58th Annual EIS Conference

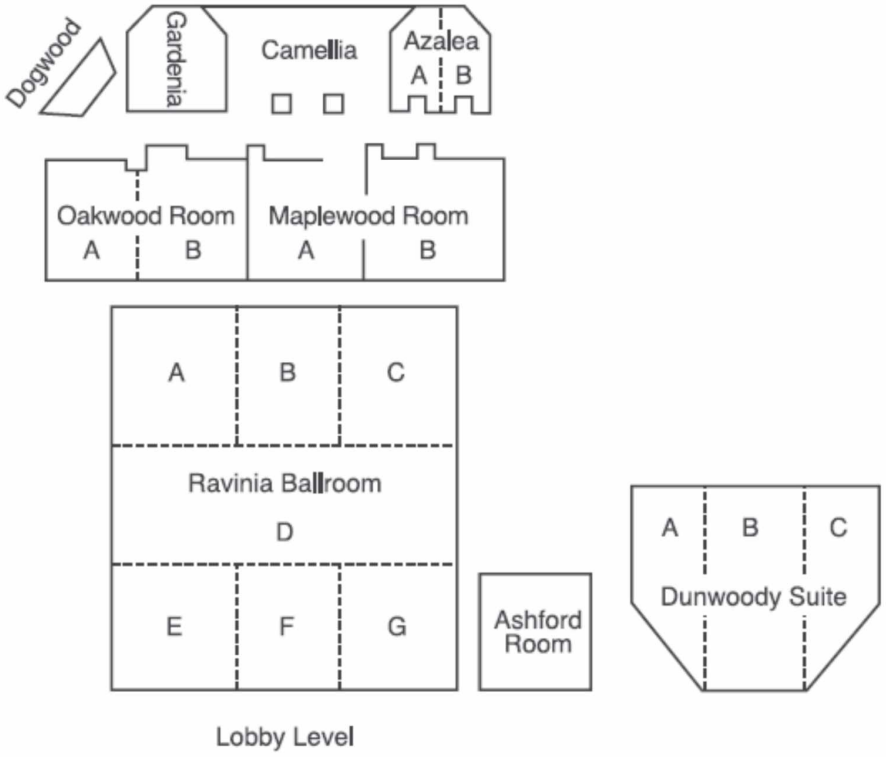
EPIDEMIC INTELLIGENCE SERVICE

APRIL 20–24, 2009 • CROWNE PLAZA HOTEL ATLANTA PERIMETER at RAVINIA

DEPARTMENT OF HEALTH & HUMAN SERVICES · USA

CDC

CENTERS FOR DISEASE CONTROL AND PREVENTION



CROWNE PLAZA HOTEL ATLANTA PERIMETER at RAVINIA

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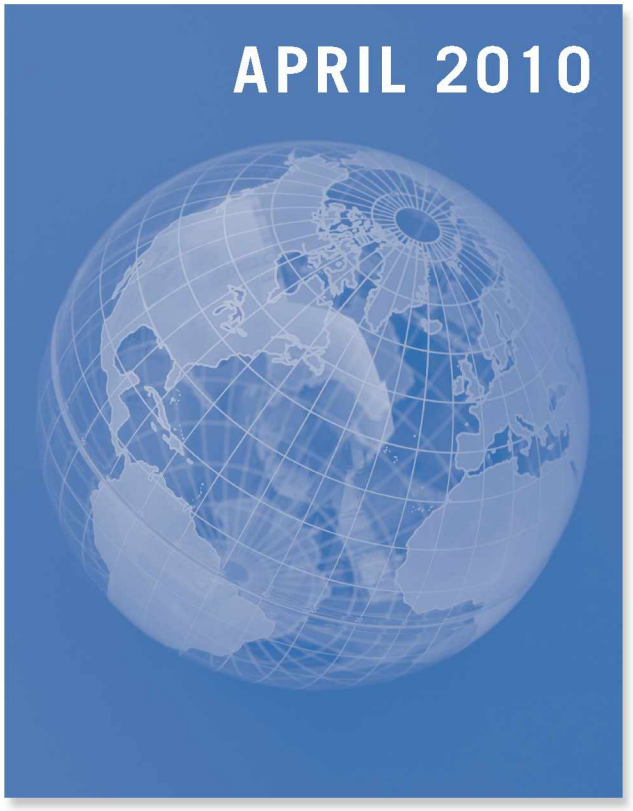
Mark Your Calendars!



59th Annual

Epidemic Intelligence Service (EIS)

Conference

April 19–23, 2010

Centers for Disease Control and Prevention

Atlanta, Georgia

Preface

Dear Friends of EIS:

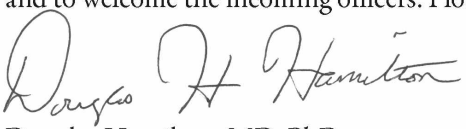
Welcome to the 58th annual Epidemic Intelligence Service (EIS) Conference. We are delighted that you are able to attend this conference, which highlights the professional activities of EIS officers. The scientific program this year includes 95 oral presentations and 30 poster presentations. In addition, your experience this week will be enriched by International Night, the EIS skit, the Prediction Run, special award presentations, and other activities that have long been a tradition at the conference. This year we saw a welcome increase in the number of Epi-Aids and officers participated in many high-profile investigations. In some ways, this has felt like the year of Salmonella because EISOs have played key roles in several prominent nationwide outbreaks (as I write this letter, we are being bombarded almost daily with new developments regarding a certain Georgia peanut processing plant). More officers have been able to get out into the field this year, and with these nationwide investigations (jalapeno peppers and peanuts), we have observed a growing collaboration with the CDC Director's Emergency Operations Center in the investigation of multistate outbreaks. You will hear all about these and many other interesting investigations in greater detail this week.

As always, we extend a special welcome to the incoming EISOs, members of the Class of 2009. This year, for the first time, we used an online application system, and it worked very well. The new system not only increased the numbers of applicants, but it gave us a much better feel for how many people are interested enough in the program to start the application process. In a typical year, we receive about 275 completed applications. This year, 710 applicants started the online application; 404 submitted the basic application packet; 333 submitted all of the required documentation; and we extended interview invitations to 201 candidates. Also this year, we used multiple professional and academic listservs to advertise the opportunity to apply. We also contacted directors of primary care medical residency programs to increase the number of physician applicants. As always, I believe that the strong applicant pool mostly results from efforts of our alumni, and word-of-mouth still seems to be our most effective recruiting tool.

This year's 84 red tags (incoming officers) are a select grou<of men and women with a broad array of interests and skills. Fifty-eight of the new officers are women (69%), and 13 are citizens of other nations (15%). The countries represented in this year's class are Australia, Azerbaijan, Cyprus, India, Indonesia, Jamaica, Kazakhstan, Lebanon (2), Nigeria, Romania, Taiwan, and the United Kingdom. Among the 44 U.S. citizens or permanent residents who supplied race/ethnicity data, 14 represent racial or ethnic minority groups (32%). We have 28 PhD-level scientists (33%), 46 physicians (55%), seven veterinarians (8%), and three nurses (4%). Five of the MDs also hold PhDs. Nine members of the class have accepted prematch assignments in state health departments.

This year, we will again be running concurrent oral sessions on Tuesday and Wednesday mornings, so please check your program book carefully. Several special sessions will also be included in this year's conference. Tuesday's lunchtime session is entitled "Development and a Six-Country Evaluation of United Nations High Commissioner for Refugees' Health Information System." A special session on Thursday at lunchtime is entitled "Elimination of Healthcare-Associated Infections — Role of State and Local Public Health Authorities." Finally, Friday's lunchtime session will focus on pandemic influenza.

The 2009 Conference provides you the opportunity to hear about many applications of epidemiology to public health and prevention by EIS officers. We welcome you to an exciting series of days and evenings in the EIS experience, an opportunity to learn, to meet old and new friends, and to welcome the incoming officers. I look forward to seeing you during the week.



Douglas Hamilton, MD, PhD
Director, Epidemic Intelligence Service
Career Development Division
Office of Workforce and Career Development

Program Committee

2009 EIS CONFERENCE • SCIENTIFIC PROGRAM COMMITTEE

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Ann Schmitz, National Center for Zoonotic, Vector-Borne, and Enteric Diseases
Lorraine Yeung, National Center on Birth Defects, and Developmental Disabilities

FRONT ROW, left to right, *Ann Schmitz, Nicole Flowers, Sheryl Lyss, Diana Bensyl, Dorothy Jones, Lorrraine Yeung, Susan Lukacs, Geoffrey Calvert*

BACK ROW, left to right, *Matt Breiding, Maryam Haddad, Manis Patel, Priti Patel, Tom Clark, Vinicius Antato, Eric Mintz*

Latebreaker Session Committee

Nicole Flowers	National Center for Chronic Disease Prevention and Health Promotion
Maryam Haddad	National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, Chair
Ann Schmitz	National Center for Zoonotic, Vector-Borne, and Enteric Diseases

The EIS Program gratefully acknowledges the invaluable assistance and cooperation of Creative Services, the Management Analysis and Services Office, and the editorial and support staff of all CDC administrative units participating in the 2009 EIS Conference

Program Production

Ron Edwards	EIS Program
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COLOR KEY NAME TAGS

Blue – EIS Alumni
Green – Current EIS Officers
Red – EIS Incoming Officers
Black – Conference Participants
Purple – Conference Staff
Light Blue Dot – Field EIS
Orange Dot – Recruiters
Pink Dot – Media

General Information

Purpose Statement

The primary purpose of the EIS Conference is to provide a forum for EIS officers to give scientific presentations (oral or poster), increase their knowledge of recent investigations and their significance to public health, and maintain and increase their skills in determining the appropriateness of epidemiological methods, presenting and interpreting results clearly and developing appropriate conclusions and recommendations.

Overall Conference Goals

- To provide a forum for EIS Officers and Alumni to engage in the scientific exchange of current epidemiologic topics.
- To highlight the breadth of epidemiologic investigations at CDC.
- To provide a venue for recruitment of EIS graduates into leadership positions at CDC and state and local departments of health.

Registration and Information

Staff will be available at the conference registration desk located in front of the Ravinia Ballroom on the main floor of the hotel. Check-in and on-site registration will be available from Monday–Friday, 7:30 a.m.–5:00 p.m.

At registration, you will receive your conference folder with a program book, general information, and your name badge. Please wear your conference badge at all times during the conference. Your name badge includes your code to access messages in the Communications Center. If you lose or misplace your name badge, the staff at the registration desk will assist you in securing a new one.

Conference staff will be wearing purple badges and will be available to assist if you need additional information.

NONSMOKING CONFERENCE: Smoking is not permitted in any of the conference sessions, hallways or meeting rooms.

CELLULAR PHONES AND PAGERS: As a courtesy to presenters and all meeting attendees, please turn off ringers on phones and pagers (or turn to silent) during conference sessions. Use of cellular phones is restricted to the meeting room foyers and public areas outside the meeting rooms.

Message Center Located in the Camellia Room, the Message Board System will handle messaging needs during this year's conference. Please check the large-screen monitors for messages. Messages can be accessed by using your registration numbers on your name badge.

Computers in the Message Center can also be used to access the internet for e-mail or the continuing education evaluation forms. Please limit your computer use to 10 minutes at a time, to allow other conference attendees an opportunity to use these services as well.

Speaker Ready-Room Located in the Dogwood Room, this room is available for presenters who need to make changes to their presentations. Three computers with PowerPoint software, re-writable CD-ROM drives, and a printer will be available from 8:00 a.m.–6:00 p.m. Monday–Thursday.

Exhibit Hall Monday–Thursday, 8:00 a.m.–5:00 p.m. in the Preconvene Area outside the Ravinia Ballroom. Check out what's going on at each of CDC's National Centers when you stop by their information tables.

2009 EIS Conference Program Schedule

MONDAY, APRIL 20, 2009

7:30 **REGISTRATION DESK OPENS**

8:15 **WELCOME AND CALL TO ORDER** ..... Ravinia Ballroom
Stephen B. Thacker, Director
Office of Workforce and Career Development

8:30 **SESSION A: BEST IN SHOW**
OPENING SESSION ..... Ravinia Ballroom
MODERATORS: ***Richard Besser*** and ***Stephen B. Thacker***

8:35 Unintentional Injury Prevention Practices Depicted in G- and PG-Rated Movies, 2003–2007. ***Jon Eric Tongren***

8:55 Rapid Screening for Aflatoxins in Maize — Eastern Kenya, 2006 and 2007. ***Yanique A. Redwood***

9:15 The Association Between Breastfeeding Duration and Maternal Weight Retention at 1 Year Postpartum Is Modified by Breastfeeding Intensity — United States, 2005–2007. ***Deborah L. Dee***

9:35 Are Two Better Than One — Did a Second Routine Dose of Measles Vaccine Hasten Measles Elimination in the Americas? ***Adrianne E. Sever***

9:55 Investigation of the First Case of Guillain-Barré Syndrome Associated with Consumption of Unpasteurized Milk — California, 2008 ***Amy E. Karon***

10:15 **BREAK**

10:45 **SESSION B: FRANKENSTEIN**
Transfusion, Transplants, and Implants ..... Ravinia Ballroom
MODERATOR: ***Elise Beltrami***

10:50 Transmission of Human Immunodeficiency Virus and Hepatitis C Virus from an Organ Donor to Four Transplant Recipients — Illinois, 2007–2008. ***Eloisa Llata***

11:10 Increased Recognition of Transfusion-Associated Cases of Babesia Infection — Wisconsin, 2008. ***Carrie F. Nielsen***

11:30 Reported Infections After Human Tissue Transplantation Before and After New Food and Drug Administration (FDA) Regulations, United States, 2001–2008. ***Tarun K. Mallick***

11:50 Outbreak of Rapidly Growing Mycobacterial Infections at an Ambulatory Plastic Surgery Center — California, 2007–2008. ***Amy E. Karon***

12:15 **LUNCH**

12:30 POSTER SESSION — *Meet the Authors in the Ravinia Ballroom. All posters presented during the conference will be on display Monday, 9:00a.m. through Friday, 12:00 p.m. The following authors will be present to discuss their studies on Monday, 12:30–1:30 p.m.*

POSTER SESSION 1: ANALYZE THIS

P1. Murine Manor: An Investigation of the Peridomestic Environment in Association with the Emergence of Murine Typhus in Austin, Texas, USA. ***Jennifer Adjemian***

P2. Treatment Outcomes of HIV-Infected Adults Enrolled in the National Antiretroviral Therapy Program — Mozambique, 2004–2007. ***Andrew F. Auld***

P3. How Severe Is the Blood Shortage? Blood Distribution in Georgetown, Guyana, November 2007. ***Sridhar V. Basavaraju***

P4. Probable Transmission of Norovirus Among Passengers During Air Travel — United States, 2008. ***Jennifer E. Cortes***

P5. Two Simultaneous Multidrug-Resistant Tuberculosis Outbreaks — Federated States of Micronesia, 2007–2008. ***Mitesh A. Desai***

P6. Results of a Pneumonia and Diarrhea Healthcare Utilization Survey — Egypt, 2008. ***Meredith Deutscher***

P7. Outbreak of *Carbapenem*-Resistant *Klebsiella pneumoniae* Associated with a Novel Carbapenemase Subtype — Puerto Rico, 2008. ***Christopher J. Gregory***

P8. Field Evaluation of Crystal VC® Rapid Dipstick Test for Cholera During a Cholera Outbreak in Guinea — Bissau. ***Julie R. Harris***

P9. *Escherichia coli* O157:H7 Infections Associated with a Youth Hunting Event — Tennessee, 2008. ***Jennifer K. MacFarquhar***

P10. A Slow and Steady Problem: Another Multistate Outbreak of Human *Salmonella* Infections Associated with Pet Turtle Exposure — United States, 2008. ***Karen P. Neil***

P11. Emergence of Murine Typhus — Austin, Travis County, Texas, 2008. ***Sharyn E. Parks***

P12. Designing HIV Prevention Programs for Persons Living with HIV — San Salvador, El Salvador, 2008. ***Neha S. Shah***

P13. Not Just Blowing Smoke! An Intervention To Increase Use of Clean-Burning Stoves and Reduce Indoor Air Pollution in Rural Kenya. ***Benjamin J. Silk***

P14. Factors Affecting Isolation of *Bordetella pertussis* — Hawaii, 2005. ***Meera V. Sreeivasan***

P15. Hunter-Acquired *Brucella suis* Infection — Pennsylvania, Florida, and South Carolina, 2008. ***Kendra E. Stauffer***

1:30 **SESSION C: ON DEADLY GROUND**

Environmental and Occupational Health ..... Ravinia Ballroom

MODERATOR: *Henry Falk*

1:35 Neighborhood Characteristics, Housing Development Type, and Mortality Among Public Housing Residents — New York City, 1999–2001. ***Hemanth P. Nair***

1:55 Comortality from Pneumoconioses and Mycoses — United States, 1974–2004. ***Yulia Y. Iossifova***

2:15 Maternal Residential Proximity to Traffic and Small for Gestational Age Births by Sex —Utah, 2000–2005. ***Renee M. Calanan***

2:35 Histoplasmosis Infections Associated with a Demolition Site — Iowa, 2008. ***Mary E. Fournier***

3:00 **BREAK**

3:15 **SESSION D: LITTLE RASCALS**

Children's Health ..... Ravinia Ballroom

MODERATOR: *Karen Steinberg*

3:20 Outbreak of *Escherichia coli* O157:H7 Infections at a Summer Camp Facility — Virginia, 2008. ***Katie M. Kurkjian***

3:40 Medication Overdoses Leading to Emergency Department Visits Among Children and Adolescents. ***Sarah F. Schillie***

4:00 Dental Disease in Rural Alaska Native Children, 2008: Characterization of a Health Disparity and Public Health Strategies for Prevention. ***Kathy K. Byrd***

4:20 Evaluation of Tuberculosis Screening Approaches Among HIV-Infected Children — Rwanda, 2008. ***Rinn Song***

4:40 Deviations from Normal Birth Weight and Autism Risk — California, 1989–2002. ***Jennifer L. Zipprich***

5:00 On the Horizon: Opportunities for Prevention of Pneumococcal Disease Among Children Under Age Two Years — United States. ***Jennifer B. Rosen***

5:30 **CONFERENCE SOCIAL** ..... Conference Preconvene Area

TUESDAY, APRIL 21, 2009

8:30 CONCURRENT SESSION E1: BREAKFAST CLUB

Food- and Waterborne Disease ..... Ravinia Ballroom

MODERATOR: *Ian Williams*

8:35 Multipathogen Waterborne Disease Outbreak Onboard a Boat — Chicago, 2008. ***Fadila Serdarevic***

8:55 Hemolytic Uremic Syndrome After an *Escherichia coli* O111 Outbreak — Oklahoma, 2008. ***Emily Piercefield***

9:15 Use of In-Person Interviews and a Household Level Study in a Complex, Multiple-Source *Salmonella* Serotype Saintpaul Outbreak — Southwestern United States, 2008. ***Amy L. Boore***

9:35 Trends in Listeriosis Incidence Among Persons 65 Years and Older, Foodborne Diseases Active Surveillance Network (FoodNet), United States, 1996–2007. ***Kashmira A. Date***

9:55 Outbreak of *Escherichia coli* O157 Associated with Raw Milk: Keeping the Point of Sale from Leaving the Farm — Connecticut, 2008. ***Alice Y. Guh***

8:30 CONCURRENT SESSION E2: BLACKBOARD JUNGLE

Public Health and Schools ..... Dunwoody Suites

MODERATOR: *Howell Wechsler*

8:35 Outbreak of Type A Foodborne Botulism in a Boarding School — Uganda, 2008. ***Melissa A. Viray***

8:55 Impact of School-Based Interventions on Physical Activity in Mexican Students Attending Public Primary Schools — Mexico City, 2006–2007. ***Nancy J. Aburto***

9:15 Do the Coughs Link? Investigation of a Pertussis Outbreak in a School — Omaha, Nebraska, September–December 2008. ***Cynthia G. Thomas***

9:35 Assessment of Washington State School-Based Youth Suicide Prevention Awareness Campaigns — 2006. ***Myduc L. Ta***

9:55 School Vending Machines: The Preferred Choice for Lunch? The Youth Physical Activity and Nutrition Survey — Florida, 2003. ***Sohyun Park***

10:15 BREAK

10:45 CONCURRENT SESSION F1: MAMMA MIA

Maternal and Child Health ..... Ravinia Ballroom

MODERATOR: *Wanda Barfield*

10:50 Is Increasing Use of Assisted Reproductive Technology Leading to Increased Rates of Low Birth Weight? — Massachusetts, 1997–2004. ***Naomi K. Tepper***

11:10 Early-Pregnancy Opioid Analgesic Treatment and Risk for Congenital Heart Defects — United States, 1997–2004. ***Cheryl S. Broussard***

11:30 Factors Associated with Smoking During Pregnancy, Maternal Outcome Monitoring System — Wyoming, 2003–2005. ***Stacey A. Anderson***

11:50 Length of Residence and Citizenship in Relation to Ever Having Breastfed — United States, 1999–2006. ***Ghasi S. Phillips***

10:45 CONCURRENT SESSION F2: GONE WITH THE WIND

Respiratory Infections..... Dunwoody Suites

MODERATORS: ***Beth Bell*** and ***Larry Anderson***

10:50 Antiviral Therapy Among Adults Hospitalized with Influenza — United States, 2005–2007. ***Saumil S. Doshi***

11:10 Field Estimate of Vaccine Effectiveness for the Adolescent Pertussis Booster — Saint Croix, 2007. ***Stanley C. Wei***

11:30 Back to Basics: Barriers to Treating Pneumococcal Pneumonia with Penicillin, Emerging Infections Network Survey — United States, 2008. ***Jennifer B. Rosen***

11:50 An Outbreak of Pneumonia Associated with Emergent Adenovirus Type 14 — Prince of Wales Island, Alaska, 2008. ***Douglas H. Esposito***

12:15 LUNCH

12:30 SPECIAL SESSION:

Development and a Six-Country Evaluation of United Nations High Commissioner for Refugees' Health Information System..... Dunwoody Suites

MODERATORS: ***Susan Cookson*** and ***Holly Williams***

SPEAKERS: ***Christopher Haskew, Basia Tomczyk, Farah Husain, David Twones, Emily Jentes, Tarissa Mitchell*** and ***Colleen Hardy***

12:30 POSTER SESSION. *Posters on Display in the Ravinia Ballroom. All posters presented during the conference will be on display Monday, 9:00 a.m. through Friday, 12:00 p.m.*

1:45 SESSION G: THE WATCHMEN

Surveillance..... Ravinia Ballroom

MODERATOR: ***Christine Branche***

1:50 Completeness of Demographic, Occupation, and Industry Information Reporting to the Ohio Cancer Incidence Surveillance System — 2005. ***Marie A. de Perio***

2:10 Increased Incidence of Coccidioidomycosis in the Northwest Valley (NWV), Arizona — 2008. True Increase or Surveillance Artifact? ***Loretta Chang***

2:30 Enhanced Rash Illness Surveillance in a Border Region of the Republic of the Congo and the Democratic Republic of Congo. ***Adam MacNeil***

2:50 Acceptability of HIV Surveillance Before and After the 2004 Transition from Code-Based to Name-Based Reporting — Kentucky, 1998–2006. ***Emily C. Lutterloh***

3:10 Does Bias in Self-Reported Surveys of Mammography Usage Obscure Racial Disparities in Usage? — United States, 1995. ***Rashid S. Njai***

3:30 Comparison of Two Influenza Syndromic Surveillance Systems — Indiana, 2006–2008. ***Matthew D. Ritchey***

4:00 BREAK

6:00 PREDICTION RUN.....Brook Run Park

WEDNESDAY, APRIL 22, 2009

8:30 CONCURRENT SESSION H1: PEAVY'S BIG ADVENTURE

Peavy Finalists.....Ravinia Ballroom

MODERATOR: ***Owen Devine***

8:35 Description of Suicides Preceded by Driving While Intoxicated Arrests — National Violent Death Reporting System, 2003–2007. ***R. Matt Gladden***

8:55 Predicting the Effects of the *Haemophilus influenzae* Type b (Hib) Vaccine Shortage on the Incidence of Hib Disease in Children <5 Years of Age — United States, 2008. ***Michael L. Jackson***

9:15 Potential Impact of New Treatment Guidelines for HIV-Infected Infants — 15 Resource-Limited Countries, 2009. ***Andrew F. Auld***

9:35 Quantitative Evaluation of a State-Based Program to Reduce Fall (1990–1998) and Electrocution (1990–1994) Fatality Rates — United States. ***Cammie K. Menendez***

9:55 Respiratory Index of Severity in Children (RISC): A Simple Clinical Score for Severity of Respiratory Infection in Young Children. ***Carrie Reed***

8:30 CONCURRENT SESSION H2: AN AFFAIR TO REMEMBER

HIV/STD/TB.....Dunwoody Suites

MODERATOR: ***Kevin A. Fenton***

8:35 Gonorrhea and HIV Coinfection Among Men Who Have Sex With Men — United States, 2006–2008. ***Robert D. Kirkcaldy***

8:55 Preventive Healthcare and HIV Infection Among Young Black Men Who Have Sex with Men — Mississippi, 2008. ***Christina Dorell***

9:15 Epidemiology of Genital Ulcer Disease at a Sexually Transmitted Disease Clinic —California, 2008. ***Ying-Ying Yu***

9:35 Epidemiology of Childhood Tuberculosis — Kenya, October 2006–September 2007. ***Joseph S. Cavanaugh***

9:55 Tuberculosis Outbreak Among Guatemalan Immigrants — Minnesota, 2008. ***Sara Lowther***

10:15 BREAK

10:30 **CONCURRENT SESSION I1: DODGEBALL**

Nutrition and Physical Activity.....Ravinia Ballroom

MODERATOR: *William "Bill" Dietz*

10:35 Contributions of Physical Activity and Television Watching to Cardiovascular Disease Risk Among Adolescents: United States, 2003–2006. ***Roberto L. F. Lobelo***

10:55 Comparison of Percentage of U.S. Adults Who Met Aerobic Activity Standards in 2007 by Two Sets of Criteria: 2008 Physical Activity Guidelines for Americans and Healthy People 2010. ***Fleetwood V. Loustalot***

11:15 The Association Between Serum Vitamin D Levels and Childhood Obesity. ***Laura L. Polakowski***

11:35 Iodine Nutrition Among Women of Reproductive Age — United States 2001–2006. ***Cria O. Gregory***

10:30 **CONCURRENT SESSION I2: SICKO**

Healthcare-Associated Illness.....Dunwoody Suites

MODERATOR: *Michael Bell*

10:35 Role of Nosocomial Transmission in a Measles Outbreak — Arizona, 2008. ***Sanny Y. Chen***

10:55 Outbreak of Bloodstream Infections at an Outpatient Dialysis Center — Ohio, 2008. ***Clara Y. Kim***

11:15 Investigation of an Outbreak of *Aspergillus fumigatus*-Positive Respiratory Cultures Among Patients in a Community Hospital — Colorado, 2008. ***Melissa A. Viray***

11:35 Multistate Outbreak of Adverse Reactions Associated with Contaminated Heparin. ***Sarah F. Schillie***

12:00 **LUNCH**

12:30 **POSTER SESSION.** ***Meet the Authors in the Ravinia Ballroom. All posters presented during the conference will be on display Monday, 9:00 a.m. through Friday, 12:00 p.m. The following authors will be present to discuss their studies on Wednesday, 12:30–1:30 p.m.***

POSTER SESSION 2: ANALYZE THAT

P16. "M-L-V-A" (Multiple-Locus Variable-Number Tandem Repeat Analysis): It's Fun To Use the M-L-V-A (for Differentiating Outbreak-Associated and Sporadic *E. coli* Infections) — United States, 2008. ***Elizabeth C. Cavallaro***

P17. Seroprevalence of Herpes Simplex Type 2 — National Health and Nutritional Examination Surveys, United States, 2005–2006. ***Sara E. Forhan***

P18. Estimating the Prevalence of Chronic Hepatitis B Virus Infection — New York City, 2008. ***Anne Marie France***

P19. The Risk of Seizures After Acellular Pertussis Vaccines in Early Childhood — United States, 2002–2006. ***Wan-Ting Huang***

P20. False-Positive Results with a Commercially Available West Nile Virus Immunoglobulin M Enzyme-Linked Immunosorbent Assay Kit — Multistate Investigation, 2008. ***Kristen B. Janusz***

P21. Knowledge, Attitudes, and Practices Regarding Syphilis Screening Among Men Who Have Sex with Men — San Francisco, 2008. ***Kenneth A. Katz***

P22. Outbreak of Hepatitis B Virus Infection Among Residents and Contacts in an Assisted Living Facility — Pennsylvania, 2007-2008. ***Anne McIntyre***

P23. Impact of Location of Death on Completeness of Child Injury Mortality Data: Comparison of Vital Records and Medical Investigator Data — New Mexico, 2003–2005. ***Megin C. Nichols***

P24. Comparison of O157 and Non-O157 Shiga Toxin-Producing *Escherichia coli* — Wisconsin, 2005–2008. ***Carrie F. Nielsen***

P25. Evaluation of the Institute of Medicine Recommendations on Weight Gain During Pregnancy — Florida, 2004–2007. *Sohyun Park*

P26. Unintentional Medication Overdose Deaths — Oklahoma, 1994–2006. ***Emily Piercefield***

P27. BALieve It or Not? Legionnaires' Disease Among Patients Undergoing Bronchoalveolar Lavage — Arizona, 2008. ***Benjamin J. Silk***

P28. Pulmonary Puzzle at a Conference: Investigating a Respiratory Disease Outbreak Among Conference Attendees — Los Angeles County, California, 2008. ***Kanta D. Sircar***

P29. Cluster of Genotype 3 Hepatitis C Virus Infections Among American Indians — Northern Plains, 2008. ***Anil G. Suryaprasad***

P30. Mental Illness and Psychotropic Drug Use Among Unintentional Drug Overdose Fatalities — West Virginia, 2006. ***Robin L. Toblin.***

1:30 SESSION J: THE STING

Vaccine Preventable Diseases ..... Ravinia Ballroom

Presentation of the Iain C. Hardy Award

MODERATORS: ***Anne Schuchat*** and ***John Ward***

1:35 Impact of Rotavirus Vaccine on Severe Acute Gastroenteritis in Children Less Than Five Years of Age, San Diego, 2000–2008. ***Jennifer E. Cortes***

1:55 Fourth Primary DTaP Dose: Does It Matter in Preventing Pertussis? A Retrospective Cohort Study Among Children Born During 2000–2004 in Oregon. ***Ning An***

2:15 The Increasing Burden of Imported Chronic Hepatitis B — United States, 1973–2007. ***Tarissa Mitchell***

2:35 Human Papillomavirus Vaccine Uptake Among Adolescent Female Medicaid Enrollees — New Hampshire, 2007. ***Sherry L. Burrer***

2:55 Postlicensure Safety Evaluation of a Combination Diphtheria, Tetanus, Acellular Pertussis, Hepatitis B, and Inactivated Poliovirus Vaccine (DTaP-HepB-IPV) — United States, 2000–2006. ***Wan-Ting Huang***

3:15 Rates of Hospitalization with Laboratory-Confirmed Influenza Infection in Children — United States, 2003–2008. ***Fatimah S. Dawood***

3:45 **BREAK**

4:00 *Announcement of Langmuir Prize Winner* ..... Ravinia Ballroom
Announcement of Friend of EIS

SESSION K:
ALEXANDER D. LANGMUIR MEMORIAL LECTURE AND RECEPTION

Sponsored by the EIS Alumni Association and the Office of Workforce and Career Development
MODERATOR: ***Stephen B. Thacker***
SPEAKER: ***Jim Marks***
TOPIC: Epidemiology, Public Health, and Public Policy

5:30 **EIS ALUMNI ASSOCIATION MEETING** ..... Maplewood Room

7:30 **SESSION L: FIELD EPIDEMIOLOGY**

Translating Science into Practice Around the World — International Night ..... Dunwoody Suites
MODERATORS: ***Kendra Chittenden*** and ***Dionisio Jose Herrera Guibert***
COSPONSORED BY: The Coordinating Office for Global Health (COGH)/ Division for Global Public Health Capacity Development and the Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET).

7:35 The Impact of Pneumococcal Conjugate Vaccination on Rates of Hospitalization for Pneumonia — Australia, 1998–2007. ***Andrew Jardine***
7:55 First Outbreak of *Salmonella* Serotype Kedougou Associated with an Infant Formula Milk — Spain, 2008. ***Johana Rodriguez-Urrego***
8:15 First Documented Outbreak of Trichinellosis in Taiwan, May 2008. ***Yi-Chun Lo***
8:35 Towards the Elimination of Malaria Deaths from Jalpaiguri District, West Bengal, India: Evidence for Further Action. ***Jagannath Sarkar***
8:55 Prevalence of Posttraumatic Stress Disorder and Comorbid Depression in Earthquake Survivors in Pisco, Peru. ***Yliana Rojas Medina***
9:15 Increasing Compliance with Mass Drug Administration for Lymphatic Filariasis — Orissa State, India, 2008. ***Paul T. Cantey***
9:35 Late Breaking Report — TBD

INTERNATIONAL NIGHT POSTER SESSION (Viewing, 6:00–7:30 p.m.)

P1. Urolithiasis Outbreak in Children Associated with Consumption of Milk Products Contaminated with Melamine: Wuwei City, Gansu Province, China, 2008. ***Yongjun Gao***
P2. Risk Factors for Recurrent Outbreaks of Measles in Temeke Municipality, Dar es Salaam, 2008. ***S. Lucy Sembuche***
P3. Cholera Outbreak at a Rural Hospital — Mudzi District, Zimbabwe, 2008. ***Ranganai Shanzi***

P4. Nonadherence to Single-Dose Nevirapine for the Prevention of Mother-to-Child Transmission of HIV in Bindura Town, Zimbabwe, 2008. ***Lazarus R. Kuonza***

P5. Field Study of Dengue Surveillance in Sa Kaeo Province on Thai-Cambodian Border, 7–16 July 2008. ***Adisorn Vatthanasak***

P6. Diarrhoeal Disease Outbreak During a School Whitewater Rafting Trip — Zambezi River, Zimbabwe, August 2008. ***M. Genevie M. Ntshoe***

P7. Factors Associated with Default Among New Sputum-Positive Tuberculosis Patients Treated with Directly Observed Treatment Short Course (DOTS) — Thoubal District, Manipur, India, 2008. ***Dinesh M. Singh***

P8. Survey of Knowledge, Attitude, and Practices for Tuberculosis and Revised National Tuberculosis Control Program Among Private Practitioners — Hooghly, West Bengal, India, 2008. ***Kisalay Datta***

P9. Outbreak of Acute Renal Failure in Children — Nigeria, December 2008. ***Aisha Abubakar***

P10. Assessment of Drug Use in a Semi-Tribal District of Himachal Pradesh, India, 2008. ***Katoch Vikram***

P11. Knowledge, Attitudes and Practices of the Population with Regard to a Cholera Epidemic in Bissau, Guinea Bissau, West Africa, September 2008. ***Jean CS Barrado***

P12. Cholera Outbreak in a Tribal Community, Philippines, 2008. ***Roston G. Garces***

P13. Meningococcal Disease Ooutbreak in a Large Food Processing Plant, Rio Verde City, Goiás State, Brazil, 2008. ***Betine PM Iser***

P14. A Large Cholera Outbreak Investigation in Chitungwiza Town — Zimbabwe, 2008. ***Ngoni W. Mashumba***

P15. Outbreak of Influenza in a Student Travel Group — Taiwan, 2008. ***Tsung-Pei Tsou***

P16. Emerging Leptospirosis Associated with Fish Catching Activities in a Natural Water Reservoir, Western Thailand, July - September 2008. ***Rochana Wutthanarungsan***

9:45 ***Presentation of William H. Foege Award*** ..... Dunwoody Suites

CLOSING REMARKS

RECEPTION

THURSDAY, APRIL 23, 2009

8:30 **SESSION M: DR. MACKEL AND MR. HYDE**

Mackel Award Finalists ..... Ravinia Ballroom

MODERATORS: *Rima Khabbaz* and *Antonia Calafat*

8:35 Large Hepatitis E Outbreak Among Conflict-Affected, Displaced Persons in Northern Uganda. ***Christopher Howard***

8:55 Transmission of Hepatitis C Virus at an Outpatient Hemodialysis Unit — New York, 2001–2008. ***Jennifer L. Jaeger***

9:15 Campylobacteriosis Outbreak Caused by Consumption of Raw Peas — Alaska, 2008. ***Tracie J. Gardner***

9:35 Outbreak of Carbapenem-Resistant Enterobacteriaceae in a Long-Term Care Facility — Cook County, Illinois, 2008. ***Jonathan M. Duffy***

9:55 Cardiac Events and Deaths in a Dialysis Facility Associated with a Healthcare Provider — Texas, 2008. ***Melissa K. Schaefer***

10:15 **BREAK**

10:30 **SESSION N: THE CHRONIC-LES OF NARNIA**

Chronic Diseases ..... Ravinia Ballroom

MODERATOR: *Janet Collins*

10:35 Trends and Patterns of Cardiovascular Disease Risk Factors Among Adolescents —United States, 1999–2006. ***Ashleigh L. May***

10:55 Analysis of Asthma-Related Mortality Using Multiple Cause-of-Death Files — United States, 2001–2005. ***Isabela C. Ribeiro***

11:15 Socioeconomic Status, Neighborhood Factors, Child Enrichment Factors, and Odds of Cognitive Deficit Among Preschool-Age Children: Results from the Follow-Up of Growth and Development Experiences Study. ***Deborah L. Christensen***

11:35 Evaluating Colorectal Cancer Screening by an Electronic Measure Among American Indians and Alaska Natives at Indian Health Service Facilities — Southwestern United States, 2007–2008. ***Anil G. Suyraprasad***

12:00 **LUNCH**

12:30 **SPECIAL SESSION: ELIMINATION OF HEALTHCARE ASSOCIATED INFECTIONS**

Role of State and Local Public Health Authorities ..... Dunwoody Suites

MODERATOR: *Scott Fridkin*

SPEAKERS: *Cathy Rebmann, Cecilia Curry, Jonathan Edwards*

1:30 SESSION O: THE WORLD IS NOT ENOUGH

International ..... Ravinia Ballroom

MODERATOR: *Mike St. Louis*

1:35 Spousal Sexual Violence, HIV, and Sexually Transmitted Infections: an Evaluation of Demographic and Health Survey Data — Zimbabwe (2005–2006), Malawi (2004), and Kenya (2003). ***Christine L. Mattson***

1:55 Impact of a Rapid Cholera Response Program on Knowledge and Practices Regarding Water Treatment and Hygiene — Kenya, 2008. ***Kashmira A. Date***

2:15 Impact on Maternal Household Hygiene Practices of Integration of Household Water Treatment and Hygiene Promotion with Antenatal Services. ***Elizabeth Russo***

2:35 Boiling Mad: Impact of Point-of-Use Chlorination Compared with Boiling and Bottled Water on Water Quality and Diarrheal Illness — Tangerang, Indonesia, March–June 2008. ***Kavita K. Trivedi***

2:55 Epidemiologic Investigation of Poliomyelitis Outbreaks Genetically Linked to India —Angola, 2007-2008. ***Sarah E. Kidd***

3:15 BREAK

3:30 SESSION P: DIE HARD

Drug Resistance ..... Ravinia Ballroom

MODERATOR: *Rebecca Sunenshine*

3:35 Outbreak of Carbapenem-Resistant *Klebsiella pneumoniae* Infections in a Long-Term Acute Care Hospital — Florida, 2008. ***John M. DePasquale***

3:55 Human Infections with Oseltamivir-Resistant Influenza A (H1N1) Virus in the United States, 2007–2008. ***Nila J. Dharan***

4:15 Characteristics of and Risks for Resistant Acinetobacter Infection — Michigan, October–December 2007. ***Jennie L. Finks***

4:35 Methicillin-Resistant *Staphylococcus aureus* Surveillance in the King County, Washington, Jail System — September 1, 2007–August 31, 2008. ***Matthew P. Hanson***

8:30 EIS SATIRICAL REVUE ..... Ravinia Ballroom

FRIDAY, APRIL 24, 2009

8:30 SESSION Q: THE COLOR PURPLE

Injury ..... Ravinia Ballroom

MODERATOR: *Rodney Hammond*

8:35 Opening the Black Box: Effectiveness of the FDA Boxed Warning on Methadone. ***Nagesh N. Borse***

8:35 Coping Alone with Suicidal Thoughts Among Those at Heightened Risk for Suicide. ***Kevin J. Vagi***

9:15 Vascular Access Hemorrhage Deaths Among Hemodialysis Patients — Maryland, Virginia, and the District of Columbia, 2000–2007. ***Rakhee S. Palekar***

9:35 Acetaminophen-Related Emergency Department Visits — United States, 2005. ***Paul C. Melstrom***

10:00 BREAK

10:15 PRESENTATION OF AWARDS ..... Ravinia Ballroom

- ***Donald C. Mackel Memorial Award***
- ***J. Virgil Peavy Memorial Award***
- ***Paul C. Shnitker International Health Award***
- ***James H. Steele Veterinary Public Health Award***
- ***Outstanding Poster Presentation Award***

10:30 SESSION R: LATE-BREAKING REPORTS ..... Ravinia Ballroom

10:30 a.m. -11:45 a.m.

