollution—Atlanta, Georgia, 1998-1999**

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GROUND-LEVEL OZONE, A COLORLESS GAS, is a major constituent of smog. Since the early 1980s, controlled studies have demonstrated that exposure to elevated levels of ozone reduces respiratory capacity in humans. In addition, ecologic analyses have indicated that daily emergency department visits for asthma exacerbations are elevated following days of high ozone pollution. The Partnership for a Smog-Free Georgia (PSG) is a state-sponsored program to reduce the number of days that ground-level ozone exceeds the national ambient air quality standard (NAAQS) in metropolitan Atlanta by providing federal and state subsidized commuting alternatives for local business employees. This report summarizes commuter data from three PSG partners to estimate reductions in emissions and monthly vehicle miles traveled that were associated with enrollment in PSG.

NAAQS for ground-level ozone is 0.12 parts per million during a 1-hour period. From May 1 through September 30, 1999, ambient ozone levels in Atlanta exceeded this standard on 24 days, maintaining the 13-county metropolitan-Atlanta region as an area of “serious” nonattainment of NAAQS. In December 1997, the Georgia governor's office issued an executive order requiring all state agencies to reduce single-occupancy vehicle commutes by at least 20% on days when NAAQS is expected to be exceeded. PSG was instituted during the summer of 1997 to help achieve this goal. Results of a study of 3 PSG partners were calculated using vehicle-miles-traveled formulas and emissions factors provided by the US Environmental Protection Agency.

Georgia Department of Transportation. On May 1, 1998, the Georgia Department of Transportation introduced a comprehensive smog-reduction program to its 1900 employees. Baseline rates of commuter behaviors were assessed in April 1998 by a departmentwide survey asking employees how they “usually” commuted to work during the preceding year. Commuting behaviors were then assessed as part of the daily log-in procedure at each employee's computer terminal. Before PSG program initiation on May 1, 91.4% of Georgia Department of Transportation employees reported that their “usual” method of commuting was in a single-occupancy...
vehicle. During this baseline period, employees commuted an estimated 1033 vehicle miles per month, volatile organic compound emissions were an estimated 393 pounds per 100 employees per month, and nitrogen oxide emissions were an estimated 351 pounds per 100 employees per month. During May-August 1999, the percentage of all daily commutes in a single-occupancy vehicle decreased to 73.6% (a relative decrease of 19%), and vehicle miles traveled and their associated emissions decreased 11%.

Georgia Board of Workers Compensation. The Georgia Board of Workers Compensation, which has 117 employees, became a PSG partner in May 1998. The agency conducted a baseline survey of their employees “usual” commuting behavior during March 1998. Beginning in May 1998, all employees completed a daily survey of commuting behavior. Most (62.1%) employees usually commuted using a single-occupancy vehicle before initiation of the PSG program. Before PSG implementation, Georgia Board of Workers Compensation employees commuted an estimated 799 miles per employee per month, emitted 303 pounds of volatile organic compounds per 100 employees per month and 272 pounds of nitrogen oxides per 100 employees per month. During May-July 1999, the percentage of all commutes in a single-occupancy vehicle was 44.9% (a relative decrease of 28%). In addition, PSG program implementation was associated with a monthly decrease of 145 vehicle miles traveled per employee per month and an estimated 18% decrease in emissions.

Georgia Power/Southern Company. Georgia Power/Southern Company has been conducting a prospective monthly survey of employee commuter behaviors since April 1997. During the baseline period of March-April 1998, an average of 587 (20%) of 2885 employees participated in the alternative commuting program. Following the repetition of seasonal promotional activities in April 1999, the average increased to 41.5% during May-July 1999 (a relative increase of 52%), and emissions were reduced 12%. To rule out any influence of seasonality on observed findings, participation rates for March-April 1999 were compared with those from March-April 1998. The employee participation rate increased 32%.

Employee commuting behaviors will be facilitated by a standardized approach to evaluation and by standard metrics to calculate vehicle miles traveled by PSG partners. These PSG partners may have achieved the 20% reduction in single-occupancy commute rates mandated by the Georgia governor’s office; however, how similar success can be achieved in a larger percentage of Atlanta’s workforce is unclear. PSG can be expanded to include a greater number of local businesses. However, half of all employees of the 3 PSG partners in this report are not participating in the alternative commuting programs, although the average distance from these PSG partners to the nearest mass transit station is less than 1 mile. Increases in alternative commute rates beyond those already achieved may be facilitated by programs that continue to make alternative commuting options viable and accessible to working populations.

Future interventions also need to target commuting behaviors other than those related to the daily commute to work. Atlanta residents drive approximately 100 million miles per day, but only 21% of all automobile trips occur between the home and the workplace. Industrial emissions and non-work-related behaviors (eg, noncommute driving, lawn-care practices, and gasoline and chemical solvent use) also contribute substantially to ground-level ozone and related health effects. Research is needed to evaluate whether employer-based programs like PSG also can reduce noncommute emissions among employee participants, their families, and co-workers. The integration of questions that incorporate day-to-day commuter behavior into state-based tracking surveys, such as the Behavioral Risk Factor Surveillance System, might provide an opportunity for this type of population-based program evaluation.

References

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