Late-Breaking Reports

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10:30 Late-Breaking Reports. Moderators: Douglas Hamilton and Bruce Bernard

10:35 Pig Brains, the Other White Matter: Risk Factors for a Novel Progressive Inflammatory Neuropathy Among Swine Abattoir Workers in the United States — 2007–2008. *Stacy Holzbauer*

10:45 Geospatial Mapping to Investigate a Tuberculosis Outbreak — South Carolina, 2005–2007. *Mitesh Desai*

10:55 Outbreak of Illness due to Oseltamivir-Resistant Influenza A in a Long-Term Care Facility, Illinois. *Nila Dharan*

11:05 Imported Measles Outbreak — San Diego, California, 2008. *David Sugerman*

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Pig Brains, the Other White Matter: Risk Factors for a Novel Progressive Inflammatory Neuropathy Among Swine Abattoir Workers in the United States — 2007–2008

S. Holzbauer, A. DeVries, J. Sejvar, C. Medus, C. Lexau, J. McQuiston, J. Adjemian, J. Harris, S. Recuenco, J. Howell, E. Belay, B. Buss, J. Gibbins, S. Brueck, K. Smith, R. Danila, R. Lynfield

Background: In October 2007, a cluster of patients with a novel neuropathy, termed progressive inflammatory neuropathy (PIN), was identified at a single swine abattoir (Plant A) in Minnesota. Patients all worked in the primary carcass processing area (warm-room); most processed severed heads (head-table). This investigation evaluated PIN risk factors to prevent additional cases.

Methods: A case-control study was conducted among Plant A workers. We defined a case as PIN evidenced by electrodiagnostic testing and symptoms of peripheral neuropathy. Two control groups were used: (1) a random selection of well warm-room workers and (2) all well head-table workers. We surveyed 26 U.S. swine abattoirs to identify cases and common processing techniques.

Results: We identified 10 cases at Plant A; illness onset occurred during November 2006–November 2007. Median age was 31 years (range=21–51 years); six were female. Case-patients were more likely than warm-room controls to work at the head-table (odds ratio [OR]=7.4; 95% confidence interval [CI]=1.39–43.84) and to remove brains or remove muscle from back of heads (back heads) (OR=16.0; 95% CI=1.88–167.68). Among head-table workers, case-patients remained more likely to remove brains or back heads (OR=8.0; 95% CI=1.17–59.39). Workers removed brains using compressed air that generated droplets and aerosolized brain tissue, exposing themselves and nearby workers. This technique was used in only two other abattoirs surveyed; four cases of PIN with illness onset during 2007 have been identified at both of these abattoirs in Indiana and Nebraska.

Conclusions: PIN appears to be associated with working closely with swine heads during postslaughter processing, and specifically with removing brains with compressed air. Three slaughterhouses using a similar technique have stopped brain removal. Investigation into an etiologic agent continues.

Key words: Minnesota; polyneuropathies; abattoirs

Geospatial Mapping to Investigate a Tuberculosis Outbreak — South Carolina, 2005–2007

Mitesh A. Desai, D. Harris, T. McKenna, S. Rabley, B. Rogers, P. Moonan, J. Oeltmann

Background: Contact investigation (CI) is a core element of tuberculosis (TB) control in the United States. In York County, South Carolina, 21 (50%) of 42 TB cases during 2005–2007 were associated with one genotype, suggesting ongoing transmission and the need to enhance the traditional name-based CI for outbreak control.

Methods: The outbreak investigation included interviews with patients and TB control staff, and review of medical records. Patients' and named contacts' home addresses were mapped using Geographic Information System technology. Geospatial analyses were conducted to explore the geographic determinants of TB transmission.

Results: Sixteen of 21 patients in this genotype cluster were adults, of whom 13 (81%) abused alcohol or illicit drugs. All adult cases were pulmonary, and 11 (69%) had acid-fast bacilli on sputum smear — both markers of infectiousness. Five (31%) adults had prior TB disease, of whom two (40%) received directly observed therapy, a mainstay of TB treatment. Although 14 (88%) adults could be epidemiologically linked, only five (31%) had previously named each other as contacts. Seventy-one (42%) of 168 named contacts had latent TB infection (LTBI). Interviews confirmed that the likely venue of transmission was a boarding house where substance abuse was highly prevalent. Geospatial mapping revealed that the boarding house coincided with the outbreak's geographic center, with 13 (62%) of 21 patients residing within 1 mile and 20 (95%) patients residing within 2 miles.