MODERATORS: ***Douglas Hamilton*** and ***Eric Mintz***

12:00 LUNCH

12:30 SPECIAL SESSION: PANDEMIC INFLUENZA PLANNING: ADDRESSING THE NEEDS OF PREGNANT WOMEN AND CHILDREN ..... Dunwoody Suites

MODERATOR: ***Lorraine Yeung***

SPEAKERS: ***Tony Fiore, Sonja Rasmussen, Beth Stevenson***

1:30 SESSION S: SOME LIKE IT HOT

Hot Topics ..... Ravinia Ballroom

MODERATOR: ***Paul Garbe***

1:35 Outbreaks of *Salmonella* Saintpaul Infections Associated with Jalapeño Peppers at Mexican-Style Restaurants — Texas, 2008. ***Rajal K. Mody***

1:55 Clinical and Laboratory Features That Differentiate Dengue From Other Febrile Illnesses in an Endemic Area — Puerto Rico, 2007–2008. ***Christopher J. Gregory***

2:15 Methicillin-Resistant *Staphylococcus aureus* Outbreak Among Firefighter Trainees —Colorado, 2008. ***Christa R. Hale***

2:35 Nonfatal Scald-Related Burns Among U.S. Adults Aged ≥ 65 Years. ***Mef D. Galle***

2:55 Public Health Communication During Wildfires — San Diego, California, 2008. ***David E. Sugerman***

3:15 CLOSING REMARKS AND ADJOURNMENT ..... Ravinia Ballroom

Stephen B. Thacker, Director
Office of Workforce and Career Development

Presenting EIS Officers

EIS OFFICERS BY COORDINATING OFFICE, NATIONAL CENTER OR OD OFFICE

FDA
Tarun Mallick

NCBDDD
Cheryl Broussard
Deborah Christensen

NCCDPHP
Nancy Aburto
Deborah Dee
Cria Gregory
Roberto Lobelo
Fleetwood Loustalot
Ashleigh May
Rashid Njai
Naomi Tepper

NCEH/ATSDR
Christopher Howard
Yanique Redwood
Isabela Ribeiro

NCHS
Ghasi Phillips
Laura Polakowski

NCHHSTP
Andrew Auld
Sridhar Basavaraju
Joseph Cavanaugh
Mitesh Desai
Christina Dorell
Sara Forhan
Robert Kirkcaldy
Anne McIntyre
Christine Mattson
Neha Shah
Rinn Song

NCIPC
Nagesh Borse
R. Matt Gladden
Robin Toblin
Kevin Vagi

NCIRD
Jennifer Cortes
Fatimah Dawood
Meredith Deutscher
Nila Dharan
Saumil Doshi
Douglas Esposito
Michael Jackson
Sarah Kidd
Carrie Reed
Jennifer Rosen
Adrianne Sever
Benjamin Silk
Stanley Wei
Cynthia Thomas

NCPDCID
Kathy Byrd
Jonathan Duffy
Wan-Ting Huang
Eloisa Llata
Tarissa Mitchell
Melissa Schaefer
Sarah Schillie

NCZVED
Jennifer Adjemian
Amy Boore
Paul Cantey
Loretta Chang
Elizabeth Cavalarro
Kashmira Date
Christopher Gregory
Julie Harris
Kristen Janusz
Adam MacNeil
Rajal Mody
Karen Neil
Elizabeth Russo
Kendra Stauffer
Kavita Trivedi
Melissa Viray

NIOSH
Marie de Perio
Yulia Iossifova
Cammie Menendez

OWCD
Ning An
Stacey Anderson
Sherry Burrer
Renee Calanan
Sanny Chen
John DePasquale
Jennie Finks
Mary Fournier
Anne Marie France
Mef Galle
Tracie Gardner
Alice Guh
Christa Hale
Matthew Hanson
Amy Karon
Jenifer Jaeger
Sara Lowther
Emily Luttherloh
Kenneth Katz
Clara Kim
Katie Kurkjian
Jennifer MacFarquhar
Paul Melstrom
Hemanth Nair
Megin Nichols
Carrie Nielsen
Rakhee Palekar
Sohyun Park
Sharyn Parks
Emily Piercefield
Matthew Ritchey
Fadila Serdarevic
Kanta Sircar
Meera Sreenivasan
David Sugerman
Anil Suryaprasad
Myduc Ta
J Eric Tongren
Ying-Ying Yu
Jennifer Zipprich

KEY FOR PRESENTING EIS OFFICERS

FDA	Food and Drug Administration
NCBDDD	National Center on Birth Defects and Developmental Disabilities
NCCDPHP	National Center for Chronic Disease Prevention and Health Promotion
NCEH/ATSDR	National Center for Environmental Health/ Agency for Toxic Substances and Disease Registry
NCHS	National Center for Health Statistics
NCHHSTP	National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention
NCIPC	National Center for Injury Prevention and Control
NCIRD	National Center for Immunization and Respiratory Diseases
NCPDCID	National Center for Preparedness Detection, and Control of Infectious Diseases
NCZVED	National Center for Zoonotic, Vector-Borne, and Enteric Diseases
NIOSH	National Institute for Occupational Safety and Health
OWCD	Office of Workforce and Career Development

Incoming EIS Class of 2009

Abraham, Bisrat, MD, MPH
Agolory, Simon, MD
Al-Samarrai, Teeb, MD
Apostolou, Andria, PhD, MPH
Baty, Steven, DVM, MPH
Bell, Jeneita, MD, MPH
Bender, Thomas, MD, PhD, MSPH
Bettencourt, Laura, MPH, PhD
Broz, Dita, PhD, MPH
Budge, Philip, MD, PhD
Capewell, Linda, VMD, MPH
Cartwright, Emily, MD
Choudhary, Ekta, PhD, MPH
Click, Eleanor, MD, PhD
Colborn, James, PhD, MSPH
Cope, Jennifer, MD
Cox, Chad, MD, MPH
Creanga, Andreea, MD
Daily, Natalie, MD
DeBoer, Carrie, MPH, MSN
El Bcheraoui, Charbel, PhD, MSc
Foltz, Jennifer, MD, MPH
Freeland, Amy, PhD
Gargano, Julia, PhD
Geissler, Aimee, PhD, MPH
Gibney, Katherine, MBBS, MPH
Graitcer, Samuel, MD
Grube, Steven, MD
Hampton, Lee, MD
Hocevar, Susan, MD
Ibrahimova, Aybaniz, MD
Ivy, Wade III, PhD, MPH
Jeffries, William, PhD, MPH
Kacanek, Deborah, ScD, SM
Katten, Jessica, MD, MPH
Kay, Meagan, DVM, MPVM
Keck, James, MD, MPH
Khaokham, Christina, MPH, MSN
Kit, Brian, MD, MPH
Knust, Barbara, DVM, MPH
Koers, Erin, PhD, MPH
Lanier, William, DVM, MPH
Lo, Yi-Chen, MD
Loharika, Anagha, MD
McFadden, Jevon, MD, MPH
Mace, Kimberly, PhD
Mandel, Sema, MBBS, MScPH
Medina-Marino, Andrew, PhD
Mettee, Shauna, MSN, MPH
Miller, Jeffrey, MD, MPH
Misegades, Lara, PhD
Morof, Diane, MD
Mortensen, Eva, MD, MPH
Murphree, Rendi, PhD
Murray, Erin, PhD, MSPH
Nelson, George, MD
Ogbuanu, Ikechkwu, MBBS, PhD, MPH
Oh, John, MD, MPH
Petersen, Brett, MD, MPH
Pillai, Pavathy, MD, MPH
Rao, Agam, MD
Reed, Caitlin, MD, MPH
Roy, Monika, MD
Sauber-Schatz, Erin, PhD, MPH
Selent, Monica, DVM, MPH
Sprecher, Armand, MD, MPH
Suarthana, Eva, MD, PhD
Taylor, Ethel, DVM, MPH
Taylor, LaShan, DrPH, MPH
Tohme, Rania, MD, MPH
Torrone, Elizabeth, PhD
Tosh, Pritish, MD
Tyler, Crystal, PhD, MPH
Underwood, Jon II, PhD
Walldorf, Jenny, MD
White, Arica, PhD, MPH
Williams, Nancy, MD, MPH
Williams, Roxanne, MD, MPH
Willis, Matthew, MD, MPH
Yard, Ellen, PhD
Yen, Catherine, MD, MPH
Zheteyeva, Yenlik, MD, MPH

Awards and Prize Manuscripts

ALEXANDER D. LANGMUIR PRIZE MANUSCRIPT AWARD

The ADL Prize was established in 1966 by the EIS Alumni Association to encourage EIS officers to publish papers based on epidemiologic work done while in the EIS. The award is given to a manuscript or publication done by a current EIS officer or "first-year alumni", for a well-designed and executed, clearly and persuasively written report of an epidemiological study.

PHILIP S. BRACHMAN AWARD

This award recognizes excellence in teaching epidemiology to EIS Officers. The Brachman Award is sponsored by the graduating class of EIS Officers.

DISTINGUISHED FRIEND OF THE EIS AWARD

Awarded by the EIS Alumni Association, the Distinguished Friend of EIS Award, recognizes a person for his or her valued contributions that have made an important difference to the health, welfare and happiness of EIS Officers and the EIS Program.

IAIN C. HARDY AWARD

The Iain C. Hardy Award recognizes a current EIS officer or an alumni within 5 years of having completed EIS training who has made an outstanding contribution to the control of vaccine-preventable diseases.

DONALD C. MACKEL MEMORIAL AWARD

This award is sponsored by the EIS Alumni Association and recognizes a current EIS officer for the oral or poster presentation that best exemplifies the effective application of a combined epidemiological and laboratory approach to an investigation.

J. VIRGIL PEAVY MEMORIAL AWARD

Sponsored by the EIS Alumni Association, this notable award recognizes a current EIS Officer for the oral or poster presentation that best exemplifies the effective and innovative application of statistics and epidemiologic methods in an investigation or study.

OUTSTANDING POSTER PRESENTATION AWARD

This award recognizes a current EIS officer. The outstanding poster is selected on the basis of (1) scientific content, including originality, study design and analysis; (2) public health impact; and (3) effectiveness of presentation.

PAUL C. SCHNITKER INTERNATIONAL HEALTH AWARD

This award recognizes a current EIS Officer or first-year EIS alumni that has made an unusual contribution to international public health. Paul C. Schnitker, M.D., died in a plane crash in Nigeria in 1969. He was en-route to serve as a public health officer in the response to famine and other public health problems resulting from the Biafra Civil War in Nigeria. He is the only person who has died while serving as an EIS officer.

JAMES H. STEELE VETERINARY PUBLIC HEALTH AWARD

This award is given to a current or former EIS Officer who has made outstanding contributions in the field of veterinary public health. This award recognizes outstanding contributions in the investigation, control, or prevention of zoonotic diseases or other animal-related human health problems.

2009 Award Committee Members

ALEXANDER D. LANGMUIR PRIZE MANUSCRIPT AWARD

Philip Brachman (EIS '54)
Kenneth Castro (EIS, '83)
Richard Dixon (EIS, '71)
Marion Kainer (EIS '00, Chair)
Janet Mohle-Boetani (EIS '90)

DONALD C. MACKEL MEMORIAL AWARD

Vinicius Anato (EIS '03)
Suzanne Kalb
Patrick Lammie
Priti Patel (EIS '02, Chair)

OUTSTANDING POSTER PRESENTATION AWARD

Matthew Breiding (EIS '05)
Geoffrey Calvert (EIS '87)
Sheryl Lyss (EIS '99)
Lorraine Yeung (EIS '02, Chair)

PAUL C. SCHNITKER INTERNATIONAL HEALTH AWARD

Michael Deming (EIS '83)
Doug Hamilton (EIS '91, ex officio)
Steve Jones (EIS '69, ex officio)
John McGowan (EIS '69)
Michael Pratt (EIS '89, Chair)
Bill Schaffner (EIS '66)
Larry Slutsker (EIS '87)
Beth Tohill (EIS '00)

IAIN C. HARDY AWARD

Beth Bell (EIS '92)
John Mouldin (EIS '73)
William Schaffner (EIS '66)
David Swerdlow (EIS "89, Chair)
Melinda Wharton (EIS '86)

JAMES H. STEELE VETERINARY PUBLIC HEALTH AWARD

Fred Angulo (EIS '93)
John Dunn (EIS '03)
Jennifer McQuiston (EIS '98, Chair)
Hugh Mainzer (EIS '92)
Jennnifer Wright (EIS '02)

J. VIRGIL PEAVY MEMORIAL AWARD

Kate Brett (EIS '91)
Owen Devine (EIS '79, Chair)
Robin Ikeda (EIS '91)
Glen Satten
Elizabeth Zell

Awards Presented at the 2008 EIS Conference

ALEXANDER D. LANGMUIR PRIZE MANUSCRIPT AWARD

Characteristics of Perpetrators in Homicide-Followed-by-Suicide Incidents: National Violent Death Reporting System — 17 Select States, 2003-2005

J. Logan, H.A. Hill, A.E. Crosby, D.L. Karch, J. D. Barnes, K.M. Lubell

DONALD C. MACKEL MEMORIAL AWARD

Multistate Measles Outbreak Associated with an International Youth Sporting Event— Pennsylvania, Michigan and Texas, August–September, 2007

T. Chen, L. Lowe, P. Kutty, J. Blostein, R. Espinoza, C. Kim, J. Sinclair, E. Hunt, M. Nguyen, S. Redd, J. Rota, P. Rota, W. Bellini, D. Payne, P. Lurie, M. Moll, A. Ferrarro, V. Urdaneta, C. Dykewicz, S. Ostroff, J. Seward

OUTSTANDING POSTER PRESENTATION

The Power of Combining Routine Molecular Subtyping and Specific Food Exposure Interviews During an Escherichia coli O157:H7 Outbreak — Minnesota, 2007

S.M. Holzbauer, B. Miller, S. Jawahir, K. Smith

PHILIP S. BRACHMAN AWARD

Lisa Pealer

DISTINGUISHED FRIEND OF THE EIS AWARD

Denise Koo

PAUL C. SCHNITKER INTERNATIONAL HEALTH AWARD

Sapna Bamrah
David Lowrance

IAIN C. HARDY AWARD

Mona Marin

JAMES H. STEELE VETERINARY PUBLIC HEALTH AWARD

John R. Dunn

J. VIRGIL PEAVY MEMORIAL AWARD

Katherine Ellingson

Alexander D. Langmuir Lectures, 1972 - 2008

1972 Prevention of Rheumatic Heart Disease — Fact or Fancy.
Charles H. Rammelkamp

1973 Cytomegaloviral Disease in Man: An Ever Developing Problem.
Thomas H. Weller

1974 Hepatitis B Revisited (By the Non-Parenteral Route).
Robert W. McCollum

1975 Origin, Spread, and Disappearance of Kuru: Implications of the Epidemic Behavior of a Disease in New Guineans for the Epidemiologic Study of Transmissible Virus Dementias.
D. Carleton Gajdusek

1976 The Future of Epidemiology in the Hospital.
Paul F. Wehrle

1977 The Historical Evolution of Epidemiology.
Abraham Lilienfeld

1978 The Biology of Cancer: An Epidemiological Perspective.
Sir Richard Doll

1979 The Epidemiology of Antibiotic Resistance.
Theodore C. Eickoff

1980 Health and Population Growth.
Thomas McKeown

1981 The Pathogenesis of Dengue: Molecular Epidemiology in Infectious Disease.
Scott B. Halstead

1982 The Epidemiology of Coronary Heart Disease: Public Health Implications.
Henry W. Blackburn, Jr.

1983 Sexually Transmitted Diseases — Past, Present and Future.
King K. Holmes

1984 Poliomyelitis Immunization — Past and Future.
Jonas E. Salk

1985 An Epidemiologist's View of Postmenopausal Estrogen Use, or What to Tell Your Mother.
Elizabeth Barrett-Connor

1986 Hepatitis B Virus and Hepatocellular Carcinoma: Epidemiologic Considerations.
Robert Palmer Beasley

1987 Environmental Hazards and the Public Health.
Geoffrey Rose

1988 Lymphotropic Retroviruses in Immunosuppression.
Myron E. (Max) Essex

1989 Aspirin in the Secondary and Primary Prevention of Cardiovascular Disease.
Charles H. Hennekens

1990 Epidemiology and Global Health.
William H. Foege

1991 Public Health Action in a New Domain: The Epidemiology and Prevention of Violence.
Garen J. Wintemute

1992 Helicobacter pylori, Gastritis, Peptic Ulcer Disease, and Gastric Cancer.
Martin J. Blasér

1993 Diet and Health: How Firm Is Our Footing?
Walter C. Willett

1994 Alexander D. Langmuir: A Tribute to the Man.
Philip S. Brachman and ***William H. Foege***

1995 Epidemiology and the Elucidation of Lyme Disease.
Allen C. Steere

1996 50 Years of Epidemiology at CDC.
Jeffrey P. Koplan

1997 Public Health, Population-Based Medicine, and Managed Care.
Diana B. Petitti

1998 Pandemic Influenza: Again?
Robert Couch

1999 The Evolution of Chemical Epidemiology.
Philip J. Landrigan

2000 Does Chlamydia pneumoniae Cause Atherosclerotic Cardiovascular Disease? Evaluating the Role of Infectious Agents in Chronic Diseases.
Walter E. Stamm

2001 Halfway Through a Century of Excellence.
J. Donald Millar

2002 Public Health Response to Terrorism: Rising to the Challenge.
Marcelle Layton

2003 Alex Langmuir's Somewhat Quiet Legacy: Epidemiology, Sexual Health, and Personal Choices.
Willard (Ward) Cates, Jr.

2004 HIV, Epidemiology, and the CDC.
James W. Curran

2005 Killin' Time: Alcohol and Injury.
Alexander C. Wagenaar

2006 Measuring Malaria.
Brian Greenwood

2007 Implications of Tuberculosis Control on Evidence-Based Public Health Practice.
Thomas Frieden

2008 Physical Activity and Public Health: Does the Environment Matter?
Ross C. Brownson

Alexander D. Langmuir Prize Manuscripts, 1966–2008

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M.A. Horwitz, J.V. Bennett

1977 Epidemic *Yersinia entercolitica* Infection due to Contaminated Chocolate Milk. N Engl J Med 1978;298:76-9.
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1979 An Outbreak of Legionnaires' Disease Associated with a Contaminated Air-Conditioning Cooling Tower. N Engl J Med 1980;302:365-70.
T.J. Dondero, Jr., R.C. Rendtorff, G.F. Mallison, et al.
and
Risk of Vascular Disease in Women: Smoking, Oral Contraceptives, Noncontraceptive Estrogens, and Other Factors. JAMA 1979;242:1150-4.
D.B. Petitti, J.Wingerd, J. Pellegrin, et al.

1980 Injuries from the Wichita Falls Tornado: Implications for Prevention. Science 1980;207:734-8.
R.I. Glass, R.B. Craven, D.J. Bregman, et al.

1981 Respiratory Irritation due to Carpet Shampoo: Two Outbreaks. Environ Int 1982;8:337-41.
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and
Toxic-Shock Syndrome in Menstruating Women: Association with Tampon Use and Staphylococcus aureus and Clinical Features in 52 Cases. N Engl J Med 1980;303:1436-42.
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2007 Methaphetamine Use is Independently Associated with Risky Sexual Behaviors and Adolescent Pregnancy
L.B. Zapata, S.D Hillis, P.M. Marchbanks, K.M. Curtis, **and** ***R. Lowry***

2008 Characteristics of Perpetrators in Homicide-Followed-by-Suicide Incidents: National Violent Death Reporting System—17 Select States, 2003–2005
J. Logan, H.A. Hill, A.E. Crosby, D.L.Karch, J.D. Barnes, K.M. Lubell

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Abstracts

2009 CONFERENCE ABSTRACTS

MONDAY, APRIL 20, 2009

SESSION A:
Best in Show
Opening Session
Ravinia Ballroom 8:30–10:15 a.m.
MODERATORS: *Richard Besser* and *Stephen B. Thacker*

8:35

Unintentional Injury Prevention Practices Depicted in G- and PG-Rated Movies — 2003–2007

AUTHORS: *Jon Eric Tongren, A. Sites, K. Zwicker, A. Pelletier*

BACKGROUND: Unintentional injuries are the leading cause of death among children in the United States, accounting for 36% of deaths among children aged 1–14 years in 2005. Children often imitate what they see on television and films. Previous studies demonstrate that children's behavior toward alcohol, tobacco, and violence can be influenced by mass media. We investigated how injury prevention practices are depicted in G- and PG-rated movies.

METHODS: We viewed the top 25 grossing domestic movies rated either G or PG for each year from 2003–2007. Movies that were animated or not set in the present day were excluded from analysis. Movie characters with speaking roles were coded for injury-prevention practices involving motor vehicles, pedestrians, bicycles, motorcycles, and boats. A person-scene was defined as a scene where one person was involved in an activity of interest.

RESULTS: Sixty-seven (54%) of 125 movies met the inclusion criteria for the study. A total of 915 person-scenes were examined; 503 (55%) depicted children and 412 (45%) adults. Twenty-two person-scenes involved crashes, resulting in three injuries and no deaths. Overall, 311 (56%) of 555 motor-vehicle passengers were belted; 73 (35%) of 211 pedestrians crossed the street in crosswalks; 11 (11%) of 102 pedestrians looked both ways before crossing the street; 8 (25%) of 32 bicyclists wore helmets; 23 (56%) of 41 motorcyclists wore helmets; and 60 (75%) of 80 boaters wore personal flotation devices.

CONCLUSION: Recommended injury prevention practices were inconsistently depicted in popular movies likely to be viewed by children. The consequences of unsafe behaviors were rarely shown. The entertainment industry should improve depiction of injury-prevention practices in G- and PG-rated movies.

KEYWORDS: movie, unintentional injury, prevention, Hollywood

8:55

Rapid Screening for Aflatoxins in Maize — Eastern Kenya, 2006 and 2007

AUTHORS: *Yanique A. Redwood, L. Lewis, J. Mwhia, H. Njapau, R. Breiman, M. McGeehin*

BACKGROUND: Aflatoxin, a potent fungal toxin, contaminates 25% of crops worldwide. Since 2004, 477 aflatoxin poisonings have occurred in Eastern Kenya due to contaminated, homegrown maize

(41% case-fatality rate). Because standard laboratory tests for aflatoxins in maize cannot be conducted in rural areas, local officials use visual inspection to screen for mold. To improve detection of aflatoxins in maize, an existing chromatographic rapid screening tool was modified for use in rural Kenya and its performance evaluated in 2006 and 2007.

METHODS: A total of 421 households were randomly selected from affected districts. Maize was collected from each household and screened using visual inspection and the rapid screening tool. The sensitivity, specificity, and predictive value positive (PVP) of visual inspection and the rapid screening tool to detect aflatoxins above the regulatory limit (20ug/L) were determined by comparing screening results to results from VICAM™ immunoaffinity fluorometric methods, representing the gold standard.

RESULTS: In 2006, maize from 85 (52%) of 165 households had aflatoxin levels >20ug/L compared to 40 (16%) of 256 in 2007. Modified rapid screening sensitivity was 90% and specificity was 96%. The PVP decreased from 97% to 78% between 2006 and 2007 due to decreased prevalence of contamination. Visual inspection sensitivity and specificity were 29% and 81%; PVP was 65% in 2006 and 17% in 2007. At very high levels (>200ug/L), rapid screening sensitivity was 100%, while visual screening sensitivity was 32%.

CONCLUSIONS: The rapid screening tool performed better than visual screening, particularly at the highest levels of contamination. Findings suggest that rapid screening may improve early detection and control of aflatoxin contamination in Kenya and provide a useful tool for preventing aflatoxin poisoning worldwide.

KEYWORDS: aflatoxins, maize, screening, aflatoxicosis

9:15 a.m.

The Association Between Breastfeeding Duration and Maternal Weight Retention at 1 Year Postpartum Is Modified by Breastfeeding Intensity—United States, 2005–2007

AUTHORS: *Deborah L. Dee, A. Sharma, K. Scanlon*

BACKGROUND: Breastfeeding guidelines call for 4–6 months of exclusive breastfeeding and continued breastfeeding for ≥1 year. Breastfeeding has been associated with lower maternal postpartum weight retention (PWR), which may reduce obesity risk. This association is controversial, however, as few PWR studies examined both breastfeeding duration and intensity.

METHODS: We used data from the Infant Feeding Practices Study-II, a longitudinal study of mother-infant pairs followed 1 year postpartum, in which mothers completed near-monthly questionnaires assessing frequency of infant intake of breast milk, formula, and foods in the previous week. We used linear regression to examine the association between breastfeeding duration and PWR among 1,328 breastfeeding mothers of term infants, tested for modification by breastfeeding intensity tertile (percentage of milk feedings during the first year that were breast milk: <25%, 25–85%, or >85%), and controlled for maternal education, race/ethnicity, pregravid body mass index, gestational weight gain, marital status, and age.

RESULTS: Mean breastfeeding duration was 7.5 months; 22.8% of mothers breastfed exclusively ≥4 months. Exclusive breastfeeding duration correlated highly with breastfeeding intensity (r=0.6); of mothers who breastfed exclusively ≥4 months, 75.9% were in the highest intensity tertile. Including only duration in the model, each month of breastfeeding was associated with just a 0.3 pound

decrease in PWR (standard error [SE]=0.1, p<.001). Adding intensity, however, modified this effect. Breastfeeding duration was associated with PWR only among women in the highest intensity tertile; each month of breastfeeding was associated with a 3.8 pound decrease in PWR (SE=1.3, p=.004).

CONCLUSIONS: Meaningful reductions in PWR were evident only among mothers in the highest breastfeeding intensity tertile. Breastfeeding duration and intensity are important predictors of PWR and should be encouraged.

KEYWORDS: breastfeeding, postpartum period, obesity, weight loss

9:35

Are Two Better Than One—Did a Second Routine Dose of Measles Vaccine Hasten Measles Elimination in the Americas?

AUTHORS: *Adrianne E. Sever, J. Rainey, E. R. Zell, K. Hennessey, A. Uzicanin, C. Castillo-Solorzano, V. Dietz*

BACKGROUND: The Region of the Americas reached measles elimination (ME) in 2002 using a strategy of high first-dose routine measles vaccine coverage (MCV1) and a second vaccination opportunity through mass campaigns every 4-6 years. A second routine dose (MCV2) at school entry was added in some countries (two-dose) but not in others (one-dose); the impact of MCV2 on ME is unclear.

METHODS: ME was defined as the first year between 1992–2002 with sustained interruption of indigenous measles virus transmission. Country data on socioeconomics, demographics, vaccination coverage, and estimated proportion of children (< 15 years) susceptible to measles were compiled. Time to ME between one-dose and two-dose countries was compared using Kaplan-Meier curves with and without propensity score-matching methods.

RESULTS: One-dose (n=14) and two-dose (n=7) countries did not differ in median MCV1 coverage for years 1999–2001 (94% for both) or median coverage for three measles campaigns (94% vs. 91%). Mean percent of susceptible children after MCV1 and campaigns were similar in one-dose (7.4%, 95% CI: 5.5–9.2) and two-dose (5.9%, 95% CI: 3.9–7.9) countries. Compared with one-dose countries, two-dose countries had significantly (p<0.05) higher median gross national income per capita (486 vs. 217 USD), percent urban population (75% vs. 58%), and female literacy (96% vs. 84%), and lower infant mortality (18 vs. 32 per 1000 live births); no difference in time to elimination was found between one-dose and two-dose countries in crude (p=0.79) and propensity score-matched (p=0.51) analyses.

CONCLUSIONS: Two-dose and one-dose countries had similar times to elimination despite apparent socioeconomic differences. MCV2 may not have hastened ME because high coverage with MCV1 and campaigns achieved a threshold immunity needed to eliminate measles.

KEYWORDS: measles, measles elimination, Region of the Americas, propensity scores

9:55

Investigation of the First Case of Guillain-Barré Syndrome Associated with Consumption of Unpasteurized Milk — California, 2008

AUTHORS: *Amy E. Karon, T. Martinelli, W. Miller, C. Parker, R. Mandrell, D. Vugia*

BACKGROUND: Guillain-Barré syndrome (GBS) is a rare, potentially fatal, autoimmune neuropathy. Campylobacteriosis precedes ≤40% of cases. Campylobacteriosis, but not GBS, has been associated with

unpasteurized milk consumption. In May–June 2008, 15 persons experienced gastroenteritis after drinking unpasteurized milk from a cow-leasing program. Stool cultures from three patients yielded *Campylobacter*. The program closed after a patient experienced GBS. We evaluated the potential association between this case and unpasteurized milk consumption.

METHODS: We reviewed the patient's medical records and interviewed her husband to assess symptoms and exposures. We tested a 6-week-old unpasteurized milk sample, obtained from the cow-leasing program and partially consumed by the patient, by multilocus sequence typing (MLST) for *Campylobacter jejuni* DNA, and by polymerase chain reaction (PCR) and sequencing for genes encoding the bacterial membrane component lipooligosaccharide (LOS) in GBS-associated *C. jejuni*. We tested the patient's serum for antibodies to this LOS by sodium dodecyl sulfate polyacrylamide gel electrophoresis immunoblot.

RESULTS: The patient, a female aged 52 years, experienced self-limiting febrile gastroenteritis 3 days after first drinking the unpasteurized milk. Eleven days later, she was hospitalized with progressive paresis. A peripheral nerve biopsy confirmed GBS. She was mechanically ventilated for 12 weeks and discharged with residual paresis. The patient's stool, cultured after she received antibiotics, was negative. In the milk sample, MLST detected *C. jejuni* DNA; PCR and sequencing identified *C. jejuni* sialyltransferase III gene encoding LOS in GBS-associated *C. jejuni*. Immunoblot testing identified serum antibodies to this LOS.

CONCLUSIONS: Laboratory and epidemiologic evidence established the first reported association between GBS and unpasteurized milk consumption. This case highlights the need for public awareness concerning the risk for severe illness from consuming unpasteurized milk.

KEYWORDS: *Campylobacter*, Guillain-Barré syndrome, unpasteurized milk, polymerase chain reaction, multilocus sequence typing, disease outbreak

MONDAY, APRIL 20, 2009

SESSION B:
Frankenstein — Transfusion, Transplants and Implants

Ravinia Ballroom 10:45 a.m.–12:15 p.m.
Moderator: *Elise Beltrami*

10:50

Transmission of Human Immunodeficiency Virus and Hepatitis C Virus from an Organ Donor to Four Transplant Recipients — Illinois, 2007–2008

AUTHORS: *Eloisa Llata, A. Grigoryan, S. Gerber, W. Heneine, CG Teo , L. Kumar, T. Durant, S. Holmberg, C. Conover, D. Seem, J. Drobeniuc, L. Ganova-Raeva, S. Kamili, Y. Khudyakov, Y. Lin, S. Ramachandran, , GL Xia, AS. Youngpairoj, WM. Switzer, G. Garcia-Lerma, MJ Kuehnert*

BACKGROUND: In 2007, when a solid organ recipient tested positive for human immunodeficiency virus (HIV) and hepatitis C virus (HCV) after transplantation, transmission from the donor to multiple recipients was suspected.

METHODS: Clinical information of the organ donor and the recipients were collected by medical record review. Donor family and social contacts were interviewed for risk factors of HIV and HCV infection. Serum samples from the recipients and from the donor were tested using serologic testing, viral load and molecular analysis for HIV and HCV. Blood traceback was conducted on transfusions to the organ donor.

RESULTS: The donor's cause of death was head trauma; his only known risk factor for

HIV was high-risk sexual behavior. HIV and HCV serology, performed as part of routine donor screening, were both negative. Four organs (liver, two kidneys and heart) were transplanted to four recipients. All donors associated with the units of blood products transfused to the organ donor were negative for HIV and HCV. Subsequent testing on plasma specimens from the donor and all recipients were HIV positive, and nucleotide sequences from two viral regions were identical. The donor and all the recipients also carried HCV genotype 1a and shared major sequence variant of a region of the HCV genome.

CONCLUSIONS: This is the first recognized co-transmission of HIV and HCV infection from an organ donor to four transplant recipients. A common source of infection among the recipients was confirmed by both epidemiologic and laboratory data. This transmission represents a failure of current organ screening protocol. Given the risk of disease transmission, it is important to reduce risk through improved screening, including risks and benefits of nucleic acid testing.

KEYWORDS: organ transplant, HIV, HCV

11:10

Increased Recognition of Transfusion-Associated Cases of *Babesia* Infection — Wisconsin, 2008

AUTHORS: *Carrie F. Nielsen, J. Kazmierczak, K. Bisgard, J. Davis, B. Herwaldt*

BACKGROUND: *Babesia microti* is an intraerythrocytic parasite transmitted by *Ixodes scapularis* ticks in nature and by transfusion of cellular blood products. Approximately 80 U.S. transfusion-associated cases have been documented, including one Wisconsin case in 2000. The Wisconsin Division of Public Health (WDPH) was notified of multiple probable transfusion-associated cases and worked collaboratively to assess the epidemiologic plausibility of blood and tickborne transmission of *Babesia* among blood-product recipients and Wisconsin blood donors.

METHODS: A blood-transfusion associated babesiosis case was defined as serologic evidence of infection, confirmed by a reference laboratory and epidemiologic link to blood transfusion by traceback or trace-forward investigation, in a blood product recipient or Wisconsin blood donor.

RESULTS: Five cases of *B. microti* infection among transfusion recipients in three states were linked to three Wisconsin blood donors (Donors A, B, and C). Among the five infected recipients, two Minnesota residents (aged 92 and 37 years) were linked to one donation from Donor A; two recipients, one Florida resident (aged 83 years) and one Wisconsin resident (aged 83 years), were linked to two different donations from Donor B (donated 5.5 months apart); and one Wisconsin recipient (aged 77 years) was linked to Donor C. All three donors (aged 55–70 years) resided or had vacationed in a babesiosis-endemic area of Wisconsin; their infections were diagnosed by transfusion traceback investigations.

CONCLUSIONS: The three donors presumably became infected through unrecognized tick bites; the recipients likely were infected by transfusion of babesia-infection blood products from these donors. Documentation of multiple transfusion-associated cases that have occurred in other states with links to Wisconsin blood donors underscores the need for effective strategies to prevent bloodborne transmission.

KEYWORDS: Babesia microti, blood transfusion-associated babesiosis, blood transfusion

11:30

Reported Infections After Human Tissue Transplantation Before and After New Food and Drug Administration (FDA) Regulations, United States, 2001- 2008.

AUTHORS: *Tarun K. Mallick, C. Zinderman, R. Wise*

BACKGROUND: U.S. allograft tissue transplantations approached 2 million in 2006 with generally excellent safety. However, rare infectious transmissions from donor tissue can be serious or fatal. In 2005, FDA issued the Current Good Tissue Practice (CGTP) rule, requiring tissue establishments to report to FDA serious infections after allograft transplantations. One goal of the rule was to reduce potentially extensive underreporting to FDA from tissue establishments.

METHODS: We reviewed reports received by FDA from January 2001 through December 2008 for infections in human tissue recipients within 1 year after transplantation, examining the numbers of reports by allograft types, infection classification, and reporter characteristics.

RESULTS: Among 389 reports, 88 (19.9/year) were received before and 301 reports (97.6/year) after the CGTP rule. Before the rule, 12.5% (11) of reports described death and another 81.8% (72) involved hospitalizations. After the rule, only 1.9% (6) of reports described deaths and 35.8% (108) involved hospitalizations. Before the rule, 39.1% involved cardiac tissue, 33.7% musculoskeletal soft tissue, 9.7% bone, and 17.5% other tissue types. After the rule, 30.5% of reports involved musculoskeletal soft tissue, 23.2% skin, 21.6% bone, 20.9% eye and 3.8% other tissue types. Among 306 reports identifying suspected organisms, 72.5% involved bacteria, 16.1% fungi and 11.4% viruses. Tissue processors submitted 63.3 reports/year after the rule, compared to 4.9/year before.

CONCLUSIONS: Our data do not confirm that the reported infections were caused by suspect tissues; indeed, most reports may represent routine post-surgical infections not due to allografts. Similarly, an unknown number of truly graft attributable infections may not have been reported. FDA's new regulations led to increased reporting with improved tissue safety surveillance for infections after allograft transplantation.

KEYWORDS: Allografts, Tissue, Infections, Surveillance, Regulation, United States

11:50

Outbreak of Rapidly Growing Mycobacterial Infections at an Ambulatory Plastic Surgery Center — California, 2007–2008

AUTHORS: *Amy E. Karon, K. Kandarian, J. Rosenberg, M. Yakrus, B. Austin, D. Duff, R. Levin, D. Vugia*

BACKGROUND: Outbreaks of rapidly growing mycobacterial (RGM) surgical site infections (SSI) are increasingly reported. These infections can be difficult to treat, requiring prolonged, targeted, antimicrobial therapy. In December 2007, an RGM SSI outbreak was reported among patients who had plastic surgery at a single surgeon-owned ambulatory surgery center (Center A). We investigated to identify the outbreak source and prevent additional cases.

METHODS: We defined cases as nonhealing surgical incisions or erythema, pain, and induration at the surgical site lasting >30 days among patients who had surgery at Center A during March 1, 2007–April 30, 2008. We interviewed patients about SSI symptoms and treatment and conducted prospective surveillance for RGM isolates from Center A patients through the local laboratory. We collected environmental specimens for mycobacterial culture, performed pulsed-field

gel electrophoresis (PFGE) on patient and environmental isolates, and reviewed Center A's infection-control practices.

RESULTS: We identified 14 cases, 12 through interviews and two through prospective laboratory-based surveillance. Eight patients had facial implants; three had breast implants; and three had facelifts. Among six patient RGM isolates, five were *Mycobacterium chelonae*, of which three matched by PFGE, and one was *Mycobacterium abscessus*. *Mycobacterium chelonae* was isolated from a surgical faucet, and *M. abscessus* from autoclave water. Patient and environmental isolates did not match by PFGE. Center A's infection-control deficiencies included incorrect instrument and implant sterilization procedures and use of nonsterile tissue-marking agents during surgery.

CONCLUSIONS: Deficiencies in Center A's infection-control practices likely caused this outbreak. We directed the surgeon to correct deficiencies and hire a certified infection-control consultant. In California, infection-control regulation of physician-owned ambulatory surgery centers is lacking. Such regulation might help prevent similar RGM SSI outbreaks.

KEYWORDS: atypical mycobacteria, soft-tissue infections, infection control, plastic surgery, disease outbreaks

Monday — Friday Poster Session

MEET THE AUTHORS

Ravinia Ballroom
12:30 p.m.–1:30 p.m.

Posters 1–15:
Poster Session 1: Analyze This

Posters 16–30:
Poster Session 2: Analyze That

POSTER 1

Murine Manor: An Investigation of the Peridomestic Environment in Association with the Emergence of Murine Typhus in Austin, Texas, USA

AUTHORS: *Jennifer Adjemian, S. Parks, K. McElroy, J. Campbell, W. Nicholson, M. Eremeeva, J. McQuiston, C. Jasso, J. Taylor*

BACKGROUND: In August 2008, CDC was notified about an outbreak of murine typhus affecting 34 persons in Austin, Texas. Murine typhus, a flea-borne zoonosis caused by *Rickettsia typhi,* had been rarely reported from this area during the last 25 years To complement the clinical investigation conducted by Texas Department of State Health Services, CDC launched an environmental investigation to assess potential animal reservoirs and peridomestic factors that may have contributed to disease emergence

METHODS: Household environmental site assessments (ESA) were performed and blood samples and ectoparasites were obtained from domestic and wild animals at consenting case-patients' homesites. Specimens were evaluated at CDC for evidence of infection.

RESULTS: ESAs were completed for 21 households representing 22 case-patients; 20 (95%) households had obvious evidence of wildlife or wildlife attractants such as compost piles on the property. Antibodies to *R. typhi* were detected, in 3 (18%) cats, 4 (44%) dogs, and 12 (67%) opossums; none of 4 rats tested were positive. Thirteen (68%) seropositive animals came from two contiguous zip codes where 12 (35%) of all human cases occurred. The majority of fleas (n=98, 66%) were collected from opossums, and almost all (n=123, 83%) were identified as cat fleas.

CONCLUSION: Although rats are historically considered a major wildlife reservoir of

R. typhi, the current outbreak appears more strongly associated with opossums and domestic animals. These findings support similar observations from other contemporary urban *R. typhi* foci. Findings were incorporated into public health messages for the general public in the Austin-Travis County area. The continuing detection of case-patients suggests that murine typhus may now be established in area wildlife and should be considered an ongoing public health threat.

KEYWORDS: Murine typhus, Rickettsia typhi, fleas, environment, wildlife

POSTER 2
Treatment Outcomes of HIV-Infected Adults Enrolled in the National Antiretroviral Therapy Program — Mozambique, 2004–2007

AUTHORS: *Andrew F. Auld, F. Mbofana, M. Sanchez, C. Alfredo, R. Shiraishi, L. Nelson, T. Ellerbrock*

BACKGROUND: In Mozambique, 85,000 HIV-infected adults (>14 years old) initiated antiretroviral therapy (ART) during 2004–2007. Attrition [the percentage of patients who die, are lost to follow-up (LTFU), or stop ART] at 6 and 12 months of follow-up is an important measure of ART program quality. Mean attrition in African ART programs has been estimated as 21% at 6 months and 25% at 12 months.

METHODS: We conducted a retrospective cohort study to assess treatment outcomes among a nationally representative sample of adult patients initiating ART during 2004–2007. Of 94 ART sites with >50 adults receiving therapy, 30 were selected by probability-proportional-to-size sampling; 2,596 medical records at these sites were randomly selected for data abstraction. After controlling for survey design, we determined baseline patient characteristics, attrition and factors affecting attrition.

RESULTS: At ART initiation, median age was 34 years, 62% of patients were female, and most patients had advanced disease; 66% had CD4+ counts <200 cells/μL. Patient malnutrition was common; 28% were underweight [body mass index (BMI) <18.5]. Attrition at 6 and 12 months of follow-up was 14% and 21%, respectively: 10% and 15% were LTFU, 4% and 5% had died, and 0% and 1% had stopped ART. In bivariate analysis, baseline CD4+ counts <200 cells/μL (OR 1.60; p=0.0022) and BMI's <18.5 (OR 3.35; p<0.0001) were risk factors for attrition at 6 months.

CONCLUSION: In Mozambique, attrition at 6 and 12 months is low compared with reports elsewhere in Africa. Over the first 12 months of ART, most attrition occurs within 6 months. Initiating ART before CD4+ counts fall below 200 cells/μl and improving nutritional support for underweight patients could reduce this early attrition.

KEYWORDS: Highly Active Antiretroviral Therapy, Mozambique, Adults

POSTER 3
How Severe Is the Blood Shortage? Blood Distribution in Georgetown, Guyana, November 2007

AUTHORS: *Sridhar V. Basavaraju, J. Pitman, C. Harry, C. McEwan, L. Hasbrouck, N. Henry, L. Marum*

BACKGROUND: In Guyana, with high burdens of malaria-associated anemia and postpartum hemorrhage, blood shortages can cause substantial morbidity. Inaccurate blood shortage estimation may impair the ability to set appropriate blood collection targets. The National Blood Transfusion Service (NBTS) supplies blood nationwide and approximately 80% of units are delivered to Georgetown Public Hospital Corporation (GPHC). Preliminary review of NBTS records suggested nearly 60% of GPHC's November 2007 requests were not

delivered. In January 2008, we investigated the extent of the apparent shortfall.

METHODS: NBTS maintains three paper-based registers: units requested, cross-matched units issued, and units returned unused. In October 2007, NBTS instituted expanded Blood Request Forms (BRFs) allowing matching of patient data with issued units. BRFs are filed as cancelled before issuing, issued and delivered, or issued but not retrieved by ward. We performed a retrospective review and descriptive analysis of registers and BRFs for November 2007.

RESULTS: NBTS rejected BRFs for 21 units due to incomplete data. Of the 1,307 other GPHC-requested units, 736 were not delivered and assumed to be a "shortage." However, 482/1,307 were cancelled by GPHC before issuing, leaving 825/1,307 requested units. NBTS issued 657/1,307 units with 571/657 issued and delivered and 86/657 issued but not retrieved by wards and returned to inventory, leaving a shortage of 168 units. Of 571 issued and delivered units, 144 were returned unused. Because 116/144 units were reissued and transfused within November, the actual shortage was not 736, but 52 units.

CONCLUSIONS: Though a blood shortage occurred, the extent was not as severe as initially estimated. We recommended a prospective request audit to accurately estimate annual demand and computerized blood bank tracking systems to improve accounting. Key words: blood, blood transfusion, blood banks, Guyana

KEYWORDS: blood, blood transfusion, blood banks, Guyana

POSTER 4
Probable Transmission of Norovirus among Passengers during Air Travel—United States, 2008

AUTHORS: *Jennifer E. Cortes, H. Kirking, S. Burrer, J. Zipprich, D. Fishbein, A. Hall, N. Cohen, U. Parashar, J. Magri*

BACKGROUND: Norovirus is the leading cause of acute gastroenteritis outbreaks worldwide; however, little is known about the risk during air travel. On October 8, 2008, a California-based tour group boarded a flight from Boston to Los Angeles that included several travelers ill with gastroenteritis, later confirmed as being caused by norovirus genogrou<<<II. Six travelers experienced diarrhea and vomiting while on board, resulting in an emergency flight diversion to Chicago within 3 hours of departure. An investigation was initiated to assess potential in-flight transmission of norovirus to non-tour group passengers.

METHODS: Phone interviews were conducted using passenger locator information. Probable cases of norovirus were defined as persons with vomiting and/or diarrhea (≥3 loose stools in 24 hours) with onset 1–5 days following the flight. Stool samples were solicited and tested for norovirus by RT-PCR (reverse transcription-polymerase chain reaction). Confirmed cases had positive norovirus RT-PCR results. Risk factors assessed included age, sex, bathroom use, hand hygiene practices, and seat location.

RESULTS: Of 106 non-tour group passengers, 85 (80%) were interviewed. Seven (8%) met the probable case definition. Of these, five (71%) submitted stool samples 8–12 days after illness onset, of which one tested positive for norovirus genogroup II. Age >65 years (relative risk [RR]: 5.6; 95% confidence interval [CI]: 1.5–21.6) and aisle seat (RR: 11.6; 95% CI: 1.5–91.7) were associated with illness.

CONCLUSIONS: Probable in-flight transmission of norovirus occurred among

passengers despite short flight duration, illustrating the high infectiousness of norovirus. Ill persons with gastroenteritis should be discouraged from boarding aircraft and seated in separate areas near bathrooms if identified during flight. Passengers should always exercise appropriate hand hygiene after bathroom use.

KEYWORDS: gastroenteritis, norovirus, aircraft, travel, transmission

POSTER 5
Two Simultaneous Multidrug-Resistant Tuberculosis Outbreaks — Federated States of Micronesia, 2007–2008

AUTHORS: *Mitesh A. Desai, R. Song, D. Fred, M. Ekiek, A. Heetderks, B. Pavlin, R. Brostrom, S. Mase, M. Haddad, S. Bamrah*

BACKGROUND: Inconsistent adherence and incorrect treatment regimens promote acquisition of tuberculosis (TB) drug resistance. Preventing multidrug-resistant TB (MDR TB), i.e., resistant to isoniazid and rifampin — the two best drugs for TB, requires directly observed therapy (DOT). Curing MDR TB requires expensive second-line drugs. In response to the first reported MDR TB cases and deaths in Chuuk, Micronesia, we conducted an investigation to prevent further transmission.

METHODS: An outbreak case was defined as culture-confirmed MDR TB disease in a Chuuk resident during January 2006–July 2008. We abstracted medical records including *Mycobacterium tuberculosis* genotypes, interviewed patients (by proxy if deceased) about their contacts, and evaluated them with standard clinical methods.

RESULTS: Among five MDR TB cases, two simultaneous outbreaks with distinct genotypes, drug susceptibilities, and transmission chains were identified. Outbreak A (n=2), caused by a three-drug resistant strain, occurred in a family with prior TB cases having non-MDR two-drug resistance but matching genotypes. These patients had not received DOT and had taken medications inconsistently. Outbreak B (n=3) strain's genotype had not been previously documented in Chuuk; the index patient's history suggested exposure as a migrant worker. Without second-line drugs available, four (80%) of five patients died after prolonged infectious periods. Of 195 named contacts, seven (4%) had findings suggestive of MDR TB disease; 104 (53%) had latent TB infection.

CONCLUSIONS: Extensive and ongoing transmission of MDR TB was documented in Chuuk and was exacerbated by the lack of DOT and second-line drugs. Outbreak A was attributed to acquired drug resistance; Outbreak B probably started with imported infection. Establishing DOT and procuring second-line drugs will be necessary to end these outbreaks and prevent future ones.

KEYWORDS: tuberculosis; multidrug-resistant; disease outbreaks; contact tracing; Micronesia; genotype

POSTER 6
Results of a Pneumonia and Diarrhea Healthcare Utilization Survey – Egypt, 2008

AUTHORS: *Meredith Deutscher, A. Seitz, T. Taylor, X. Zhang, E. Dueger, A. Mansour, C. Van Beneden*

BACKGROUND: Pneumonia and diarrhea are leading causes of disease and death worldwide. The Egyptian government and CDC's International Emerging Infections Program are developing population-based surveillance to accurately monitor these illnesses. We conducted a healthcare utilization survey in Egypt's Damanhour District to estimate disease prevalence regardless of whether care was

sought and identify facilities where surveillance should be established.

METHODS: We randomly selected 1200 urban households and 2070 households among randomly selected villages in rural Damanhour using ArcGIS and Google Earth high resolution imagery. A household census was obtained and primary caregivers questioned about each member's episode of pneumonia (in previous 12 months), diarrhea (in previous 30 days), and healthcare seeking behaviors when ill.

RESULTS: The survey was completed by 1071 (89%) urban and 1942 (94%) rural households from June—September 2008. Pneumonia was reported by 2.3% and 1.3% of persons in urban and rural households, respectively; 4.7% and 3.2% of persons in urban and rural households, respectively, reported diarrhea in the previous month. Among persons with pneumonia, most (63% urban, 54% rural) sought care with private providers while 38% (urban) and 41% (rural) visited a hospital. Among persons with diarrhea, a minority of ill residents sought care through hospitals (11% urban, 12% rural) or private providers (15% urban, 14% rural); however, approximately 41% of all persons with diarrhea sought care from a pharmacist.

CONCLUSIONS: Most residents in urban and rural Damanhour did not seek health care for pneumonia or diarrhea in hospitals, a generally convenient setting for population-based surveillance. More representative data on diarrhea and pneumonia in Egypt might be obtained through establishing surveillance in alternative healthcare settings such as primary providers and pharmacies.

KEYWORDS: healthcare utilization survey, pneumonia, diarrhea, population-based surveillance, Egypt

POSTER 7
Outbreak of Carbapenem-Resistant *Klebsiella pneumoniae* Associated with a Novel Carbapenemase Subtype – Puerto Rico, 2008

AUTHORS: *Christopher J. Gregory, E. Llata, N. Stine, A. Cortes, M. Ramos, A. Srinivasan, C. Gould, K. Tomashek*

BACKGROUND: Carbapenem resistance among gram-negative bacteria is an emerging public health threat as carbapenems are the last treatment option for many serious bacterial infections. Carbapenem resistance mediated by *Klebsiella pneumoniae* carbapenemases (KPCs) was first documented in 2001 and is now endemic in New York City and Israel, but remains uncommon elsewhere. We describe our investigation of the first carbapenem-resistant *Klebsiella pneumoniae* (CRKP) outbreak in Puerto Rico.

METHODS: Cases were defined as patients admitted to Hospital A between February 1 and September 18, 2008 with CRKP isolated at least 48 hours after admission. Case finding during this period was performed via laboratory database and chart review. A case-control study was conducted using two control groups: hospitalized patients without *K. Pneumoniae* and patients with carbapenem-susceptible *K. Pneumoniae* (CSKP). Multivariate logistic regression was performed using variables with p values ≤0.1 on univariate analysis. *K. Pneumoniae* isolates were typed by PFGE and typing of the KPC enzyme. Active surveillance cultures and cohorting of infected/colonized patients were initiated to prevent further transmission.

RESULTS: We identified 26 case-patients. Case-patients were more likely to have wounds than general controls (adjusted OR [aOR]=73.6) or CSKP controls (aOR=7.7). Case-patients were more likely than CSKP controls to have been transferred between floors (aOR=12.1). Five of eight *K. Pneumo-*

niae isolates had identical PFGE patterns, and KPC sequencing of these isolates identified a previously undescribed KPC subtype (blaKPC-8). No further case-patients were identified after the initiation of active surveillance and patient cohorting.

CONCLUSIONS: This was the first outbreak of CRKP reported in Puerto Rico and was associated with intrahospital patient transfers. Active surveillance and cohorting of patients with carbapenem-resistant *Enterobacteriae* may be valuable in controlling ongoing outbreaks.

KEYWORDS: *Klebsiella pneumoniae*, antibiotic resistance, outbreaks, *Enterobacteriae*, carbapenemase, hospital infections

POSTER 8
Field Evaluation of Crystal VC® Rapid Dipstick Test for Cholera During a Cholera Outbreak in Guinea-Bissau

AUTHORS: *Julie R. Harris, E. Cavallaro, A. Nobrega, J. Barrado, C. Bopp, M. Parsons, D. Djalo, F. Gomes da Silva Fonseca, U. Ba, A. Semedo, J. Sobel, E. Mintz*

BACKGROUND: Epidemic cholera strikes frequently and unpredictably in sub-Saharan Africa. Stool culture, the diagnostic gold standard, is often delayed in settings with limited laboratory capacity; a rapid diagnostic test could facilitate outbreak control. During a recent epidemic in Guinea-Bissau, we evaluated characteristics and ease of use of the Crystal VC® Rapid Dipstick test (VC), a new rapid test for *Vibrio cholerae*.

METHODS: From August 29-September 10, 2008, 99 patients were enrolled at a Bissau hospital. The VC was performed on whole stool; samples were sent to CDC for PCR and culture. Sensitivity (SN), specificity (SP), positive (PPV) and negative (NPV) predictive values of VC were assessed. Test performance by local health workers was assessed at three clinics.

RESULTS: Among a first batch of 43 samples, *V. cholerae* O1 was isolated from 29 (67%); 28 (97%) were PCR-positive, and 27 (93%) were VC-positive. *V. cholerae* was not isolated from 14 samples; 13 (93%) were PCR-negative and 9 (64%) were VC-negative. Only seven (13%) of 56 samples in the second batch were culture-positive; however, technical issues compromised many specimens. All seven were PCR-positive and VC-positive. Among the 49 culture-negative samples, 31 were PCR-positive of which 30 (97%) were VC-positive; 18 were PCR-negative, of which 14 (78%) were VC-negative. Among the 43 first-batch samples with culture results, VC characteristics were: SN 93%; SP 64%; PPV 84%; NPV 82%. Among 99 samples with PCR results, VC characteristics were: SN 97%; SP 75%; PPV 89%; NPV 92%. Four local health workers performed the test and interpreted results correctly.

CONCLUSION: The highly sensitive and specific VC may be useful in detection of *V. cholerae* O1 outbreaks when laboratory capacity is limited.

KEYWORDS: cholera, rapid test

POSTER 9
Escherichia coli O157:H7 Infections Associated with a Youth Hunting Event — Tennessee, 2008

AUTHORS: *Jennifer K. MacFarquhar, J. Dunn, S. Copeland, W. Schaffner, T. Jones*

BACKGROUND: *Escherichia coli* O157:H7, a Shiga toxin-producing *E. coli* (STEC), is a leading cause of hemolytic uremic syndrome (HUS). Novel sources of *E. coli* O157 infection continue to be identi-

fied. We investigated an outbreak of *E. coli* O157 associated with a youth hunting event held October 24–25, 2008, at a Tennessee county fairground.

METHODS: We performed a retrospective cohort study, interviewing event attendees regarding activities and food consumed. We defined a confirmed case as laboratory evidence of STEC or HUS, occurring ≤10 days after the event. Probable cases were defined as bloody diarrhea or diarrhea lasting >24 hours occurring during the same period in an event attendee. We cultured food and environmental specimens. Multivariate analysis and logistic regression were computed by using SAS®.

RESULTS: Of 374 registered attendees and volunteers, 186 (50%) were interviewed. Three confirmed cases and nine probable cases were identified (median age, 22 years; range, 4–46 years). Illness onsets ranged from October 25 to November 3. One of two hospitalized HUS patients had culture-confirmed *E. coli* O157 infection. Eleven patients had eaten a noon meal on October 25. Nine (75%) patients reported having eaten pulled buffalo meat (risk ratio: 5.08; 95% confidence interval [CI], 1.13–22.87). Controlling for other suspected food items, multivariate analysis revealed that consumption of buffalo meat (odds ratio: 5.51; 95% CI, 1.15–26.25) was a significant risk factor. Screening of environmental samples indicated a high level of contamination with STEC in the barn where attendees had eaten.

CONCLUSIONS: Environmental contamination at the site of food consumption contributed to this outbreak. Food should not be consumed in locations used for animal housing.

KEYWORDS: *Escherichia coli* O157, STEC, diarrhea, outbreak, hemolytic uremic syndrome, fairground, buffalo

POSTER 10
A Slow and Steady Problem: Another Multistate Outbreak of Human *Salmonella* Infections Associated with Pet Turtle Exposure — United States, 2008.

AUTHORS: *Karen P. Neil, A. Patel, G. Han, C. Barton Behravesh, Salmonella* **Typhimurium Investigation Team.**

BACKGROUND: Small turtles are an important source of human *Salmonella* infections, especially in children. Despite the 1975 federal prohibition against sales of small turtles (with carapace lengths <4 inches), large, multistate *Salmonella* outbreaks associated with these turtles continue. Fewer than five states have regulations prohibiting small turtle sales. In September 2008, state and local public health agencies and CDC investigated a possible turtle-associated multistate outbreak of *Salmonella* Typhimurium infections.

METHODS: A case was defined as an infection in a person with outbreak strains of *Salmonella* Typhimurium with illness between 3/13/2008-11/04/2008. We conducted a multistate case-control study using age- and geographically-matched controls to investigate exposure to turtles and other animals. Turtle environments were cultured for *Salmonella*.

RESULTS: One hundred and thirty-two cases were reported from 25 states and DC; 29 (36%) of 81 were hospitalized. Twenty-eight (41%) of 67 primary cases were in children aged <5 years. Twenty (27%) of 74 cases attended daycare; nine cases in three Pennsylvania daycares resulted from person-to-person transmission from separate index cases with turtle exposure. In the case-control study, 17 (47%) of 36 cases reported turtle exposure during the week before illness began, versus nine (20%) of 44 controls (matched odds ratio=15.5; 95% confidence

interval=2.1-683.7). Fifteen (94%) of 16 cases reported small turtle exposure. Three environmental samples tested positive for an outbreak strain.

CONCLUSIONS: Despite the 1975 federal ban, salmonellosis associated with small turtles remains an ongoing public health problem, especially in young children. CDC recommends that children aged <5 years not have direct contact with turtles and other reptiles. Enacting state and local legislation prohibiting small turtle sales could strengthen public health efforts to prevent turtle-associated salmonellosis.

KEYWORDS: *Salmonella*, turtles, reptiles, outbreaks, children

POSTER 11
Emergence of Murine Typhus — Austin, Travis County, Texas, 2008

AUTHORS: *Sharyn E. Parks, J. Adjemian, K. McElroy, J. Campbell , J. McQuiston, C. Jaso, M. DaSilva, W.L. Nicholson, M. Eremeeva, P. Raj*

BACKGROUND: Murine typhus is a rickettsial disease typically maintained in rodent-flea cycles. Although endemic in southern Texas during 1998–2007, only two cases were reported in Travis County. Beginning in March 2008, an outbreak of typhus was identified in Austin. To confirm the causative agent and assess severity of the outbreak strain, an investigation was conducted.

METHODS: For this descriptive study, clinical information from reports to the local health department during March 1–November 1, 2008, were reviewed. Confirmed cases were defined as having laboratory confirmation of murine typhus and fever (≥38°C) with either headache, rash, or myalgia. Suspect cases had consistent clinical symptoms without laboratory confirmation. Case follow-up included patient interviews, medical chart reviews, and collection of serum and blood specimens for laboratory testing.

RESULTS: A total of 30 confirmed and four suspect cases were identified. Onsets ranged from March to October, with 71% occurring during May–August. The median age was 37.5 years, and 53% were white males. Sixty-eight percent were hospitalized, with 27% admitted to intensive care. Only one patient was hospitalized with a diagnosis of possible rickettsial illness. Serious complications, including renal failure and coagulopathy, occurred among 26.5% of patients. No patients died. The median time from symptom onset to prescription of correct antibiotics was 8 days (range, 0–19).

CONCLUSIONS: Reasons for emergence of murine typhus in Travis County are unknown. Delays in recognition and diagnosis of the illness likely explain the high rate of severe illness in this cluster. Efforts to increase awareness of physicians about the risk and symptoms of murine typhus infections can improve the public health response time in the event of future outbreaks.

KEYWORDS: murine typhus, *Rickettsia typhi*, diagnosis, symptoms, complications

POSTER 12
Designing HIV Prevention Programs for Persons Living with HIV— San Salvador, El Salvador, 2008

AUTHORS: *Neha S. Shah, M. Guardado, J. Creswell, F. Hernandez, S. Cienfuegos, A. Kim, T. Diaz, E. Kim, E. Monterroso, G. Paz Bailey*

BACKGROUND: Prevention is the cornerstone of the fight against HIV infection. As increasing numbers of people living with HIV (PLWH) receive treatment, prevention programs need to enhance strategies to help

PLWH given their critical role in preventing further HIV transmission. In El Salvador, data needed to design prevention programs for PLWH are sparse. To inform such prevention programs, we assessed risky behaviors among PLWH in San Salvador.

METHODS: During March–September 2008, we interviewed PLWH receiving outpatient or support services from two large hospitals to obtain data on demographics and sexual behaviors. Frequencies of number of sexual partners, condom use during most recent sexual encounter, and HIV disclosure were measured for stable and casual partners. Correlates of condom use with HIV-negative partners were assessed by multivariate analysis.

RESULTS: Of 1,158 eligible persons, 812 consented to participate (median age 35 years): 17% had >1 partner during the past year. Of 519 participants with stable partners and 270 with casual partners, 38% and 49%, respectively, reported HIV-negative partners; 11% and 35%, respectively, reported partners of unknown HIV serostatus. Most participants reported condom use with their partners of unknown HIV serostatus or negative status: 78% with stable partners; 74% with casual partners. HIV disclosure differed by type of partner: 66% of participants disclosed to stable partners; 14% disclosed to casual partners. Condom use with stable HIV-negative partners was associated with HIV disclosure (adjusted odds ratio=3.47, 95% confidence interval=1.35–8.95).

CONCLUSIONS: Most PLWH have partners of negative or unknown serostatus, and condom use with those partners is inconsistent. Prevention efforts should concentrate on encouraging 100% condom use and HIV disclosure with partners.

KEYWORDS: HIV, prevention, disclosure, condoms

POSTER 13
Not Just Blowing Smoke! An Intervention to Increase Use of Clean-Burning Stoves and Reduce Indoor Air Pollution in Rural Kenya

AUTHORS: *Benjamin J. Silk, C. Ochieng, J. Harris, B. Person, V. Were, B. Nygren, A. Obure, R. Quick, A. Cohen*

BACKGROUND: Over two million children under age 5 years die annually from pneumonia. Approximately one-third of pneumonia cases in developing countries are attributed to exposure to indoor smoke from solid cooking fuels. We evaluated an intervention to motivate women to purchase and use clean-burning stoves, which reduce indoor air pollution in Nyanza Province, Kenya.

METHODS: Members of women's groups were trained as vendors to sell clean-burning stoves as an income-generating activity in 11 villages (n=387 households). We randomly selected six of the 11 villages to receive supplemental education through listening (ETL) training, a behavior change intervention designed to help vendors sell stoves. We conducted baseline surveys on cooking practices during household visits in July 2008 and tracked ongoing sales. Using monitoring devices, we measured concentrations of particulate matter <2.5μm in diameter (PM2.5), the size that can enter lung alveoli and cause pneumonia, over 36-hour periods in 30 stove-using and 30 nonusing households.

RESULTS: At baseline, 99% of households cooked over open fire pits; most (79%) fire pits were located indoors. Vendors sold 252 stoves from July to December 2008 (range: 3-58 stoves per village). In villages where vendors received ETL, 193 (80%) of 241 households bought stoves, compared to 59 (40%) of 146 households in villages where ETL was not used (p<0.001). Preliminary results showed that average PM2.5 concen-

tration was lower in stove-using households compared to non-using households (0.24 vs. 1.14mg/m3).

CONCLUSIONS: Adoption of clean-burning stoves was accelerated in rural Kenyan communities by training women's groups on behavior change techniques designed to improve sales. Preliminary measurements of particulate matter suggest the potential for indoor air quality improvements in developing countries using practical and sustainable strategies.

KEYWORDS: pneumonia, indoor air pollution, Kenya, pediatric

POSTER 14
Factors Affecting Isolation of *Bordetella pertussis* — Hawaii, 2005

AUTHORS: *Meera V. Sreenivasan, T. Chen, H. He, J. Elm, M. Ching-Lee, J. Sasaki, SY. Park*

BACKGROUND: During 1976–2005, U.S. reported pertussis incidence increased from 0.5 to 8.6 cases/100,000 population despite high vaccination rates. Hawaii reported 11.6 cases/100,000 population in 2005. We analyzed 2005 surveillance data to determine factors associated with isolating *B. pertussis*.

METHODS: We reviewed cases reported to the Hawaii Department of Health in 2005, triggered either by clinical suspicion or laboratory testing for pertussis. We compared demographics, symptoms, and vaccination history between culture-positive and culture-negative patients. We calculated Wilcoxon scores for continuous variables and prevalence ratios (PR) for symptoms and vaccination history.

RESULTS: Of 401 suspected pertussis reports, 261 (65%) had nasopharyngeal samples submitted; 42/261 (16%) cultures were positive. Patients' ages ranged from 1 day to 84 years; 139/261 (53%) were aged <1 year. We identified no median age difference between culture-positive and culture-negative patients (P=0.6). Median cough duration from onset to time of specimen collection was greater for culture-positive than culture-negative patients (16 versus 11.5 days, P=0.002). Culture-positive patients were more likely to have inspiratory whoop (PR=1.44, 95% confidence interval [CI]=1.06–1.95), posttussive vomiting (PR=1.28, 95% CI=1.04–1.58), or paroxysmal coughing (PR=1.34, 95% CI=1.15–1.55). Among patients aged <1 year, vaccination history was unassociated with having a positive culture (PR=0.66, 95% CI=0.27–1.61). Among those aged ≥1 year, patients receiving ≥1 vaccine dose were less likely to have a positive culture than unvaccinated patients (PR=0.21, 95% CI=0.08–0.59).

CONCLUSIONS: *B. pertussis* is more likely to be isolated from patients with classic pertussis respiratory symptoms, or who are aged ≥1 year and unvaccinated. Clinicians should consider these factors in requesting culture and interpreting results. Healthcare providers should ensure appropriate pertussis vaccination.

KEYWORDS: Pertussis, Diagnosis, Symptoms, Vaccination, Culture

POSTER 15
Hunter-acquired *Brucella suis* Infection — Pennsylvania, Florida, and South Carolina, 2008

AUTHORS: *Kendra E. Stauffer ,E Hunt, C Nicorlardi, J Mincer, A Weltman, D Stanek, S Matthews, C Siegenthaler, C Blackmore, D Giurgiutiu*

BACKGROUND: Human brucellosis caused by *Brucella suis* has been historically common in abattoir workers exposed to infected swine, and can cause severe disease. The expansion of the USDA National Brucellosis Eradication Program to swine herds in 1972 resulted in a lower incidence

of brucellosis among commercial, but not feral, swine. In 2008, Pennsylvania, Florida, and South Carolina Departments of Health and CDC investigated three human *B. suis* case-patients.

METHODS: Case-patients, hunting companions, and their families were interviewed about hunting, carcass handling and meat preparation techniques. Available feral swine meat and diagnostic specimens from the case-patients were obtained for agglutination testing, culture and genotyping, as appropriate.

RESULTS: Case-patients had hunted feral swine in Florida in December 2007. No case-patient used PPE during field dressing or butchering of swine. Feral swine meat was cooked properly. *B. suis* was cultured from the blood of the Pennsylvania case-patient, from synovial fluid, joint aspirate, and blood of the South Carolina patient, and from two feral swine meat specimens from Pennsylvania. The Florida case-patient's serum agglutination test was positive. Analysis of the three Pennsylvania *B. suis* isolates at CDC by Multiple-Locus Variable-Number Tandem Repeat Analysis indicated a strong genetic correlation.

CONCLUSIONS: This investigation suggests that human infection with B. suis from feral swine was acquired during the field dressing or butchering processes since family members who prepared or consumed meat were not clinically affected. Using PPE during field dressing and butchering could have prevented infection. Public health education, partnering with sportsmen's associations and wildlife and agricultural agencies and focusing on brucellosis risk and appropriate PPE recommendations similar to those used in abattoirs, should prevent brucellosis in feral swine hunters.

KEYWORDS: Brucella, brucellosis, swine, Sus scrofa, animals wild

Monday, April 20, 2009

SESSION C:
On Deadly Ground — Environmental and Occupational Health

Ravinia Ballroom 1:30 a.m.–3:00 p.m.

MODERATOR: *Henry Falk*

1:35
Neighborhood Characteristics, Housing Development Type, and Mortality Among Public Housing Residents — New York City, 1999–2001

AUTHORS: *Hemanth P. Nair, K. Althoff, L. Thorpe, T. Matte*

BACKGROUND: Improving the health of socioeconomically disadvantaged populations is a major priority of the New York City (NYC) Department of Health (DOH). Recently, DOH found higher mortality rates among older, low-income public housing residents, compared with nonpublic housing residents. Within the public housing population, we evaluated whether neighborhood and development characteristics were associated with higher mortality.

METHODS: We analyzed a data set that linked death records for 1999–2001 NYC vital statistics with 2000 U.S. Census population statistics, neighborhood variables from NYC city planning and police departments, and building characteristics from the NYC housing authority. We used generalized estimating equations to evaluate associations between census-block–level natural-cause mortality among public housing residents aged ≥50 years and neighborhood factors (poverty, crime, pedestrian safety, and land-use mix), and development type (older high- and low-apartment density and newer low-apartment density) after controlling for age, sex, and race/ethnicity.

RESULTS: We evaluated age- and sex-specific death counts for 247 census-

blocks entirely comprising public housing (5,467deaths, 1,466 observations). Pedestrian safety, development type, and crime significantly improved the fit of a model containing only demographic factors (chi2=32.2; df=6; P<0.0001). We identified higher mortality rates in neighborhoods with high pedestrian-auto injuries (adjusted rate ratio [aRR], 1.2; 95% confidence limits [CL], 1.1, 1.7), high felony rates (aRR, 1.1; 95% CL, 1.1, 1.2), and in older high-apartment density (aRR, 1.4; 95% CL, 1.2, 1.6) and older low-apartment density (aRR, 1.2; 95% CL, 1.1, 1.4) developments relative to newer low-apartment density developments.

CONCLUSIONS: Relative to demographics, neighborhood and development characteristics have modest, but important associations with health among older public housing residents. Public health initiatives for reducing mortality rates should consider neighborhood safety and development design.

KEYWORDS: mortality; public housing; design, environment; residence characteristics; crime; poverty

1:55
Comortality from Pneumoconioses and Mycoses — United States, 1974-2004

AUTHORS: *Yulia Y. Iossifova, R. Bailey, J. Wood, K. Kreiss.*

BACKGROUND: Over 2 million U.S. workers are exposed to respirable crystalline silica in general industry, construction, mining and sandblasting. Inhalation of silica is associated with silicosis, a type of dust-induced lung disease or pneumoconiosis. The National Institute for Occupational Safety and Health received two requests for health hazard evaluations questioning whether silica-exposed workers are at increased risk of fungal infections. In response, we examined whether excess risk of mycosis exists among silicotics compared to the general population and other pneumoconiotics.

METHODS: We compared mycosis mortality in U.S. residents dying with any mention of silicosis as a cause-of-death (underlying or contributing) to those dying without mention of pneumoconiosis. We used data from the National Center for Health Statistics for 1974-2004. We restricted analysis to those dying at age ≥45 years, because silicosis has at least a 20-years latency. We examined the specificity of the mycosis comortality with silicosis by comparing to mycosis co-mortality with asbestosis and CWP.

RESULTS: Prevalence ratios and 95% confidence intervals (CI) for risks of dying with any mycosis in decedents with silicosis, asbestosis, or CWP were 4.5 (CI=3.4-6.0), 1.5 (CI=1.2-2.0), and 1.0 (CI 0.8-1.2), respectively. Mycosis tended to be a more likely underlying cause of death among decedents with silicosis compared to asbestosis (OR=1.8; CI=0.81–3.9), but not to CWP (OR=1.1; CI=0.51–2.3). Most common mycoses among silicosis decedents were pulmonary Aspergillosis (42%), Cryptococcosis (15%) and Coccidioidomycosis (12%).

CONCLUSIONS: Health professionals should consider this increased risk of mycosis for preventive interventions, differential diagnosis, and mycosis treatment in silica-exposed workers. Measures to protect silica-exposed workers include: decreasing silica exposures, wetting soil and bird droppings to suppress fungi-contaminated dust, and respiratory protection.

KEYWORDS: asbestosis, coal workers pneumoconiosis (CWP), mycosis, silicosis

2:15
Maternal Residential Proximity to Traffic and Small for Gestational Age Births by Sex — Utah, 2000–2005

AUTHORS: *Renee M. Calanan, S.D. LeFevre, R.T. Rolfs, D. Bensyl, M. Friedrichs*

BACKGROUND: Air-pollutant exposure has been associated with adverse pregnancy outcomes. Other exposures (e.g., maternal smoking) have been reported to affect fetal growth more for males than for females, but sex-specific effects of air-pollutant exposure on small for gestational age (SGA) births have not been well-studied.

METHODS: We conducted a cross-sectional study using 2000–2005 birth record data from four urban counties in Utah. Live, singleton births with 22–44 weeks gestation and no genetic anomalies and mothers aged 18–44 years with no reported alcohol, tobacco, or illicit substance use during pregnancy, diabetes, or hypertension were included. Multivariable logistic regression models were used to evaluate associations between a surrogate measure of exposure to motor-vehicle exhaust pollutants (maternal residence within 250 meters of a highway or secondary roadway) and SGA births (weight less than the sex-specific10th percentile).

RESULTS: We identified 7,267 (9.0%) SGA infants among 81,188 male births and 6,918 (8.9%) SGA infants among 78,125 female births. Preliminary results showed that sex modified the association between residential proximity to traffic and SGA (p = 0.007). After adjustment for mother's age, race/ethnicity, education level, body mass index, marital status, number of previous live births, and chronic conditions, an increased risk for SGA associated with residential proximity to traffic was identified for males (adjusted odds ratio [aOR], 1.09; 95% confidence interval [CI], 1.03–1.15) but not females (aOR, 0.98; CI, 0.93–1.04).

CONCLUSIONS: These results reveal an association between a surrogate measure of exposure to motor-vehicle exhaust pollutants and SGA births that differs by sex. This study provides Utah-specific evidence to be used in local policymaking decisions and in development of local public health recommendations and healthcare guidelines.

KEYWORDS: infant, small for gestational age; pregnancy; air pollution; vehicle emissions

2:35
Histoplasmosis Infections Associated with a Demolition Site — Iowa, 2008

AUTHORS: *Mary E. Fournier, P. Quinlisk, A. Garvey*

BACKGROUND: Histoplasmosis is a fungal infection caused by inhalation of aerosolized spores of *Histoplasma capsulatum*. Although infections are sometimes asymptomatic, severe disease and death can occur. In October 2008, three weeks after being involved with demolishing a bat-infested attic, four ill Iowa workers received diagnoses of histoplasmosis. An investigation was conducted to define the scope of the outbreak, identify risk factors, and develop prevention and control measures.

METHODS: A retrospective cohort study was conducted among workers and visitors within the building that housed the demolition project. Each participant provided a blood sample and completed a standardized questionnaire. Consistent with previous outbreaks, a laboratory-confirmed case was defined by detection of antibody by micro-immunodiffusion or complement fixation ratio of ≥1:32.

RESULTS: Of the 60 workers and visitors in the building, 32 (53%) had confirmed infection. Among patients, 23/32 (70%) reported symptoms; one required hospitalization. Attack rate was similar among workers (10/21 = 48%) and visitors (22/39 = 57%) (P = 0.59). Among workers, eight (38%) had worn respiratory personal protective equipment (PPE) (full or half-face respirator or dust mask); two had worn PPE throughout the project. PPE use among workers was associated with increased infection (relative risk, 2.44; 95% confidence interval, 0.98–6.05), indicating inadequate use. Among visitors with infection, 19 (86%) had been near the construction site for <1 hour; none had worn PPE. Workers neither wet down their clothing before undressing, nor changed clothes before leaving work.

CONCLUSIONS: PPE does not provide protection against histoplasmosis if used incorrectly or inconsistently. Recommendations for prevention include correct use of PPE through training, safe handling of dusty work clothes, and limiting access to demolition sites to essential personnel.

KEYWORDS: histoplasmosis, mycoses, respiratory protective devices, occupational exposure

MONDAY, APRIL 20, 2009

SESSION D:

Little Rascals — Children's Health

Ravinia Ballroom 3:15 p.m.–5:20 p.m.

MODERATOR: *Karen Steinberg*

3:20

Outbreak of *Escherichia coli* O157:H7 Infections at a Summer Camp Facility—Virginia, 2008

AUTHORS: *Katie M. Kurkjian, S. Levine, J. Falk, M. McMahan, E. Luckman, A. Chu, D. Sockwell, C. Novak, J. Yang, D. Larsen, D. Woolard*

BACKGROUND: *Escherichia coli* O157:H7 (*E. coli* O157) accounts for 70,000 infections annually in the United States. Children are more likely to experience severe complications, such as hemolytic uremic syndrome. In July 2008, Virginia Department of Health investigated an *E. coli* O157 outbreak at a camp facility to identify the source and prevent additional illness.

METHODS: We conducted a retrospective cohort study, environmental inspections, and laboratory analysis of stool specimens, leftover food, and environmental samples. A case was defined as illness in a person visiting the facility July 20–26, 2008, with either a laboratory-confirmed Shiga toxin-producing E. coli (STEC) infection or diarrhea and one or more symptoms of fever, vomiting, nausea, or abdominal cramps.

RESULTS: During the outbreak period, 1,600 persons attended camp activities. Of 538 survey responders, 59 (11%) met the case definition; 34 had laboratory-confirmed STEC. Ill persons had a median age of 13 years (range: 10–66 years) and were identified from four of six campsites. Participants in a traditional campfire meal where raw ground beef was cooked by campers were six times (relative risk: 6.0; 95% confidence interval: 1.9–19.2) as likely to become ill as nonparticipants. The campsites with no ill persons received ground beef in pre-portioned patties, compared with bulk form for other campsites. *E. coli* O157 cultured from leftover beef was indistinguishable from 14/19 (74%) stool specimens tested by pulsed-field gel electrophoresis. *E. coli* O157 was not detected in water or swabs of commonly used surfaces.

CONCLUSIONS: Consuming undercooked, contaminated ground beef likely caused the outbreak. Future illness can be prevented by cooking foods thoroughly and modifying campfire foods to include precooked or ready-to-eat meat products.

KEYWORDS: Shiga toxin-producing *Escherichia coli, Escherichia coli,* disease outbreaks

3:40
Medication Overdoses Leading to Emergency Department Visits Among Children and Adolescents

AUTHORS: *Sarah F. Schillie, N. Shehab, K. Thomas, D. Budnitz*

BACKGROUND: Outpatient medication use is increasingly common, with 82% of adults and 56% of children taking at least one medication every week. The high frequency of medication use increases the potential for medication overdoses in ambulatory settings, especially among children. We sought to describe the burden of unintentional outpatient pediatric medication overdoses to target new prevention efforts.

METHODS: We analyzed data from the National Electronic Injury Surveillance System (NEISS) to estimate the number of emergency department (ED) visits from unintentional medication overdoses among children aged 18 years and younger. We categorized the overdose cause as either unsupervised ingestion, error, or misuse. We analyzed these data by patient demographics and implicated products, and compared them to visits for non-pharmaceutical consumer product poisonings.

RESULTS: An estimated 71,224 ED visits for medication overdoses were made annually by children, representing 68.9% of visits for unintentional pediatric poisonings. The rate of unintentional poisonings from medications was twice that from non-pharmaceutical consumer products (9.2 visits per 10,000 individuals per year [95% CI, 7.3–11.0] vs. 4.2 visits per 10,000 individuals per year [95% CI, 3.3–5.0]). Four-fifths (81.7%) of visits for medication overdoses were from unsupervised ingestions, while medication errors and misuse caused 7.8% and 7.0% of visits, respectively. Most visits (81.3%) involved children aged 5 years and younger. Medications commonly available over-the-counter accounted for one-third (33.9%) of visits.

CONCLUSIONS: Medication overdoses among children, notably unsupervised ingestions, represent a substantial public health burden. New efforts to prevent injuries from pediatric medication overdoses are needed. Engineering strategies to prevent unsupervised ingestions, such as packaging innovations, would likely have the largest impact in reducing the burden of outpatient pediatric medication overdoses.

KEYWORDS: medication overdose, poisoning, injury prevention, medication error

4:00
Dental Disease in Rural Alaska Native Children, 2008: Characterization of a Health Disparity and Public Health Strategies for Prevention

AUTHORS: *Kathy K. Byrd, F. Husain, M. Bruce, D. Bruden, S. Rolin, E. Beltran, C. Jones, M. Swanzy, J. Klejka and T. Hennessy*

BACKGROUND: Alaska Native (AN) children have high rates of dental caries. Children with early childhood caries are at higher risk for future caries and poor height and weight development. We evaluated dental caries and associated risk factors in rural AN children in region A, where 1/3 of villages lack in-home running water and <10% have fluoridated water.

METHODS: We estimated dental caries prevalence and severity using the decayed, missing or filled primary (dmft) and permanent teeth (DMFT) oral examination indices, in a convenience sample of children 4-15 years in 5 region A villages (fluoridated villages

n=118 participants; non-fluoridated=237). Risk factor information was obtained through parental questionnaires and analyzed by logistic regression.

RESULTS: 86% of children 4-5 years had dental caries or sequelae with mean dmft of 8.25 (95%CI=6.68,9.81) and mean untreated decay of 3.23 (95%CI=1.76,4.68). Filled teeth made up the largest proportion of dmft for this age group; mean of 4.09 (95%CI=2.84,5.34). 91% of children 12-15 years had dental caries or sequelae with mean DMFT of 4.97 (95%CI=4.15,5.78) and mean untreated decay of 2.61 (95%CI=2.09,3.12). Mean U.S. estimate for DMFT and untreated decay for this age group is 1.78 and 0.36 respectively. For primary and permanent teeth, a higher proportion of dmft/DMFT was associated with lack of fluoridated water (both adjusted p<0.0001). Children with higher daily soda-pop consumption had greater proportions of dmft/DMFT (both primary and permanent adjusted p≤0.04).

CONCLUSION: Alaska Native children in our sample have higher caries prevalence than other U.S. children. Lack of water fluoridation and soda-pop consumption were significantly associated with dental disease. To decrease tooth decay, increased access to fluoridated water and decreased soda-pop consumption should be considered.

KEYWORDS: oral health, dental caries, dental public health, fluoridation, Alaska Native,

4:20
Evaluation of Tuberculosis Screening Approaches among HIV-infected Children — Rwanda, 2008

AUTHORS: *Rinn Song, S. Toney, H. Menzies, G. Vandebriel, D. Akishuri, I. Habimana, A. Finlay, O. Mukabayire, A. Ayaba, K Cain, J. Mazurek, V. Nizeyimana, M. Kramer, M. Gasana*

BACKGROUND: Tuberculosis (TB) is the leading cause of death among HIV-infected persons in resource-limited settings. The World Health Organization recommends TB screening for all persons with HIV infection. TB diagnosis in children is difficult because microbiologic confirmation is often lacking; evaluation focuses on chronic symptoms or TB contact history. Data are needed to determine yield of TB screening in HIV-infected children and to develop an evidence-based approach to TB screening.

METHODS: During March–June 2008, we enrolled HIV-infected children in 3 HIV/AIDS outpatient care facilities in Rwanda in a cross-sectional study. We conducted a standardized medical history and physical examination, tuberculin skin test (TST), chest radiography, abdominal ultrasound, immunologic testing, and, when clinically indicated, collected sputum or gastric specimens for mycobacteriologic testing. TB cases were categorized as definite if mycobacteriologically or radiologically confirmed, or as clinical based on standardized case definitions and expert review. We determined TB prevalence and calculated sensitivity and specificity of screening, limiting the latter analysis to definite cases.

RESULTS: Overall, 325 children were enrolled. Median age was 9 years (range 0–14 years); 42 (13%) of 325 were diagnosed with TB, of whom 20 (48%) of 42 had definite TB, including two with mycobacteriologic confirmation. Having any one of the following was 70% sensitive and 67% specific: cough ≥2 weeks, failure to thrive, or TB contact history. Adding TST and replacing cough ≥2 weeks with any cough increased sensitivity to 95%

(specificity 54%).

CONCLUSIONS: TB is common among children with HIV in Rwanda, underscoring the importance of routine screening. An approach to screening incorporating TST and cough of any duration had high sensitivity, and is feasible to implement in resource-constrained settings

4:40

Deviations from Normal Birth Weight and Autism Risk — California, 1989–2002

AUTHORS: *Jennifer L. Zipprich, G.C. Windham, M. Anderson, J.K. Grether*

BACKGROUND: Approximately 25,000 children born in California during 1989–2002 received services through the Department of Developmental Services (DDS) for autism, yet knowledge is limited regarding autism risk factors. Low birth weight (LBW) and preterm delivery have been linked to social and learning deficits among children; however, findings from studies of birth weight and autism are inconsistent.

METHODS: We evaluated associations between birth weight and autism risk in the California Department of Public Health statewide database, linking DDS and vital statistics data on singleton live births during 1989–2002 surviving to age 1 year. Our study focused on children eligible for autism services after DDS evaluation (n = 23,913); all other children in the cohort (n = 7,125,777) served as control subjects. Sociodemographic factors, birth weight, and gestational age were obtained from birth certificate files. Logistic regression was used to calculate adjusted odds ratios (AORs) between autism and birth weight categories (reference, 2,500–3,999 g), controlling for maternal age, education, race, parity, sex, gestational age, year, and delivery payment type.

RESULTS: Eleven percent of singletons were high birth weight (≥4,000 g), 3.9% LBW (1,500–2,499 g), 0.4% very LBW (VLBW, 1,000–1499 g), and 0.2% extremely LBW (ELBW, <1,000 g). AORs for autism were highest for ELBW (2.20; 95% confidence interval [CI], 1.80–2.70) and elevated for VLBW (1.20; 95% CI, 0.99–1.46), LBW (1.13; 95% CI, 1.06–1.21), and high birth weight (1.12; 95% CI, 1.08–1.16), compared with the referent.

CONCLUSIONS: Deviations from normal birth weight, particularly ELBW, were associated with an increase in the odds of autism among singleton children. Exploring this association is necessary to confirm birth weight as a predictor.

KEYWORDS: autism, risk factor, birth weight, gestational age

5:00

On the Horizon: Opportunities for Prevention of Pneumococcal Disease Among Children Under Age Two Years—United States

AUTHORS: *Jennifer B. Rosen, A. Thomas, R. Lynfield, A. Reingold, M. Cartter, L. Harrison, N. Bennett, J. Baumbach, K. Gershman, W. Schaffner, M.M. Farley, B. Beall, C. Whitney, M. Moore, CDC Emerging Infections Program Network, Atlanta, GA*

BACKGROUND:
Streptococcus pneumoniae is the leading cause of bacterial pneumonia and meningitis. During 1998-1999, invasive pneumococcal disease (IPD) incidence was 181 cases per 100,000 among children <2 years; 80% of cases were caused by seven of 91 serotypes. In 2000, a 7-valent pneumococcal conjugate vaccine (PCV7) targeting these serotypes was licensed in children. By 2007, >3 dose vaccine coverage was 90% and IPD incidence in children <2 years was 35 cases per 100,000.

However, incidence of non-PCV7 serotype 19A was increasing. A new 13-valent pneumococcal conjugate vaccine (PCV13) containing six additional serotypes (6ST), including 19A, is expected to be licensed in 2009. We evaluated the potential PCV13 impact on IPD burden.

METHODS: IPD cases had pneumococcus isolated from sterile sites and occurred in 10 Active Bacterial Core surveillance (ABCs) areas. Isolates were serotyped in reference laboratories. Using ABCs' national disease estimates and U.S. Census population data, we calculated 2007 national IPD incidence, hospitalization, and mortality rates in children <2 years.

RESULTS: In 2007, a national estimate of 2,954 cases of IPD occurred in children aged <2 years; the new 6STs caused 1,802 (61%) cases with an incidence of 21 per 100,000; serotype 19A alone accounted for 41% (15 cases per 100,000); PCV7 serotypes caused 2% (0.7 cases per 100,000). The 6ST-IPD hospitalization and mortality rates were 12 and 0.2 per 100,000, respectively. The 6STs caused 52% of bacteremia, 59% of meningitis and 73% of bacteremic pneumonia cases.

CONCLUSIONS: The six additional serotypes included in PCV13 cause a substantial portion of IPD cases among children <2 years. PCV13 introduction into immunization programs has the potential to significantly reduce the remaining IPD burden among children nationally.

KEYWORDS: *Streptococcus pneumoniae*, pneumococcal conjugate vaccine, serotype

TUESDAY, APRIL 21, 2009

CONCURRENT SESSION E-1:

Breakfast Club — Food and Water Borne Disease

Ravinia Ballroom 8:30 a.m.–10:15 a.m.

MODERATOR: *Ian Williams*

8:35

Multipathogen Waterborne Disease Outbreak Onboard a Boat — Chicago, 2008

AUTHORS: *Fadila Serdarevic, S. Black, R. Jones, K. Ritger, F. Guichard, B. Emanuel, P. Dombroski, K. Weaver, J. Antonelli, L. Miller, S. Gerber*

BACKGROUND: More is known about waterborne outbreaks associated with large passenger vessels that have foreign itineraries compared to outbreaks associated with smaller domestic vessels. During September 12–14 Chicago experienced extreme rainfall that exceeded the capacity of the sewer reservoir system, forcing discharge of wastewater into Lake Michigan. The Chicago Department of Public Health received a report of a cluster of diarrheal illnesses among a group of reunion participants who had attended a dinner boat cruise on September 13, 2008. On September 22, we initiated an investigation.

METHODS: A retrospective cohort study was conducted. The case definition was diarrhea and either fever, nausea, vomiting, abdominal cramps, myalgias, or bloody stool in a reunion participant. Patient stools, water samples, and environmental swabs were tested for bacteria and parasites. An environmental inspection of the boat was performed.

RESULTS: Of 72 participants, 41 (57%) patients were identified. Seventeen healthcare visits and four hospitalizations resulted. Of participants who had consumed ice, 35/54 (65%) became ill, compared with 5/17 (29%) of those who had not consumed ice (relative risk, 2.2; P = 0.011). Five patients were identified with the following pathogens: *Shigella sonnei* (3), *Cryptosporidium spp* (2), and *Giardia spp* (3). *S. sonnei* was isolated from an environmental swab obtained from an ice machine. The environmental inspection at the water docking station revealed a cross-connection that might have allowed

lake water to contaminate the boat's potable water system.

CONCLUSIONS: The epidemiologic and environmental investigations indicated that ice was the likely vehicle of transmission. Sewage in the lake might have contaminated the boat's potable water system, causing this multipathogen outbreak. Guidelines for safe potable water connections for boats should be formulated.

KEYWORDS: *Shigella, Cryptosporidium,* Giardia, waterborne outbreak, ice

8:55

Hemolytic Uremic Syndrome After an Escherichia coli O111 Outbreak — Oklahoma, 2008

AUTHORS: ***Emily Piercefield, K. Bradley, R. Coffman, S. Mallonee***

BACKGROUND: An Oklahoma restaurant-associated *Escherichia coli* O111 outbreak in August 2008 caused 161 confirmed or probable cases, including hemolytic uremic syndrome (HUS), plus 182 suspect cases. HUS typically occurs among 4%–15% of *E. coli* O157 cases, but non-O157 HUS incidence is not well-characterized. We examined outbreak-associated hospitalizations to characterize *E. coli* O111 HUS illness.

METHODS: Active case finding was conducted through laboratories, hospitals, and surveys of restaurant patrons. For all 73 hospitalized patients, medical records were reviewed for clinical presentation and evidence of HUS; those with and without HUS were compared by using chi-square and Wilcoxon rank-sum tests.

RESULTS: Overall, HUS was identified in 26 (16%) of 161 confirmed or probable cases; 65% of HUS patients required dialysis. Median age of HUS patients was 43.5 years (range, 1–88); children aged ≤12 years accounted for 35% of HUS cases. Before or during hospitalization, HUS patients were more likely to have vomiting (risk ratio [RR]=1.6; 95% confidence interval [CI]=1.2–2.1), documented fever (RR=4.0; 95% CI=1.5–10.2), acute hypertension (RR=2.1; 95% CI=1.2–3.8), neurologic signs (RR=5.1; 95% CI=2.0–12.5), chest infiltrate (RR=2.7; 95% CI=1.2–5.7), pleural effusion (RR=6.2; 95% CI=1.6–23.3), and higher admission white blood cell counts (median, 16.4 versus 12.6–103/uL; P=0.005) than non-HUS hospitalized patients. Administration of antimicrobials (RR=1.0; 95% CI=0.5–1.9) or antimotility agents (RR=1.7; 95% CI=0.9–3.1) was not associated with subsequent HUS diagnosis.

CONCLUSIONS: HUS incidence in this *Escherichia coli* O111 outbreak was comparable to that for *E. coli* O157-related illnesses. Although a substantial proportion of HUS cases occurred among children, the majority of cases occurred among adults. Use of antimicrobials and antimotility agents did not increase HUS risk.