Conclusions: This outbreak was uninterrupted since 2005. Traditional name-based CI had failed largely due to patients' reluctance in naming contacts. Given the geographic clustering in this outbreak, we recommended targeted screening at the boarding house and other locations frequented by patients within 2 miles of the outbreak center.

Key words: tuberculosis; genotype; geographic information systems; disease outbreaks; South Carolina

Outbreak of Illness due to Oseltamivir-Resistant Influenza A in a Long-Term Care Facility, Illinois

Nila J. Dharan, M. Patton, A. Siston , M. Galle, J. Morita, E. Ramirez, T. Wallis, V. Deyde L. Gubareva, S. Klimov, J. Bresee, A. Fry

Background: Adamantanes and neuraminidase inhibitors (NAI) are the two classes of antivirals licensed for treatment and prophylaxis of influenza in the U.S. Since 2005, the NAIs have been the only agents recommended for use because of increases in adamantane-resistance. In 2006–2007, <1% of influenza A (H1N1) viruses were resistant to the NAI oseltamivir, but in 2007–2008, 8.7% were resistant. We describe the first outbreak of oseltamivir-resistant H1N1 in a long-term care facility.

Methods: We interviewed facility staff, performed chart abstraction, and established surveillance for new cases. A case-patient was defined as a resident of Facility A with a positive RT-PCR or rapid influenza test from January 20–February 8, 2008. Laboratory testing for antiviral resistance was performed.

Results: On January 27, three case-patients were identified on unit 1 of Facility A. Control measures included isolation and treatment of cases with oseltamivir, quarantine of all units and prophylaxis of all non-ill residents on affected units. Six additional case-patients were identified for a total of 9 (53%) among 17 residents on unit 1 and one case-patient was identified on unit 2. After February 1, no new case-patients were identified. All case-patients were infected with oseltamivir-resistant H1N1, the median age was 20.5 years and 83% were male. All had underlying medical conditions (100% neurologic, 33% pulmonary, 92% gastrointestinal), and 92% had received inactivated influenza vaccine. No case-patients were hospitalized and one with end-stage lung disease expired.

Conclusions: Oseltamivir-resistant H1N1 was easily transmitted among residents in Facility A despite previous hypotheses that such viruses would be of lower fitness. Despite drug resistance, rapid infection control and high resident vaccination rates may have contributed to the control of this outbreak.

Key words: oseltamivir; resistance; influenza; outbreak

Imported Measles Outbreak — San Diego, California, 2008

David E. Sugerman, A. Barskey, J. Tate, K. Waters-Montijo, J. Seward, S. Waterman

Background: Vaccination has eliminated measles, a highly contagious disease with serious complications including death, in the United States. However, imported cases can cause outbreaks among susceptible populations. On February 1, 2008, San Diego Immunizations Branch was notified of a confirmed measles case in an unvaccinated child aged 7 years who recently returned from Switzerland. An investigation and public health response was initiated.

Methods: To reduce measles transmission, we initiated active case finding and identification of contacts. Patients were isolated and contacts without evidence of immunity were vaccinated, offered immunoglobulin, or placed on voluntary quarantine.

Results: The index patient, with rash onset January 25, was unvaccinated because of personal belief exemption (PBE). Thirty-six (10%) of the 376 children in his school claimed PBEs. Eleven additional measles cases occurred during January 31–February 19, including the index patient's two siblings, five schoolmates, and four children (three aged <12 months) infected in the pediatrician's office on January 25. One infant was hospitalized for 2 days. Measles virus isolated from patients yielded the same viral genotype as the outbreak strain circulating in Switzerland, D5. Seventy-four unvaccinated children, who had been exposed to the 12 patients, were placed under voluntary home quarantine for 3 weeks.

Conclusions: PBE at a school and lack of early diagnosis combined with isolation precautions allowed unprotected persons to be infected with measles, although rapid public health response limited the outbreak to 12 cases. No cases occurred among vaccinated children. Measles-mumps-rubella vaccine protects against measles among U.S. residents at home and abroad. More stringent criteria allowing vaccine exemption should be considered for school entry. Isolation guidelines for highly infectious agents should be followed in clinical settings.