KEYWORDS: hemolytic uremic syndrome; shiga-toxigenic *Escherichia coli*; disease outbreaks

9:15

Use of In-Person Iterviews and a Household Level Study in a Complex, Multiple-Source Salmonella serotype Saintpaul outbreak – Southwestern United States, 2008

AUTHORS: ***Amy L. Boore, E.Russo, K.Ong, R.Rickert, S.Chen, J.Cheek, J.Redd, L.Gould***

BACKGROUND: A multi-state outbreak of *Salmonella* serotype Saintpaul infections was identified on May 22, 2008. Early investigations implicated tomatoes as the source of illness, but continuing infections suggested an additional source. We investigated cases

among persons living in New Mexico and northeast Arizona.

METHODS: We conducted individual and household-level case-control studies. Cases had culture-confirmed outbreak strain *Salmonella* infection with illness onset after May 31, 2008. Matched controls were enrolled from neighborhood households with no diarrheal illness after April 30. The household-level study assessed the presence of food items in households, as reported by the primary food preparer(s). Interviews were conducted in-person using food props and photographs to aid recall.

RESULTS: We enrolled 41 patients and 107 matched controls and their corresponding food preparers. In the individual-level study, illness was not associated with the consumption of any food items in the week before illness began. In the household-level study, illness was associated with having jalapeño peppers in the household in the week before illness began, reported by 63% of case and 40% of control households (matched odds ratio [mOR] 3.0; 95% confidence interval [CI] 1.2-7.6). Having tomatoes in the household in the same week was not associated with illness (49% of case-households, 33% controls, mOR 1.8, CI 0.8-4.6)..

CONCLUSIONS: The association of illness among cases occurring after May 31 with having jalapeño peppers in the household, but not with individual consumption of these peppers, may indicate cross-contamination or incomplete knowledge of food ingredients by consumers. Interviewing persons who know which foods are brought into and prepared in the home may contribute to the investigation of complex foodborne outbreaks by providing information about specific ingredients in foods.

KEYWORDS: Salmonella, Salmonellosis, Disease outbreaks, Jalapeño pepper

9:35

Trends in Listeriosis Incidence Among Persons 65 Years and Older, Foodborne Diseases Active Surveillance Network (FoodNet), United States, 1996–2007

AUTHORS: *Kashmira A. Date, T. Jones, D. Vugia, S. Hurd, B. Anderson, A. Cronquist, M. Farley, M. Plantenga, O. Henao*

BACKGROUND: Listeriosis, a serious life-threatening infection, is estimated to cause over 2,500 infections with over 500 deaths annually in the United States, the second highest case-fatality rate among foodborne illnesses. The elderly are at increased risk for listeriosis and experience more serious sequelae. FoodNet conducts population-based active surveillance of laboratory-confirmed listeriosis in >650 laboratories in 10 states. We reviewed FoodNet surveillance data to describe the epidemiology and incidence trends for listeriosis among persons ≥65 years of age.

METHODS: We examined FoodNet listeriosis data from 1996–2007. We determined demographic characteristics; age-specific incidence, hospitalization, and case-fatality rates; and compared annual trends among persons <65 and ≥65 years of age.

RESULTS: From 1996–2007, 1324 laboratory-confirmed listeriosis cases were ascertained in FoodNet; 51% were in persons ≥65 years of age; 85% were white. From 1996–2007, the annual incidence decreased from 19.1 to 12.5 per million among persons ≥65 years old, and from 2.6 to 1.3 per million among persons <65 years old. The hospitalization rate was 95% for persons ≥65 years old and 92% for persons <65 years old (relative risk [RR] 1.03, confidence interval [CI] 1.00–1.06). The case-fatality rate was significantly higher among persons ≥65 years old than persons <65 years old (RR 2.6, 95% CI 1.9–3.4).

CONCLUSIONS: Listeriosis disproportionately affects persons ≥65 years of age who also suffer more serious illness and death. While overall annual incidence for listeriosis has declined, the incidence in the ≥65 year age group remains well above the healthy people goal of 2.5 per million for 2010. Additional efforts are required by industry and government to reduce food supply contamination to affect further decline in listeriosis incidence.

KEYWORDS: Listeriosis, FoodNet, incidence rate, elderly

9:55

Outbreak of *Escherichia coli* O157 Associated with Raw Milk: Keeping the Point of Sale from Leaving the Farm — Connecticut, 2008

AUTHORS: *Alice Y. Guh, Q. Phan, R. Nelson, K. Purviance, P. Mshar, M. Cartter*

BACKGROUND: In Connecticut, despite health hazards of raw milk consumption, attempts to ban raw milk sale have been unsuccessful, and consumer warning labels inadequately convey health risks. In July 2008, two children experienced renal failure from hemolytic uremic syndrome (HUS) caused by *Escherichia coli* O157 after consuming Farm X raw milk purchased at a retail market and the farm. We investigated to determine outbreak source and control measures.

METHODS: Confirmed cases were either culture-confirmed *E. coli* O157:NM infections with isolates matching one of two outbreak pulsed-field gel electrophoresis patterns or HUS diagnosis in Connecticut residents during June–July 2008. Probable cases were diarrheal illness in Farm X customers during the same period. We conducted two case-control studies with neighborhood-matched and household-member controls, respectively. Farm X dairy practices were assessed; environmental, milk, and stool specimens were cultured for *E. coli* O157.

RESULTS: We identified 14 cases (7 confirmed). Median age was 5 years (range: 1–81 years). Five (36%) required hospitalization, three (21%) had HUS. Twelve (86%) had consumed Farm X raw milk (three from non-farm retail purchases); two (14%) were contacts of a case-patient who had consumed retail raw milk. Compared with neighborhood-matched controls, more case-patients had consumed raw milk (OR=231.0, 95% confidence interval=4.0-13304.1). The household-member case-control study demonstrated a dose-response relation between illness and frequency of raw milk consumption (P=0.01). Dairy practice reflected industry standards. *E. coli* O157:NM outbreak strains were isolated from stool specimens of six case-patients and one cow.

CONCLUSIONS: Farm X's raw milk was the outbreak source despite acceptable dairy practice. This investigation has led to proposed legislation to prohibit non-farm retail sale, strengthen warning labels, and increase raw-milk testing for pathogens.

KEYWORDS: *Escherichia coli* O157, hemolytic uremic syndrome

TUESDAY, APRIL 21, 2009

CONCURRENT SESSION E2:

Blackboard Jungle — Public Health and Schools

Dunwoody Suites 8:30 a.m.–10:15 a.m.

MODERATOR: *Howell Wechsler*

8:35

Outbreak of Type A Foodborne Botulism in a Boarding School — Uganda, 2008

AUTHORS: *Melissa A. Viray, J. Wamala, R. Fagan, C. Luquez, S. Maslanka, R. Downing, M. Biggerstaff, M. Malimbo, J. Kirenga, J. Nakibuuka, E. Ddumba, W. Mbabazi, D. Swerdlow*

BACKGROUND: Foodborne botulism, an uncommon but potentially fatal paralytic disease, has rarely been reported from Africa. In October 2008, we investigated three suspect cases of botulism, including one death, among students at a boarding school in Uganda.

METHODS: Case finding was undertaken at the school and a national referral hospital. A survey questionnaire was administered to assess food exposures among ill and non-ill dormitory residents. Clinical specimens and available food samples were tested at CDC for botulinum toxin.

RESULTS: Three case-patients were identified from the school; case finding did not identify any additional cases at the school or the referral hospital. The affected boarding school houses 1,200 students; the three case-patients resided in the same 24-person dormitory room. The only food exposures unique to the dormitory room were foods brought from students' homes. Both surviving case-patients and 18 well roommates were interviewed with the survey questionnaire. The single home-brought food eaten by all three case-patients was a homemade vegetable-in-oil, although in the survey, this food item was also eaten by five (28%) well roommates (p=0.52). The vegetable-in-oil, which was not available for testing, contained onions and peppers, and remained at room temperature for several weeks before consumption. Botulinum toxin type A was detected in patient clinical samples.

CONCLUSIONS: This is the first confirmed outbreak of foodborne botulism in Uganda. A homemade vegetable-in-oil was the probable source. Worldwide, other botulism outbreaks have implicated similar products, such as garlic in oil. The use of homemade vegetable-in-oils is reported to be widespread in Ugandan schools, putting children at risk for botulism. We recommend that the consumption of unrefrigerated vegetable-in-oils be discouraged.

KEYWORDS: botulism, outbreak, Uganda, botulinum toxin type A

8:55

Impact of School-Based Interventions on Physical Activity in Mexican Students Attending Public Primary Schools – Mexico City, 2006-2007

AUTHORS: *Nancy J. Aburto, Janet E. Fulton, Margarita Safdie, Tiffany Gust, Annabelle Bonvecchio, Juan A. Rivera*

BACKGROUND: Greater than 25% of school-aged children in Mexico are overweight or obese, risk factors for diabetes, heart disease, and other common comorbidities in Mexico. Increased physical activity is correlated with decreased overweight. Our objective was to test the impact of two school-based interventions on physical activity.

METHODS: The National Institute of Public Health, Mexico randomly assigned 24 schools in Mexico City evenly to basic or plus interventions or control (no change). The basic intervention improved the school's physical environment, held awareness-raising meetings, provided activity time during lunch and implemented a communication campaign inside the school. The plus intervention consisted of the basic intervention "plus" daily calisthenics and a second physical education class per week. Randomly selected 4th and 5th-grade students (n=699) wore pedometers for one week before and after the 6-month intervention. Researchers registered school-day and all-day (24-hour) steps as an indicator of physical activity. We calculated the average change in school-day and all-day steps from baseline to follow-up. We used linear regression to test the effect of intervention on activity.

RESULTS: School-day steps significantly increased ($p<0.05$) in both interventions, and significantly decreased in control from

baseline to follow-up: basic (change=640); plus (change=686); control (change=-639). All-day steps significantly ($p < 0.05$) increased in the basic (change=580), significantly decreased in the control (change=-419) but did not change in the plus (change=-20, $p=0.47$). After controlling for baseline steps, the change in school-day steps in the plus and all-day steps in the basic differed significantly from control.

CONCLUSIONS: Though both school-based interventions increased average school-day steps, only the basic increased all-day steps. More research is necessary to evaluate the impact these increases might have on overweight and/or morbidity.

KEYWORDS: children, obesity, Mexico City, physical activity

9:15

Do the Coughs Link? Investigation of a Pertussis Outbreak in a School — Omaha NE, September-December 2008

AUTHORS: *Cynthia G. Thomas, J. Liang, T. Clark, P. Cullison Bonner, A. O'Keefe, B. Harmon, H. Wu, N. Messonnier, J. Frederick, J. Sison*

BACKGROUND: Pertussis is a significant cause of vaccine-preventable morbidity domestically, with 15,632 cases reported in 2006. Outbreaks are recognized, even in highly vaccinated populations like schools. Data on pertussis transmission in schools are limited but useful for formulating effective control recommendations.

METHODS: We evaluated pertussis transmission in a school outbreak (preschool through eighth grade) using clinical and demographic data, vaccination records, and available classroom (third and fifth grade) seating arrangements. We applied Council of State and Territorial Epidemiologists' case definitions, calculated attack rates (AR) and attack rate ratios (ARR).

RESULTS: Results are preliminary. Twenty-three of 607 (3.8%) students had pertussis (17 confirmed, 6 suspect cases) with median age 9 years, range 3-14 years. The highest AR was in fifth graders: 8/64 (12.5%). Age-appropriate DTaP vaccine coverage with four or five doses was 97.7%. Pertussis risk in students with < three DTaP doses (2/14, AR 14.3%) compared to students with > three doses (21/593, AR 3.5%) was 4.0 (95% confidence interval [CI] 1.05-15.6). Time since last vaccination was not associated with risk. The AR was elevated in third and fifth grade students sitting immediately beside or in front of case-patients (9/59, 15.3%) compared to 2/70 (2.9%) in other seats (ARR 5.3, 95%CI 1.2-23.7). The three third graders with pertussis sat adjacent to each other in one classroom; no cases occurred among students in the other third grade classroom.

CONCLUSIONS: This study showed increased risk among students seated adjacent to case-patients and students with < three DTaP doses. These results and lack of widespread transmission in the school support both focused chemoprophylaxis of close contacts and vaccination of underimmunized contacts as a control strategy in school settings.

KEYWORDS: pertussis, control, vaccine, chemoprophylaxis, outbreak

9:35

Assessment of Washington State School-Based Youth Suicide Prevention Awareness Campaigns — 2006

AUTHORS: *Myduc L. Ta, J. VanEenywk, L. Bensley, J. Sabel, S. Macdonald*

BACKGROUND: Suicide is the second leading cause of death among Washington youths aged 15–19 years. The state-sponsored

Youth Suicide Prevention Program (YSPP) supports student-led suicide awareness campaigns. To evaluate the effectiveness of YSPP campaigns, we analyzed projected suicide-related help-seeking among students at YSPP and non-YSPP schools during the 2005–2006 school year.

METHODS: Data came from the 2006 Healthy Youth Survey, a biennial survey of Washington public school students administered in October. Thirty-eight YSPP schools (n = 4,082 students) were compared with 52 randomly selected non-YSPP schools (n = 4,024 students). Logistic regression models, adjusted for student demographics and substance use, compared 10th grade students in schools with and without YSPP programs in the past year; additionally, among YSPP schools, students reporting seeing or hearing suicide prevention information at schools (YSPP/Aware) were compared with students reporting not receiving such information (YSPP/Unaware).

RESULTS: Students in schools with and without YSPP programs had similar reports of anticipated help-seeking for suicidal feelings for oneself (adjusted odds ratio [AOR], 1.03; 95% confidence interval [CI], 0.89–1.18) or a friend (AOR, 0.97; 95% CI, 0.85–1.12). Compared with YSPP/Unaware students, YSPP/Aware students reported higher likelihood of seeking help for oneself (AOR, 1.28; 95% CI, 1.03–1.58) or a friend (AOR, 1.54; 95% CI, 1.22–1.95).

CONCLUSIONS: Comparison of students at YSPP and non-YSPP schools did not suggest an influence of YSPP on anticipated help-seeking. However, within YSPP schools there was an association between reported exposure to suicide prevention programming and increased anticipated help-seeking. Lack of detailed exposure information limits statements of causality and surveys with more specific questions on suicide prevention programming exposure are necessary to assess YSPP effectiveness.

KEYWORDS: suicidal behavior, youth, program evaluation, peer education, students

9:55

School Vending Machines: The Preferred Choice for Lunch? The Youth Physical Activity and Nutrition Survey — Florida, 2003

AUTHORS: *Sohyun Park, Y. Huang, W. Sappenfield, B. Yu, B. Sherry, D. Bensyl*

BACKGROUND: Childhood obesity has reached epidemic proportions in the United States and is associated with short and long-term morbidity. Unhealthy snacks and beverages readily available in school vending machines might contribute to inadequate dietary behaviors and the obesity epidemic.

METHODS: We examined risk factors among Florida middle school students for purchasing snacks or beverages from vending machines instead of lunch from the school cafeteria, using the 2003 Youth Physical Activity and Nutrition Survey. Self-reported data were weighted to represent all Florida public middle school students. Chi-square and logistic regression measured associations between student characteristics and purchasing a snack/beverage from vending machines ≥2 days during the previous 5 days instead of buying lunch.

RESULTS: Survey response rate was 72% (N = 4,452 students); 18% of students reported purchasing a snack/beverage from a vending machine for ≥2 days instead of buying lunch. Snack machines were available to 99% of students surveyed, but beverage machines were available to only 89%. Healthy options were available, but chips, pretzels, crackers, soda, or sports drinks were purchased most commonly. More students chose snacks/beverages instead of lunch in schools where beverage

vending machines were available (19%) than students in schools where machines were unavailable (7%), P ≤0.05. Beverage vending machine availability was the strongest risk factor for purchasing snacks/beverage (adjusted odds ratio, 3.6; 95% confidence interval, 2.18–5.91). Other significant risk factors included smoking, nonwhite race, and being an older student.

CONCLUSIONS: The availability of beverage vending machines in schools might contribute to unhealthy dietary behaviors beyond snack vending machines. Although healthier choices were available, the most common choices were less healthy snacks and beverages. Schools should consider reducing unhealthy choices

KEYWORDS: food vending machine, school health, nutrition survey.

TUESDAY, APRIL 21, 2009

CONCURRENT SESSION F1:
Mamma Mia — Maternal and Child Health
Presentation of the Iain C. Hardy Award
Ravinia Ballroom 10:45 a.m.–12:15 p.m.

MODERATOR: *Wanda Barfield*

10:50
Is Increasing Use of Assisted Reproductive Technology Leading to Increased Rates of Low Birthweight? — Massachusetts, 1997–2004

AUTHORS: *Naomi K. Tepper, S. Farr, B. Cohen, A. Nannini, Z. Zhang, J. Anderson, D. Jamieson, M. Macaluso*

BACKGROUND: Low birthweight (LBW) (less than 2500 grams) is an important risk factor for infant morbidity and mortality, and the LBW rate among U.S. infants is increasing. Although LBW is more common among infants conceived through assisted reproductive technology (ART) than among those who are not, little is known about whether the increased use of ART has contributed to the increase in the LBW rate.

METHODS: Using Massachusetts birth records linked with ART records by maternal and infant dates of birth for the years 1997–2004, we calculated the percentage of infants with LBW by ART status and plurality, used the Cochrane-Armitage test to assess trends in LBW rates over time, and calculated the population attributable risk of LBW from ART.

RESULTS: From 1997 to 2004 in Massachusetts, the percentage of births resulting from ART fluctuated between 1.8% and 2.3%. The population attributable risk of LBW from ART during these years was approximately 7.0% (range: 5.9% to 8.1%). The LBW rate increased from 6.3% to 7.0% (p-value for trend <0.0001) among all non-ART infants and from 4.8% to 5.1% (p-value for trend <0.0001) among non-ART singletons. Among ART singleton births, the LBW rate also increased from 6.4% to 8.2% (p-value for trend 0.03). The LBW rate did not increase among multiple births.

CONCLUSIONS: ART births contributed disproportionately to LBW births in Massachusetts from 1997 through 2004. However, the increase in the rate of LBW births during this period is not solely explained by ART and further evaluation is needed.

KEYWORDS: infant, low birth weight; reproductive techniques, assisted; pregnancy complications; risk

11:10
Early-Pregnancy Opioid Analgesic Treatment and Risk for Congenital Heart Defects — United States, 1997–2004

AUTHORS: *Cheryl S. Broussard, S. Rasmussen, J. Reefhuis, J. Friedman, M. Jann, M. Honein,* **National Birth Defects Prevention Study**

BACKGROUND: Congenital heart defects affect approximately 1% of births and cause approximately 8% of infant deaths in the United States. Therapeutic use of opioid analgesics is increasing, but the fetal effects of maternal use are uncertain. Three of four previous case-control studies showed an association between maternal first-trimester codeine use and children's risk for heart defects, but the association's validity has been questioned because of study limitations.

METHODS: To test the validity of this association, we analyzed data from the National Birth Defects Prevention Study (1997–2004), a 10-site case-control study in which heart defect cases were identified via surveillance systems and reviewed by pediatric cardiologists, and opioid exposure classification was based on maternal reports of opioid analgesic treatment between 1 month before and 3 months after conception. Mothers with preexisting diabetes or exposure to opioid-containing street drugs were excluded. We performed logistic regression to estimate odds ratios (ORs) and 95% confidence intervals (CIs) — adjusted for maternal age, race/ethnicity, education, pre-pregnancy obesity, smoking status, and study site — for all congenital heart defects and defect subgroups with at least 200 cases or 4 exposed cases.

RESULTS: Overall, 105 (1.8%) of 5,878 control mothers and 189 (2.8%) of 6,712 case mothers reported early-pregnancy opioid analgesic treatment. Treatment was associated with an elevated risk for all cardiac defects combined (OR=1.5, 95% CI=1.2–1.9) and for 8 of 20 defect subgroups, including hypoplastic left heart syndrome (OR=2.8, 95% CI=1.6–4.8) and tetralogy of Fallot (OR=2.0, 95% CI=1.3–3.4).

CONCLUSIONS: Our finding that early-pregnancy opioid analgesic treatment is associated with certain types of congenital heart defects may help women and their physicians make informed treatment decisions regarding pain management.

KEYWORDS: opioid analgesics, therapeutics, pregnancy, congenital heart defects, congenital abnormalities

11:30

Factors Associated with Smoking During Pregnancy, Maternal Outcome Monitoring System — Wyoming, 2003–2005

AUTHORS: *Stacey A. Anderson, A. Busacker, C. Hill, A. Crotsenberg, T. Murphy*

BACKGROUND: Smoking during pregnancy is associated with low birth weight. During 1996–2002 in the U.S., smoking decreased among pregnant women by 16.2% but increased among pregnant Wyoming women by 1%. In 2006, approximately 20% of Wyoming pregnant women smoked. To inform programs that develop smoking-cessation interventions among Wyoming women, we evaluated the characteristics associated with persistent smoking during pregnancy.

METHODS: Data were analyzed from the Wyoming Maternal Outcome Monitoring System, a population-based survey of 9,023 Wyoming women who delivered a live birth during 2003–2005. Respondents reported smoking status 3 months before pregnancy and 3 months before delivery. We assessed the association between persistent smoking and selected sociodemographic factors; the effect of Medicaid status was examined by logistic regression.

RESULTS: The response rate was 69.2%. During 2003–2005, a total of 28.8% (95% confidence interval [CI]=28.4%–29.3%) of women smoked 3 months before pregnancy; 44.7% (95%CI= 43.7%–45.6%) quit smoking by the third trimester. Compared with pregnant women who quit smoking, persistent smokers were more likely to be

Medicaid recipients (odds ratio [OR]=2.08; 95%CI=1.75–2.44), educated <12 years (OR=1.4; 95%CI=1.15–1.75), unmarried (OR=1.59; 95%CI=1.37–1.89), and live with another smoker (OR=3.85; 95%CI=3.03–5.0). The odds of persistent smoking during pregnancy among women who live with a smoker varied by Medicaid status; Medicaid recipients (OR=6.67; 95%CI=3.23–12.5) had twice the odds of persistent smoking compared with non-Medicaid recipients (OR=3.13; 95%CI=2.33–4.17).

CONCLUSIONS: Smoking-cessation behaviors among pregnant Wyoming women are consistent with those reported nationally. Living with another smoker was a significant barrier to quitting, which was multiplied among Medicaid recipients. Future smoking-cessation programs should consider the critical roles of partner support and household smoking environments.

KEYWORDS: cigarette smoking, women, smoking cessation, pregnancy

11:50

Length of Residence and Citizenship in Relation to Ever Having Breastfed — United States, 1999–2006

AUTHORS: *Ghasi S. Phillips, K. Brett*

BACKGROUND: Breastfeeding has many known benefits, including lowering infectious diseases among infants and reducing breast cancer incidence among women. Although foreign-born women are more likely to breastfeed than native-born women, it is unclear whether breastfeeding practices decrease with increasing length of U.S. residence and citizenship acquisition. Identifying harmful effects of these acculturation measures will help shape health education programs designed for foreign-born women, who gave birth to 25% of all births in 2005.

METHODS: We analyzed data for 5,993 parous women ≥20 years from the National Health and Nutrition Examination Survey from 1999–2006. Subjects reported citizenship, birthplace, and foreign-born women their date of arrival to the United States. Those whose first livebirth occurred before moving to the United States were excluded. Nationally representative estimates of breastfeeding were calculated and differences by length of residence and U.S. citizenship were estimated using weighted t-tests and odds ratios (OR), adjusting for age, education, race/ethnicity, and marital status.

RESULTS: The age-adjusted national estimate of ever breastfeeding was 58.7%. Relative to native-born women, the OR of ever breastfeeding among foreign-born women decreased from 5.59 (95% CI: 3.51, 8.90) to 1.59 (1.09, 2.36) for the categories of <10, 10-19, 20-29, and ≥30 years of residence (p-trend= 0.001). The OR of ever breastfeeding among foreign-born U.S. citizens was 1.87 (1.30, 2.69) and 2.73 (1.71, 4.36) for foreign-born non-U.S. citizens.

CONCLUSIONS: The higher propensity to breastfeed among foreign-born women compared with native-born women appears to dissipate with length of U.S. residence and citizenship acquisition. Our results support that acculturation diminishes breastfeeding practices. Programs aimed at maintaining high breastfeeding rates among foreign-born women with increasing length of U.S. residence should be promoted.

KEYWORDS: acculturation, breastfeeding, women, minority health.

Tuesday, April 21, 2009

CONCURRENT SESSION F2:
Gone With the Wind — Respiratory Infections

Dunwoody Suites 10:45 a.m.–12:15 p.m

MODERATORS: *Beth Bell* and *Larry Anderson*

10:50

Antiviral Therapy Among Adults Hospitalized with Influenza – United States, 2005 — 2007

AUTHORS: *Saumil S. Doshi, L. Finelli, A. Fry, S. Jain, P. Gargiullo, L. Kamimoto, A. Reingold, K. Gershman, K. Yousey-Hindes, M. Farley, K. Arnold, P. Ryan, R. Lynfield, C. Morin, J. Baumbach, E. Hancock, N. Bennett, S. Zansky, A. Thomas, W. Schaffner, and D. Kirschke,* **for the Emerging Infections Program (EIP) Network**

BACKGROUND: During the 1990's, annual influenza epidemics caused an average of 226,000 hospitalizations and 36,000 deaths in the United States (US). Antiviral therapy has been shown to decrease the duration and severity of uncomplicated influenza when started ≤2 days after illness onset and may reduce influenza-associated complications, including death. CDC recommends antivirals as an option in persons hospitalized with influenza, but little information on antiviral treatment among hospitalized persons is available. We describe antiviral treatment over two influenza seasons (2005-07) among patients hospitalized with laboratory-confirmed influenza.

METHODS: The Emerging Infections Program conducts active surveillance for individuals hospitalized with laboratory-confirmed influenza in selected counties of 10 states; the catchment area represents 7% of the US population. We analyzed data collected through hospital chart review from patients ≥18 years with laboratory-confirmed influenza to describe characteristics associated with antiviral use.

RESULTS: During the two seasons, 1,984 adults hospitalized with laboratory-confirmed influenza were identified: 843 (42%) were male, 1,079 (54%) were ≥65 years, and 219 (11%) were nursing home residents. Of 1,080 (54%) patients treated with antivirals, 1,031 (95%) were prescribed oseltamivir. Among 1,002 (51%) patients hospitalized and diagnosed within ≤2 days of symptom onset, 661 (66%) were treated with antivirals; conversely, only 419/982 (43%) of those hospitalized and diagnosed ≥3 days after onset were treated ($p<0.0001$). Preliminary analysis showed that antiviral therapy was more frequent among nursing home residents (68% vs. 53%, $p<0.001$) and older persons (median age 72 vs. 63 years, $p<0.001$). Multivariate analyses are pending.

CONCLUSIONS: Opportunities to treat patients hospitalized with influenza are missed. Reasons for limited use of antivirals should be explored, including concerns about insufficient data on effectiveness against influenza complications.

KEYWORDS: influenza, hospitalization, antiviral, oseltamivir

11:10

Field Estimate of Vaccine Effectiveness for the Adolescent Pertussis Booster —Saint Croix, 2007

AUTHORS: *Stanley C. Wei, K. Cushing, J. Rosen, K. Brown, K. Tatti, P. Cassiday, L. Pawloski, M. Martin, L. Tondella, T. Clark, R. Olans, S. Martin*

BACKGROUND: With 15,632 cases reported in 2006, pertussis is among the most poorly controlled bacterial vaccine-preventable diseases. Waning adolescent immunity increases the susceptible population. In 2006, ACIP recommended a tetanus, reduced-dose diphtheria, and acellular pertussis (Tdap) booster vaccine for adolescents and adults. Tdap was licensed based on serologic response without vaccine effectiveness data.

METHODS: From 10/1-12/19/2007, a pertussis outbreak occurred at a pre-kinder-

garten through twelfth grade school on St. Croix. We screened all students for cough and collected clinical history, including Tdap receipt, from students aged ≥11 years. We offered diagnostic testing (serology, culture, and polymerase chain reaction [PCR]) to coughing students. We defined clinical cases as students with cough ≥14 days plus whoop, paroxysms, or post-tussive vomiting. We defined confirmed cases as any cough with isolation of *Bordetella pertussis* or clinical case with PCR or antibody evidence of pertussis; other clinical cases were probable. VE was calculated using standard methods.

RESULTS: There were 51 clinical cases among 499 students (attack rate [AR] 9.8%). Disease clustered in grades 6-12 with a peak AR of 38.3% among tenth graders. Of 287 students aged ≥ 11, complete clinical data and Tdap history were obtained from 266 (92.7%); 31 (11.7%) had received Tdap. Forty-four had clinical pertussis, twenty-five (56.8%) of whom were laboratory confirmed. Forty-two (18.0%) unvaccinated students had clinical pertussis versus two (6.5%) vaccinated students (RR=2.8); estimated VE was 63.9% (95% confidence interval -41.8 - 88.1%, p=0.127).

CONCLUSIONS: This first field evaluation of Tdap VE suggests Tdap provides some protection against pertussis despite low coverage levels. Understanding the performance of Tdap once higher coverage is achieved is important to inform disease prevention and control recommendations.

KEYWORDS: *Bordetella pertussis*, Whooping cough, Diphtheria-tetanus-pertussis vaccine, diseases outbreaks

11:30

Back to Basics: Barriers to Treating Pneumococcal Pneumonia with Penicillin, Emerging Infections Network Survey — United States, 2008

AUTHORS: *Jennifer B. Rosen, S. Beekmann, P. Polgreen, M. Moore*

BACKGROUND: *Streptococcus pneumoniae* (pneumococcus) is the most common cause of bacterial meningitis and pneumonia. Penicillin resistance, defined *in vitro* by the minimum concentration of penicillin inhibiting growth, can result in treatment failure. New penicillin resistance definitions for pneumococcal pneumonia published in January 2008, categorized fewer pneumococcal infections as penicillin resistant. Increased penicillin use might reduce the need for broader spectrum antibiotics that are more likely to promote antibiotic resistant healthcare infections.

METHODS: To assess awareness of the new definitions and whether they will result in increased penicillin prescribing over broader spectrum antibiotics, we surveyed 1247 infectious disease physicians through the Emerging Infections Network. The survey was emailed three times over 3 weeks in October 2008, 10 months after publication of the new definitions. Only respondents treating patients with pneumococcal infections were included.

RESULTS: Of 1247 physicians, 588 (47%) responded to the survey and 529 (42%) saw patients with pneumococcal infections; 418 (79%) were aware of the new definitions. Among 314 (59%) respondents reporting infrequent penicillin use before the definition change, 150 (48%) were unlikely to increase use after the change. Fifty-nine (11%) respondents reported that they believed non-infectious disease physicians would likely increase penicillin use after the change. The most commonly reported barriers included the frequent (every 4-6 hours) penicillin dosing schedule (n=257, 49%) and the standard practice of switching patients from intravenous to oral antibiotics before resistance testing results were available (n= 216, 41%).

CONCLUSIONS: Standard clinical practices, including a preference for infrequent dosing regimens and early transition from intravenous to oral antibiotics, are barriers to intravenous penicillin use. Increasing awareness of changes in resistance definitions alone may be insufficient to increase penicillin use.

KEYWORDS: Streptococcus pneumoniae, penicillin, survey, hospital epidemiology

11:50

An Outbreak of Pneumonia Associated with Emergent Adenovirus Type 14 – Prince of Wales Island, Alaska, 2008

AUTHORS: *Douglas H. Esposito, E. Schneider, J. Tate, C. Panozzo, T. Gardner, S. Jenkerson, C. Robbins, L. Stockman, A. Curns, D. Erdman, X. Lu, G. Fischer, L. Thomas, J. McLaughlin, G. Armstrong, L. Anderson*

BACKGROUND: In September 2008, an outbreak of pneumonia occurred on Prince of Wales Island (PWI), Alaska. Specimens sent to CDC tested positive for a rare adenovirus (serotype 14 [Ad14]). To determine risk factors for disease during the Ad14 outbreak, we investigated pneumonia cases occurring in three affected PWI communities (population ~2,633).

METHODS: Case-patients included PWI residents presenting to one of two medical clinics between September 1 and October 27, 2008 with clinical or radiological evidence of pneumonia. Controls from the community were matched 1:1 to case-patients based on age group, gender, and community of residence. Cases and controls were interviewed and serum/respiratory specimens were collected. Risk factors for pneumonia were determined by conditional logistic regression.

RESULTS: Thirty-two pneumonia case-patients and 32 matched controls were interviewed. Among case-patients, the median age was 48 (range, 2-95) years, 75% were male, and 72% were Alaska Native. Nine cases resulted in hospitalization and there was one death. Risk factors for pneumonia included chronic obstructive pulmonary disease (COPD; 22% versus 0% [p=0.016]), current smoking (47% versus 13%, OR=15.0, 95%CI=1.5-153), and lack of off-island travel (81% versus 44%, OR=5.0, 95%CI=1.4-17.3). Nineteen case-patients and no controls had serologic and/or PCR evidence of Ad14 infection (p<0.001, 1 case and 4 controls not tested).

CONCLUSIONS: This is one of the first known community outbreaks of Ad14 since the virus emerged in 2007 as a major cause of respiratory disease among military recruits in the United States. COPD, current smoking, and lack of off-island travel increased a person's risk of pneumonia. The lack of Ad14 antibodies in controls suggests that Ad14 did not circulate widely on PWI previously or during this pneumonia outbreak.

KEYWORDS: Adenovirus 14, pneumonia, community outbreak, Alaska

TUESDAY, APRIL 21, 2009

SESSION G:

The Watchmen — Surveillance

Ravinia Ballroom 1:45 p.m.–4:00 p.m.

MODERATOR: *Christine Branche*

1:50

Completeness of Demographic, Occupation, and Industry Information Reporting to the Ohio Cancer Incidence Surveillance System – 2005

AUTHOR: *Marie A. de Perio*

BACKGROUND: One in three Ohioans will eventually develop cancer, leading to annual costs of $8 billion. Approximately 4-20% of cancers are attributable to occupational ex-

posures. The Ohio Cancer Incidence Surveillance System (OCISS), established in 1991, collects and analyzes cancer incidence and mortality data. The 1992 Cancer Registries Amendment Act requires registries collect demographic, occupation, and industry data to identify high-risk populations and guide prevention and detection interventions. We evaluated OCISS's most recent performance in obtaining these required data.

METHODS: We determined the completeness of submitted data for age, sex, race, county, occupation, and industry from cancer case reports submitted to OCISS by Ohio medical providers for 2005 by classifying responses into "known" and "unknown." We also assessed the completeness of reported occupation and industry information annually from 1996-2005 and used the Armitage-Cochran test for temporal trends.

RESULTS: 60,401 cancer case reports were submitted to OCISS in 2005. Age, sex, and county information were recorded for 100%, and race for 94% of cases. From 1996-2005, the percentage of case reports with known occupation and industry data improved from 22% to 68% ($p<0.001$), and 14% to 49% ($p<0.001$), respectively.

CONCLUSIONS: OCISS receives nearly complete age, sex, race, and county information from its reporting sources, allowing identification of geographic and demographic patterns of cancer. Despite showing improvement, largely due to implementation of a computerized reporting system and training of cancer registrars, occupation and industry reporting is still poor, and OCISS does not code these data. Further improvement is necessary to identify occupational groups that may benefit from prevention or detection interventions. OCISS should target feedback to reporting sources regarding missing information and distribute reporting requirements to medical providers.

KEYWORDS: cancer, surveillance, occupation, industry

2:10

Increased Incidence of Coccidioidomycosis in the Northwest Valley (NWV), Arizona – 2008. True Increase or Surveillance Artifact?

AUTHORS: *Loretta V. Chang, A. Ahlquist, R Sunenshine, J.Harris, S.Imholte, C.Tsang, S.Anderson, L.Erhart, M.Schumacher, S.Santana, A.Nesset, K.Komatsu, S.Chen, T.Chiller, B.Park*

BACKGROUND: The fungal disease coccidioidomycosis is a common, though underdiagnosed source of morbidity in Arizona. It causes up to 29% of community-acquired pneumonias, 31 missed workdays per case, and $86 million in hospital charges statewide annually. In 2007, Arizona surveillance data indicated that the age-adjusted coccidioidomycosis incidence in the NWV was more than twice that of the rest of metropolitan Phoenix.

METHODS: To investigate reasons for this increase, we conducted a study with five components. First, we evaluated provider knowledge, attitudes, and practices using data from a recent provider survey. Second, we examined residents' health-seeking behaviors, using enhanced surveillance data. Third, to estimate lab testing frequency, we calculated the positive-to-ordered *Coccidioides* test ratio from a large commercial laboratory. Fourth, the incidence among dogs was estimated as a human surveillance proxy using veterinary laboratory test data. Finally, we examined the impact of transient winter residents on reported incidence using home security data.

RESULTS: Compared to other areas of metropolitan Phoenix, NWV providers were more likely to attend continuing medical education (RR= 2.6, 1.7-4.0) and to provide coccid-

ioidomycosis counseling (RR=1.7, 1.3-2.0). NWV patients were tested earlier after disease onset (79 vs 170 days; p=0.06) and with fewer symptoms (RR=1.2, 1.1-1.4). No difference in the positive-to-ordered test ratio existed. Incidence among NWV dogs was lower (0.8% vs. 3.4%, p<0.001). Security data indicated that 20% of the NWV population are transient non-residents, compared to 5% statewide.

CONCLUSIONS: Our findings suggest that the higher reported coccidioidomycosis rate in the NWV may not accurately reflect a higher true incidence. The higher rate is likely due to a combination of increased awareness and testing, and an inflated numerator from transient non-residents.

KEYWORDS: coccidioidomycosis, Arizona, incidence, surveillance

2:30

Enhanced Rash Illness Surveillance in a Border Region of the Republic of the Congo and the Democratic Republic of Congo

AUTHORS: *Adam MacNeil, M. Reynolds, J.V. Mombouli, N. Badinga, A. Bikindou, D. Carroll, N. Benzekri, I. Damon*

BACKGROUND: Monkeypox is a zoonotic disease, found in central Africa, characterized by a pustular rash manifestation that can resemble varicella. Monkeypox case fatality is approximately 10%, and human-to-human transmission can occur. Monkeypox is endemic in Equateur Province, the Democratic Republic of Congo (DRC), and recent data indicate ongoing human disease. The Likouala district, the Republic of the Congo, experienced 11 monkeypox cases in 2003, but is not known to have endemic disease. However, Likouala is at risk for importation of monkeypox due to geographic proximity with Equateur, porous borders, and a high concentration of refugees from DRC.

METHODS: To improve local capacity to rapidly detect, diagnose, and control monkeypox in Likouala, we developed and implemented an enhanced passive surveillance system for rash illnesses. In July 2008, in collaboration with Congolese national and regional partners, we held a workshop in Likouala to educate health professionals in the recognition of monkeypox, patient care and infection control, and sample collection and reporting.

RESULTS: Prior to implementing enhanced surveillance, a large rash illness outbreak occurred in Likouala, in 2007. Through follow-up investigation, 37 probable cases of varicella were identified; however, etiologic confirmation occurred approximately nine months after the first illnesses. In contrast, following enhancement of rash surveillance, reports of two suspicious rash illnesses were received in December 2008, and etiologic confirmation of varicella was made within 10 days.

CONCLUSIONS: Implementation of enhanced surveillance required multilateral cooperation, and has been successful in achieving rapid reporting and diagnosis of suspicious rash illnesses in Likouala. We believe this is a model that can be implemented in other areas of central Africa which have endemic monkeypox or are at risk for emergence.

KEYWORDS: monkeypox, varicella, surveillance, rash illness

2:50

Acceptability of HIV Surveillance Before and After the 2004 Transition from Code-Based to Name-Based Reporting — Kentucky, 1998–2006

AUTHORS: *Emily C. Lutterloh, M. Tipton, J. Nakayima, D. Thoroughman*

BACKGROUND: During 2006, approximately 56,000 new HIV infections occurred

in the United States. A total of 347 HIV diagnoses were reported in Kentucky in 2006. CDC has recommended name-based rather than code-based reporting of HIV infections to facilitate collection of high-quality data for monitoring transmission and for allocating resources. The Kentucky Department for Public Health's (KDPH's) 2004 transition from code-based to name-based HIV reporting prompted us to evaluate patient acceptability of surveillance.

METHODS: Patients may choose either confidential or anonymous testing at Kentucky's counseling and testing centers. Positive confidential tests are reported to KDPH's surveillance office; positive anonymous tests are not reported because they cannot be linked to an identifiable person. We assessed acceptability of name-based reporting by comparing the proportions of persons choosing confidential code-based testing versus anonymous testing in 2003, and confidential name-based testing versus anonymous testing in 2005. We also calculated the proportions of confidential and anonymous tests for each year 1998–2006 to detect any trends.

RESULTS: Proportions of persons choosing confidential testing under the code-based reporting system in 2003 were 78.7% (13,091/16,632) and under the name-based reporting system in 2005 were 79.6% (15,266/19,169; P = 0.03). These data are consistent with an upward trend in the proportions of persons choosing confidential testing from 66.2% in 1998 to 81.5% in 2006.

CONCLUSIONS: The implementation of name-based HIV reporting in 2004 did not adversely affect the proportion of persons choosing confidential testing. On the basis of our study, name-based reporting is acceptable to persons seeking testing at Kentucky's counseling and testing centers. Name-based HIV surveillance can provide high-quality data for monitoring the epidemic and guiding public health planning.

KEYWORDS: HIV, AIDS, surveillance, program evaluation

3:10
Does Bias in Self-Reported Surveys of Mammography Usage Obscure Racial Disparities in Usage?—United States, 1995

AUTHORS: *Rashid S. Njai, P. Siegel, Y. Liao*

BACKGROUND: Mammograms are a key tool for detecting breast cancer at an early, treatable stage and thereby reducing breast cancer mortality rates. These rates remain higher among black women than white women, even though self-reported Behavioral Risk Factor Surveillance System (BRFSS) data show the two groups to have had similar mammography usage rates since the 1990s. Racial differences in the validity of these self-reported data against "gold standard" sources such as medical and billing records may, however, obscure true disparities in mammography usage rates.

METHODS: We conducted a multi-study literature review, which determined that the sensitivity (se) of self-reported mammography usage for the previous 2 years was 0.97 for both black and white U.S. women aged 40 years or older but that the specificity (sp) of such data was lower for black women: 0.49 vs 0.62. We adjusted 1995 BRFSS mammography usage data by applying these validity results in the following misclassification-adjustment formula: [(estimated prevalence - 1 + sp) /(se + sp - 1)].

RESULTS: Among black and white women aged 40 years or older who participated in the 1995 BRFSS survey (N=37009), 69% of whites and 70% of blacks reported having had

a mammogram during the previous 2 years; after adjusting for the suspected misclassification of BRFSS population data, we estimated that the true prevalence of mammography usage was 52% among whites and 42% among blacks.

CONCLUSION: BRFSS data probably overestimates the percentage of women who receive mammograms every 2 years and underestimates the disparity in mammography usage between black and white women. This disparity may help explain current racial disparities in stage of breast cancer at diagnosis and breast cancer mortality.

KEYWORDS: racial disparities, breast cancer, screening mammography, surveillance

3:30

Comparison of Two Influenza Syndromic Surveillance Systems — Indiana, 2006–2008

AUTHORS: *Matthew D. Ritchey, S. Richards, T. Duszynski, R. Gentry, T. Chester*

BACKGROUND: Timely influenza surveillance is critical to effectively identify outbreaks, recognize the emergence of pandemic strains, and implement control measures. Indiana's influenza burden is approximated by the percentages of influenza-like illness (ILI) reported by two syndromic surveillance systems: sentinel clinic and emergency department (ED) systems. Sentinel clinic systems are long established and validated, and have the advantage of specimen collection. ED systems are automated and very timely but have not been validated. This study compares timeliness, correlation, and alert thresholds of Indiana's two systems during the 2006–07 and 2007–08 influenza seasons.

METHODS: Sentinel clinics were asked to actively report weekly their percentages of patients having ILI (fever ≥100°F with cough or sore throat). Automated reports of EDs' percentages of patients with medical record keywords associated with influenza occurred every three hours. We compared the systems' influenza time series signals and alert thresholds by linear regression. Timeliness from diagnosis to report was compared by using Student's t-test.

RESULTS: ILI percentages detected by the two systems were highly correlated during the 2006-07 ($R2 = 0.79$; $P<0.05$) and 2007-08 ($R2 = 0.86$; $P<0.05$) seasons. β coefficients of 0.45 (2006–07) and 0.51 (2007–08) demonstrated that the sentinel clinic system's preestablished ILI alert threshold of 3% corresponded to approximately 2% in the ED system. ED system reports were timelier (0.13 days vs. 9.21 days $P<0.01$).

CONCLUSIONS: Indiana's two ILI syndromic surveillance systems perform similarly in identifying influenza trends, however, lower alert thresholds are required for ED surveillance. Although this ED system is unable to collect specimens for laboratory confirmation or virus characterization, its greater timeliness makes it more useful in detecting and initiating management of outbreaks.

KEYWORDS: evaluation studies, influenza, surveillance, syndrome, sentinel surveillance

WEDNESDAY, APRIL 22, 2009

CONCURRENT SESSION H1:

Peavy's Big Adventure — Peavy Finalists

Ravinia Ballroom 8:45 a.m.–10:15 a.m.

MODERATOR: *Owen Devine*

8:35

Description of Suicides Preceded by Driving While Intoxicated Arrests—National Violent Death Reporting System, 2003-2007.

AUTHORS: *R. Matt Gladden, A. Crosby*

BACKGROUND:
Suicide results in approximately 32,000 deaths annually, or 11 per 100,000 people. Personal crises, such as arrest for driving while intoxicated (DWI), may indicate acute or underlying risks for suicide. However, the prevalence and circumstances of suicide following DWI arrest remain unclear. This study describes suicides preceded by DWI arrest and investigates whether their circumstances differ from other suicides.

METHODS:
The National Violent Death Reporting System (NVDRS) links death certificate, law enforcement and coroner/medical examiner data from 17 states. Suicides preceded by a DWI arrest for 2003-2007 were examined. The proportion of DWI arrests resulting in suicide in 14 states for 2005-2006 was calculated by combining NVDRS information with the Federal Bureau of Investigation's Uniform Crime Reports. The associations between suicides preceded by DWI arrest and nine suicide circumstances among males were tested with hierarchical logistic regression. There were too few female suicides preceded by DWI arrests for analysis.

RESULTS:
There were 54.2 suicides per 100,000 DWI arrests. Of the 608 suicides preceded by DWI arrest, 19.9% occurred within 48 hours of the arrest and another 57.7% occurred while the court case was pending. Decedents with a DWI arrest were more likely to be currently depressed (Adjusted Odds Ratio (AOR)=1.5, 95% CI =1.3–1.8) and have job problems (AOR=1.9, 95% CI=1.5-2.3) than other suicide decedents.

CONCLUSIONS:
Additional research is required to understand whether suicidal ideation precedes risk for DWI or if cumulative stressors associated with DWI arrest exacerbate risk for suicide. Nonetheless, the results indicate the need for coordinated and timely support services for DWI perpetrators to address underlying and situational stressors associated with suicide following DWI arrest, including depression and job problems.

KEYWORDS: suicide, driving under the influence, NVDRS, arrest, driving while intoxicated

8:55

Predicting the Effects of the *Haemophilus influenzae* type b (Hib) Vaccine Shortage on the Incidence of Hib Disease in Children <5 years of age — United States, 2008

AUTHORS: *Michael L. Jackson, C. Rose, F. Coronado, T. Clark, N. Messonnier*

BACKGROUND: *Haemophilus influenzae* type b (Hib) vaccines have reduced the incidence of invasive Hib disease in children aged <5 years from 41 cases/100,000 in 1987 to 0.22 cases/100,000 in 2006. Since December 2007 the US has experienced a shortage of Hib vaccines. To manage the shortage, CDC recommends temporarily deferring the Hib booster, usually administered at age 12–15 months. Prolonged booster deferral is expected to increase the incidence of invasive Hib disease, but the timing and magnitude of the increase are unknown.

METHODS: We used an age-structured deterministic model to simulate Hib transmission, carriage (pharyngeal colonization), and disease incidence in the United States. We defined model parameters using published studies and maximum likelihood estimation. We assessed model validity by comparing model output with observed carriage and incidence from national surveillance systems during 1980–2007. We projected the model forward to estimate the impact of the shortage on Hib disease in children <5 years.

RESULTS: The model closely fits the observed data (pseudo-R2 = 0.87). In the

absence of a vaccine shortage the model predicts an annual incidence of 0.31 cases/100,000 children <5 years during 2009-2010, or 65 cases per year. If the shortage continues the model predicts 0.41 cases/100,000 in 2009 and 0.52 cases/100,000 in 2010, or 87 and 110 cases in 2009 and 2010, respectively. After 2010, Hib incidence is predicted to increase by approximately 25% per year for another decade before plateauing.

CONCLUSIONS: Continued deferral of the Hib booster dose could result in a 69% increase in invasive Hib among children <5 years by 2010. Because surveillance may not be timely or sensitive, modeling provides an alternate tool for public health decision-making.

KEYWORDS: *Haemophilus influenzae* type b; Vaccination; Computer simulation; Mathematical model; Supply and distribution

9:15
Potential Impact of New Treatment Guidelines for HIV-Infected Infants—15 Resource-Limited Countries, 2009

AUTHORS: *Andrew F. Auld, R. Shiraishi, O. Bolu, E. Rivadeneira, E. Raizes, T. Ellerbrock*

BACKGROUND: If untreated, 20%–40% of HIV-infected infants die in their first year. The 2006 World Health Organization (WHO) guidelines for treating HIV-infected infants recommend initiating antiretroviral therapy (ART) at advanced disease stages; however, 2008 WHO guidelines recommend ART immediately after diagnosis. Modeling costs and benefits of implementing the 2008 guidelines in 15 focus countries of the President's Emergency Plan for AIDS Relief is important for planning programs in this initiative.

METHODS: We used recent WHO-reported data on HIV prevalence amongst pregnant women, annual numbers of live births, and HIV transmission rates dependant on availability of ART and breast milk substitutes for prevention of mother-to-child transmission, to estimate numbers of HIV-infected infants in focus countries in 2009. We used WHO-reported infant diagnosis coverage rates, published data on survival benefit of early ART initiation, and Clinton Foundation ART prices to estimate impact and cost of implementing 2008 guidelines in 2009. From triangular probability distributions for model parameters, Monte Carlo simulation for 10,000 trials constructed 95% plausibility bounds.

RESULTS: In focus countries, about 282,903 (249,716–319,710) infants will be HIV-infected at birth or through breastfeeding during 2009. Implementing 2008 guidelines would increase the number of HIV-infected infants provided ART from 11,106 (9,546–12,770) to 23,755 (19,088–25,141) and could increase the number of infant life-years gained from 2,195 (1,823–2,649) to 3,588 (3,081–4,200). Implementing 2008 guidelines would increase costs of infant ART from U.S. $296 ($249–$338) to $458 ($384–$460) per infant life-year gained.

CONCLUSIONS: For 2009, implementation of 2008 WHO guidelines in focus countries would treat twice as many HIV-infected infants and gain 60% more infant life-years, but cost $1 million extra for ART.

KEYWORDS: Highly Active Antiretroviral Therapy, cost-benefit analysis

9:35
Quantitative Evaluation of a State-Based Program to Reduce Fall (1990–1998) and Electrocution (1990–1994) Fatality Rates — United States

AUTHORS: *Cammie K. Chaumont Menéndez, D. Castillo, S. Hendricks*

BACKGROUND: In 2007 there were 5,488 work-related injury fatalities. The National Institute of Occupational Safety and Health (NIOSH) funds state programs (Fatality Assessment and Control Evaluation, or FACE) to identify contributing factors for work-related injury fatalities and disseminate recommendations for prevention. This is accomplished through a series of targeted, focused investigations guided by surveillance data. We evaluated the effect of FACE funding on fall and electrocution fatality rates using an observational time series analysis.

METHODS: National Traumatic Occupational Fatalities data from 1980–2001 and Current Population Survey data provided fall and electrocution fatality rates. Statistical models were constructed and included a variable designating state-based program participation during a specified time period when these fatality causes were emphasized (falls:1990–1998; electrocutions:1990–1994). Potential covariates were: age, gender, race, employment in the construction industry, and federal regulatory investigations. A backwards stepwise covariate selection process was conducted. An observational time series with contemporaneous comparison group study design employing Poisson multivariable statistical models using generalized estimating equations evaluated the impact of FACE.

RESULTS: FACE funded twenty states (falls) and fifteen states (electrocutions) during all or a portion of the specified time period. FACE states experienced a statistically significant reduction in fall fatality rates and a reduction in electrocution fatality rates compared to non-FACE states [Rate ratio (RR) for falls for 1-year lag = 0.89, 95% Confidence intervals (CI) 0.80–0.98, $p<0.05$; RR for electrocutions for 5-year lag = 0.87, 95% CI 0.74–1.05, $p=0.08$].

CONCLUSIONS: The state-based FACE Program was effective in reducing occupational fatality rates in funded states beyond generally declining rates observed across the US. A time series analysis should be considered when measuring a program's impact.

KEYWORDS: occupational safety, program evaluation, regression analysis, accidental falls, electric injuries

9:55

Respiratory Index of Severity in Children (RISC): A Simple Clinical Score for Severity of RespiratoryInfection in Young Children

AUTHORS: *Carrie Reed, S. Madhi, K. Klugman, L. Kuwanda, J. Ortiz, L. Finelli, A. Fry*

BACKGROUND: Pneumonia is a leading cause of death in children worldwide. A simple clinical score that predicted the probability of death in a young child with lower respiratory tract infection (LRTI) could aid clinicians and provide a standardized measure of severity during epidemiologic studies.

METHODS: To develop the Respiratory Index of Severity in Children (RISC), we analyzed 4,148 LRTI hospitalizations in children <24 months enrolled in a pneumococcal conjugate vaccine trial in South Africa from 1998–2001. Using clinical data at admission, a multivariable logistic regression model for mortality was developed in a random subset of the initial cohort and statistically validated in the remaining subset. Points were assigned to risk factors based on their coefficients in the multivariable model. A child's RISC score is the sum of points for each risk factor present. Separate models were developed for HIV-infected (36% of episodes, 18% mortality) and non-infected children (1.2% mortality).

RESULTS: Significant risk factors in RISC scores for HIV-infected and non-infected children included: low oxygen saturation,

chest indrawing, wheezing, and refusing feeds. The models also included age and HIV clinical classification (N/A/B/C) (HIV-infected children) or weight-for-age (non-infected children). RISC scores ranged up to 9 points (non-infected) or 12 points (HIV-infected) and correlated with probability of death (0-10%, non-infected; 0-45%, HIV-infected). In the validation subset, final models had good discrimination (area under the ROC curve of 0.93 for non-infected and 0.77 for HIV-infected children) and calibration (goodness-of-fit p=0.99, non-infected and p=0.69, HIV-infected).

CONCLUSIONS: The RISC score incorporates a simple set of risk factors that accurately discriminate between young children based on their risk of death from LRTI, and may provide a better means to quantify severity.

KEYWORDS: pneumonia, severity, children

WEDNESDAY, APRIL 22, 2009

CONCURRENT SESSION H2:

An Affair to Remember — HIV/STD/TB

Dunwoody Suites 8:30 a.m.–10:15 a.m.

MODERATOR: *Kevin A, Fenton*

8:35

Gonorrhea and HIV Coinfection Among Men Who Have Sex With Men — United States, 2006–2008

AUTHORS: *Robert D. Kirkcaldy, K. Mahle, J. Donnelly, C. Mettenbrink, K. Bernstein, J. Stover, M. Stenger, S. Martins, L. Newman, H. Weinstock.*

BACKGROUND: A diagnosis of gonorrhea in an HIV-positive man is a marker of unprotected sexual activity. Although men who have sex with men (MSM) are at high risk of HIV-gonorrhea coinfection, national-level data on coinfection are limited. Data are particularly limited from providers other than sexually transmitted disease (STD) clinics. Providers outside STD clinics accounted for >60% of reported gonococcal infections in men in 2007.

METHODS: The STD Surveillance Network collects data from 11 counties in five states. For February 2006–August 2008, we analyzed data on cases from the first 10 men reported with gonorrhea and interviewed by state or county health departments each month (excluding those reported from STD clinics).

RESULTS: Of 2,039 gonorrhea interviews, 422 (21.7%) were with MSM. Of 381 MSM with gonorrhea for whom HIV data were available, 110 (29.9%) self-reported HIV positivity (range by state, 16.6%–47.3%). Of HIV-gonorrhea coinfected MSM, 69.2% were white, 12.2% Hispanic, and 7.5% black; mean age was 38.7 (range: 21–58). Coinfected cases were largely reported from primary care settings (61.8%), HIV clinics (7.4%), and urgent care clinics or emergency departments (5.9%). Compared to self-reported HIV-negative MSM, MSM with HIV were more likely to report anonymous sex (50.6% vs. 26.0%, p<0.001), finding sexual partners through the Internet (55.2% vs. 40.4%, p=0.01), methamphetamine use (30.8% vs. 9.4%, p<0.001), and erection-enhancing agent use (29.5% vs. 11.2%, p<0.001) during the past 3 months.

CONCLUSIONS: Large percentages of MSM with gonorrhea are coinfected with HIV and engage in risky sexual practices. Primary care physicians should understand the importance of integrating HIV and STD prevention and treatment services for MSM, a population at great risk of transmitting HIV. Key words: HIV, gonorrhea, homosexuality, methamphetamine, unsafe sex

KEYWORDS: HIV, gonorrhea, homosexuality, methamphetamine, unsafe sex

8:55

Preventive Healthcare and HIV Infection Among Young Black Men Who Have Sex with Men — Mississippi, 2008

AUTHORS: *Christinia Dorell, A. Oster, F. Hardnett, P. Thomas, L. Mena, J. Heffelfinger*

BACKGROUND: Of 13- to 24-year-old men who have sex with men (MSM), black MSM accounted for 59% of new HIV diagnoses in the United States during 2006. From 2005 through 2007, HIV diagnoses among black men aged 13–24 years increased 48% in Mississippi; 70% were in MSM. Unprotected anal intercourse (UAI) and sexually transmitted diseases (STDs) increase risk of HIV infection. To characterize risk factors for HIV infection in black MSM, we conducted a case-control study in Jackson, Mississippi.

METHODS: Through surveillance, we identified 29 HIV-infected black MSM (case-patients) who were diagnosed or lived in Jackson during 2006-2008. We recruited 90 self-reported HIV-uninfected black MSM (controls) who lived in Jackson from local venues. Case-patients and controls, aged 16–25 years, were asked about risk behaviors and healthcare utilization in the year before diagnosis or the year before interview, respectively. We used chi-square and logistic regression to test for associations between HIV infection and potential risk factors.

RESULTS: Case-patients were more likely than controls to report UAI (odds ratio [OR] =3.2; 95% confidence interval [CI] =1.3–7.8), lack health insurance (OR=2.5; CI=1.1—5.0), lack primary care providers (PCPs) (OR=8.5; CI=2.9—24.2), and not discuss STD testing with healthcare providers (OR=6.0; CI=2.3—15.5). Controlling for college enrollment, older sex partners, and healthcare visits in the past year, case-patients were more likely than controls to report UAI (AOR=3.6; CI=1.2—11.3), not discuss STD testing with providers (AOR=6.6; CI=1.6—28.1), and lack PCPs (AOR=5.7; CI=1.7—19.0).

CONCLUSIONS: UAI and lack of discourse with healthcare providers appear to be risk factors for HIV infection among black MSM. Having a PCP and patient-provider discussions of STD testing may help prevent HIV infection among black MSM.

KEY WORDS: HIV, prevention, homosexuality, blacks, African Americans

9:15

Epidemiology of Genital Ulcer Disease at a Sexually Transmitted Disease Clinic — California, 2008

AUTHORS: *Ying-Ying Yu, J. Hacker, S. Guerry, H. Bauer, E. Samoff, H. Boyd, G. Bolan*

BACKGROUND: The most common sexually transmitted disease (STD)-related etiologies of genital ulcer disease (GUD) in the United States are herpes, syphilis, and chancroid. Overlap in clinical presentations frequently results in incorrect presumptive diagnoses. Knowledge of the local GUD epidemiology, combined with clinical data, is important for successful diagnosis. We investigated the epidemiology of GUD at a California STD clinic by using a highly sensitive and specific polymerase chain reaction (PCR) assay and described the prevalence of clinical symptoms among PCR-positive patients.

METHODS: During July 1–September 30, 2008, swab specimens were collected from all patients presenting with genital ulcers at a local STD clinic in California. Specimens were tested for herpes simplex virus (HSV), *Haemophilus ducreyi* (chancroid), and *Treponema pallidum* (syphilis), using a real-time PCR assay. Specimen collection is on-going. We reviewed medical charts for patient sex and characteristic clinical symptoms. Serologic

(rapid plasma reagin) results, routine testing at this clinic, were obtained for patients with a positive PCR for T. pallidum.

RESULTS: PCR results for 44 patients presenting with genital ulcers identified HSV among 16 (37%), *T. pallidum* in 1 (2%), *H. ducreyi* in 0, and none of the three organisms in 27 (61%) patients. Thirty-two (73%) patients were male. Of the 16 patients with PCR-confirmed HSV, four (25%) had characteristic, multiple, painful lesions. The one patient with syphilis was male, presented with a solitary, painful lesion, and had a negative serologic test.

CONCLUSION: Herpes was the most prevalent identifiable cause of GUD at a California STD clinic, and patients with herpes and syphilis frequently did not present with characteristic symptoms. Using PCR may improve the understanding of local GUD epidemiology with STD etiologies.

KEYWORDS: genital ulcer disease, STD, syphilis, PCR, etiology

9:35

Epidemiology of Childhood Tuberculosis — Kenya, October 2006–September 2007

AUTHORS: *Joseph S. Cavanaugh MD, I. Ngune, K. Laserson, A. Van't Hoog, M. Ackers, J. Sitienei, J. Odhiambo, N. Wambua, P. Mboya, K. Cain*

BACKGROUND: Pediatric tuberculosis (TB) has historically garnered limited attention from national TB programs because diagnosis is challenging, children rarely infect others, and if TB is diagnosed early, treatment is usually successful. However, it is not known whether these tenets are true in countries where HIV prevalence is high. We describe TB and associations with death among children in Kenya.

METHODS: We collected demographic and clinical registry data on children aged <15 years whose TB treatment was initiated during October 2006–September 2007 in two provinces. We tested associations with outcome using bivariate analysis.

RESULTS: TB treatment was initiated for 987 children: median age was 5 years; 520 (53%) were male. Pulmonary TB was diagnosed for 689 (70%) children: sputum smear results were positive for 77 (11%); the remaining cases were diagnosed clinically. Final outcomes were known for 830 of the 987 children, 40 (5%) of whom died during TB treatment. HIV test results were available for 670 (68%) children; 371 (55%) tested positive. Of 323 HIV-infected children with TB whose outcomes were known, 25 (8%) died during TB treatment, compared with 9 (4%) of 257 patients who had TB only (relative risk=2.2, 95% confidence interval=1.1–4.7).

CONCLUSIONS: In Kenya, pulmonary TB is the most common form of pediatric TB, but diagnosis is rarely confirmed by laboratory testing. HIV infection in children with TB is common, and our data suggest that children with both TB and HIV have twice the risk of death compared to children with TB only. Expanded HIV testing, which results in early diagnosis and treatment, and the use of validated procedures for the clinical diagnosis of TB in children may improve survival.

KEY WORDS: tuberculosis, pediatric, HIV, Kenya

9:55

Tuberculosis Outbreak Among Guatemalan Immigrants — Minnesota, 2008

AUTHORS: *Sara Lowther, R. Miramontes, B. Navara, M. Brueshaber, S. Solarz, N. Sabuwala, D. Sodt, R. Lynfield*

BACKGROUND: In 2006, approximately 9.2 million cases and 1.7 million deaths from tuberculosis (TB) occurred worldwide; 57% of U.S. TB cases were in foreign-born persons. In August 2008, the Minnesota Department of Health detected a TB cluster among Guatemalan immigrants. An investigation was conducted to confirm, characterize, and control the outbreak.

METHODS: We sought cases, defined as culture-confirmed TB with matching *Mycobacterium tuberculosis* genotype or epidemiologically linked clinical TB diagnosis, through surveillance and contact investigations. We interviewed patients, reviewed medical records, and screened contacts by tuberculin skin test (TST). Prevalence ratios (PR) and 95% confidence intervals (CI) compared TST positivity by contact-type.

RESULTS: We found 10 cases. The index case was a 6-month-old U.S.-born boy with Guatemalan parents, with TB diagnosed (May 2008) after 4 months of illness; six family members ages 2–13 years had TB. The source was a 25-year-old Guatemalan male with active pulmonary TB which was diagnosed in June 2008 but missed at a healthcare encounter in November 2007. He sang in a band that played at a church and was managed by the infant's father. Two other Guatemalan men had TB after contact with the singer. Of 155 contacts identified, we screened 148 (95%); of whom 68 (46%) had positive TST results. The proportion with positive TST results was 100% (7/7) among the singer's household contacts and among band members 7/7 (PR=3.3; 95% CI=2.4–4.6), 55% (12/22) in coworkers (PR=1.6; 95% CI=1.0–2.7), and 30% (24/79) in parishioners (reference). Cases and latently-infected contacts received appropriate TB treatment.

CONCLUSIONS: Delayed diagnosis contributed to *M. tuberculosis* transmission. Clinicians should be vigilant for TB among foreign-born persons and U.S.-born children having foreign-born parents.

KEYWORDS: tuberculosis, outbreaks, epidemiology, Minnesota, contact tracing

WEDNESDAY, APRIL 22, 2009

CONCURRENT SESSION I1: Dodgeball — Nutrition and Physical Activity

Ravinia Ballroom 10:30 a.m.–12:00 p.m.

MODERATOR: *William "Bill" Dietz*

10:35

Contributions of Physical Activity and Television Watching to Cardiovascular Disease Risk Among Adolescents: United States, 2003–2006

AUTHORS: *Roberto L. F. Lobelo, F. Loustalot, M. Pratt*

BACKGROUND: Risk for cardiovascular disease (CVD) begins during childhood and is increased by various CVD risk factors. The combined effects of physical activity (PA) and sedentary behaviors such as television watching (TVW) on CVD risk have not been studied in a population-based sample of U.S. adolescents.

METHODS: We analyzed data for 983 12- to 19-year-old participants in the 2003–2006 National Health and Nutrition Examination Survey. Their PA time was measured with an ActiGraph accelerometer (motion sensor), and their TVW time was self-reported. We assessed compliance with recommendations that adolescents engage in ≥60 minutes/day of moderate-to-vigorous PA and ≤2 hours/day of TVW and calculated CVD risk scores based on waist circumference; mean arterial blood pressure; and fasting glucose, HDL-cholesterol, and triglyceride levels. Higher risk scores indicate greater risk. We used linear regression analysis to assess associations between time engaged in PA and TVW and CVD risk scores

adjusted for accelerometer wear time,,age, sex, race/ethnicity, and socioeconomic status.

RESULTS: Approximately 14.5% of adolescents met recommendations for PA, 58.1% for TVW, 8.8% for both, and 36.2% for neither. CVD risk scores ranged from -3.04 to 1.87 (mean -1.37 ± 0.63). Each minute of PA was negatively (p=0.012) and each hour of TVW positively associated (p=0.002) with CVD risk. CVD risk scores were lower among adolescents meeting PA recommendations (-1.47 vs. -1.34; p=0.025), those meeting TVW recommendations (-1.42 vs. -1.28; p=0.0004), and those meeting both recommendations (-1.52 vs. -1.26; p=0.0004) than among those who did not.

CONCLUSIONS: Among U.S. adolescents, PA and TVW time are independently associated with CVD risk. Efforts to reduce CVD risk among U.S. adolescents should focus both on increasing PA and reducing sedentary behavior.

KEYWORDS: Adolescent, physical activity, television, cardiovascular disease, risk factors

10:55

Comparison of Percentage of U.S. Adults Who Met Aerobic Activity Standards in 2007 by Two Sets of Criteria: 2008 Physical Activity Guidelines for Americans and Healthy People 2010

AUTHORS: *Fleetwood V. Loustalot, S. Carlson, J. Fulton, D. Galuska, J. Kruger, F. Lobelo*

BACKGROUND: Participation in aerobic physical activity can reduce people's risk for death, cardiorespiratory and metabolic disease, and certain cancers. The *2008 Physical Activity Guidelines for Americans* (PAG), is a new standard for assessing the prevalence of adequate levels of such activity, which had been assessed previously on the basis of *Healthy People 2010 (HP2010)* criteria.

METHODS: Using data from 399,107 adult respondents to the 2007 Behavioral Risk Factor Surveillance System (BRFSS) survey, we compared the percentage who met *PAG* minimum aerobic physical activity criteria (≥150 minutes per week at moderate-intensity, 75 minutes per week at vigorous-intensity, or an equivalent combination) with the percentage who met corresponding *HP2010* criteria (≥30 minutes at moderate-intensity 5 days per week or 20 minutes at vigorous-intensity 3 days per week). We used t-tests to compare estimates by sex, age, and race/ethnicity.

RESULTS: In 2007, 64.5% of BRFSS respondents met minimum aerobic physical activity levels according to *PAG* criteria, and 48.8% according to *HP2010* criteria. Demographic patterns in prevalence estimates based on the two sets of criteria were similar: men were more likely to meet guidelines than women (p<0.01), whites more likely to do so than blacks or Hispanics (p<0.01), and younger adults were more likely to do so than older adults (p for trend <0.01).

CONCLUSIONS: Because *PAG* aerobic physical activity criteria are based on total weekly activity regardless of number of days and allow moderate- and vigorous-intensity minutes to be combined, 15.7% more BRFSS respondents met minimum weekly aerobic physical activity standards by *PAG* criteria than by *HP2010* criteria; however, this increase reflects only a change in definition rather than a population increase in aerobic physical activity prevalence.

KEYWORDS: guideline, adult, physical activity, Behavioral Risk Factor Surveillance System

11:15

The Association Between Serum Vitamin D Levels and Childhood Obesity

AUTHORS: *Laura L. Polakowski, L. Akinbami*

BACKGROUND: Vitamin D deficiency remains a public health concern among U.S. children, with recent prevalence estimates in adolescents ranging from 24 to 42%, depending on the criteria used. The growing evidence that vitamin D may prevent several chronic diseases prompts the need to identify children at risk for vitamin D deficiency. Obesity has been linked to vitamin D deficiency in adults and adolescents. We aimed to determine if an association exists between obesity and inadequate serum vitamin D levels among U.S. children.

METHODS: We used serum 25-hydroxyvitamin D (25-OHD), vitamin D, and body measurement data from 4,745 U.S. children aged 6–18 years examined in the National Health and Nutrition Examination Survey (NHANES) from 2003–2006, and evaluated the relationship between serum vitamin D levels and obesity, defined as a body mass index (BMI) ≥ 95th percentile. Children with missing data, implausible BMI percentiles, and any pregnant females were excluded. Vitamin D levels were dichotomized as deficient (<15ng/ml) or not deficient in logistic regression models to assess odds of vitamin D deficiency accounting for age, sex, race/ethnicity, poverty status, and vitamin D-containing supplement use.

RESULTS: Among obese children, 16.9% were vitamin D deficient versus 8.4% of children with BMI <95th percentile. Obese children had increased adjusted odds of vitamin D deficiency (AOR=2.07;95%CI=1.64–2.62).

CONCLUSIONS: Obese children are more likely to be vitamin D deficient. Although the exact physiologic nature of this relationship remains unclear, these findings help identify an at-risk pediatric population that can be targeted for interventions to increase serum vitamin D levels.

KEYWORDS: 25-hydroxyvitamin D, vitamin D deficiency, vitamin D insufficiency, childhood obesity

11:35
Iodine Nutrition Among Women of Reproductive Age — United States 2001–2006

AUTHORS: *Cria O. Gregory, K. Herrick, M. Serdula, K. Sullivan*

BACKGROUND: Adequate iodine nutrition during pregnancy is critical for fetal neurologic development. Even mild deficiency can result in impaired cognitive ability. In the U.S. major sources of iodine include dairy products and iodized salt. Although the U.S. population has traditionally been considered iodine sufficient, median urinary iodine (UI) levels have decreased 50% since the 1970s. Iodine deficiency among women of reproductive age may be a public health problem.

METHODS: We analyzed 2001–2006 National Health and Nutrition Examination Survey (NHANES) data from UI spot tests for pregnant (n=330) and nonpregnant (n=1,640) women aged 15–49 years and used World Health Organization criteria to define iodine deficiency (median UI: <150 µg/L pregnant; <100 µg/L nonpregnant). Estimates of median UI were weighted to be nationally representative.

RESULTS: Median UI among all pregnant women was 153.3 µg/L (95% confidence interval [CI]=104.6–196.0) and below the level of sufficiency among those aged 15–19 (137.4 µg/L; 95% CI=117.5–192.1), aged 30–39 (146.9 µg/L; 95% CI=101.0–258.6), and the 13% who had not consumed dairy products in the previous 24 hours (99.9 µg/L; 95% CI=56.7–169.6). Median UI among all nonpregnant women was 124.9 µg/L (95%

CI=116.8–136.2) and below the level of sufficiency among those who did not consume dairy products (20%) and were aged 30–39 (83.4 µg/L; 95% CI=65.5–101.7) or aged 40–49 (65.3 µg/L; 95% CI=33.5–129.4).

CONCLUSIONS: Although larger samples are needed to confirm these findings, these results raise serious concerns and support the American Thyroid Association's recommendation that pregnant women receive daily iodine supplementation. Continued monitoring of iodine levels among U.S. women is essential, particularly among subgroups at risk for iodine deficiency.

KEYWORDS: iodine deficiency, urinary iodine, NHANES, pregnancy, diet

WEDNESDAY, APRIL 22, 2009

Concurrent Session I2:
Sicko — Healthcare Associated Illness
Dunwoody Suites 10:30 a.m.–12:00 p.m.

MODERATOR: *Michael Bell*

10:35
Role of Nosocomial Transmission in a Measles Outbreak — Arizona, 2008

AUTHORS: *Sanny Y. Chen, F. Lugo, P. Kutty, R.H. Sunenshine, B. Johnson, J. Leung, S. Goodykoontz, R. Norrish, S. Daniels, J. Rosen, P. Gould, D. Ehrhardt, J. Rota, W.J. Bellini, G.L. Armstrong, K. Lewis, K. Komatsu, M. McDonald, S. Anderson, J. Seward*

BACKGROUND: Measles elimination was declared in the United States in 2000. However, measles importations continue and can lead to outbreaks. On February 12, 2008, a visiting Swiss citizen was admitted to Hospital A with rash and pneumonia. Measles was confirmed on February 19. Through July 21, a total of 13 additional measles cases were identified in healthcare settings and the community. We sought to determine factors contributing to this outbreak.

METHODS: We classified measles cases according to the CDC/Council of State and Territorial Epidemiologists case definitions. We defined healthcare settings (HS) as locations that provide medical care and healthcare personnel (HCP) as persons who work in HS.

RESULTS: The 14 confirmed measles patients ranged in age from 8 months to 50 years; five (36%) were hospitalized. All 14 patients were unvaccinated; seven (50%) acquired measles in HS. Of the 11 (79%) patients who accessed healthcare services while infectious, none were masked while waiting to see a provider, and nine (82%) who had presented with rash and fever were not placed in a negative pressure room promptly. In Hospital A, 421 (22%) of 1,872 HCP lacked evidence of measles immunity. Twenty-six (6%) of 404 HCP tested before vaccination were measles IgG seronegative, including one who acquired measles.

CONCLUSION: Failure to implement existing vaccine policy recommendations, combined with delays in diagnosis and implementation of airborne precautions, contributed to the largest U.S. nosocomial outbreak since 1988. Healthcare providers should consider measles among patients with a rash illness and institute immediate airborne isolation. Ensuring HCP and the public are vaccinated in accordance with policy recommendations by the Advisory Committee on Immunization Practices are paramount in preventing spread of measles.

KEYWORDS: measles, nosocomial transmission, MMR, health care worker

10:55
Outbreak of Bloodstream Infections at an Outpatient Dialysis Center — Ohio, 2008

AUTHORS: *Clara Y. Kim, S. Schillie, J. Carmean, C. Kippes, A. Arendt, J. Napolitano, M. Johnson, D. Pastula, B. Jensen, J. Noble-Wang, M. Arduino, P. Patel*

BACKGROUND: Among hemodialysis patients, ~50,000 bloodstream infections (BSIs) occur annually. We investigated a four-fold increase in Gram-negative BSIs at Dialysis Center X during February–August, 2008, to determine the infection source and recommend control measures.

METHODS: We conducted a case-control study. A case was defined as fever or chills with positive blood culture for *Burkholderia cepacia, Ralstonia pickettii, Pseudomonas aeruginosa,* or *Stenotrophomonas maltophilia* in a patient treated at Dialysis Center X during February 21–August 2, 2008. Approximately four control subjects per case were randomly selected from patients treated at the center during the same period without symptoms. We reviewed medical charts for vascular access type and medications administered, observed infection-control practices, and cultured purified water and dialysate. We used Fisher's exact test to identify factors associated with cases.

RESULTS: Among 14 cases (nine *B. cepacia*, three *R. pickettii*, one *P. aeruginosa*, and one *S. maltophilia*) and 55 control subjects, odds of case status were higher among patients with catheter access compared with graft or fistula (odds ratio [OR], 6.9; 95% confidence interval [CI], 1.8–25.5) and lower among patients who received heparin compared to patients who did not (OR, 0.1; 95% CI 0–0.6). Prime buckets that came in contact with sterile blood tubing contained dialysate, used needles, and bandages. Caregivers rarely changed gloves after contact with dialysate. *B. cepacia* and *R. pickettii* were cultured from purified water and dialysate.

CONCLUSION: Catheter access was associated with Gram-negative BSI. Purified water and dialysate were the likely outbreak source. Opportunities for transmission occurred through contact with contaminated prime buckets and caregiver hands. Correct handling of prime buckets and hand hygiene are necessary to prevent similar outbreaks.

KEYWORDS: hemodialysis, Gram-negative bacterial infections, infection control, outpatients

11:15

Investigation of an Outbreak of *Aspergillus fumigatus*-Positive Respiratory Cultures Among Patients in a Community Hospital – Colorado, 2008

AUTHORS: *Melissa A. Viray, A. Greenbaum, C. McCammon, T. Ghosh, A. Balajee, T. Chiller, J. Noble-Wang, K. Wannemuehler, S. Magill*

BACKGROUND: *Aspergillus fumigatus* (AFU) is an airborne mold that can cause healthcare-associated disease outbreaks. Identifying an environmental point source for these outbreaks can be difficult due to a lack of standardized environmental sampling methods and robust subtyping techniques. We used two recently-developed subtyping methods in an investigation of a hospital-associated outbreak of AFU-positive clinical cultures.

METHODS: Case-patients (inpatients with ≥1 AFU-positive culture from 1/11/08–3/31/08) were identified through hospital microbiology databases. After medical record review, we compared case-patients to patients with AFU-positive cultures when rates were at baseline levels (1/1/06–1/10/08). A hospital environmental assessment, including air, water and surface fungal cultures, was performed. Confirmatory fungal species identification and subtyping using cell surface protein (CSP) single-locus-sequence typing and a microsatellite marker (MM) method were performed at CDC.

RESULTS: Nine case-patients were compared to 15 patients with AFU-positive

cultures before the outbreak period. Case-patients more frequently had prior hospitalizations (67% vs. 27%) and ICU exposures (56% vs. 33%), although these differences were not statistically significant. Construction, mold abatement and changes in hospital cleaning practices occurred before and during the outbreak period; environmental samples were negative for AFU. Three of eight available case-patient isolates had identical CSP genotypes, but all isolates were unique when tested with the more discriminatory MM assay.

CONCLUSIONS: AFU conidial plumes arising during construction, renovation and/or cleaning activities may have caused the outbreak. *Aspergillus* strain-typing methods augment investigations by determining the genotypic relationships of epidemiologically-linked isolates. In this investigation, no common case-patient exposure or environmental point source was identified, which was supported by MM strain-typing results. Using the MM method in future investigations may improve understanding of factors contributing to healthcare-associated fungal outbreaks.

KEYWORDS: *Aspergillus fumigatus*, outbreak, mycological typing techniques, mycoses

11:35
Multistate Outbreak of Adverse Reactions Associated with Contaminated Heparin

AUTHORS: ***Sarah F. Schillie, D. Blossom, J. Jaeger, K. Kurkjian, N. Shehab, G. Turabelidze, R. Sasisekharan, A. Kallen and P. Patel*** **for the Heparin Adverse Event Investigation Group**

BACKGROUND: Over 1 million vials of heparin are used each month in U.S. hemodialysis and other healthcare settings. In January 2008, CDC was notified of seven patients who developed allergic-type reactions, including angioedema and hypotension, during hemodialysis. An investigation was initiated to identify the cause.

METHODS: Additional reports of acute allergic-type reactions and preceding healthcare product exposures were first elicited from dialysis facilities, and then from other healthcare facilities. Twenty-one dialysis facilities that reported reactions and 23 randomly selected dialysis facility controls were included in a case-control study. A case-facility had >1 patient who developed allergic-type reactions within 1 hour of hemodialysis session initiation after November 1, 2007. Unopened heparin vials obtained from facilities that reported reactions were analyzed for contaminants using spectroscopy.

RESULTS: During November 19, 2007–January 31, 2008, 152 allergic-type reactions were identified in 113 patients from 13 states. Of 131 reactions among dialysis patients, 128 (98%) occurred after heparin administration; 122 (93%) involved heparin manufactured by Baxter Healthcare. In the case-control study, Baxter heparin use was reported by all case facilities and one of 23 control facilities (100.0% vs. 4.3%, $p<0.001$). Oversulfated chondroitin sulfate (OSCS), a contaminant, was detected in 9 of 10 Baxter heparin lots tested. Of 54 reactions for which the lot number of administered heparin was known, 52 (96%) occurred after administration of OSCS-contaminated heparin.

CONCLUSIONS: Heparin contaminated with OSCS was epidemiologically linked to adverse reactions in this nationwide outbreak. Reactions reported to CDC ceased following a national voluntary recall of Baxter heparin products. This investigation underscores the importance of reporting and investigating clusters of adverse events in healthcare settings.

KEYWORDS: heparin, hemodialysis, allergic reaction, oversulfated chondroitin sulfate

MONDAY — FRIDAY
POSTER SESSION
MEET THE AUTHORS
Ravinia Ballroom
12:30 p.m.–1:30 p.m.

POSTERS 1–15:
Poster Session 1 — Analyze This

POSTERS 16–30:
Poster Session 2 — Analyze That

POSTER 16
"M-L-V-A" (Multiple-locus variable-number tandem repeat analysis): It's fun to use the M-L-V-A (for differentiating outbreak-associated and sporadic *E. coli* infections) — United States, 2008

AUTHORS: *Elizabeth C. Cavallaro, M. Viray, E.Hyytia-Trees, P.Lafon, K.Wannemuehler, S.Nowicki, E. Brandt, A.Weltman, P.Kludt, K. Sheline, L. Pogostin, M.Sotir*

BACKGROUND: *Escherichia coli* O157:H7 (ECO157) is a major cause of food-borne outbreaks in the United States. MLVA, a highly discriminatory subtyping technique, helps differentiate outbreak-associated and sporadic illnesses, especially among clusters of ECO157 isolates with a frequently-reported pulsed-field gel electrophoresis (PFGE) pattern. We report the usefulness of MLVA in two multistate ECO157 outbreaks, occurring in June (Outbreak A) and August (Outbreak B) 2008.

METHODS: We defined a case as confirmed ECO157 illness with onset during or after May, 2008 with PFGE and MLVA matching outbreak patterns A or B. We conducted standardized interviews, traceback investigations, and product sampling at retail stores and patient homes and a case-control study for Outbreak A.

RESULTS: Sixty-four patients from 12 states and 36 patients from 9 states were reported in Outbreaks A and B, respectively. Ground beef was implicated in both; Outbreak A was associated with eating ground beef products from retail chain X (Odds Ratio = 9.3, 95% Confidence Interval = 1.9-8.9). Implicated products in both outbreaks originated from the same Nebraska supplier (Plant Y); multiple recalls occurred. In Outbreak A, MLVA linked a geographically distinct restaurant sub-cluster to the main cluster; the restaurant used beef from Plant-Y. In Outbreak B, MLVA linked ground beef product samples to Plant Y. Among PFGE matching isolates, 19 (23%) of 84 isolates in Outbreak A and 10 (21%) of 48 isolates in Outbreak B were different by MLVA, and could not be epidemiologically linked to the implicated product.

CONCLUSIONS: MLVA helped differentiate sporadic ECO157 illness from outbreak cases and to link environmental samples with traceback findings. Use of MLVA as an investigation tool for ECO157 and other pathogens should be explored.

KEYWORDS: Multiple-locus variable-number tandem repeat analysis, *E.coli* O157:H7, ground beef

POSTER 17
Seroprevalence of Herpes Simplex Type 2 — National Health and Nutritional Examination Surveys, United States, 2005–2006

AUTHORS: *Sara E. Forhan, F. Xu, M. Sternberg, S. Gottlieb, S. Berman, L. Markowitz*

BACKGROUND: Herpes simplex virus type 2 (HSV-2), a sexually transmitted virus, causes lifelong infection. HSV-2 infection is the main cause of genital herpes and neonatal herpes, and can also increase the risk of HIV

acquisition at least 2-fold. We sought to determine the most recent U.S. HSV-2 seroprevalence estimates.

METHODS: We analyzed data from the National Health and Nutritional Examination Surveys (NHANES) 2005–2006 to establish the seroprevalence of HSV-2 among persons aged 14–49. Data were weighted to provide national estimates. We used logistic regression to identify factors associated with HSV-2 seroprevalence. To determine HSV-2 seroprevalence trends, we compared NHANES HSV-2 seroprevalence in 2005–2006 and 1999–2004.

RESULTS: In NHANES 2005–2006, 3,929 participants were tested for HSV-2 antibody. Overall HSV-2 seroprevalence was 16.4% (95% confidence interval [CI]=13.9%–19.3%). Seroprevalence increased with age, from 0.7% among those aged 14–19 to 25.8% among those aged 40–49, and was higher among women (20.8%) than among men (12.0%, $p<0.001$). Seroprevalence was higher among non-Hispanic blacks (25.1%) than among non-Hispanic whites (12.6%, $p<0.001$) or Mexican Americans (8.6%, $p<0.001$). Age, gender, race/ethnicity, education level, and number of lifetime sex partners were independently associated with HSV-2 seroprevalence. Overall, estimates of seroprevalence during 2005–2006 and during 1999–2004 did not differ ($p=0.65$).

CONCLUSIONS: In the United States, approximately 1 in 6 persons aged 14–49 years has HSV-2 infection; women and African Americans are more likely to be infected. The development of effective prevention strategies for HSV-2 infection could reduce the burden of genital herpes in the United States and may also benefit HIV prevention.

KEYWORDS: HSV-2, prevalence, United States

POSTER 18
Estimating the Prevalence of Chronic Hepatitis B Virus Infection — New York City, 2008

AUTHORS: *Anne Marie France, K. Bornschlegel, M. Layton, J. Lazaroff, C. Zimmerman, S. Balter*

BACKGROUND: Chronic hepatitis B virus (HBV) infection is a preventable cause of liver failure, cirrhosis, and liver cancer; estimated chronic HBV infection prevalence is 0.3%–0.5% nationwide. Prevalence in New York City (NYC) is likely higher because foreign-born persons, who represent 36% of NYC's population versus 11% nationwide, bear a disproportionate burden of chronic HBV infection. However, because no comprehensive, population-based survey of chronic HBV infection has been conducted in NYC, the true prevalence is unknown. We combined available local, national, and international data to estimate the prevalence and distribution of chronic HBV infection in NYC to inform public health policymakers.

METHODS: NYC's population, as reported in the 2000 U.S. Census, was stratified into mutually exclusive subgroups, according to demographic factors relevant to chronic HBV infection risk. For each subgroup, we reviewed local, national, and international public health program data and research literature from 1995-2008 to identify estimates of the prevalence of chronic HBV; the estimate most representative of the current NYC population was applied to the census count to estimate the case count for that group. Estimates were summed across all subgroups and divided by the total NYC population to generate an overall NYC prevalence estimate.

RESULTS: We estimate that 1.4% of NYC residents (109,519 of 8,008,278) have chronic HBV infection. Foreign-born persons represent 94% of estimated cases; of these, the

largest proportion is estimated to be persons born in China (23%).

CONCLUSIONS: The estimated prevalence of chronic HBV infection in NYC is ~3 times higher than national prevalence estimates. Although this estimate should be validated against estimates derived from available surveillance data, we recommend that programmatic efforts tailored to foreign-born populations be prioritized.

KEYWORDS: hepatitis B, prevalence estimation, foreign-born populations, New York City

POSTER 19
The Risk of Seizures after Acellular Pertussis Vaccines in Early Childhood — United States, 2002–2006

AUTHORS: *Wan-Ting Huang, P. Gargiullo, I. Shui, E. Weintraub, J. Baggs, K. Broder, J. Iskander;* **for the Vaccine Safety Datalink Team**

BACKGROUND: Receipt of whole-cell pertussis vaccine (DTP) is associated with acute neurologic adverse events, including seizures. Because of concerns about DTP safety, since 1997 a less reactogenic acellular pertussis vaccine (DTaP) has been recommended for routine U.S. childhood immunizations, in which 4 DTaP doses are recommended at ages 2, 4, 6, and 15–18 months. Population-based studies assessing the risk of seizures after DTaP are limited.

METHODS: We conducted a self-controlled case series (SCCS) analysis using 2002–2006 automated data at seven managed care organizations in the Vaccine Safety Datalink. We identified children aged 6 weeks to 23 months with seizure ICD-9 codes in the emergency department/hospital. The occurrences of seizures within 0–3 days after DTaP were compared with those in referent periods outside the 0–3 days for the same individual. Each patient serves as his/her own control; therefore, the SCCS method avoids potential confounding that may result from comparing patients with different baseline risks of seizures. Conditional Poisson regression was used to estimate the incidence rate ratio (IRR) with adjustment for calendar year, influenza season, age and receipt of measles-mumps-rubella/measles-mumps-rubella-varicella vaccine, which has been associated with febrile seizures.

RESULTS: We identified 3,638 seizures in 3,028 patients. The adjusted IRR across all doses was 0.98 (95% confidence interval [CI]=0.76–1.26). No increased risk of seizures after the first (0.71, 95% CI=0.37–1.34), second (0.87, 95% CI=0.46–1.63), third (0.90, 95% CI=0.51–1.60), or fourth (1.21, 95% CI=0.84–1.75) dose was observed.