Key words: measles; outbreak; vaccination; personal belief exemption; isolation precaution

Investigation of Formaldehyde Levels in Occupied FEMA-Supplied Temporary Housing Units in Louisiana and Mississippi — December 2007–January 2008

Matthew W. Murphy, J. Lando, G. Noonan, J. Brunkard, S. Kieszak, M. Sutter, M. McGeehin

Background: In 2005, the Federal Emergency Management Agency (FEMA) provided disaster-related housing for those displaced from their homes due to Hurricanes Katrina and Rita. In 2006, some area physicians began reporting increases in upper respiratory symptoms in children living in FEMA-supplied temporary housing units (THUs). CDC was asked to investigate if FEMA THUs posed a potential public health risk from formaldehyde exposure, which can cause respiratory symptoms and nasal-pharyngeal cancer.

Methods: Five hundred and nineteen THUs were randomly sampled from the 46,970 occupied THUs identified in Louisiana and Mississippi in November 2007. We collected and tested an air sample from each THU for formaldehyde levels. The THUs were divided into 11 strata defined by type (travel trailer, park model, and mobile home) and brand for analysis of factors that could impact formaldehyde levels.

Results: Formaldehyde levels among all THUs in this study ranged from 3 parts per billion (ppb) to 590 ppb with a geometric mean of 77 ppb. There were statistically significant differences in formaldehyde levels between THU types ($p<0.01$). The geometric mean formaldehyde level was 81 ppb among travel trailers, 59 ppb among mobile homes, and 40 ppb among park models. Among travel trailers, formaldehyde levels varied significantly by brand. Brand A ($p<0.01$), Brand B ($p<0.01$), Brand C ($p<0.01$), and Brand D travel trailers ($p<0.03$) each had significantly higher levels of formaldehyde as compared to all other travel trailers.

Conclusions: Geometric mean formaldehyde levels in FEMA-supplied THUs were over 4 times that of traditional homes in the United States (17 ppb). To reduce potential public health impacts of formaldehyde exposure, CDC recommended that FEMA relocate THU occupants; FEMA is acting upon this recommendation.

Key words: formaldehyde; indoor air quality

Emergence of Ciprofloxacin-Resistant *Neisseria meningitidis* — North Dakota and Minnesota, 2007–2008

Henry M. Wu, B. Harcourt, S. Wei, C. Hatcher, R. Novak, X. Wang, B. Juni, D. Boxrud, J. Rainbow, S. Schmink, R. Mair, M. Theodore, M. Sander, T. Miller, K. Kruger, L. Mayer, A. Cohn, T. Clark, N. Messonnier, R. Lynfield

Background: Meningococcal Disease (MD) is a medical and public health emergency. One in four cases results in death or permanent disability. Close contacts of case-patients are at 500–800-fold higher risk of acquiring MD and are recommended chemoprophylaxis. Ciprofloxacin is a chemoprophylaxis agent of choice due to high efficacy and single-dose administration. We describe the first occurrence of ciprofloxacin-resistant *Neisseria meningitidis* in North America.

Methods: The Minnesota and North Dakota Health Departments investigate clinically compatible illnesses and classify cases as confirmed if *N. meningitidis* is isolated in culture or probable if *N. meningitidis* DNA is detected by polymerase chain reaction. A pharyngeal swab survey for *N. meningitidis* carriage was conducted among social contacts of the most recent case and persons at affiliated institutions. Invasive and carriage isolates underwent antimicrobial susceptibility testing by broth microdilution (using Clinical and Laboratory Standards Institute guidelines) and E-test, and molecular characterization by multi-locus sequence typing (MLST).

Results: Three confirmed MD cases caused by ciprofloxacin-resistant *N. meningitidis* occurred in Minnesota and North Dakota from January 2007–January 2008, among 38 total cases in the same period. No epidemiologic links were found among the cases, although one occurred in a student at a childcare facility in which a probable MD case occurred three months prior. All four cases occurred in the same geographic region. *N. meningitidis* was isolated from 40 (7.5%) of 530 carriage survey participants; one was ciprofloxacin resistant. The four ciprofloxacin-resistant *N. meningitidis* isolates were indistinguishable by MLST.