CONCLUSIONS: We did not observe an increased risk of seizures after DTaP in children 6 weeks to 23 months of age. These findings provided reassuring evidence on the safety of DTaP vaccines.

KEY WORDS: infant, diphtheria-tetanus-acellular pertussis vaccine, safety, pharmacoepidemiology

POSTER 20
False-Positive Results with a Commercially-Available West Nile Virus Immunoglobulin M Enzyme-Linked Immunosorbent Assay Kit — Multistate Investigation, 2008

AUTHORS: *Kristen B. Janusz, A. Panella, D. Neitzel, S. Wong, W. Chung, S. Semple, J. Hallisey, M. Kemperman, M. Fischer, J. Laven, O. Kosoy, R. Lanciotti, J. E. Staples* **for the WNV False-Positive IgM ELISA Multistate Investigation Team**

BACKGROUND: In September 2008, CDC was notified of an increase in

false-positive West Nile virus (WNV) test results obtained with a specific commercially-available WNV IgM ELISA kit. The kit was labeled for use on serum to aid in a presumptive diagnosis of WNV infection in patients with clinical symptoms of neuroinvasive disease. A multistate investigation was performed to determine the scope and impact of this problem.

METHODS: In collaboration with state health departments, we identified specimens that tested positive with the implicated kit, collected clinical syndrome and case status on individuals with affected samples, and notified healthcare providers of potential false-positive results. We used WNV IgM immunoassays to reevaluate available specimens and classify previous results as false-positive or true-positive.

RESULTS: One test kit lot distributed in the US was identified as the problem and subsequently recalled. This lot was used by four laboratories and resulted in positive tests on 568 specimens obtained from 518 individuals in 42 states; 208 (40%) individuals had been reported to CDC as WNV disease cases. Of the 166 specimens retested at CDC, 119 (72%) had false-positive results; 45 (39%) of 115 individuals with false-positive results had been reported as WNV cases. False-positive results occurred more frequently among individuals without evidence of neuroinvasive disease (78%, 97/125) than those with neuroinvasive disease (47%, 14/30) ($p<0.001$).

CONCLUSION: The use of a commercially-available WNV IgM assay led to a substantial number of false-positive test results and revisions in WNV surveillance reports. The indicated use of commercially-available kits for diagnosis of WNV neuroinvasive disease should be considered when requesting testing and interpreting results; positive results should be confirmed at a state health department or CDC.

KEYWORDS: West Nile virus, False Positive Reactions, Enzyme-Linked Immunosorbent Assay, Antibodies, Surveillance

POSTER 21
Knowledge, Attitudes, and Practices Regarding Syphilis Screening Among Men Who Have Sex with Men — San Francisco, 2008

AUTHORS: *Kenneth A. Katz, H. Raymond, K. Bernstein, J. Klausner*

BACKGROUND: After three annual decreases, syphilis cases in San Francisco (SF) increased >50% in 2008, with 94% of 460 cases occurring among men who have sex with men (MSM). SF Department of Public Health recommends syphilis screening among MSM every 3–6 months. We investigated factors associated with MSM meeting syphilis screening recommendations.

METHODS: We used time-location sampling to select SF venues frequented by MSM and a day and time during June–November 2008 when MSM were likely present. During each time, we counted men present and approached them for in-person interviews. We asked men to identify the recommended screening interval and to state whether they believed they were at risk for syphilis. We defined meeting syphilis screening recommendations as self-reporting any syphilis test within 6 months of interview. We weighted data to account for complex sampling. We performed multivariate logistic regression to identify factors associated with meeting syphilis screening recommendations.

RESULTS: Among 301 MSM, 73.0% identified the recommended screening interval; 52.9% felt at risk for syphilis; and 43.4% met syphilis screening recommendations. Adjusted odds of meeting syphilis screening recommendations were significantly higher among MSM who identified the recommended

screening interval (odds ratio [OR], 2.6; 95% confidence interval [CI], 1.2–5.7) or reported having a sexually transmitted disease within the previous 12 months (OR, 2.6; 95% CI, 1.2–5.6). Age, race/ethnicity, human immunodeficiency virus status, methamphetamine use, number of male sex partners, and belief regarding syphilis risk were not associated with meeting screening recommendations.

CONCLUSIONS: SF MSM identifying the recommended syphilis screening interval had higher odds of meeting screening recommendations. Interventions to encourage screening should emphasize the recommended screening interval.

KEYWORDS: syphilis; sexually transmitted diseases; screening; knowledge, attitudes, and practices; time-location sampling

POSTER 22
Outbreak of Hepatitis B Virus Infection Among Residents and Contacts in an Assisted Living Facility — Pennsylvania, 2007–2008

AUTHORS: *Anne McIntyre, N. Thompson, W. Miller, K. Warren, M.T. Temarantz, J. Drobeniuc, S. Kamili, P. Baloga, C. Zaleppa, K. Simonson, V. Urdaneta, D. Hu*

BACKGROUND: Approximately 46,000 U.S. residents acquire hepatitis B virus (HBV) infections annually; another 1.4 million have chronic infection, which can lead to liver cancer. In long-term care settings, improper sharing of blood glucose monitoring (BGM) equipment is a recognized risk factor for HBV infection. Of the 1 million residents of assisted living facilities (ALFs), 20% require frequent fingersticks for BGM. Hepatitis B vaccine is not currently recommended for this population. During March 2007–February 2008, four residents of an ALF in Pennsylvania were reported to have acute HBV infection, prompting our investigation to identify exposures associated with infection.

METHODS: We conducted a retrospective cohort study of diabetic residents and their roommate contacts (ALF residency: December 2006–June 2008), collected blood specimens from residents, and reviewed medical charts and staff practices. Blood specimens were tested to define HBV infection (negative, acute, chronic) according to CDC guidelines and were genetically sequenced when possible.

RESULTS: Of 50 residents in the cohort, 26 had been discharged or had died. Of the 24 available for testing, 8 had acute or chronic HBV infection. Four of those 8 specimens were positive for HBV DNA with identical HBsAg gene sequences, suggesting a common source. HBV infection was significantly associated with being diabetic (p=0.015) and receiving fingersticks (p=0.003). Review of staff practices identified other risks: sharing of fingerstick devices, poor hand hygiene, and failures to clean glucometers between uses.

CONCLUSIONS: Epidemiologic and laboratory investigation strongly suggested that person-to-person HBV transmission was associated with inappropriate BGM practices performed by ALF staff. Facility administrators must ensure that recommended BGM practices are fully implemented. Effectiveness of the HBV vaccine in the ALF population should be evaluated.

KEYWORDS: hepatitis B virus, blood glucose monitoring, assisted living facilities, infection control

POSTER 23
Impact of Location of Death on Completeness of Child Injury Mortality Data: Comparison of Vital Records and Medical Investigator Data — New Mexico, 2003–2005

AUTHORS: *Megin C. Nichols, M. Landen, C.M. Sewell*

BACKGROUND: Unintentional injury is the leading cause of death for U.S. children; New Mexico (NM) is among the top 10 states for child injury mortality. Health departments use vital statistics or medical investigator data to evaluate child injury mortality; however, NM's Office of the Medical Investigator (OMI) does not have jurisdiction over deaths in other states or on tribal lands. We evaluated the effect of death location on completeness of NM child injury mortality data.

METHODS: Electronic death records were obtained from OMI and the Bureau of Vital Records and Health Statistics (VR) with manner of death and ***International Classification of Diseases***, Tenth Revision codes, respectively, for unnatural deaths during 2003–2005 among NM residents aged 0–19 years. Death location was determined from occurrence codes.

RESULTS: VR and OMI data together identified 57 out-of-state deaths and 53 deaths on tribal lands. VR data missed five (9%) out-of-state deaths and one (2%) death on tribal land. OMI data missed 52 (91%) out-of-state and 14 (26%) deaths on tribal lands. Of all deaths on tribal lands, OMI data missed seven (64%) of 11 hanging suicides, one (20%) of five homicides, and six (21%) of 29 transport-related deaths; OMI data were more likely to miss hanging deaths than all other causes combined (risk ratio, 3.8; 95% confidence interval, 1.7–8.6).

CONCLUSION: Location of death affects completeness of both OMI and VR data, but OMI more substantially. OMI data alone might inaccurately describe child injury deaths (e.g., hangings) on tribal land and consequentially, among American Indians. Analysis of child injury mortality should include both VR and OMI data in states where deaths commonly occur beyond medical investigator jurisdiction.

KEYWORDS: vital statistics registration, medical examiner, injury, children, Native American tribes, New Mexico

POSTER 24
Comparison of O157 and Non-O157 Shiga Toxin-Producing *Escherichia coli* — Wisconsin, 2005–2008

AUTHORS: *Carrie F. Nielsen, R. Klos, J. Archer, D. Hoang Johnson, R. Heffernan, T. Monson, K. Bisgard, J. Davis*

BACKGROUND: *Escherichia coli* O157:H7 causes 70,000 diarrheal illnesses annually in the United States; 5%–10% result in hemolytic-uremic syndrome (HUS). In a 2004 national study, 56% of O157:H7 isolates had *stx1* and *stx2* virulence genes; 42% had only the *stx2* gene. Although >100 serogroups of Shiga toxin-producing *Escherichia coli* (STEC) cause diarrhea and HUS, data regarding epidemiologic features of non-O157 STEC are limited. We sought to better understand the occurrence of STEC illnesses in Wisconsin.

METHODS: Confirmed STEC cases were diarrheal illnesses among Wisconsin residents with isolates submitted to the State Laboratory of Hygiene during January 2005–October 2008. Among isolates, serogroup and pulsed-field gel electrophoresis (PFGE) patterns were determined; non-O157 isolates were tested for virulence genes.

RESULTS: Among 727 STEC isolates, 597 (82%) were O157 and 130 (18%) were non-O157. Patient features for O157, compared with non-O157 STECs, include being female, 56% and 50%, and median age, 20 and 16 years, respectively. Twelve cases of HUS were associated with O157, compared with none among non-O157 STECs (Fisher's exact test,

$P = 0.10$). Most common among 10 non-O157 serogroups were O111 (22% of isolates), O26 (21.5%), O103 (20%), and O45 (14%). Of 130 non-O157 PFGE patterns, 126 were unique; two isolates from siblings matched; and two nonepidemiologically linked isolates matched. Virulence gene testing of 121 non-O157 STECs identified 101 (83%) with only *stx1* gene, 13 (11%) with only *stx2* gene, and seven (6%) with both genes.

CONCLUSIONS: In Wisconsin, non-O157 STEC infections were sporadic comprised of 18% of detected STEC-related illnesses and had unique virulence profiles that differed from O157 strains. STEC isolation and characterization remains critical to tracking and preventing related illnesses and outbreaks.

KEYWORDS: Shiga toxin-producing *Escherichia coli*, STEC, *Escherichia coli* O157

POSTER 25
Evaluation of the Institute of Medicine Recommendations on Weight Gain During Pregnancy — Florida, 2004–2007

AUTHORS: *Sohyun Park, W. Sappenfield, C. Bish, D. Goodman, H. Salihu, D. Bensyl*

BACKGROUND: Maternal obesity and excessive weight gain are associated with adverse reproductive outcomes. The 1990 Institute of Medicine (IOM) recommendations on weight gain during pregnancy are those most commonly used in practice. IOM is reevaluating these recommendations for adequacy. We investigated the association between IOM recommendations on gestational weight gain and birth outcomes by using 2004–2007 Florida birth certificate data.

METHOD: Birth outcomes for women aged 18–40 years with a singleton full-term live birth, without chronic diabetes or hypertension, and with available information on prepregnancy body mass index (BMI) and gestational weight change, were evaluated. Outcomes included large-for-gestational-age (LGA) and small-for-gestational-age (SGA). Gestational weight gain was assessed for 10 prepregnancy BMI categories by using logistic regression. IOM recommendations, which vary by prepregnancy weight, were considered the referent. Comparison categories below and above were defined on the basis of the referent interval length. Odds ratios were adjusted (AOR) for age, race/ethnicity, parity, gestation, and maternal age. Only statistically significant findings are presented ($P < 0.05$).

RESULTS: Prevalence of LGA increased with weight gain. Compared with gaining within IOM recommendations, LGA odds ratios for all BMI categories decreased when gaining less than recommended (AOR range, 0.36–0.75) and increased when gaining more than recommended (AOR range, 1.31–2.13). The reverse was true for SGA. Gaining less than recommended for all BMI categories increased the odds ratios (AOR range, 1.16–1.89) and gaining more than recommended decreased the odds ratios (AOR range, 0.60–0.79).

CONCLUSIONS: Gestational weight gain influenced the risk for LGA and SGA in opposite directions, regardless of prepregnancy BMI category. IOM weight gain recommendations should consider these differing outcomes when formulating guidelines.

KEYWORDS: prepregnancy body mass index, gestational weight gain, LGA, SGA, IOM guidelines

POSTER 26
Unintentional Medication Overdose Deaths—Oklahoma, 1994–2006

AUTHORS: *Emily Piercefield, P. Archer, S. Mallonee*

BACKGROUND: During 1999–2005, U.S. unintentional poisoning death rates increased 80%, from 4.4 to 7.9/100,000 population; >90% of these deaths were attributed to legal or illegal drugs. We characterized the demographics and trends of unintentional medication overdose deaths among Oklahoma residents to target prevention strategies.

METHODS: State medical examiner data on unintentional poisonings during 1994–2006 and Drug Enforcement Administration opioid retail sales data during 1997–2006 were analyzed. Deaths attributed solely to illicit drugs, alcohol, or both were excluded.

RESULTS: We identified 2,112 fatal unintentional medication overdoses (4.7 deaths/100,000 population) involving 3,743 total intoxicants (mean: 1.8 substances/decedent). Median age was 42 years (range, 0–88); highest fatality rate (11.4/100,000 population) was in the 35–44-year age group. Males (61%) and whites (5.4/100,000 population) predominated. Crude death rates increased 12-fold (0.9/100,000 population in 1994; 11.1 in 2006); the rate of prescription opioid analgesic-related deaths increased 19-fold (0.6 to 11.1) during 1994–2006. The leading drug types were opioid analgesics (n = 1,992; 53%) and anxiolytics (n = 455; 12%). The most common drugs were methadone (n = 653; 17%), hydrocodone (n = 407; 11%), alprazolam (n = 320; 8%), and oxycodone (n = 311; 8%). Illicit substances and alcohol were identified as contributing factors in 8% and 19% of deaths, respectively. During 1997–2006, an eight-fold increase in crude death rates occurred, compared with a six-fold increase in per-capita opioid sales.

CONCLUSIONS: Unintentional medication-related deaths are increasing in Oklahoma and occur predominantly among middle-aged males. Three of the top four substances involved are opioid analgesics. Prevention strategies should target middle-aged adults and stress the dangers of coingesting substances and incorrect use of prescription pain medications.

KEYWORDS: poisoning; overdose; substance-related disorders

POSTER 27

BALieve it or not? Legionnaires' Disease Among Patients Undergoing Bronchoalveolar Lavage — Arizona, 2008

AUTHORS: *Benjamin J. Silk, S. Chen, N. Kozak, R. Sunenshine, C. Kioski, E. Brown, C. Ogden, K. Montefour, M. Buss, M. Arduino, B. Fields, L. Hicks*

BACKGROUND: Legionnaires' disease (LD) is a potentially fatal form of pneumonia acquired by inhalation of water aerosols containing *Legionella* bacteria. In June and July 2008, *L. pneumophila* was isolated from bronchoalveolar lavage (BAL) specimens of four patients who underwent bronchoscopies with the same bronchoscope at an Arizona hospital. We conducted epidemiologic and environmental investigations to characterize *Legionella* transmission and identify the source.

METHODS: We used a standardized form to collect clinical information and microbiologic testing results. Environmental samples were collected from endoscopy reprocessing sinks and two ice machines near the endoscopy department. Clinical and environmental specimens were analyzed by serogrouping and sequence-based typing (SBT) of seven gene fragments. Bronchoscopy procedures and disinfection practices were assessed.

RESULTS: None of the case-patients had clinical or radiographic evidence consistent with LD. *L. pneumophila* was detected in BAL specimens (n=4 isolates, serogroup 8), a primary ice machine (n=4, serogroup 8), a backup ice machine (n=3, serogroups 6 and

8), a reprocessing sink (n=1, serogroup 6), and the implicated bronchoscope (n=1, serogroup 6). All four BAL isolates were identical by SBT. SBT of isolates from both ice machines matched the BAL isolates. SBT of isolates from the sink and backup ice machine matched the bronchoscope isolate. Syringes used for flushing during bronchoscopy were in direct contact with ice from the machines. Deviations from manufacturer recommendations for bronchoscope reprocessing and structural damage to the bronchoscope were identified.

CONCLUSIONS: A pseudo-outbreak of LD occurred among patients undergoing bronchoscopy. SBT linked BAL and bronchoscope isolates to colonized environmental sources. Nonsterile ice should not come into direct contact with flushing syringes during bronchoscopy. Manufacturer's bronchoscope sterilization guidelines should be strictly followed to prevent contamination.

KEYWORDS: *Legionella*, pneumonia, bronchoscopy, ice

POSTER 28

Pulmonary Puzzle at a Conference: Investigating a Respiratory Disease Outbreak among Conference Attendees — Los Angeles County, California, 2008

AUTHORS: *Kanta D. Sircar, D. Dassey, A. Kimura, L. Mascola*

BACKGROUND: Noninstitutional-associated respiratory outbreaks are difficult to identify and investigate, often because of delays in recognition and diagnostic testing, yet effective investigation can be critical for control measures. In July 2008, LAC Department of Public Health (DPH) received reports of illness among attendees of a conference and initiated an investigation.

METHODS: A case was defined as any respiratory symptoms in an attendee <3 weeks after the conference. A severe case included fever (>100°F) and the patient having sought medical attention. A questionnaire regarding symptoms, travel history, medical care, ill contacts, and risk factors was sent by e-mail. Laboratory results and medical records were collected for persons who had sought medical attention. LAC DPH requested additional tests. A site visit was conducted; the hotel manager was questioned about guests and conferences. Hotel employees absent from work were interviewed.

RESULTS: Of 108 conference attendees, 72 (67%) answered the questionnaire; 17 (24%) met the case definition, of which eight had severe illness. Four persons had pneumonia; all were male (mean age 34 years), febrile (range, 101–103°F), and had gastrointestinal symptoms. All pneumonia patients were placed on empiric antibiotics. Routine clinical evaluation of two of eight persons with severe illness included testing for potential pathogens. Subsequent testing yielded one positive mycoplasma IgM. No secondary cases were identified.

CONCLUSION: An effective public health investigation including additional laboratory testing identified a possible mycoplasma cluster. Because no ongoing transmission occurred, no further action was warranted. By collecting appropriate specimens from unusual community-acquired pneumonia patients with no other risk factors and by reporting unusual cases, physicians extend public health's ability to detect clusters of severe respiratory disease.

KEYWORDS: mycoplasma pneumonia, disease outbreak, respiratory tract infections, pneumonia

POSTER 29

Cluster of Genotype 3 Hepatitis C Virus Infections Among American Indians — Northern Plains, 2008

AUTHORS: *Anil G. Suryaprasad, J. Redd, H. Bellete, E. Campbell, J. Drobeniuc, S. Kamili, Y. Khudyakov, S. Holmberg, C.G. Teo, J. Cheek*

BACKGROUND: Hepatitis C virus (HCV) genotype 3 is rare in the United States (<8% of cases), and treatment for chronic infection is shorter and more successful than for genotype 1. In October 2008, health officials in a remote Northern Plains area reported two adolescent American Indian females with recently diagnosed HCV infection and shared injection-drug use (IDU), prompting a contact investigation.

METHODS: Cases were positive for antibody to HCV by enzyme immunoassay and confirmed with signal-to-cutoff ratio >3.8 or with a more specific assay (recombinant immunoblot assay or nucleic acid testing for HCV RNA). We assessed behavioral risks by standardized questionnaires, offered HCV testing to first- and second-generation IDU-related contacts of index patients, and compared HCV genomic sequences by quasispecies analysis through end-point limiting-dilution real-time PCR.

RESULTS: Both index patients, five of six first-generation contacts, and three of 56 second-generation contacts agreed to testing. All 10 were confirmed cases; eight were viremic. Behavioral risks included self-injecting crushed narcotic pills (10/10; 100%), sharing needles (3/8; 38%), reusing needles or syringes (5/5; 100%), cleaning injection equipment with water (3/4; 75%), sharing sponges to absorb crushed pills (5/6; 83%), and reusing common water to dissolve pills (2/4; 50%). All viremic patients carried HCV genotype 3. Sequence analysis of HCV quasispecies revealed close relatedness between strains, suggesting one patient's strain was spread to five others.

CONCLUSIONS: We identified the first community outbreak of genotype 3 HCV infection in the United States and the first community outbreak in which sensitive, real-time PCR-based quasispecies analysis has implicated a pattern of HCV spread. Continued surveillance for HCV infections and genotype profiling among this population is needed to guide public health actions and clinical decision making.

KEYWORDS: hepatitis C virus, injection-drug use, genotype, American Indians

POSTER 30
Mental Illness and Psychotropic Drug Use Among Unintentional Drug Overdose Fatalities – West Virginia, 2006

AUTHORS: *Robin L. Toblin, L. Paulozzi, J. Logan, A. Hall, J. Kaplan*

BACKGROUND: In 2005, 22,448 unintentional drug overdose deaths occurred in the U.S. – twice the number in 1999. In West Virginia (WV), deaths increased by 650% within this 6-year period. This study identifies the prevalence of mental illness, a risk factor for substance abuse, among prescription drug overdose deaths in WV and ascertains if psychotherapeutic drugs contributing to the deaths were used to treat mental illness or for nonmedical purposes.

METHODS: We abstracted data from the WV Office of the Chief Medical Examiner for decedents meeting the case definition of unintentional prescription drug overdose death in 2006. Mental illness was determined from medical records and interviews conducted during death investigations. Psychotherapeutic drug use was determined from postmortem toxicology. Prescription records were obtained from the state prescription drug monitoring program and medical records.

RESULTS: History of mental illness was documented in 43% of 295 decedents; mood/anxiety disorders were most prevalent. Opioid

analgesics (e.g., oxycodone) were involved in 93% of deaths. Psychotherapeutic drugs were involved in 49%; of these, 77% were benzodiazepines. Benzodiazepines contributing to death were not associated with mental illness (aOR=1.0, CI: 0.6-1.7) while antidepressants (aOR=2.9, CI: 1.4-6.2) and other psychotropics (aOR=7.0, CI: 1.4-34.0) were. Forty percent of people who died from benzodiazepines had no prescription for the drug in the year prior to death.

DISCUSSION: A history of mental illness may have contributed to substance abuse associated with the overdose deaths. Clinicians should consider history of mental illness when prescribing opioids. Benzodiazepines appear to have been used nonmedically rather than as a psychotherapeutic drug, reflecting drug diversion. Restricting benzodiazepine prescriptions to a 30-day supply with no refills, as is done for opioids, might be considered.

KEYWORDS: death, poisoning, substance abuse, prescription drugs, mental illness

WEDNESDAY, APRIL 22, 2009

SESSION J:
The Sting — Vaccine Preventable Diseases

Ravinia Ballroom 1:30 a.m.–3:45 p.m.

MODERATORS: ***Anne Schuchat*** **and** ***John Ward***

1:35
Impact of Rotavirus Vaccine on Severe Acute Gastroenteritis in Children Less Than Five Years of Age, San Diego, 2000-2008

AUTHORS: ***Jennifer E. Cortes, J. Tate, J. Leake, I. Garcia, M. Patel, U. Parashar***

BACKGROUND: Before routine vaccination against rotavirus was initiated in 2006, this leading pathogen of severe childhood gastroenteritis caused over 55,000 hospitalizations, 200,000 emergency department (ED) visits, and 400,000 outpatient visits in US children. To assess vaccine impact, we examined data for 2000-2008 on patients treated for gastroenteritis at a large pediatric hospital in San Diego, California.

METHODS: We examined hospital and ED discharge records to compare acute gastroenteritis and rotavirus disease trends in children <5 years for a 6-year pre-vaccine period during rotavirus season from December 2000-May 2006 with data from December 2007-May 2008, 1-year following vaccine introduction. Available laboratory data for 2006-2008 were also examined.

RESULTS: Annually, from 2000-2006, a median of 1,972 (range, 1,790 to 2,171) visited the ED and 263 (range, 231 to 350) children <5 years were admitted to the inpatient unit with gastroenteritis between December and May. Thirty percent (80 of 263) gastroenteritis hospitalizations were coded as rotavirus. In 2007-2008, gastroenteritis ED visits and hospitalizations decreased 27% (N=1,449) and 29% (N=186), respectively, compared with 2000-2006. Rotavirus-coded hospitalizations decreased 81% (N=4). From 2005-2006 and 2007-2008, the proportion of rotavirus positive tests declined by 50%, from 44% (76 of 172) to 22% (12 of 54). Among children >2 years of age, the proportion of inpatients coded as rotavirus decreased from 30% in 2000-2006 to 5% in 2007-2008.

CONCLUSIONS: Following introduction of rotavirus vaccine, severe pediatric gastroenteritis patients, especially inpatients with rotavirus gastroenteritis, declined substantially at this San Diego hospital. The decline in children >2 years, age ineligible for rotavirus vaccination, suggests indirect benefits (i.e., herd immunity) from vaccination. Further studies are needed to assess vaccine impact at a national level.

KEYWORDS: gastroenteritis, rotavirus, vaccine, disease burden

1:55
Fourth Primary DTaP Dose: Does It Matter in Preventing Pertussis? A Retrospective Cohort Study Among Children Born During 2000–2004 in Oregon

AUTHORS: *Ning An, J. Liko, P.R. Cieslak, K. Hedberg*

BACKGROUND: Major declines in infant and childhood pertussis have been attributed to diphtheria-tetanus toxoids-acellular pertussis (DTaP) vaccination. The Advisory Committee on Immunization Practices (ACIP) recommends a 4-dose primary series of DTaP at ages 2, 4, 6, and 15–18 months and a booster at 4–6 years. National coverage for the fourth DTaP is the lowest among primary childhood vaccines. Limited data exist regarding fourth dose effectiveness. We assessed its effectiveness in preventing pertussis.

METHODS: We included children born in Oregon during 2000–2004 who were in the statewide immunization registry. A valid third dose was defined as the third ACIP-recommended dose administered before age 12 months. A valid fourth dose was administered at age 12–47 months and ≥6 months after a valid third dose. Pertussis cases confirmed by CDC criteria were linked to immunization data. Follow-up began at age 18 months when all children were eligible for valid fourth dose and was censored at pertussis onset, time of next dose, or 07/09/2008, when case data were extracted. Cox proportional hazards regression was used.

RESULTS: Of 155,932 children with a valid third dose, 134,057 (86%) had a valid fourth dose; age distribution was similar across groups. Of 81 pertussis cases among children with a valid third dose, 69 (85%) had a valid fourth dose. Pertussis incidence was 1.3/10,000 person-years among children with valid fourth dose and 1.1/10,000 person-years for children with only valid third dose. The adjusted hazard ratio was 1.4 (95% confidence interval=0.7–2.8).

CONCLUSIONS: We did not detect reduced pertussis incidence following a fourth DTaP. Effectiveness studies with wider geographic coverage are needed to evaluate reproducibility and other outcomes including disease severity.

KEYWORDS: pertussis, DTaP, vaccine effectiveness

2:15
The Increasing Burden of Imported Chronic Hepatitis B —United States, 1973-2007

AUTHORS: *Tarissa Mitchell, J. Painter, G. Armstrong, A. Wasley, D. Hu, C. Phares, M. Weinberg*

BACKGROUND: An estimated 25% of individuals chronically infected with hepatitis B virus (HBV) die of late complications including cirrhosis and liver cancer. The United States, which implemented a strategy to eliminate HBV transmission through universal immunization in 1991, is a country of low HBV prevalence. There have been approximately 3,000-5,000 new U.S.-acquired chronic HBV infections annually since 2001. Many more chronically infected persons migrate to the U.S. yearly from countries of higher HBV prevalence. Although early identification of HBV can help mitigate transmission and late complications, immigrants are not routinely screened for HBV at the time of immigration.

METHODS: To estimate the number of imported cases of chronic HBV, we multiplied country-specific HBV prevalence estimates by the yearly number of immigrants from each country for 1973-2007. Data were analyzed for trends over 5-year periods.

RESULTS: During 1973-2007, 27.2 million immigrants entered the U.S. Sixty-one percent were born in countries of intermediate or high HBV prevalence (range 2%-31%). An estimated average of 46,200 chronic HBV cases was imported to the U.S. yearly from 2003-2007; without intervention, nearly a quarter of these persons may die of later complications. China, the Philippines, and Vietnam contributed the most imported cases (13.6%, 12.3%, and 11.1%, respectively). Imported cases increased from a low of 91,400 in 1973-1977 to a high of 247,300 in 2003-2007.

CONCLUSIONS: The yearly number of imported chronic HBV cases exceeds the yearly number of U.S.-acquired cases up to fifteen-fold. Earlier case identification and management of chronically-infected immigrants would strengthen the U.S. strategy to eliminate HBV transmission, and could delay HBV disease progression and prevent some deaths among immigrants.

KEYWORDS: Hepatitis B, chronic; immigrants; prevalence; cirrhosis; liver cancer

2:35

Human Papillomavirus Vaccine Uptake Among Adolescent Female Medicaid Enrollees — New Hampshire, 2007

AUTHORS: *Sherry L. Burrer, L. Anderson, J. Stull*

BACKGROUND: Human papillomavirus (HPV) vaccine targets HPV types that cause 70% of cervical cancers and 90% of genital warts. The Advisory Committee on Immunization Practices recommends routine HPV vaccination with a 3-dose series at 0, 2, and 6 months for females aged 11–12 years and for unvaccinated females aged 13–26 years. In January 2007, HPV vaccine became available at no cost to New Hampshire (NH) healthcare providers for female Medicaid enrollees aged 11–18 years. Data to monitor vaccination coverage rates and guide programmatic interventions are needed.

METHODS: From the NH Medicaid 2007 database we identified female HPV vaccine recipients aged 11–18 years by using the Current Procedural Terminology code for HPV vaccine administration. From annual average Medicaid population enrollments, we calculated percentages and 95% confidence intervals (CIs) for enrollees receiving ≥1 HPV vaccinations, stratified by age, county of residence, and completion of the 3-dose series.

RESULTS: Of 12,169 female NH Medicaid enrollees aged 11–18 years, 19.7% (95% CI, 19.0–20.4) received ≥1 HPV vaccinations during 2007. Uptake was highest among enrollees aged 14 years (24.2%; 95% CI, 22.1–26.4) and lowest among enrollees aged 11 years (13.4%; 95% CI, 11.7–15.1). Uptake by county ranged from 10.5% to 29.7%. Among enrollees initiating vaccination during January–June 2007, only 26.0% (95% CI, 23.3–28.6) had completed the series by December 31, 2007.

CONCLUSIONS: During 2007, HPV vaccine uptake among NH's female adolescent Medicaid population was unevenly distributed among age groups and counties. Underlying reasons for this variability should be explored. Selected age groups and counties might benefit from interventions to improve uptake. Observed low vaccination series completion warrants continued monitoring.

KEYWORDS: Medicaid; New Hampshire; adolescent; HPV vaccine

2:55

Postlicensure Safety Evaluation of a Combination Diphtheria, Tetanus, Acellular Pertussis, Hepatitis B, and Inactivated Poliovirus Vaccine (DTaP-HepB-IPV) — United States, 2000–2006

AUTHORS: *Wan-Ting Huang, P. Gargiullo, E. Weintraub, J. Baggs, K. Broder, J. Iskander;* **for the Vaccine Safety Datalink Team**

BACKGROUND: In 2002, combination DTaP-HepB-IPV vaccine was licensed for children aged 6 weeks through 7 years. Prelicensure studies in infants aged ≤6 months suggested higher fever rates 0–3 days after DTaP-HepB-IPV compared with coadministering separate component vaccines. We evaluated risks for fever and seizures after DTaP-HepB-IPV in the Vaccine Safety Datalink (VSD) postlicensure cohort.

METHODS: A retrospective study was conducted using 2000–2006 automated data at seven managed care organizations (MCOs) in the VSD. We identified infants aged 6 weeks to 7 months who, at the same visit, received either DTaP-HepB-IPV with pneumococcal conjugate vaccine (PCV7), or DTaP with separate HepB, IPV, and PCV7. In the postvaccination 0–3 days of each cohort, we identified ICD-9 codes of 1) fever in any healthcare setting; and 2) seizures in the emergency department/hospital. Incidence rate ratios (IRRs) were estimated by unconditional Poisson regression adjusted for MCO, gender, calendar year, influenza season and age.

RESULTS: We identified 333,782 visits for DTaP-HepB-IPV with PCV7, and 56,776 visits for the separate vaccines. The adjusted IRR across all doses was 1.39 (95% confidence interval [CI]=1.05–1.84) for fever, comparing DTaP-HepB-IPV (583 fevers) with separate component vaccines (54 fevers). DTaP-HepB-IPV coadministered with PCV7 was associated with 1 additional medically-attended fever per 2,041 doses, compared with separate component vaccines. Few postvaccination seizures were observed; the adjusted IRR was 1.24 (95% CI=0.28–5.45) comparing DTaP-HepB-IPV (16 seizures) with the separate vaccines (2 seizures).

CONCLUSIONS: Combination vaccines reduce the number of injections and may improve vaccination coverage. These benefits should be considered in the context of excess risk for medically-attended fever when deciding whether to use DTaP-HepB-IPV or DTaP, HepB, and IPV simultaneously.

KEYWORDS: infant, combination vaccine, safety, diphtheria-tetanus-acellular pertussis vaccine, fever

3:15

Rates of Hospitalization with Laboratory-Confirmed Influenza Infection in Children—United States, 2003-2008

AUTHORS: *Fatimah S. Dawood, L. Finelli, A. Fiore, L. Kamimoto, A. Reingold, K. Gershman, J. Meek, J. Hadler, K. Arnold, P. Ryan, R. Lynfield, C. Morin, J. Baumbach, E. Hancock, S. Zansky, N. Bennett, A. Thomas, — W. Schaffner, and D. Kirschke,* **for the Emerging Infections Program (EIP) Network**

BACKGROUND: Influenza is a common cause of hospitalization. However, many estimates of hospitalization rates in children have used modeling, indirect measures, or laboratory-confirmed cases from limited numbers of hospitals and seasons which limits generalizability. Population based, multiseason estimates of the burden of influenza among children will help guide prevention strategies.

METHODS: Through the Emerging Infections Program Network, population-based surveillance for laboratory-confirmed influenza was conducted from 2003–2008 in 149 hospitals in 10 states including 5.3 million children. Hospitalized children aged <18 years were identified retrospectively; clinicians made influenza testing decisions. Data collected from the hospital record included demographics, medical history, and clinical

course. Census data were used to calculate incidence rates.

RESULTS: The highest hospitalization rates occurred in children aged <6 months (seasonal range 13–30 per 10,000 children), while the lowest rates occurred in children aged 5–17 years (0.3–1 per 10,000 children). Overall, 4015 children were hospitalized of which 44% had a pre-existing medical condition; asthma (18%), prematurity (8%), and developmental delay (7%) were the most common. Serious complications included intensive care unit admission (12%), mechanical ventilation (5%), bacterial co-infection (2%), and death (0.5%). Among eligible children, one-third received at least 1 dose of influenza vaccine during the season (29-35%), and less than half received antiviral treatment (36-48%).

CONCLUSIONS: Rates of influenza-associated hospitalization varied by season and age group and likely underestimate true rates since many hospitalized children are not tested for influenza. Quantifying the incidence of influenza hospitalization is critical to understanding disease burden and provides a baseline to evaluate prevention strategies including the recent Advisory Committee on Immunization Practices recommendation for universal influenza vaccination of all children aged <19 years.

KEYWORDS: influenza, child, hospitalization, incidence

WEDNESDAY, APRIL 22, 2009

SESSION L:
Field Epidemiology — Translating Science into Practice Around the World
International Night
Dunwoody Suites 7:30 p.m.–9:35 p.m.

MODERATORS: *Kendra Chittenden* and *Dionisio Jose Herrera Guibert*

7:35

The Impact of Pneumococcal Conjugate Vaccination on Rates of Hospitalization for Pneumonia—Australia, 1998-2007

AUTHORS: *Andrew Jardine, R. Menzies, P McIntyre*

BACKGROUND: The heptavalent pneumococcal conjugate vaccine (7vPCV) has been shown to reduce hospitalizations for pneumonia in a 4 dose schedule, both in randomized controlled trials and post-marketing studies. In Australia, a three dose primary schedule without a booster (3+0) is used routinely for non-Indigenous children, beginning in January 2005. Our aim was to determine if a reduction comparable to that documented in the United States has occurred in Australia, despite the absence of the booster dose.

METHODS: All hospitalizations of non-Indigenous persons with a primary diagnosis of pneumonia in Australia from July 1998 to June 2007 were identified in an electronic database of national hospitalisation records. Monthly rates of were determined for age groups <2, 2-4 5-17, 18-39, 40-64 and >65 years, with Poisson regression modeling used to ascertain the vaccine impact after adjusting for Background: and seasonal trends.

RESULTS: A total of 523,591 hospital separations were identified. In the 2.5 year period after routine 7vPCV introduction, there was a significant adjusted reduction in all cause pneumonia in children aged <2 and 2-4 years of 38% (95%CI=36%-40%) and 29% (26%-31%) respectively. Reductions of between 3% and 11% were observed in the older age groups.

CONCLUSION: This is the first study outside North America, and hence in a setting without a booster dose, to evaluate the population impact of 7vPCV on pneumonia. The differential effects observed by time

period and age group are suggestive of a vaccine effect of similar size to that observed in the US. This has important implications for the cost-effectiveness of 7vPCV, particularly in developing countries where financial and operational barriers prohibit booster dose inclusion, and the World Health Organization recommends a similar 3+0 schedule.

KEYWORDS: Streptococcus pneumoniae, pneumonia, heptavalent pneumococcal conjugate vaccine, immunisation schedule

7:55

First outbreak of Salmonella serotype Kedougou associated with an infant formula milk. Spain, 2008

AUTHORS: *Johana Rodríguez-Urrego, P. Soler, S. Herrera, F. Simón, A. Echeíta-Sarriondia, S. Mateo, D. Herrera*

BACKGROUND: On 05/08/2008, National Centre of Microbiology notified a three times increase in isolates of Salmonella Kedougou compared to 2007, 90% cases under one year old. The National Centre of Epidemiology began a study to confirm this increase, identify the source, transmission mode and associated risk factors in order to implement appropriate control measures.

METHODS: A matched case-control study was performed (1:4). Controls were matched for age, sex, medical attention place, and diagnosis week. Case definition was: "Any child under one year old with S. Kedougou isolated since 01/01/2008". An ad-hoc questionnaire was administrated to cases and controls. We described the cases and conducted a multivariable analysis to identify risk factors (exact conditional logistic regression). Confidence Interval (95%) was estimated.

RESULTS: 32 cases were confirmed from 11 Spanish Regions (33% hospitalized). The median age was 4.3 months and 42% were male. Main symptoms were diarrhoea (100%), fever (38%) and vomiting (27%). All cases consumed infant formula milk "Brand A" compared with 10% of controls. The multivariable analysis (22 cases-70 controls) showed an association between illness and 'Brand-A' milk consumption (exact matched OR=41.6, 95%CI=7.5-infinity). All isolates showed exact pulse field pattern and the same sensitivity to antibiotics. Microbiological tests of 5 milk samples from 3 cases were negative for Salmonella. Factory samples from raw materials and end products were negative for Salmonella, but positive for Enterobacteriaceae. We could not establish microbiological association between cases and milk Brand A.

CONCLUSIONS: It is the first Salmonella Kedougou outbreak related to infant formula milk studied in Spain. Spanish Food Safety Authorities recalled five Brand A milk batches. Two cases have been isolated after control measures were implemented.

KEYWORDS: Salmonella, Outbreak, Infant, Formula Milk

8:15

First Documented Outbreak of Trichinellosis in Taiwan, May 2008

AUTHORS: *Yi-Chun Lo, D. Jiang, C. Chiu, C. Lai, C.Hung, I. Nagano, Y. Takahashi*

BACKGROUND: Trichinellosis is a zoonotic disease which has never been reported in Taiwan and is rarely linked to consumption of reptiles. We investigated the first documented outbreak of trichinellosis in Taiwan consisting of 8 patients who became acutely ill after eating at the same restaurant in May 2008.

METHODS: We conducted a retrospective cohort study by interviewing the patients and persons who ate together. A case was

defined as illness in an attendee who had fever (>38.0oC) or myalgia <4 weeks after consumption of the suspected meals and was seropositive for Trichinella antigen by enzyme-linked immunoassay and immunohistochemical staining. Environmental study of the soft-shelled turtle farm was performed.

RESULTS: Of the 23 attendees, 8 persons met the case definition (attack rate = 35%). The most common presenting symptoms were myalgia (88%), fever (88%), and periorbital swelling (38%). The median onset of symptoms was 8 days after consumption of the suspected meals. All 8 patients sought medical care; five were hospitalized. Of the 7 patients who underwent blood tests, all had moderate eosinophilia. All 8 patients' serum samples were strongly reactive to Trichinella excretory-secretory antigen. The only food item significantly associated with illness was the raw soft-shelled turtle meat (relative risk undefined). Trace back study lead to a soft-shelled turtle farm. Histological examination of the soft-shelled turtles produced there was negative for Trichinella species.

CONCLUSIONS: The most likely cause of this outbreak was consumption of raw soft-shelled turtle served at the restaurant. This investigation indicates Taiwan is not free of trichinellosis. Prevention and control programs of trichinellosis should be established. The public should be aware of the risk of acquiring trichinellosis from consumption of raw soft-shelled turtle.

KEYWORDS: trichinosis, Taiwan, turtle, zoonoses

8:35

Towards the elimination of malaria deaths from Jalpaiguri district, West Bengal, India: Evidence for further action.

AUTHORS: *Jagannath Sarkar, Y. Hutin, M Murhekar*

BACKGROUND: In 2006, a cluster of malaria deaths in the highly endemic Jalpaiguri district, West Bengal, India led to assignment of additional resources. Malaria deaths decreased, but continued to occur. We conducted a study to identify the risk factors for residual malaria deaths.

METHODS: We defined a malaria death as one from fever with microscopically confirmed falciparum in a Jalpaiguri resident in 2008. For each case, we recruited three age, sex and locality matched controls among microscopically confirmed falciparum malaria patients cured during the same period. We abstracted clinical and treatment information from records and interviewed the relatives to collect information about knowledge, presence of bed nets and DDT spraying. We calculated adjusted odds ratio (AOR) using conditional logistic regression.

RESULTS: We matched 51 malaria deaths with 153 controls who did not differ by age (median: 35 versus 36 years) and proportion of males (62.7% versus 63%). Compared with survivors, malaria deaths were more likely to have been admitted with already existing complications [AOR = 4.1, 95% confidence interval (CI)=1.6-10), treated at a private facility (AOR= 3.7, 95% CI= 1.2-12), received treatment after 48 hours of onset (AOR= 13.6, 95% CI= 2.9- 64), received chloroquine (AOR=13.3, 95% CI= 3.7- 47). Households of the deceased were also more likely to have missed bed-nets (AOR= 6.3, 95% CI= 1.9-24) and DDT spraying (AOR=9.2, 95% CI= 2.8-31).

CONCLUSIONS: Elimination of malaria deaths will require education of providers for prompt referral of malaria patients before complications, engagement of the private sector, community awareness for early treatment as well as scaled-up use of bed-nets use and DDT. Use of newer generation anti-malarials must to be generalized.

KEYWORDS: Malaria, deaths, risk factors, India

8:55
Prevalence of Post-traumatic Stress Disorder and Comorbid Depression in Earthquake Survivors in Pisco-Peru

AUTHORS: *Yliana Rojas Medina, M Avila*

BACKGROUND: Exposure to earthquakes is associated with increased psychological distress. The most common psychiatric conditions seen among earthquake survivors are post-traumatic stress disorder (PTSD) and depression. This study examined the prevalence of post-traumatic stress disorder and comorbid depression among survivors living in shelters five months after the August 2007 earthquake in Pisco-Peru.

METHODS: We conducted a cross-sectional study of randomly selected persons, 18 years of age or older, among all families living in 17 shelters. Earthquake survivors were assessed using the Screening Instrument for Traumatic Stress, a previously validated and easily administered self-rating scale. Socioeconomic data were evaluated with Ministry of Health data on the earthquake affected area.

RESULTS: The prevalence of PTSD and comorbid depression were 17.5% (CI 95% 13.8%, 21.2%) and 19.2% (CI 95% 15.4%, 23.0%), respectively. Linear regression analyses showed that PTSD was strongly related to history of physical abuse, history of psychological problems; PTSD and comorbid depression were related to fainting during the earthquake and loss of family members. Within the sample, 22 people also reported suicidal ideation, of those 21, 19 were women.

CONCLUSIONS: The loss of family relatives during the earthquake was an important factor in the appearance of PTSD and comorbid depression. While PTSD was more common, the identification of persons with these diagnoses allowed local health authorities to direct interventions and thus reduce the occurrence of subsequent mid-term and long-term problems.

KEYWORDS: earthquake, depression, cross-sectional survey, Peru

9:15
Increasing Compliance with Mass Drug Administration for Lymphatic FilariasisBackground:Orissa State, India, 2008

AUTHORS: *Paul T. Cantey, L. Fox, J. Rout, G. Rao, S. Dhir*

BACKGROUND: In India, 590 million people are at risk for lymphatic filariasis (LF). LF can be eliminated through annual mass drug administration (MDA) with diethylcarbamazine (DEC), but compliance with DEC in India has been problematic. Recently, a non-governmental organization (CASA) in Orissa State implemented an educational campaign to increase DEC compliance. Our coverage survey for the LF MDA revealed an overall coverage of 56% and suggested that the CASA campaign's message was not easily understood . We conducted a study to identify reasons for non-compliance and predictors of compliance with DEC to inform future educational efforts.

METHODS: Using probability proportionate to size sampling, a cluster survey was carried out in CASA areas, which received the new educational campaign, and non-CASA areas, which received the standard government campaign. Univariate and multivariate CASA-stratified, weighted, cluster-adjusted analyses were performed across the entire study population.

RESULTS: Reasons for not taking DEC were fear of side effects (47.4%) and lack of

recognition of benefits (15.8%). Side effects of DEC were reported by 12.0% and were minor. Univariate predictors of compliance included: knowing about the MDA in advance, knowing DEC prevents LF, knowing mosquitoes transmit LF, believing contaminated water transmits LF, and knowing anyone can acquire LF. Modifiable multivariate predictors for compliance included: knowing DEC prevents LF (aOR=2.62; 95% CI, 1.35–5.07) and an interaction involving knowing about the MDA in advance and that mosquitoes transmit LF (aOR=5.41; 95% CI, 2.80–10.44).

CONCLUSIONS: Promoting a simple, timely public health message that addresses the risk of LF transmission, benefits of LF prevention, and minimal side effects of DEC could increase compliance and help India progress further towards LF elimination.

KEYWORDS: lymphatic filariasis, mass drug administration, coverage

9:35
Late Breaking Report — TBD

INTERNATIONAL NIGHT POSTER SESSION
Viewing from 6:00 p.m–7:30 p.m.

POSTER 1
Urolithiasis Outbreak in Children Associated with Consumption of Milk Products Contaminated with Melamine: Wuwei City, Gansu Province, China, 2008

AUTHORS: *Yongjun Gao, G Shi, Z Wang, J Liu, H Xu, T Shen, Z Wang, X Jiang, H Liu, Z Feng, RE Fontaine, G Zeng, W Yang, Y Wang*

BACKGROUND: In September 2008, thousands of Chinese children developed urolithiasis, presumably caused by infant formula (IF) containing melamine. From September 15-27, we investigated this outbreak to identify the responsible milk products.

METHODS: We defined a urolithiasis case as urinary calculi >2mm diameter detected by ultrasound. We identified all children (2733) born after September 1, 2005, in two townships of Wuwei Prefecture. We performed ultrasound on them and interviewed their caregivers about symptoms and milk product consumption. We tested leftover IF for melamine.

RESULTS: Of 2085 participants (76% participation), 17% had urolithiasis. Of 348 case-children, 10% were hospitalized, one (3/1000) died, and 18% had symptoms, including crying on urination (14%), oliguria (13%), anuria (7%), hematuria (1%), and edema (1%). The mean calculus diameter was 3.2 mm (range: 2.0-16 mm). Of 57 children whose only milk feedings were breast milk (BM) none had urolithiasis. In comparison to only BM, urolithiais rates were 26% of 332 for only Sanlu IF [unbiased estimator for rate ratio (RRUE)=29, 95% CI=1.9-470], 16% of 1168 for mixed products (RRUE=19, 95% CI=1.2-299), 7% of 56 for only other milk products (RRUE=7.2, 95% CI=0.51-166), and 5% of 111 for only other IF brands (RRUE=6.7, 95% CI=0.38-117). We detected melamine in 91% of 44 Sanlu IF samples (median=1700 mg/kg; range: 130-4700 mg/kg) and 31% of 39 other formula samples (median=25 mg/kg; range: 4-1700 mg/kg).

CONCLUSIONS: This outbreak was caused by IF (especially Sanlu) and other milk products containing melamine. Health authorities should test all milk products for melamine; screen children who consumed milk products, and follow up children with urolithiasis for long-term consequences.

KEYWORDS: urolithiasis, melamine, infant formula; cohort study.

POSTER 2

Risk Factors for Recurrent Outbreaks of Measles in Temeke Municipality, Dar es Salaam, 2008

AUTHORS: *S. Lucy Sembuche, D. Kadigi, J. Mghamba, M. Mohamed, F. Mosha, D. Klaucke, P. Mmbuji, C. Moshiro*

BACKGROUND: Despite various initiatives, Tanzania has been experiencing recurrent measles outbreaks in recent years. The last campaign for the National Measles Immunization Day was conducted early September 2008. On the 8th of October 2008, we received report of 2 suspected measles deaths which occurred in Temeke Municipality, Dar es Salaam city. We conducted an investigation to determine the magnitude of the current outbreak, and assess risk factors for recurrent outbreak.

METHODS: A retrospective unmatched case control study was done to assess the risk factors. We defined a suspected case as a person residing in Temeke with rash and fever with or without cough or running nose or conjunctivitis. We reviewed hospital records to identify cases. Data was analyzed using Epi Info version 3.5.1.

RESULTS: A total of 23 cases were reported from 30th September-30th November 2008. Out of 7 specimens taken, 6 were confirmed as Measles; none had Rubella. The most affected age group was 0-59 months (Attack rate=1.9%). The proportion of children who had complete childhood immunizations was significantly lower in the measles cases compared to the controls [2/10 (0.2%) vs 8/10 (0.8%), P =0.007).Neither parents' education nor breastfeeding pattern was associated with having measles. Cases were 21 times more likely to be in contact with a measles case than controls (95%CI: 1.1-950.8). The most frequent reasons for not taking a child for vaccination was being afraid of side effects (68%).

CONCLUSION: These results emphasize the importance of having a national sensitization and advocacy strategy for immunization that should address the safety of the vaccine. A community sensitization is planned to take place in January 2009 before the planned activities of supplemented immunization.

KEYWORDS: measles, rubella, Tanzania, outbreak, case control study, measles vaccine

POSTER 3

Cholera outbreak at a rural hospital—Mudzi district, Zimbabwe, 2008.

AUTHORS: *Ranganai Shanzi, S.T Zizhou, M. Tshimanga*

BACKGROUND: A report of cholera outbreak in Mudzi district was received on the 7th of February 2008. The outbreak affected health workers and patients admitted at the hospital. Twelve stool specimens tested positive for Vibrio cholerae. We investigated risk factors for contracting cholera at the hospital.

METHODS: A 1:1 unmatched case-control study was conducted. A case was any person in Mudzi district who developed acute watery diarrhea with or without vomiting between the 6th of February and 27th of March 2008. A control was a person resident of Mudzi district without diarrhea during the same period. We collected data from 71 cases and 71 controls on risk factors.

RESULTS: A total of 265 cases and 41 deaths (case fatality rate =15.5%) were reported. The index case had traveled to cholera-affected areas and had the soiled clothes washed by the hospital borehole-well. Of the 265 cases, 135 (50.9%) resided within the hospital premises. Risk factors for cases residing within the district hospital were; drinking from the hospital borehole (OR= 17.69: 95% CI 1.86-167.84) and having a diarrheal contact (OR=4.96: 95%CI 0.87-28.15). Hav-

ing received training in infection control had protective effect (OR=0.29: 95% CI 0.05-4.25). Traveling to the areas reporting cholera cases was a risk factor for cases that did not reside within the hospital premises (OR=35.9: 95% CI 5.4 -242). Bacteriological analysis of the hospital borehole water yielded faecal Escherichia coli.

CONCLUSION: Cholera in the hospital premises resulted from contamination of the hospital borehole. The bush pump at the borehole was disconnected and reticulated water supplied to the hospital and the community. A reduction of cases was observed but areas further from the hospital continued to report more cases.

KEYWORDS: Zimbabwe, cholera outbreak, vibrio cholerae, borehole contamination

POSTER 4

Non-Adherence to Single Dose Nevirapine for the Prevention of Mother-To-Child Transmission of HIV in Bindura town, Zimbabwe 2008

AUTHORS: *Lazarus R. Kuonza, C. Tshuma, G Shambira*

BACKGROUND: Of the 65 HIV positive mothers who delivered at Bindura Hospital between January and May 2007, only 43 (66.2%) swallowed the recommended Nevirapine before giving birth. We assessed the prevalence of adherence and determined factors associated with non-adherence to single dose Nevirapine amongst mother-baby pairs in Bindura.

METHODS: An analytic cross-sectional study was undertaken in four public health institutions. All mother-baby pairs on the PMTCT programme attending post-natal care were included. Questionnaires were used to obtain socio-demographic and risk factor information. Non-adherence was defined as lack of or delayed consumption of NVP (i.e NVP being taken at less than 2 hours before delivery by the mother and more than 72 hours after birth of the baby by either the mother or the baby.

RESULTS: The non-adherence rate to the maternal NVP dose was 65/212 (30.7%), while non-adherence to the newborn NVP dose was 57/212(26.9%). The combined mother-baby pair NVP non-adherence was 91/212 (42.9%). Non-adherence to maternal Nevirapine dose was independently associated with no maternal secondary education (OR=2.38, 95%CI: 1.05-5.39), multi-parity (OR=2.66,95%CI: 1.05-6.72) and staying with in-laws at time of delivery (OR=3.81, 95%CI: 1.42-10.20). Prior exposure to PMTCT (OR=0.22, 95%CI: 0.08-0.57) and dispensing NVP during antenatal care (OR=0.03, 95%CI: 0.01-0.09) reduced the risk. Home delivery (OR=48.76, 95%CI: 17.51-135.82), maternal use of traditional herbs (OR=4.20, 95%CI: 1.45-12.19) and maternal non-disclosure of HIV status to partner (OR=2.75, 95%CI: 1.04-7.32) were independently associated with non-adherence to the infant dose on logistic regression.

CONCLUSIONS: There is high non-adherence to single dose Nevirapine in Bindura. Nurses working in the PMTCT clinics have been instructed to dispense Nevirapine to HIV positive mothers at first contact regardless of the stage of the pregnancy.

KEYWORDS: adherence, nevirapine, maternal, infant, cross sectional study

POSTER 5

Field Study of Dengue Surveillance in Sakaeo Province on Thai-Cambodian border, 7-16 July 2008

AUTHORS: *Adisorn Vatthanasak, Sonthichai C., Jongcherdchootrakul K.,*

Gronsang D., Poonaklom P., Silaporn P., Ayood P., Wutthanarungsan R. , Jiamsiri S., Tikumrum S., Jiraphongsa C., Sanaoseang S., Iamsirithaworn S.

BACKGROUND: Dengue is a priority disease in the national notifiable disease surveillance report (506 report) of Thailand. The high incidence of dengue disease in Sakaeo caused concern to provincial health authorities, so another system called Rapid report was practised. This study was conducted to describe dengue surveillance in Sakaeo.

METHODS: Key attributes were assessed using 2 gold standards, Bureau of Epidemiology (BOE) surveillance criteria and doctor diagnosis of DF/DHF/DSS. Information was obtained from 52 respondents: health authorities, surveillance staff and medical practitioners. We observed surveillance processes and reviewed medical records and dengue-related documents of patients sought care between 1 April and 31 May 2008 at all hospitals in Sakaeo.

RESULTS: Using BOE surveillance criteria as the gold standard, the 506 report had sensitivity=34.2% and PPV=52.9% and the Rapid report had sensitivity=41.3% and PPV=55.1%. Using Doctor diagnosis as the gold standard, 506 report had sensitivity=36.4% and PPV=97.5% and Rapid report had sensitivity=39.8% and PPV = 97.1%. No statistically difference between 506 report and Rapid report. Differences of sensitivity and PPV varied from hospital to hospital. Accuracy of data was 99.2%, 94.3% and 80.8% for gender, age, and onset date variables, respectively. With Rapid report, only 40.7% of dengue cases were reported within 24 hours. Screening by hospital staff to reduce numbers of dengue cases in 506 report resulted in distortion of sensitivity and true representativeness.

CONCLUSIONS: Both 506 and Rapid reports were not different in sensitivity and PPV. Timeliness of dengue report was fair. We recommend that the Ministry of Public Health not use incidence and numbers of dengue cases reported in 506 report as performance indicators. A meeting was conducted to revise BOE surveillance definition for dengue disease.

KEYWORDS: dengue, surveillance, Thailand

POSTER 6

Diarrhoeal disease outbreak during a school White Water rafting trip-Zambezi River, Zimbabwe, August 2008

AUTHORS: *Genevie M. Ntshoe, A Malaza, E Prentice, K Tint, F Ndugulile*

BACKGROUND: In October 2008, the SAFELTP was informed of a diarrhoeal disease outbreak during a school trip to the Zambezi River. The traveling party consisted of a total of 99 learners, teachers and parents. The study was conducted to identify possible sources of infection and to institute control measures for future school trips.

METHODS: A retrospective cohort study was conducted. Self administered questionnaires were used using Epi Info. The relative risks (RR), 95% confidence intervals and one tailed fisher exact p-values were calculated.

RESULTS: The study response rate was 80% (79 out of 99). Out of 79 respondents, 75 reported diarrhoeal disease, with an attack rate of 95%. The outbreak started with six patients on day three of the trip and the number increased in the following two days. Symptoms included watery diarrhea (100%), fatigue (80%), nausea (68%), abdominal pains (64%), fever (52%), chills (41%), vomiting (40%), and bloody stool (4%). Out of 55 patients who consulted doctors, stool and blood specimens were taken from 14. Salmonella typhi was cultured in two and Salmonella

enteritidis was cultured in four, one of whom had a mixed infection with Campylobacter species. There were no significant associations between diarrhoeal disease and consumption of food and drinking water.

CONCLUSIONS: No source of infection was identified. Limitations of this study were the lack of a detailed menu of all meals eaten during the trip as well as the recall bias. Exposure to potentially contaminated river water also poses a risk during recreational activities. We recommended the guidelines for safe handling of food; safe drinking water and proper hand washing using antiseptic hand gels after going to toilet when tap water is not available.

KEYWORDS: diarrhoea, Salmonella typhi, Salmonella enteritidis, Campylobacter species

POSTER 7

Factors associated with default among new sputum positive tuberculosis patients treated with directly observed treatment short course (DOTS) - Thoubal district, Manipur, India, 2008

AUTHORS: *Dinesh M. Singh, M. Murhekar., Y. Hutin, T. Bhatnagar*

BACKGROUND: Defaulting from treatment is one of the major obstacles to treatment management and an important challenge for tuberculosis control. The default rate in Thoubal district of Manipur state in India has been more than 5% since 2002. We conducted a study to identify the risk factors associated with default among new sputum smear positive pulmonary tuberculosis patients treated with DOTS.

METHODS: We conducted a case control study. We recruited 77 treatment defaulters as cases and 231 TB patients who got cured as controls. Using a pre-tested structured questionnaire, we interviewed study subjects and collected information about socio-demographic details, treatment related factors and knowledge about treatment duration and mode of transmission of TB. We conducted multiple logistic regression to identify the factors associated with default.

RESULTS: Treatment default was higher among males [Adjusted Odds Ratio (AOR) =2.8, 95% Confidence Interval (CI): 1.0-7.9), alcoholics (AOR=2.7, 95% CI: 1.1-6.5) and who had side effects to medication (AOR=7.7, 95% CI: 3.4-32.9). TB patients who did not know about the treatment duration (AOR=7.11, 95% CI: 2.1-24.4), who said the DOTS timing was inconvenient (AOR=5.9, 95% CI: 2.3-15.3) and who were not satisfied with the interaction with DOTS providers (AOR=10.5, 95% CI: 4.1-31.4) were also more likely to default.

CONCLUSION: Our study identified determinants of defaulting among new smear positive patients in Thoubal district. We recommend: (1) increase working hours of DOTS centers and (2) improve interpersonal communication skills of DOTS providers to increase awareness of TB patients about duration, and frequency of treatment and possible side effects.

KEYWORDS: TB default, DOTS, Case Control Study.

POSTER 8

Survey of Knowledge, Attitude and Practices for Tuberculosis and Revised National Tuberculosis Control Program Among Private Practitioners - Hooghly, West Bengal, India, 2008

AUTHORS: *Kisalay Datta, M. Murhekar, Y. Hutin, T. Bhatnagar*

BACKGROUND: In India, private practitioners (PPs) are widely distributed in rural and urban areas and treat over half of the tuberculosis (TB) patients. Involvement of PPs

in Revised National TB Control Programme (RNTCP) is associated with improved case notification and treatment outcomes. Knowledge of PPs about diagnosis and treatment of TB patients affects their involvement in the programme. In Hooghly district of West Bengal, India, TB case notification rates were lower than the national and state average. We conducted a study among PPs in Hooghly district to assess their knowledge, attitudes and practice about diagnosis and management of tuberculosis and RNTCP.

METHODS: We randomly selected 260 allopathic PPs treating TB patients. Using a self-administered, pre-tested questionnaire, we collected information about investigations prescribed for diagnosis of TB, treatment regimens used, health education given to the TB patients. We collected information about their involvement in RNTCP and reasons for non-involvement.
Result: Only 29 (11%) PPs were involved in RNTCP. 176 (68%) preferred chest x-ray over sputum examination for TB diagnosis. Only 70 (27%) prescribed alternate day regimen. Majority (75%) expressed no faith in RNTCP while 89% opined that maintenance of documents was too difficult. About two-third (62%) uninvolved PPs were willing to get involved in RNTCP while majority (98%) recommended appreciation by the government as a way for increasing their involvement.

CONCLUSION: The knowledge and involvement of PPs in RNTCP in Hooghly district was very low. Regular training, greater interaction with programme officers and adequate incentives in different public-private partnership schemes could increase the involvement of PPs in RNTCP as well as increase their knowledge about diagnosis and management of TB patients.

KEYWORDS: Tuberculosis, RNTCP, private practitioners

POSTER 9
Outbreak of Acute Renal Failure in Children — Nigeria, December 2008

AUTHORS: *Aisha Abubakar, S Badaru, E Awosanya, S Haladu, H Akpan , J Oladejo, I Dalhatu , P Nguku, N Knight, K Hawkins, O Oleribe, S Ngobua, K Sabitu, A Nasidi, L Umar , M Bugaje*

BACKGROUND: In November 2008 there were reports of an unusual increase of unexplained acute renal failure (ARF) in children by a number of hospitals in Nigeria. It was suspected that a teething mixture(TM) contaminated with diethylene glycol (DEG) was responsible. DEG is a highly toxic organic solvent that is nephrotoxic. A study was undertaken to determine the magnitude, extent and cause of the outbreak.

METHODS: A descriptive study and laboratory analysis were conducted. Caregivers and patients were interviewed and hospital records reviewed. A suspected case was defined as a child presenting with fever and reduced urine passage with difficulty in breathing, edema, vomiting or diarrhea. Samples of recalled suspected medications were tested for DEG and other potential contaminants.

RESULTS: A total of 109 suspected cases were reported with 84 (77%) deaths in 4 states. The median age was 12 months (range 6 days - 7 years). The index case was reported on 3rd November while the last documented case was on 16th December 2008. Of the 90 patients with clinical history, the major symptoms included fever, vomiting and oliguria (85 [90%], 49[54%], 47[52%]) respectively. Of the 32 case patients with records available on drug consumption prior to their illness, 24 (77.4%) had consumed the suspect TM. Out of those that had consumed the TM, 20 (83.3%) died. Laboratory analysis of samples of the TM consumed by case patients showed the concentration of DEG ranged from 6.75 - 91.0%.

CONCLUSION: The source of outbreak was DEG contaminated TM. The immediate recall of the TM and aggressive public health education campaigns interrupted the outbreak. Adherence to good manufacturing practice should be enforced by relevant government agencies.

KEYWORDS: acute renal failure, children, diethylene glycol

POSTER 10
Assessment of drug use in a semi-tribal district of Himachal Pradesh, India, 2008

AUTHORS: ,
Vidya Ramachandran, **National Institute of Epidemiology, India**

BACKGROUND: Use of public health care facility by the patients is highest (77.1%) in the state of Himachal Pradesh in India. To ensure availability of essential drugs in public health care facilities the government of Himachal Pradesh formulated a drug policy and implemented it in 2000. Since then no assessment of prescription practices and availability of essential drugs has been made in any part of the state. To assess this we conducted a study in Chamba district to describe prescription, dispensing practices and availability of essential drugs in government health facilities.

METHODS: We adopted World Health Organization guidelines for investigation of drug use in health facilities and selected 20 health facilities and 600 patient encounters by adopting two stage sampling procedure with health facilities as primary sampling units and other stakeholders/units as second stage sampling units. We collected data on prescription and dispensing practices using structured interview questionnaires and checklist.

RESULTS: Average number of drugs per prescription was 3.1(sd ± 1.2). Most (91.8%) prescriptions were by generic names, 64.8% prescribed antibiotics and 23.2% were prescribed with injections. Only 33% of medicines were prescribed from the essential drug list and 40% of prescriptions conformed to standard treatment guidelines (STG). Three fourth of prescribed drugs were dispensed by the health facilities. Forty four percent of the patients had to purchase medicines from the market.

CONCLUSIONS: Two third of prescribed medicines were not from essential drug list. High proportion of prescriptions did not conform to standard treatment guidelines. Eighty percent of health facilities did not have essential drugs in stock. The drug policy is not implemented in the district and needs to be enforced by regulating authorities.

KEYWORDS: Essential drugs, Rational use, Standard treatment guidelines, Health facilities, Prescription encounters.

POSTER 11
Knowledge, Attitudes and Practices of the Population with Regard to a Cholera epidemic in Bissau, Guinea Bissau, West Africa, September 2008

AUTHORS: *Jean CS Barrado, A Nobrega, E Cavallaro, J Harris, A Betunde, C NaBangna, I Alvarenga, E Minz, J Sobel,*

BACKGROUND: Waterborne transmission is the classical cause of cholera epidemics. In May 2008 an outbreak of cholera caused by *Vibrio cholerae O1 El Tor* erupted in Guinea Bissau. Prevention measures included widespread educational home visits. To help inform these efforts, we assessed knowledge, attittude, and practices (KAP) regarding cholera and water management in the capital, Bissau (Population, ~460,000).

METHODS: We conducted a 30x7 cluster survey. We randomly selected thirty of Bissau's eighty neighborhoods and seven homes

in each neighborhood, and interviewed each head of household. Precision was 10%, confidence 95%, and estimated design effect, 2. We administered a questionnaire, observed a household member treating drinking water, and measured free chlorine therein. Adequate chlorination was defined as >0.5mg/L.

RESULTS: Between May-September 2008, 8,621 cases and 160 deaths by cholera occurred in the country; 80% were in the capital (incidence, 1,499/100,000). Of 210 respondents, 74% did not know how cholera was transmitted; 80% applied some treatment to drinking water. Of those treating their water, 89% used bleach, 68% stored drinking water in a dedicated clay pot, and 93% were unaware of the volume of the pot. Nearly all were unable to reproduce the water treatment they reported. In 93% of homes where drinking water free chlorine level was measured, the level was <0.5mg/L.

CONCLUSIONS: During a massive cholera epidemic, most households report treating drinking water but in almost all households chlorination was inadequate. To prevent waterborne cholera transmission in Bissau, we recommend that a home visit should entail calculating the correct amount of chlorine to be added to each household's water storage vessel and the family shown how to properly chlorinate the water.

KEYWORDS: cholera, Guinea Bissau, cluster survey, water

POSTER 12
Cholera Outbreak in a Tribal Community, Philippines, 2008

AUTHORS: *Roston G. Garces , R. Martinez , J. Pabellon, J. Lopez, E. Tayag*

BACKGROUND: On August 8, 2008, an FETP team was sent to investigate the cause of increasing diarrhea cases in a conflict area of a southern tip province in Mindanao, Philippines. A cholera outbreak was investigated in the same municipality on 2005 and 2006.

METHODS: Review of records was done at the health station. A case-control study was done. Cases were recently well individuals who had watery stools, three or more times per day anytime from July 27, 2008 to August 14, 2008. Controls were unaffected residents in the same area. Rectal swabs were taken from cases and controls. Drinking water sources were examined for bacteriologic analysis. Key informant interview and environmental survey were conducted.

RESULTS: There were 47 cases and 94 controls. Cases were more likely to have drunk from shallow well (OR 12.5; 95%CI 4.4-37.3) and more likely to have eaten foods served in the funeral (OR 10.1; 95%CI1.1-240.5). Protective factors were the practice of eating of foods while hot (OR 0.04; 95% CI 0.01- 0.23), hand washing before eating (OR 0.03; 95% CI 0.01-0.09), and drinking water from the spring (OR 0.04; 95% CI 0.01-0.23). There were 11 (8%) cases positive for *Vibrio cholera El Tor Ogawa* strain. All the dripping water sources were positive for fecal coliforms. There was no existing sanitary toilet in the area.

CONCLUSION: There was a cholera outbreak in the area. The narrow window of peace helped much in the control of spread because government agencies including the Red Cross were able to mobilize manpower and supplies. Actions taken were education campaign, oresol and chlorine tablets distribution and provision of water containers

KEYWORDS: cholera, Philippines, case control study, water

POSTER 13
Meningococcal Disease Outbreak in a Large Food Processing Plant, Rio Verde City, Goiás State, Brazil, 2008

AUTHORS: *Betine PM Iser, H Lima, C de Moraes, P Silva, L Watanabe, J Sobel, D dos Santos*

BACKGROUND: Meningococcal disease (MD) is an important public health problem worldwide. In Brazil, MD is an endemic winter season phenomenon. In Rio Verde (population, 139,200), in Midwestern Brazil, an outbreak of MD was detected in June 2008. We investigated risk factors in order to recommend control measures.

METHODS: We conducted a descriptive study. An MD case- was defined as isolation of Neisseria meningitidis, or detection of polysaccharide antigen, or presence of clinical purpura fulminans, or epidemiological link with laboratory confirmed case-patient, between June-August, 2008. A matched case-control study was conducted, including primary laboratory-confirmed cases. Case-patients were matched to four neighborhood controls. Matched univariate analysis was utilized to calculate Mantel-Haenzael Odds Ratios (mOR) and 95% confidence intervals (CI).

RESULTS: Sixteen MD cases confirmed; in eight the serogroup C ST-103 complex was identified. Ten (63%) were male; median age was six years (range: 2 months-45 years). Five (31%) case-patients had neurologic and five (31%) died. Attack rate was 1.15 cases/10,000 town residents and 6 cases/10,000 employees in a large local food processing plant. Additionally, eight employees' relatives were infected. Factors associated with illness were work at the processing plant (mOR=22, 95%CI=2.3 -207.7 p<0.01), and residing <1 year in the Rio Verde (mOR=7, 95%CI=1.1-43.9 p<0.02). Following vaccination of >10,000 plant employees, two new cases occurred.

CONCLUSIONS: This highly fatal MD outbreak involved the population of employees of a large food-processing plant with secondary cases among employees' household contacts, principally children. A mass vaccination campaign controlled the outbreak. Enhanced surveillance and prompt identification and vaccination of affected populations are required to prevent death and permanent disability in future outbreaks.

KEYWORDS:
Brazil, Neisseria meningitides, vaccination, case control study

POSTER 14
A large cholera outbreak investigation in Chitungwiza town- Zimbabwe, 2008

AUTHORS: *Ngoni W. Mashumba, S.M. Midzi, N. Gombe, N Ndlovu*

BACKGROUND: On the 2nd of September 2008 a large number of patients from Unit O, Chitungwiza, presented with an acute watery diarrhoea and severe dehydration. Stool samples taken from five tested positive for *Vibrio cholerae*, serotype *Ogawa*. We investigated factors associated with the outbreak.

METHODS: A 1: 1 matched case-control study was carried out. Cases and controls were matched for age and sex. The sample size was 150. A case was defined as any resident of Unit O, who presented with acute onset watery diarrhea with or without vomiting, during the period of the outbreak. A control was defined as any individual resident in Unit O, who had no diarrhoea or diarrhoeal contact at home. Data was collected on risk factors and water samples were tested for faecal contamination.

RESULTS: A total of 912 cases and 148 deaths were reported. The case fatality rate was 16%. The epidemic peaked on 2 September 2008 with 29 cases and 3 deaths. Drinking water from a well (OR = 6.8; 95% CI = 2.4 - 19.3), drinking untreated water (OR = 2.4; 95% CI = 1.2 - 4.8), attending a funeral (OR = 5; 95% CI = 2.1 -12.0), eating food at funeral (OR = 5.5; 95% CI = 1.2 - 24.8),

an proximity to sewage (OR = 5.77; 95% CI = 2.4 - 13.5) were associated with contracting cholera. Water sampled was heavily contaminated with E. Coli.

CONCLUSION: A contaminated well was the probable source of the outbreak, which was then propagated by person-to-person spread especially at funerals. Control measures carried out included: health education, antibiotic prophylaxis, decontamination of homes, supervision of funerals, chlorination of drinking water, distribution of oral rehydration salts, soap and water tanks.

KEYWORDS: Vibrio cholera, matched case-control, watery diarrhea, Zimbabwe

POSTER 15
Outbreak of influenza in a student travel group—Taiwan, 2008

AUTHORS: *Tsung-Pei Tsou, Chien-Hui Lin, Yi-Chun Lo, Yi-Syue Li, Chan-Hsien Chiu*

BACKGROUND: Influenza is a highly contagious virus transmitted by inhalation of aerosols and direct contact with animate or inanimate objects. Outbreaks are common in densely populated organization like schools, military crew or hospitals. Outbreak in travel groups was less commonly reported. In July 2008, we investigated an influenza outbreak among a large student travel group. The impact of illness was assessed and control measures were implemented.

METHODS: We conducted a retrospective cohort study by interviewing all travel group members. We identified anyone with fever or respiratory symptoms such as cough, sore throat or rhinorrea. Influenza-like illness (ILI) was defined as fever plus any respiratory symptom. Symptomatic people had their samples tested. Risk factors and contact history were also recorded.

RESULTS: One-hundred and seventy among the 172 participants completed the interview. Among them, 46 (26.9%) had fever or at least one respiratory tract symptom. Twenty-two (12.9%) had ILI. Twelve had been admitted. Of the 33 specimens collected, 18 (54.5%) were positive for influenza A by RT-PCR. Symptomatic students were distributed in all 14 groups except one. Even though 104 students (61.2%) recalled having contact with someone who was ill, this was not a statistically significant risk factor for illness (RR 1.02, 95%CI [0.8 -1.2]). The attack rate of flu-like illness among vaccinated was lower than in unvaccinated group (6.7% vs. 14.8%).

CONCLUSIONS: In a tour group setting, where participants have frequent and prolonged contact with each other, influenza can be transmitted efficiently, placing everyone at risk. After implementation of cohorting and the use of surgical masks, the outbreak stopped one week later. Vaccination is probably the only effective way to prevent infection.

KEYWORDS: influenza, travel group, vaccination

POSTER 16
Emerging Leptospirosis Associated with Fish Catching Activities in a Natural Water Reservoir, Western Thailand, July - September 2008

AUTHORS: *Rochana Wutthanarungsan, K Sujit, A Mungaomklang, S Suthachana, V Jongpipatvanich, S Laolueakiat, C Chanchew, D Suwancharoen, K Chanachai, K Wongsathapornchai , T Chuxnum, P Chumk*

BACKGROUND: Leptospirosis is common among rice farmers in north-eastern Thailand. In late August 2008, an outbreak of leptospirosis was detected for the first time in Thong Phaphum District, western

Thailand. An investigation was initiated to identify sources and risk factors for infection, and to implement appropriate prevention and control measures.

METHODS: A cross-sectional seroprevalence survey and a case-control (1:4) study were conducted in Huay Kayaeng sub-district by systematic random sampling from houses. Environmental investigation was done around the natural water reservoirs where the villagers engaged in fish catching activities. Sixty-nine blood samples were collected from cattle, rats, dogs, goats, cats and sent for microscopic agglutination test (MAT).

RESULTS: A total of 36 leptospirosis cases (20 confirmed cases, and 16 suspect cases) were reported in Thong Phaphum District (incidence=53.3/100,000 population). Median age of cases was 33 years (range: 14-72) and male to female ratio was 8:1. The seroprevalence was 13% (17 /131) in humans and 80% (24/30) in cattle (titer > 1:100). The predominant human serovars were Australis, Shermai, and Sejroe, which were compatible with the serovars from cattle. Strong risk factors of leptospira infection were fish catching activities (adjusted OR=8.3, 95%CI=1.2, 56.4), being male (adjusted OR=9.8, 95%CI=1.9, 51.6) and age 15-29 years (adjusted OR=38.3 95%CI=4.1, 359.7). Cattle were raised near the lake where urine of infected cows might have contaminated ithe water reservoir early in the rainy season.

CONCLUSIONS: The emergence of leptospirosis outbreak was associated with fish catching activities in the natural lake that possibly contaminated by the urine of infected cattle. Intensive health education and cotton boots were provided to villagers. The outbreak subsided after ending fish catching activities.

KEYWORDS: leptospirosis, Thailand, case control study, cattle

THURSDAY, APRIL 23, 2009

SESSION M:
Dr. Mackle and Mr. Hyde
Mackel Award Finalists
Ravinia Ballroom 8:30 a.m.–10:15 a.m.

MODERATORS: *Rima Khabbaz* and *Antonia Calafat*

8:35

A Large Hepatitis E Outbreak Among Conflict-Affected, Displaced Persons in NorthernUganda

AUTHORS: *Christopher Howard, Eyasu Teshale, Scott Grytdal, Vince Hill, Saleem Kamili, Jordan Tappero, Dale Hu, Thomas Handzel*

BACKGROUND: Hepatitis E virus (HEV) is often transmitted by fecally contaminated drinking water. An outbreak of HEV began in northern Uganda in October 2007 in a camp of internally-displaced persons. By June 2008, 3,530 cases and 67 deaths had been reported. The purpose of the investigation was to describe the outbreak, determine risk factors, and guide mitigation strategies.

METHODS: In Paloga sub-county, descriptive sero-epidemiologic data were collected with a case-finding census and seroprevalence survey. A case-control study examined risk factors for HEV infection: case-patients were those with jaundice and anti-HEV antibodies. Human and pig sera were tested for anti-HEV antibodies, HEV RNA, and genotype. Using novel methods, water and hand-lavage samples were collected using filtration cartridges and tested using real-time RT-PCR and pyrosequencing of RT-PCR positives.

RESULTS: Of 8,563 residents, 18.9% had jaundice; the case fatality rate was 1.3%. Among 245 systematically selected participants, 61.5% had anti-HEV antibodies. Among 112 case-patients and 145 controls, use of large-mouthed water storage vessels

(AOR 2.83, p=0.023) and hand-washing in common basins (AOR 1.90, p=0.028) were significantly associated with HEV infection. HEV RNA was detected in surface-water and hand-lavage samples, but not from dedicated well-water samples. Genotyping revealed genotype 1 in humans and genotype 3 in pigs.

CONCLUSIONS: This is the first HEV outbreak ever reported from Uganda, and the largest among displaced persons. Poor personal hygiene practices and ingestion of contaminated surface water, but not dedicated well-water or pig exposure, were likely modes of transmission. Current control strategies - water treatment, latrine construction - should be supplemented with household level interventions such as aggressive promotion of hand-washing and distribution of proper drinking-water storage vessels and soap.

KEYWORDS: Hepatitis E, outbreak, risk factors, Uganda, displaced persons

8:55

Transmission of Hepatitis C Virus at an Outpatient Hemodialysis Unit — New York, 2001–2008

AUTHORS: *Jenifer L. Jaeger, R. Hallack, G. Johnson, E. Clement, L. Biega, B. Hart, M. Parker, A. Walsh, N. Sureshbabu, T. Kwechin, N. Thompson, P. Patel, J. Perz, J. Magri, J. Schaffzin, B. Wallace, P. Smith*

BACKGROUND: Approximately 3.2 million Americans have chronic hepatitis C virus (HCV) infection, a leading cause of chronic liver disease; ~80% are asymptomatic. HCV infection prevalence among hemodialysis patients is five times that in the general population. Beginning 7/1/08, we investigated hemodialysis unit (HDU) X following three HCV seroconversions in the previous six months.

METHODS: Current HDU X patients underwent anti-HCV testing during the investigation; results were compared with admission HCV status based on chart review. Chronic or incident HCV infection determination was limited to patients with known admission status. HCV-positive patients' serum underwent RNA sequencing of 5'UTR and NS5b regions. A source patient was defined as a chronic HCV patient with ≥95% sequence identity to an incident HCV patient receiving hemodialysis concurrently or sequentially the same day. HDU X practices were reviewed. Material eluted from two hemodialysis machine internal transducers was assessed using serology- and DNA-amplification–based methods for human hemoglobin or DNA.

RESULTS: Of 162 current HDU X patients, HCV status could be determined for 119. Twenty-seven (23%) had chronic HCV infection and 10 (attack rate 11%) had incident HCV infection, seroconverting during 2001–2008. Combined epidemiologic-phylogenetic analysis of all available serum specimens (22 chronic, 9 incident) identified source patients for four incident patients (sequence identity ≥98%; bootstrap score ≥93). Investigation identified numerous infection control (IC) breaches, including blood contamination of environmental surfaces (e.g., dialysis chairs) and both internal transducers.

CONCLUSION: Epidemiologic and laboratory investigation documented numerous HCV transmission events at HDU X occurring over seven years, suggesting longstanding IC deficiencies. Appropriate IC practices and prompt reporting of HCV seroconversions are critical for preventing HCV transmission within HDUs. This investigation resulted in facility closure.

KEYWORDS: renal dialysis, hepatitis C, infection control, phylogeny, disease transmission, epidemiology

9:15
Campylobacteriosis Outbreak Caused by Consumption of Raw Peas—Alaska, 2008

AUTHORS: *Tracie J. Gardner, C. Fitzgerald, C. Xavier, J. McLaughlin*

BACKGROUND: Campylobacteriosis, a common cause of zoonotic-related bacterial gastroenteritis in the United States, usually occurs as sporadic events rather than outbreaks but can have severe complications. We investigated a campylobacteriosis outbreak to determine risk factors for illness and prevent transmission.

METHODS: We conducted a case-control study, using two age- and geographically matched control subjects per case in a conditional multiple-logistic regression analysis. The case definition was a person living in Southcentral Alaska with laboratory-confirmed *Campylobacter jejuni* infection, August 1—September 26, 2008. Exposure histories were ascertained through telephone interviews. Control subjects were selected using consecutive-digit–dialing with each case-patient's telephone number as the referent. Clinical and environmental specimens from farms were obtained. Isolates were subtyped by pulsed-field gel electrophoresis (PFGE).

RESULTS: Sixty-three cases of laboratory-confirmed infection were identified; patient age range:1-79 years (median: 47). Five patients were hospitalized; one experienced Guillain-Barré syndrome. Consumption of raw peas and cucumbers and exposure to livestock were statistically significant in bivariate analysis. Only raw shelled peas, consumed by 71% (45/63) of case-patients and 10% (13/126) of control subjects, were associated with illness (hazard ratio: 18.078; P<0.001). Peas were traced back to Farm A in Southcentral Alaska; 16 environmental samples were positive for *C. jejuni*. Clinical isolates were indistinguishable by PFGE from Sandhill Crane stool and from peas.

CONCLUSIONS: Farm A peas were the source of this outbreak. Isolation of *Campylobacter* from implicated environmental sources is rare in outbreaks; however, clinical and environmental isolates identified Sandhill Crane stool as the likely source of pea contamination. Sandhill Cranes, known carriers of *Campylobacter*, can be colonized with multiple strains. Identifying the outbreak source allowed development of targeted control measures to prevent future outbreaks.

KEYWORDS: *Campylobacter jejuni*; gastroenteritis; disease outbreaks; electrophoresis, gel, pulsed-field

9:35
Outbreak of Carbapenem-Resistant Enterobacteriaceae in a Long-term Care Facility — Cook County, Illinois, 2008

AUTHORS: *Jonathan M. Duffy, S. Schillie, J. Patel, S. Nelson, L. Gallagher, C. Counard, K. Calvert, A. Shams, C. Gould, T. MacCannell, A. Srinivasan, M. Vernon, A. Kallen*

BACKGROUND:
Carbapenem-resistant Enterobacteriaceae (CRE), including those producing *Klebsiella pneumoniae* carbapenemase (KPC), are drug-resistant bacteria that cause difficult-to-treat infections with high mortality rates. Following the identification of four CRE-infected patients at a long-term care facility (LTCF) with no history of CRE, an investigation was initiated to determine the extent of the outbreak and to identify control measures.

METHODS:
A case was a CRE-positive culture from an LTCF patient between 10/1/08 and 12/4/08. Active surveillance cultures (ASC) of the rectum, urine, and wounds of asymptomatic patients were performed to identify CRE carriage. Carbapenemase production was identified using the modified Hodge test and

confirmed using PCR for the KPC gene. Environmental cultures were tested for CRE. A case-control study was performed to identify CRE risk factors using LTCF patients with negative ASC as controls.

RESULTS: CRE were identified in 24 patients: four by clinical culture (urine) and an additional 20 by ASC (19 rectal and 1 wound). CRE point prevalence was 49%. All CRE isolates carried the KPC gene. Risk factors for CRE included the presence of a urinary catheter (OR=21, 95%CI=3.8-116) and receipt of broad-spectrum antimicrobials in the prior three months (OR=3.4, 95%CI=1.1-10.5). Environmental cultures did not grow CRE.

CONCLUSIONS: This investigation demonstrates the importance of ASC in identifying asymptomatic CRE carriers when the organism is discovered in a nonendemic setting. Unrecognized carriers may serve as a source of ongoing CRE transmission and likely hindered initial efforts to contain this outbreak. LTCF healthcare providers should ensure the appropriate use of antimicrobials and invasive medical devices, and, when patients with CRE are identified, implement rectal ASC and contact isolation precautions to control transmission.

KEYWORDS: Enterobacteriaceae, Carbapenemase, *Klebsiella pneumoniae*, Long-Term Care, Disease Outbreaks, Cross Infection

9:55

Cardiac Events and Deaths in a Dialysis Facility Associated with a Healthcare Provider – Texas, 2008

AUTHORS: *Melissa K. Schaefer, C. Lucero, M. Sochaski, R. Kleiman, J. Su, M. Arduino, A. Kallen, M. Schwartz, P. Patel* **for the Texas Dialysis Investigation Team**

BACKGROUND: Instances of healthcare professionals (HCPs) intentionally harming patients are rare but can result in numerous deaths and are often difficult to detect. In April 2008, a cluster of cardiac arrests occurred in a Texas dialysis facility. Allegations arose that an employee (HCP X) had intentionally injected patients with bleach.

METHODS: A case was cardiac arrest, respiratory arrest, or chest pain during hemodialysis in a patient at Clinic A in April 2008. Fifty-seven controls were randomly selected among dialysis sessions in April for a case-control study. Medical records were reviewed. Plasma specimens were obtained from cases and a convenience sample of non-case blood specimens (laboratory controls). Specimens were analyzed using gas chromatography with mass spectrometry for percent conversion of tyrosines in plasma proteins to chlorinated tyrosines, as a potential biomarker of bleach exposure. Used syringes were tested for presence of bleach using chemical reagent strips.

RESULTS: Of 18 identified cases, eight were cardiac/respiratory arrest. Six case-patients died. Baseline vital signs pre-dialysis and medication exposures did not differ between cases and controls. HCP X was the only employee significantly associated with cases based on being present in the facility (OR 5.8; 95% CI, 1.2-27.7) and treating the patient (OR 4.2; 95% CI, 1.4-12.9). Five of six case-patients for whom plasma specimens were available had detectable chlorinated tyrosines (range: 0.02-0.14%) compared to 0 of the 32 laboratory controls. Four discarded syringes tested positive for bleach.

CONCLUSIONS: Intravenous bleach exposure was the likely cause of this cluster of cardiac events, including 6 deaths. HCP X was epidemiologically associated with cases and laboratory findings were consistent with injection of bleach. HCP X is no longer employed by the clinic.

KEYWORDS: Hemodialysis, cardiac arrest, bleach, toxicology

THURSDAY, APRIL 23, 2009

SESSION N:

The CHRONIC-les of Narnia — Chronic

Ravinia Ballroom 10:30 a.m.–12:00 p.m.

MODERATOR: *Janet Collins*

10:35

Trends and Patterns of Cardiovascular Disease Risk Factors Among Adolescents—United States, 1999–2006

AUTHORS: *Ashleigh L. May, E.V. Kuklina, P.W. Yoon*

BACKGROUND: Cardiovascular disease (CVD) is the leading cause of death among U.S. adults. Recent data showing a link between CVD risk factors in adolescence and adult disease suggest that reducing risk factor prevalence among adolescents may prevent future CVD. This study describes CVD risk factor trends and clustering among adolescents.

METHODS: To estimate the prevalence and clustering of four CVD risk factors (overweight/obesity, prediabetes/diabetes, borderline/high LDL cholesterol, and prehypertension/hypertension) among U.S. adolescents, we analyzed data for 2,922 12-19-year old participants in the National Health and Nutrition Examination Surveys during 1999–2006. We estimated the percentage having each risk factor and having 0, 1, 2, or >3 risk factors, overall and by sex, age, and race/ethnicity, and tested for demographic differences and linear trends.