Conclusions: Ciprofloxacin is no longer recommended for MD chemoprophylaxis in affected counties in Minnesota and North Dakota. Surveillance for the spread of ciprofloxacin-resistant *N. meningitidis* is ongoing. Evaluation of additional chemoprophylaxis agents is warranted.

Key words: *Neisseria meningitides*; ciprofloxacin; antimicrobial resistance

Atypical Presentation of Varicella-Zoster Virus Infection in a Family Cluster — Republic of Congo, August–September 2007

Adam MacNeil, M. Reynolds, K. Karem, O. Moundeli, J.-V. Mombouli, A. Jumaan, S. Schmid, I. Damon

Background: The monkeypox virus (MPXV) and varicella-zoster virus (VZV) both cause pustular-rash illnesses in humans. MPXV has greater pathogenicity, with case fatality rates up to 10%. While rashes caused by both viruses are similar in appearance, lesions are characteristically absent from the palms and soles of the hands and feet in VZV infection, a marked difference from MPXV infection, where lesions on the palms and soles occur in up to 76% of cases.

Methods: While investigating a suspected monkeypox outbreak in Likouala district, the Republic of Congo, we observed an infant with disseminated pustular lesions, including numerous lesions on the palms and soles. Based on family member interviews and case histories, a rash illness cluster occurred in the previous 6 weeks, affecting the mother, and three siblings. Illness onset dates indicated 3–4 serial transmissions. Lesion scars were observed on the palms and soles of the mother and two siblings.

Results: Lesion samples from the infant were positive for VZV and negative for MPXV by PCR. Viral genotyping indicated infection with VZV subtype E2, a subtype never before documented in central Africa. Sera from family members indicated recent VZV infection, based on VZV-avidity assay, and were orthopoxvirus-specific IgM negative, demonstrating absence of recent MPXV infection.

Conclusions: We documented transmission of VZV with palm and sole involvement in a monkeypox endemic area. The unusual rash manifestation may be a characteristic of the interaction between this VZV strain and the population, indicating that further clinical and virologic characterization of VZV in central Africa is warranted. Our observations suggest the need for additional guidelines to differentiate MPXV and VZV infections in regions of the world that these viruses co-circulate.

Junk in the Trunk: Acute Renal Failure Associated with Soft-Tissue Filler Injections — North Carolina, 2007

Zackary S. Moore, L. Terrado, M. Green, R. Langley, D. Campbell, B. Goode, P. Patel, M. Jhung, M. Sutter, J. Schier

Background: Serious adverse events, including deaths, have occurred after administration of soft-tissue filler injections (STFI) by unlicensed practitioners. On December 27, 2007, the North Carolina Division of Public Health was notified of three cases of acute renal failure (ARF) among residents of Illinois, Maryland, and Washington, DC, who had received STFI at a North Carolina facility (Facility A). We investigated to identify unrecognized cases and prevent additional adverse events.

Methods: Investigators interviewed the index patients and reviewed medical records. We inspected Facility A, interviewed the practitioner, and attempted to interview all persons who had received STFI at Facility A during 2007.

Results: The index patients were black women aged 26–42 years. Each had received injections of 600–1,000 mL of “silicone oil and saline” in the buttocks on December 8 and again on December 22. All three women experienced headache, nausea, and purple urine within 1 hour after the injections on December 22 and were hospitalized with ARF 1–4 days later. Laboratory and pathology investigations did not identify a specific etiology. Two patients required hemodialysis; both subsequently regained normal renal function. Investigators could not verify the injected products or their source. Five other persons were identified as having received STFI, all during November 17–December 18, 2007. One experienced pink urine transiently; none experienced ARF. The practitioner had no medical training or supervision. An order prohibiting the administration of injections at Facility A was issued on January 3, 2008.

Conclusions: These cases illustrate the dangers of STFI administered by unlicensed practitioners. Public health officials should investigate reports of adverse events associated with these injections and take all necessary actions to prevent additional injuries.

Key words: kidney failure, acute; cosmetic techniques; silicone oils; adverse effects; quackery