RESULTS: Overall, 32% of adolescents were overweight/obese, 14% were prehypertensive/hypertensive, 14% were prediabetic/diabetic, and 22% had borderline/high LDL; 45% had no risk factors, 35% had 1, 15% had 2, and 5% had >3. From 1999-2006, the prevalence of prediabetes/diabetes increased from 8% to 20% ($p < .05$), but the prevalence of the other risk factors did not change significantly. Those with >3 risk factors were primarily male (67%; $p<.05$) and age 18–19 years (40%; $p<.05$). There were no significant racial/ethnic differences or linear trends in the prevalence of >3 risk factors.

CONCLUSIONS: Most U.S. adolescents have one or more modifiable risk factors for CVD. Subsequent cluster analyses should be used to examine whether CVD risk factor patterns among adolescents are similar to those among adults. Knowledge about trends in and patterns of CVD risk factor prevalence could lead to more focused and effective interventions to reduce the prevalence and ultimately prevent CVD.

KEYWORDS: adolescents, cardiovascular disease, risk factors, patterns, trends

10:55

Analysis of Asthma-Related Mortality Using Multiple Cause-of-Death Files — United States, 2001–2005

AUTHORS: *Isabela C. Ribeiro, C. Johnson, D. Callahan*

BACKGROUND: In 2005, an estimated 7.7% of persons in the United States (U.S.) had asthma, and 3,884 deaths occurred with asthma as the underlying (i.e., primary) cause of death. Asthma mortality using underlying cause-of-death (UCD) data is well documented; however, it might underestimate asthma-related mortality. By counting all occurrences of asthma listed on death certificates it may be possible to assess the total potential contribution of asthma to mortality.

METHODS: To determine national statistics of mortality attributable to asthma between 2001 and 2005, we analyzed mortality data from the National Vital Statistics System multiple cause-of-death (MCD) files. Asthma deaths were selected using International Classification of Diseases, 10th Revision, codes J45-J46. Rates and 95% confidence intervals (CI) were calculated to determine differences of asthma-related mortality as the underlying

versus the contributing cause (any mention of asthma) of death among subgroups.

RESULTS: A total of 47,812 asthma-related deaths occurred over the 5-year period, representing an age-adjusted mortality rate of 32.5 (CI:32.2--32.78) per million. Asthma as the UCD appeared in 42% of the records. Although death distribution by gender and race examined using either UCD or MCD files was similar, the age-adjusted mortality rate was 2.3 times higher when calculated with contributing cause-of-death. Mortality was 127% and 80% higher among blacks than whites, respectively by underlying and contributing cause-of-death methods.

CONCLUSIONS: We found that using UCD underestimates the total burden of asthma on national mortality statistics. The MCD measure is a more complete measure of national asthma-related mortality. Scientists and policymakers should consider the analysis of MCD data to better portray the total contribution of asthma to the mortality among the U.S. population.

KEYWORDS: asthma, respiratory diseases, mortality, cause of death

11:15

Socioeconomic Status, Neighborhood Factors, Child Enrichment Factors, and Odds of Cognitive Deficit Among Preschool-age Children: Results from the Follow-Up of Growth and Development Experiences Study

AUTHORS: *Deborah L. Christensen, L. Schieve, C. Drews-Botsch*

BACKGROUND: Cognitive deficit is associated with poorer health and functioning throughout the lifespan and disproportionately affects children from lower socioeconomic status (SES) populations. We examined cognitive deficit by individual SES, neighborhood, and enrichment factors among preschool-age children from two birth hospitals: a public hospital serving a socioeconomically disadvantaged population (Hospital A; n=219) and a private hospital serving a socioeconomically advantaged population (Hospital B; n=246).

METHODS: Cognitive deficit was defined as a score <70 on the Differential Ability Scales, a standardized psychometric test. We constructed three scales based on parent-reported SES factors, adverse neighborhood factors, and child enrichment (e.g., children's books at home). Within each hospital population, we used logistic regression to assess associations between high/low scale scores and cognitive deficit, adjusted for perinatal factors (e.g., pregnancy drinking and growth retardation).

RESULTS: Prevalence of cognitive deficit was 40.6% and 5.8%, and proportion with low SES score was 57.1% and 2.0%, for children born in Hospitals A and B, respectively. Children from Hospital A had lower odds of cognitive deficit with high enrichment score (adjusted OR [AOR] =0.3, 95% confidence interval [CI]=0.2-0.6) and higher odds with low SES score (AOR=1.8, 95% CI=1.0-3.3). The SES association was slightly attenuated by addition of enrichment score to the model (AOR=1.6, 95% CI=0.9-4.2). Results were similar for neighborhood score. Similarly, children from Hospital B had lower odds of cognitive deficit with high enrichment score (AOR=0.05, 95% CI=0.01-0.24), higher odds with low SES score (AOR=30.8, 95% CI=3.6-263.4), and attenuation with addition of enrichment score (AOR=11.1, 95% CI=1.0-133.1).

CONCLUSIONS: In children from socioeconomically advantaged and disadvantaged populations, a child's individual SES was further associated with cognitive deficit. Child enrichment attenuated the SES influence.

KEYWORDS: neurodevelopmental; epidemiology; sociodemographic determinants; Differential Ability Scales

11:35

Evaluating Colorectal Cancer Screening by an Electronic Measure Among American Indians and Alaska Natives at Indian Health Service Facilities — Southwestern United States, 2007–2008

AUTHORS: *Anil G. Suryaprasad, D. Espey, J. Redd, D. Haverkamp, L. Layne, A. Neri, B. Reilley, N. Cobb, J. Cheek*

BACKGROUND: Colorectal cancer (CRC) is a leading cause of cancer mortality among American Indians and Alaska Natives (AI/ANs). Guidelines for asymptomatic persons recommend screening by colonoscopy every 10 years, sigmoidoscopy or double-contrast barium enema every 5 years, or fecal occult blood testing every year. The Indian Health Service (IHS) tracks CRC screening through an algorithm applied to IHS electronic medical records. In a pilot study, we evaluated the accuracy of this algorithm.

METHODS: We randomly sampled medical records from two IHS facilities for 243 patients eligible for CRC screening. We chose equal numbers of patients classified by the electronic algorithm as either having undergone a CRC screening test or not, during July 1, 2007–June 30, 2008. Screening status as determined by the algorithm was compared to chart review as the gold standard. We then estimated sensitivity, specificity, predictive value positive (PVP), and predictive value negative (PVN) of the electronic measure as a predictor of true screening status and characterized any coding or misclassification errors.

RESULTS: Sensitivity (0.97) and PVN (0.98) of the algorithm were higher than specificity (0.62) and PVP (0.47). Of the 243 patients, 24 (10%) were misclassified by the algorithm. Seventeen of these 24 patients (71%) were misclassified as having been screened for CRC when tests were done for diagnostic or follow-up purposes. Other errors included miscoding (4 patients; 17%) and ordered tests not completed (3 patients; 12%).

CONCLUSIONS: The electronic measure for CRC screening overestimated true screening prevalence among asymptomatic AI/AN patients by misclassifying diagnostic and follow-up tests. If chart reviews at other IHS sites produce similar findings, improvement of the electronic algorithm will require better documentation of CRC test indication.

KEYWORDS: colorectal cancer, screening, electronic measure, Native Americans

THURSDAY, APRIL 23, 2009

SESSION O:

The Word is Not Enough — International Presentation of the Paul C. Schnitker International Health Award

Ravinia Ballroom 1:30 p.m.–3:15 p.m.

MODERATOR: *Mike St. Louis*

1:35

Spousal Sexual Violence, HIV, and Sexually Transmitted Infections: an Evaluation of Demographic and Health Survey Data — Zimbabwe (2005–2006), Malawi (2004), and Kenya (2003)

AUTHORS: *Christine L. Mattson, S. Settergren, J. Sabatier*

BACKGROUND: In 2007, 67% of the 33 million people worldwide who were living with HIV were in sub-Saharan Africa where women bear the greater HIV burden. In some African countries, up to half of ever-married women report spousal sexual violence, which recent studies suggest is associated with HIV infection and sexually transmitted infections (STIs). We determined the prevalence of and associations among spousal sexual violence,

HIV infection, and STIs among women in Zimbabwe, Malawi, and Kenya.

METHODS: Cross-sectional Demographic and Health Surveys provide nationally representative information about population health, including an HIV serosurvey. We estimated prevalence and used logistic regression to evaluate the association of spousal sexual violence (defined as forced sexual intercourse or other sex acts) with HIV infection and with self-reported symptoms or diagnosis of STIs among ever-married women in Zimbabwe (n=4,718 surveyed in 2005–2006), Malawi (n=1,894 in 2004), and Kenya (n=1,872 in 2003). Analyses included appropriate sample weights and design effects.

RESULTS: Prevalences, by variable and country, were: HIV infection, 25.7% (95% confidence interval [CI]=23.9–27.5) in Zimbabwe, 14.7% (CI=13.0–16.4) in Malawi, and 10.3% (CI=8.7–11.9) in Kenya; spousal sexual violence, 13.7% (CI=12.5–15.0), 13.4% (CI=12.2–14.5) and 14.7% (CI=13.3–16.1), respectively; STIs, 10.8% (CI=9.5–12.0), 8.4% (CI=7.6–9.2), and 4.7% (CI=4.1–5.4), respectively. Spousal sexual violence was not associated with HIV infection but was associated with STIs in Zimbabwe (adjusted odds ratio [AOR]=2.2, CI=1.7–2.8), Malawi (AOR=3.2, CI =2.1–4.8), and Kenya (AOR=3.0, CI =1.6–5.3).

CONCLUSIONS: HIV infection prevalence was high in all three countries, and spousal sexual violence was consistently associated with STIs. As HIV services increase, linkages between violence prevention and HIV/STI programs should be strengthened.

KEYWORDS: HIV, sexual abuse, sexually transmitted infections, Africa

1:55
Impact of a Rapid Cholera Response Program on Knowledge and Practices Regarding Water Treatment and Hygiene —Kenya, 2008

AUTHORS: *Kashmira A. Date, B. Nygren, A. Obure, S. Kola, K. Wannemuehler, R. Quick*

BACKGROUND: Cholera outbreaks cause considerable morbidity and mortality in Kenya, with death rates exceeding 3%. We developed rapid cholera response teams to respond to outbreaks by distributing locally-available, socially-marketed water chlorination products and educating affected populations. We assessed program impact on water treatment knowledge and practices.

METHODS: In November 2008, we conducted a cross-sectional survey of one household per homestead in six cholera-affected (intervention) communities, where our cholera teams had responded within the preceding 6 months, and six geographically-matched comparison communities where our teams did not respond. We confirmed water treatment by testing stored household water for residual chlorine.

RESULTS: We surveyed 362 intervention and 361 comparison households; 75% respondents were female; 34% were illiterate. Over 33% of respondents in both groups were aware that a cholera outbreak had occurred, and about half in each group had attended a cholera education event; 64% of intervention and 57% of comparison respondents reported receiving water treatment products at these events. Over 93% were aware of WaterGuard, the most commonly available water treatment product, but <10% from a cholera event. Water treatment on the day of interview was reported by 60% of intervention and 58% of comparison respondents. Intervention households had a greater tendency than

comparison households to have detectable chlorine residuals in stored water (18% vs. 13%, matched odds ratio 1.5, 95% confidence interval 0.97-2.3).

CONCLUSIONS: Although cholera outbreak awareness, cholera event attendance, and water treatment knowledge were similar between the two groups, intervention households had a greater tendency than comparison households to treat stored water effectively. Efforts to improve the impact of cholera response activities, including coordination with other organizations that respond to outbreaks, are planned.

KEYWORDS: Cholera, water treatment, hygiene, residual chlorine

2:15

The Impact on Maternal Household Hygiene Practices of Integration of Household Water Treatment and Hygiene Promotion with Antenatal Services

AUTHORS: *Elizabeth Russo, A. Sheth, M. Menon, A. Kudzala, B. Tauzie, R. Quick*

BACKGROUND: Diarrhea, one of Malawi's leading causes of childhood mortality, can be mitigated by improving hygiene and drinking water quality. We evaluated a clinic-based intervention that distributed (free of charge) water storage containers, sodium hypochlorite water treatment solution (*WaterGuard*), soap, and educational messages to pregnant women during antenatal clinic visits.

METHODS: We surveyed 389 women receiving antenatal care before and nine months after program implementation by assessing knowledge about water treatment procedures, testing drinking water for residual chlorine, and observing handwashing. We also surveyed non-pregnant female relatives and friends with children <5 years old to assess the program's diffusion into the community.

RESULTS: Program participants were more likely to know correct water treatment procedures (62% vs. 29%, p<0.0001), treat drinking water with *WaterGuard* (61% vs. 2%, p<0.0001), and demonstrate correct handwashing practices (68% vs. 22%, p<0.0001) at follow-up than at baseline. They also were more likely to purchase and use *WaterGuard* after free distribution ended (32% vs. 2%, p<0.0001). Relatives and friends who were not in the antenatal program were more likely to know correct water treatment procedures (48% vs. 27%, p<0.0001), treat drinking water (25% vs. 2%, p<0.0001), demonstrate correct handwashing practices (60% vs. 18%, p<0.0001), and purchase and use *WaterGuard* (23% vs. 2%, p<0.0001) at follow-up than at baseline.

CONCLUSIONS: This antenatal clinic-based program is an effective strategy for promoting water treatment and hygiene behaviors among pregnant women. Participants purchased WaterGuard after discontinuation of free distribution, suggesting that program benefits may be sustainable. Friends and relatives of participants also exhibited improved water treatment and hygiene practices, suggesting extended impact beyond program participants.

KEYWORDS: diarrhea, water treatment, hygiene, antenatal care, diffusion, Malawi

2:35

Boiling Mad: Impact of Point-of-Use Chlorination Compared with Boiling and Bottled Water on Water Quality and Diarrheal Illness — Tangerang, Indonesia, March–June 2008

AUTHORS: *Kavita K. Trivedi, S. Sodha, E. Blanton, A. Ati, A. Boore, T. Nguyen, K. Delea, R. Ainslie, M. E. Figueroa, R. Quick*

BACKGROUND: In Indonesia, diarrhea remains a major cause of morbidity and

mortality among children <5yo, despite 50 years of government promotion of boiling drinking water. Point-of-use chlorination is currently promoted as a less expensive, less time-consuming alternative to boiling. We evaluated the impact of this strategy on water quality and diarrhea.

METHODS: We enrolled all households with children <5yo in four communities in Tangerang, Indonesia; conducted a baseline survey; and measured residual chlorine in stored water and *Escherichia coli* contamination in source and stored water. Each household was visited weekly for 12 weeks to collect diarrhea incidence data in children <5yo and to test stored water for residual chlorine and *E. coli*.

RESULTS: We enrolled 289 households with 297 children <5yo. At baseline, 78% of water sources yielded E. coli. Household water treatment practices included boiling (81%) and chlorination (5%); 9% of households used bottled water without treatment. In households that chlorinated, stored water was less likely to yield *E. coli* than in households that boiled (30% vs. 57%, relative risk [RR] 0.5; 95% confidence interval [CI] 0.4–0.7) or used bottled water (30% vs. 50%, RR 0.6; 95% CI 0.5–0.8). The proportion of children with diarrhea tended to be lower in households that chlorinated than in those that boiled (2% vs. 5%, RR 0.3; 95% CI 0.1–1.3) or used bottled water (2% vs. 6%, RR 0.3; 95% CI 0.1–1.1).

CONCLUSIONS: Chlorination resulted in significantly better microbiologic quality of stored water and a lower, though not significant, proportion of children with diarrhea compared with boiling or use of bottled water. However, chlorine use was low. Enhanced efforts to promote chlorination are warranted.

KEYWORDS: diarrhea, *Escherichia coli*, water microbiology, Indonesia

2:55
Epidemiologic Investigation of Poliomyelitis Outbreaks Genetically Linked to India — Angola, 2007–2008

AUTHORS: *Sarah E. Kidd, J. Goodson, J. Aramburu, A. Morais, A.Gaye, J. Buffington, S. Gerber, A. Uzicanin.*

BACKGROUND: From April 2007–October 2008, Angola reported 33 cases of paralytic poliomyelitis genetically linked with two different poliovirus strains originating from India. Angola had been polio-free from 2001 until a 2005–2006 outbreak, also due to poliovirus of Indian origin. An investigation was undertaken to describe the 2007–2008 outbreaks and evaluate factors associated with paralytic poliomyelitis.

METHODS: We reviewed national surveillance and oral polio vaccine (OPV) coverage data, interviewed case-patients regarding exposures and possible links to India, and conducted a case-control study. Case-patients were children with acute flaccid paralysis (AFP) and laboratory-confirmed wild poliovirus (WPV) infection genetically related to the 2007–2008 poliovirus importations. Controls were age- and neighborhood-matched with cases. Undervaccination was defined as having <3 OPV doses through routine immunization. Risk factors were assessed using conditional logistic regression.

RESULTS: Of 33 eligible cases, 27 cases (8 WPV type 1, 19 WPV type 3) from 11 districts in 3 provinces were enrolled, along with 81 controls. At AFP onset, median age of case-patients was 20 months (range 7–188). In bivariate analysis, case-patients were more likely to be undervaccinated (matched odds ratio [MOR], 4.0; 95% Confidence Interval [CI], 1.3–12.0) and have a household member travel outside the province within the two months preceding AFP onset (MOR, 2.9; CI, 1.2–7.1). In multivariable analysis, under-

vaccination and travel outside the province remained associated with paralytic poliomyelitis (adjusted MOR 4.1, [CI 1.3–12.7] and 2.9 [CI 1.2–7.6], respectively). No epidemiologic links to India were identified.

CONCLUSIONS: Undervaccination and travel outside province of residence likely contributed to the poliomyelitis outbreaks. Strengthening routine immunization would reduce the risk of outbreaks following WPV importations in Angola.

KEYWORDS: poliomyelitis, outbreak, risk factor, vaccination, Angola

THURSDAY, APRIL 23, 2009

Session P: Die Hard — Drug Resistance
Ravinia Ballroom 3:30 p.m.–5:00 p.m.

MODERATOR: *Rebecca Sunenshine*

3:35

Outbreak of Carbapenem-Resistant *Klebsiella* pneumoniae Infections in a Long-Term Acute Care Hospital — Florida, 2008

AUTHORS: *John M. DePasquale, A. Endimiani, S. Forero, D. Roberts, P. Fiorella, N. Pickens, R. Baker, A. Srinivasan, J. Patel, B. Kitchel, R. Bonomo, A. Casiano-Colon, R. Freedman, J. Livengood, R. Hopkins*

BACKGROUND: Carbapenem-resistant *Klebsiella pneumoniae* (CRKP) is an emerging nosocomial pathogen in the United States. High mortality rates, limited treatment options, and transmission potential underscore substantial public health implications. We investigated a CRKP outbreak in a long-term acute-care hospital (LTACH).

METHODS: We conducted a case-control study to identify risks for CRKP acquisition. We performed rectal swab cultures on all LTACH patients to search for additional cases (active surveillance). Case-patients were infected or colonized with CRKP diagnosed ≥72 hours after admission, January 15-April 30. Control-patients tested negative for CRKP. Isolates were typed with pulsed-field gel electrophoresis (PFGE) and compared with PFGE and multilocus sequence types of other U.S. CRKP isolates. Additionally, we assessed mortality within the LTACH cohort.

RESULTS: CRKP was isolated from 13 case-patients (8 infected; 5 colonized); active surveillance identified CRKP among six patients, all of whom were known case-patients. All isolates had indistinguishable PFGE patterns. This complex of PFGE patterns represents a novel K. pneumoniae sequence type (ST258), which accounts for the majority of CRKP in the U.S. Case-patients and control subjects were similar in age, sex, race and Charlson comorbidity score. Case-patients had longer lengths of stay and more invasive medical devices (ANOVA and Chi-Square, $P<0.05$). Deaths/1,000 patient-days of observation were higher for CRKP patients (incidence density ratio: 4.9; 95% confidence interval, 1.1-22.9).

CONCLUSIONS: This is the first CRKP outbreak reported in an LTACH and the first in which all in-patients were screened. Surveillance cultures demonstrated no on-going transmission to other patients, which allowed the facility to focus control efforts on case-patients. High mortality underscores the need for prevention efforts of healthcare-associated infections in long-term care facilities with this highly pathogenic *Klebsiella* strain.

KEYWORDS: *Klebsiella pneumoniae* Carbapenemase (KPC), carbapenemase, outcome, epidemiology, LTCF, LTACH

3:55
Human infections with oseltamivir-resistant influenza A(H1N1) virus in the United States, 2007-2008

AUTHORS: *Nila J. Dharan, MD, Larisa V. Gubareva, PhD, John J. Meyer, MPH, Margaret Okomo-Adhiambo, DVM, PhD, Reginald McClinton, MPH, Steven A. Marshall, MS, Kirsten St. George, MAppSc, PhD, Scott Epperson, MPH, Lynnette Brammer,* **Oseltamivir-Resistance Working Group**, *Alexander I. Klimov, PhD, Joseph S. Bresee, MD, Alicia M. Fry, MD, MPH*

BACKGROUND: Two classes of influenza antiviral drugs are licensed in the U.S., however, due to high levels of resistance to adamantanes, only neuraminidase inhibitors (oseltamivir and zanamivir) were recommended beginning in January 2006. During the 2007—2008 influenza season, oseltamivir-resistance among influenza A(H1N1) viruses, conferred by the H274Y mutation in the virus neuraminidase, increased significantly for the first time worldwide. We describe characteristics of oseltamivir-resistant influenza identified during the 2007-2008 influenza season.

METHODS: We tested influenza A(H1N1) viruses isolated during the 2007—2008 season by U.S. public health laboratories and submitted to CDC. The presence of H274Y mutation was determined by sequencing and/or pyrosequencing, a high-throughput technique developed at CDC for rapid antiviral resistance testing. Clinical and demographic information was collected from patients with oseltamivir-resistant A(H1N1) infections and a comparison group of patients with oseltamivir-susceptible A(H1N1) infections.

RESULTS: Overall, 142 (13%) of 1,124 A(H1N1) viruses tested from 24 states were oseltamivir-resistant, all with the H274Y mutation. Data were available for 99 oseltamivir-resistant and 182 oseltamivir-susceptible cases. Among resistant cases, median age was 19 years (range 1 month—62 years), 5% were hospitalized, and 4% died. None reported oseltamivir exposure before influenza diagnostic sample collection. No significant differences were found between cases of oseltamivir-resistant and oseltamivir-susceptible influenza in demographic characteristics, underlying medical illness or clinical symptoms; cases of oseltamivir-resistant influenza were less likely to be hospitalized, although numbers were small.

CONCLUSIONS: Oseltamivir-resistant A(H1N1) viruses circulated widely in the U.S., were not related to oseltamivir exposure and appeared to cause illness similar to that of oseltamivir-susceptible A(H1N1) viruses. Ongoing surveillance is important for the development of guidelines for antiviral use for the treatment and prophylaxis of influenza.

KEYWORDS: influenza, oseltamivir, resistance, pyrosequencing, neuraminidase inhibitor

4:15
Characteristics of and Risks for Resistant *Acinetobacter* Infection — Michigan, October–December 2007

AUTHORS: *Jennie L. Finks, K. Kutzko, T. Dyke, E. Wells, M. Wilkins*

BACKGROUND: Resistant *Acinetobacter* infections are associated with longer hospitalizations and higher mortality than susceptible infections. In 2007, Michigan Department of Community Health was notified of an increased frequency of multidrug-resistant *Acinetobacter* in southeast Michigan hospitals. We sought to identify risk factors for resistance.

METHODS: Infection preventionists at five southeast Michigan hospitals retrospectively reviewed all cases diagnosed by *Acinetobacter-*

positive culture during October 1–December 31, 2007. Imipenem resistance was considered a marker for multidrug resistance. Cases were considered hospital-acquired if culture collection was >48 hours after admission; otherwise they were considered community-acquired. Cases were considered healthcare-associated if they were hospital-acquired or occurred among patients transferred directly from another facility or hospitalized ≤30 days before admission; otherwise they were considered community-associated.

RESULTS: Of 220 cases, 115 (52%) were imipenem-resistant, 135 (61%) were hospital-acquired, and 199 (90%) were healthcare-associated. Risk for resistance was 1.4 (95% confidence interval [CI], 1.1–1.8) times higher among hospital-acquired (79/135 = 59%) versus community-acquired cases (36/85 = 42%). No difference existed in risk for resistance among transferred versus nontransferred or previously hospitalized versus nonpreviously hospitalized patients. Risk for resistance was 1.9 (95% CI, 1.3–2.7) times higher among nontransferred patients with hospital-acquired (56/88 = 64%) versus community-acquired cases (11/35 = 31%); no difference existed among transferred patients. Risk for resistance was 1.8 (95% CI, 1.4-2.4) times higher among healthcare-associated (111/199 = 56%) versus community-associated (4/21 = 19%) cases.

CONCLUSION: Although hospital-acquired are more likely than community-acquired cases to exhibit drug resistance, distinction between hospital- and community-acquired cases among patients transferred from other facilities is difficult. *Acinetobacter*-positive patients with healthcare exposure are more likely to harbor resistant pathogens; facilities should reevaluate infection-control practices accordingly.

KEYWORDS: *Acinetobacter*, resistance

4:35

Methicillin-Resistant *Staphylococcus aureus* Surveillance in the King County, Washington, Jail System — September 1, 2007–August 31, 2008

AUTHORS: *Matthew P. Hanson, C. Rodriguez, T. Kwan-Gett, J. Duchin*

BACKGROUND: Inmates are at risk for skin and soft-tissue infections (SSTIs), including those caused by methicillin-resistant *Staphylococcus aureus* (MRSA). A surveillance system was established in 2007 in two King County, Washington, jails to determine the timing of MRSA infection onset and to evaluate the association between the rate of MRSA infection and duration of incarceration.

METHODS: All inmates incarcerated September 1, 2007–August 31, 2008, were included in the analysis. An MRSA case was defined as the first MRSA-positive culture in a person incarcerated in a King County jail. Culture results were obtained from the jail electronic health record (EHR) and from the commercial laboratory serving the jail. Inmate-days were provided by jail census data. SSTI onset, determined by EHR review, before booking or <6 days into incarceration was classified as likely community-acquired, 6–14 days as indeterminate, and >14 days as potentially jail-acquired. Kaplan-Meier survival analysis was used to estimate hazard rates. Incidence rates were approximated by using the mean hazard rate during the study period.

RESULTS: Among 203 MRSA cases, onset occurred before booking or <6 days into incarceration for 96 (47%) inmates, 6–14 days after incarceration for 35 (17%), and >14 days for 72 (36%). The incidence rate during the study period was 0.305 cases/1,000 inmate-days (95% confidence interval, 0.3036–0.3064). The incidence rate for MRSA infection during incarceration did not increase with duration of incarceration.

CONCLUSIONS: The highest percentage of MRSA cases diagnosed among inmates was likely community-acquired. We did not find evidence of an increase in the rate of MRSA infection across time, demonstrating that the jail environment did not increase the likelihood of infection during the study period.

KEYWORDS: hazard, methicillin resistance, MRSA, skin infections, SSTI, *Staphylococcus aureus*, survival analysis

FRIDAY, APRIL 24, 2009

SESSION Q:

The Color Purple — Injury

Ravinia Ballroom 8:30 a.m.–10:00 a.m.

MODERATOR: *Rodney Hammond*

8:35

Opening the Black Box: Effectiveness of the FDA Boxed Warning on Methadone

AUTHORS: *Nagesh N. Borse, L. Paulozzi, J. Gilchrist, A. Dellinger*

BACKGROUND: Methadone, an opioid analgesic, has become a prominent drug of abuse in the United States. Methadone overdose-related deaths increased 567% from 1999 to 2005, when 4,462 deaths occurred. On November 26, 2006, the Food and Drug Administration (FDA) issued a "boxed warning" on the product labeling cautioning doctors and patients about the danger of methadone overdose. This study assessed whether the warning affected methadone overdoses or methadone consumption.

METHODS: In a pre-post study of the 2005–2007 time period, we examined: (1) monthly counts of methadone overdose-related and total opioid-analgesic-related emergency department visits (EDVs) from a consistent panel of 102 hospitals participating in the Drug Abuse Warning Network (DAWN); and (2) quarterly national methadone distribution in grams per 100,000 people, a proxy for consumption as reported to the Drug Enforcement Administration.

RESULTS: Overall, methadone EDVs showed a 66% increase (271 to 449) from 1st quarter (Q1-) 2005 to 4th Quarter (Q4-) 2007. Methadone EDV counts were 4% lower in Q4-2006, the time period of the warning, than in Q4-2005. The proportion of opioid EDVs involving methadone declined from 16.9% in Q3-2006 to 14.7% in Q4-2006 ($p<0.025$). The proportion involving methadone was 15.9% in 2006 and 15.2% in 2007 ($p = 0.14$). Methadone consumption increased 43% from Q1-2005 to Q4-2007. Although it declined by 1% from Q3- to Q4-2006, methadone consumption increased steadily in 2007.

CONCLUSIONS: The boxed warning might have slowed the rate of increase in methadone overdose-related EDVs without resulting in a net reduction. There was no evidence that the warning led to lower consumption of methadone. More effective interventions to reduce methadone overdose and abuse need to be developed and implemented.

KEYWORDS: Methadone, Poisoning, USFDA, Drug Labeling, Emergency Department Visits

8:55

Coping Alone with Suicidal Thoughts among Those at Heightened Risk for Suicide

AUTHORS: *Kevin J. Vagi, J. Chen, T. Simon, M. Breiding, M. Lynberg Black*

BACKGROUND: More than 32,000 suicides occur annually in the United States. While social connectedness can reduce risk for suicidal behavior, the extent to which groups at heightened risk for suicide, including those who report recent suicidal ideation or behavior (SIB), males, victims of violence,

and those lacking social support are willing to seek help from others for suicidal thoughts remains unclear.

METHODS: In a nationally-representative random-digit-dialed telephone survey conducted from 2001 through 2003, 9,684 adults were asked how they would cope with suicidal thoughts. Responses were coded as seeking help from others (e.g., counselor, clergy, hotline) versus coping alone (e.g., cope by myself, ignore it). Multivariable logistic regression modeling was used to test the associations between help-seeking and past 12-month SIB, sex, past 12-month sexual violence (SV) victimization, and current social support, controlling for race/ethnicity, employment, marital status, education, and household poverty.

RESULTS: Overall, 11.3% of the US adult population reported that they would cope alone if feeling suicidal. Among persons who reported SIB, 21.6% indicated that they would cope alone, (Adjusted Odds Ratio [AOR]=2.6, 95% Confidence Interval [CI]=2.0-3.4). Those who reported SV victimization (AOR=1.8, 95% CI=1.0-3.1) and males (AOR=2.1, 95% CI=1.7-2.6) were also more likely to report coping alone. Having low social support mediated the association between SV victimization and help-seeking and was directly associated with coping alone (AOR=3.3, 95% CI=2.7-4.1).

CONCLUSIONS: Those at heightened risk for suicide were less likely to report coping behaviors that can reduce the risk of suicide. This suggests the need for suicide prevention and sexual violence intervention programs to enhance social support and reduce stigma and other barriers to help-seeking as a means to prevent suicide.

KEYWORDS: coping behavior, suicide, sexual violence, social support

9:15

Vascular Access Hemorrhage Deaths Among Hemodialysis Patients — Maryland, Virginia, and the District of Columbia, 2000–2007

AUTHORS: *Rakhee S. Palekar, K. Ellingson, C. Lucero, K. Kurkjian, S. Chai, D. Vincenti, D. Schlossberg, J.Davies-Cole, M. Arduino, D. Woolard, J. Magri, D. Blythe, P. Patel*

BACKGROUND: In 2005, ~341,000 U.S. patients underwent chronic hemodialysis for end-stage renal disease (ESRD). Hemodialysis requires vascular access through an arteriovenous fistula, arteriovenous graft, or intravascular catheter. Although transient posthemodialysis vascular-access bleeding is a recognized complication, fatal vascular-access hemorrhage (FVAH) is inadequately understood. Prompted by a possible FVAH cluster noted by Maryland's medical examiner (ME) in 2007, we investigated regional FVAH epidemiology.

METHODS: We queried the Centers for Medicare and Medicaid Services (CMS) ESRD cause-of-death database and MEs to identify potential FVAH cases in Maryland, Virginia, and the District of Columbia. We reviewed outpatient and ME records and death certificates for these potential cases. Confirmed cases had explicit documentation of fatal hemorrhage from the vascular access during 2000–2007. To examine FVAH risk factors, we compared Maryland cases (n=20) with randomly selected CMS ESRD database control subjects (deaths from non-FVAH causes; n=38) from the same facility pool as cases.

RESULTS: We identified 84 confirmed cases during 2000–2007, of which 22 were ME-identified only; 60.5% (49/81) hemorrhaged from grafts, 28.4% (23/81) from fistulas, and 11.1% (9/81) from catheters; 83.3% (65/78) hemorrhaged at home. Year-to-year case

counts were stable; FVAH represented 0.6% of all ESRD deaths. Compared with control subjects, more case-patients had grafts (odds ratio [OR]=6.52; 95% confidence interval [CI]=1.89–22.51) and access-related complications within 6 months of death (OR=9.67; 95% CI=2.75–34.02). Psychosocial factors and anticoagulation were not significant risk factors.

CONCLUSIONS: FVAH among hemodialysis patients occurred most often at home, among patients with grafts, and among those with recent access complications. Strategies to rapidly control access hemorrhage at home and further delineation of warning signs are needed to prevent FVAH.

KEYWORDS: renal dialysis, vascular access, hemorrhage, death

9:35

Acetaminophen-Related Emergency Department Visits — United States, 2005

AUTHORS: *Paul C. Melstrom, D. Budnitz, J. Horan, L. Febrs, E. Weiss*

BACKGROUND: Acetaminophen overdose is a leading cause of acute liver failure in the United States, which has a 30% mortality rate. It is a leading cause of calls to poison control centers, but such passive reporting might not represent national morbidity. We describe emergency department (ED) visits for adverse drug events (ADEs) from acetaminophen alone or acetaminophen with other medications (combinations).

METHODS: We identified ED visits for ADEs involving acetaminophen-containing products (ACPs) from National Electronic Injury Surveillance System — Cooperative Adverse Drug Event Surveillance (NEISS-CADES), 2005. NEISS-CADES represents U.S. hospitals with 24-hour EDs, and is weighted to calculate national estimates. For each visit, we analyzed ADEs reported and ACPs used. For unintentional overdoses, we describe patient age, sex, and race/ethnicity.

RESULTS: On the basis of 902 cases, a projected 55,485 ED visits for ADEs resulted from ACPs; 25% involved acetaminophen alone and 75%, combinations. Unintentional overdoses or exposures caused 71% of visits resulting from acetaminophen alone, but only 27% of visits were caused by combinations. Allergic reactions caused 18% of visits resulting from acetaminophen alone, and 28% resulted from combinations. Other side-effects caused 11% of visits from acetaminophen alone; 45% from combinations. Among patients who experienced unintentional overdoses from any ACP, 47% were male. Twelve percent were aged <2 years; 40%, 2–<5 years; 21%, 5–<25 years; and 27%, ≥25 years. Fifty-two percent were non-Hispanic white; 15%, non-Hispanic black; 10%, other races/ethnicities; and race/ethnicity was unknown for 23%.

CONCLUSIONS: Approximately half of ED visits for unintentional overdose from ACPs involved children aged <5 years. Interventions targeting this population may reduce ED visits. Additional outcomes data can help target prevention efforts to overdoses causing greatest harm.

KEYWORDS: acetaminophen, toxicity, emergency departments, children

FRIDAY, APRIL 24, 2009

SESSION S:

Some Like it Hot — Hot Topics

Ravinia Ballroom 1:30 p.m.–3:15 p.m.

MODERATOR: *Paul Garbe*

1:35

Outbreaks of *Salmonella* Saintpaul Infections Associated with Jalapeño Peppers at Mexican-Style Restaurants — Texas, 2008.

AUTHORS: *Rajal K. Mody, S. Greene, A. Sever, K. Herman, L. Cantwell, G. Falkenhorst, H. Nair, L. Gaul, T. Dang, A.Gass, R. Wood, A. Cone, K. Wannemuehler, M. Hoekstra, I. McCullum, K. Delea, D.Swerdlow*

BACKGROUND: In May 2008, a multistate outbreak of *Salmonella* Saintpaul infections with an indistinguishable pulsed-field gel electrophoresis pattern (PFGE) was detected. Ultimately this outbreak resulted in 1,471 reported cases. Initial investigations identified associations between illness and tomato consumption. Despite national tomato advisories, infections continued. In mid-June, we investigated two clusters of infections with the outbreak PFGE pattern among patrons of Texan restaurants to further characterize the outbreak's source.

METHODS: We conducted case-control studies of Restaurant A and B patrons, defining cases as diarrheal illnesses occurring within 7 days after eating at either restaurant. Controls were well meal-companions of case-patients. The source of implicated items was investigated.

RESULTS: The first study enrolled 47 case-patients and 40 controls who dined at Restaurant A during May 30–June 2. The second study enrolled 30 case-patients and 31 controls who dined at Restaurant B during May 23–June 12. In both studies, illness was associated with only one menu item, salsa (Restaurant A: OR 52, 95% CI 11–530; Restaurant B: OR 11, 95% CI 1.6–infinity), and only one salsa ingredient, raw jalapeño peppers (Restaurant A: OR 36, 95% CI 4.4–>999; Restaurant B: OR 9.3, 95% CI 1.3–infinity). Implicated peppers came through two importers on the Texas-Mexico border. Cultures of a jalapeño pepper collected from one of these importers and a serrano pepper and irrigation water from a Mexican farm that supplied that importer grew *Salmonella* Saintpaul with the outbreak PFGE pattern.

CONCLUSIONS: These investigations were critical in understanding the broader multistate outbreak. Jalapeño peppers were identified as vehicles of *Salmonella* transmission for the first time. Measures are needed to reduce produce contamination in the field.

KEYWORDS: *Salmonella*, food poisoning, disease outbreak, electrophoresis, gel, pulsed-field, capsicum

1:55
Clinical and Laboratory Features That Differentiate Dengue From Other Febrile Illnesses in an Endemic Area – Puerto Rico, 2007-2008

AUTHORS: *Christopher J. Gregory, L. Santiago, G. Gonzalez-Zeno, B. Irizarry, K. Tomashek, DF Arguello*

BACKGROUND: Dengue causes >100 million infections annually and is a leading cause of morbidity in the tropics. Dengue classification using the World Health Organization (WHO) system, which was developed using pediatric cases in Southeast Asia, is currently undergoing review. Our goal was to identify clinical and laboratory features that better distinguish dengue from other illnesses among Puerto Rican residents.

METHODS: From June 2007 to May 2008, 1946 case-patients were referred for dengue testing through an enhanced surveillance system. Laboratory-positive (positive PCR or IgM seroconversion in paired samples) and negative (negative PCR and IgM in paired samples) case-patients with complete data were included in the analysis. We calculated adjusted odds ratios (aOR) and 95% confidence intervals (CIs) to measure association between clinical and laboratory features and laboratory-positive dengue, using a backward stepwise regression model. Receiver-operating-characteristic (ROC) curves were constructed to compare the sensitivity and

specificity of this model with the WHO dengue case definition (acute febrile illness with ≥2 features: headache, retro-orbital pain, myalgia, arthralgia, rash, hemorrhage, or leukopenia).

RESULTS: Data from 704 patients were analyzed. In the final model laboratory-positivity was associated with rash (aOR=6.4, 95% CI=3.2—12.7), absence of nasal congestion (aOR=2.4, 95% CI=1.4—4.1), and platelet count ≤227,000 (aOR=7.1, 95% CI=3.2—15.7). The ROC curve differentiated laboratory-positive dengue with a sensitivity of 76% and specificity of 71% (area under curve=0.79). The sensitivity and specificity of the WHO definition was 65% and 54%, respectively.

CONCLUSIONS: A model based on clinical symptoms and platelet count is able to predict dengue with more accuracy than the WHO case definition in our population. Further analysis will evaluate the model by patient age and time post symptom onset.

KEYWORDS: Dengue, diagnosis, signs and symptoms

2:15
Methicillin-Resistant *Staphylococcus aureus* Outbreak Among Firefighter Trainees — Colorado, 2008

AUTHORS: *Christa R. Hale, K Gershman, K Meyer-Lee, D Heltzel*

BACKGROUND: Methicillin-resistant *Staphylococcus aureus* (MRSA) is an emerging cause of community-acquired skin infections. We investigated an MRSA outbreak among a previously unreported group, firefighter trainees.

METHODS: We defined a probable case as a clinically compatible skin infection in an autumn 2008 firefighter class trainee; cases were confirmed by MRSA isolation. Available isolates were typed by using pulsed-field gel electrophoresis (PFGE). We conducted a site visit, interviewed patients and staff, and administered a questionnaire to recruits to assess risk factors for acquiring MRSA.

RESULTS: Among the 15 trainees, we identified five confirmed and one probable infection (attack rate, 40%) with onsets during September 12–October 3; two trainees were hospitalized. Four (80%) of five trainees who reported sharing personal items or gear experienced MRSA infections, compared with two (20%) of 10 trainees who had not shared these items (risk ratio, 4.0; 95% confidence interval, 1.1–14.9; $P = 0.09$). Staff interviews revealed that overnight stays were more common among this class than past classes. Six (46.1%) of 13 trainees who had stayed overnight experienced MRSA infections versus none of two trainees who had not stayed overnight (P = 0.49). Site visit and interviews indicated the need for improved wound management, hygiene, and environmental cleaning. No additional cases were identified after implementation of recommendations addressing these concerns. PFGE typing of three available isolates indicated that two were USA300 and one was USA100.

CONCLUSIONS: Because of limited numbers, this investigation failed to demonstrate statistically significant risk factors for MRSA infection. However, sharing of personal items or gear was borderline significant and has been implicated in past outbreaks. Implementation of standard MRSA infection-control practices appeared to stop transmission.

KEYWORDS: skin infections, staphylococcal; methicillin resistance; MRSA; occupational exposure

2:35
Nonfatal Scald-related Burns Among U.S. Adults Aged ≥65 Years

AUTHORS: *Mef D. Galle, E. Sullivent, D. Hungerford, K. Thomas, M. Wald*

BACKGROUND: Older adults (≥65 years) are at increased risk for scald burns (SBs) and suffer a worse prognosis than younger persons. The population of U.S. older adults will double by 2030, and currently more than 94% live in their homes. No national estimates of SBs currently exist for older adults.

METHODS: We analyzed 2001–2006 data from the National Electronic Injury Surveillance System—All Injury Program, a nationally representative stratified probability sample from 66 emergency departments (EDs) to identify visits for SBs among adults aged ≥65 years. National estimates were based on weighted data from 705 patients. Scalds were characterized by injury circumstance and products associated with the event.

RESULTS: ED visits for SBs for those aged ≥65 years averaged 8,617 annually (95% confidence interval:1,377–18,610). Females made two-thirds of these visits. The average annual incidence rate for SBs during the study period was 24 per 100,000 older adults. The majority of SBs (76%) occurred at home, especially in the kitchen, dining area, or bathroom. The most common body parts affected were the upper (42%) and lower (38%) extremities. Scalds were associated with hot food (42%), hot water/steam (30%), cookware (9%), and home/kitchen appliances (8%). Ninety-three percent of patients were discharged home, 4% were hospitalized, and 2% were transferred. Few SBs (0.3%) were reported as intentional.

CONCLUSIONS: Among older adults, most SBs occurred among females and in the home. The incidence of SBs is expected to rise as the number of older adults increases. Community-based scald prevention programs for older adults are needed. Public health messages oriented toward female older adults addressing scald hazards related to cooking are warranted.

KEYWORDS: scald burns, stratified probability sample, weighted data, work-related, intentional

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Public Health Communication During Wildfires — San Diego, California, 2008

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BACKGROUND: In October 2007, wildfires burned approximately 300,000 acres in San Diego County (SDC). Emergency risk communication messages were broadcast to reduce community exposure to fire-related air pollution. This investigation determined residents' exposure to, understanding of, and compliance with health messaging.

METHODS: Using random digit dialing, interviewers called SDC residents during March 18–June 18, 2008. We determined respondent demographics, fire exposure, health precautions, and public health message recall, comprehension, and compliance.

RESULTS: Of those sampled (n = 1,803), respondents were predominantly aged 35–64 years (65.9%), white (65.5%), and educated past high school (79.0%). The majority of those sampled live >1 mile away from the fires (82.5%), although many were exposed to smoky air for 5–7 days (60.7%) both inside and outside their homes. A majority of the population heard (87.9%), primarily by television (77.4%) and radio (6.2%), understood (97.9%), and complied (80.0%) with respiratory health messages during the week of unhealthy air quality, including staying inside their home (58.7%), avoiding outdoor exercise (88.4%), keeping windows and doors closed (75.8%), and wetting ash before cleanup (75.6%). Approximately 5% recalled hearing messages to place air-conditioners on recirculate, use HEPA filters, or use N-95

masks during ash cleanup, but <10% of those hearing the messages followed these specific recommendations.

CONCLUSIONS: Overall general message exposure, understanding, and compliance were high during the wildfires. Message exposure and compliance on specific devices, including N-95 masks during ash cleanup, HEPA filters, and air-conditioners placed on recirculate was inadequate. To improve community understanding and compliance, future disaster health communicators should be aware of reduced understanding of technical recommendations.

KEYWORDS: fire, communication, disaster

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