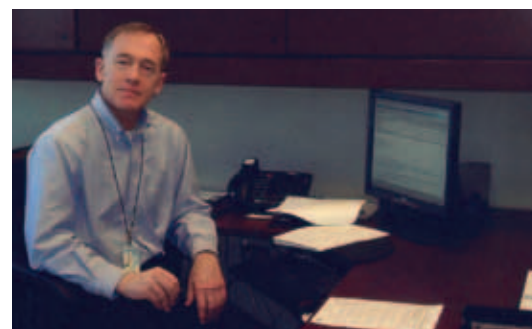


# 62<sup>nd</sup> Annual Epidemic Intelligence Service (EIS) Conference



Volume 62 Number 1 April 22–26, 2013

<http://www.cdc.gov/eis/conference.html>



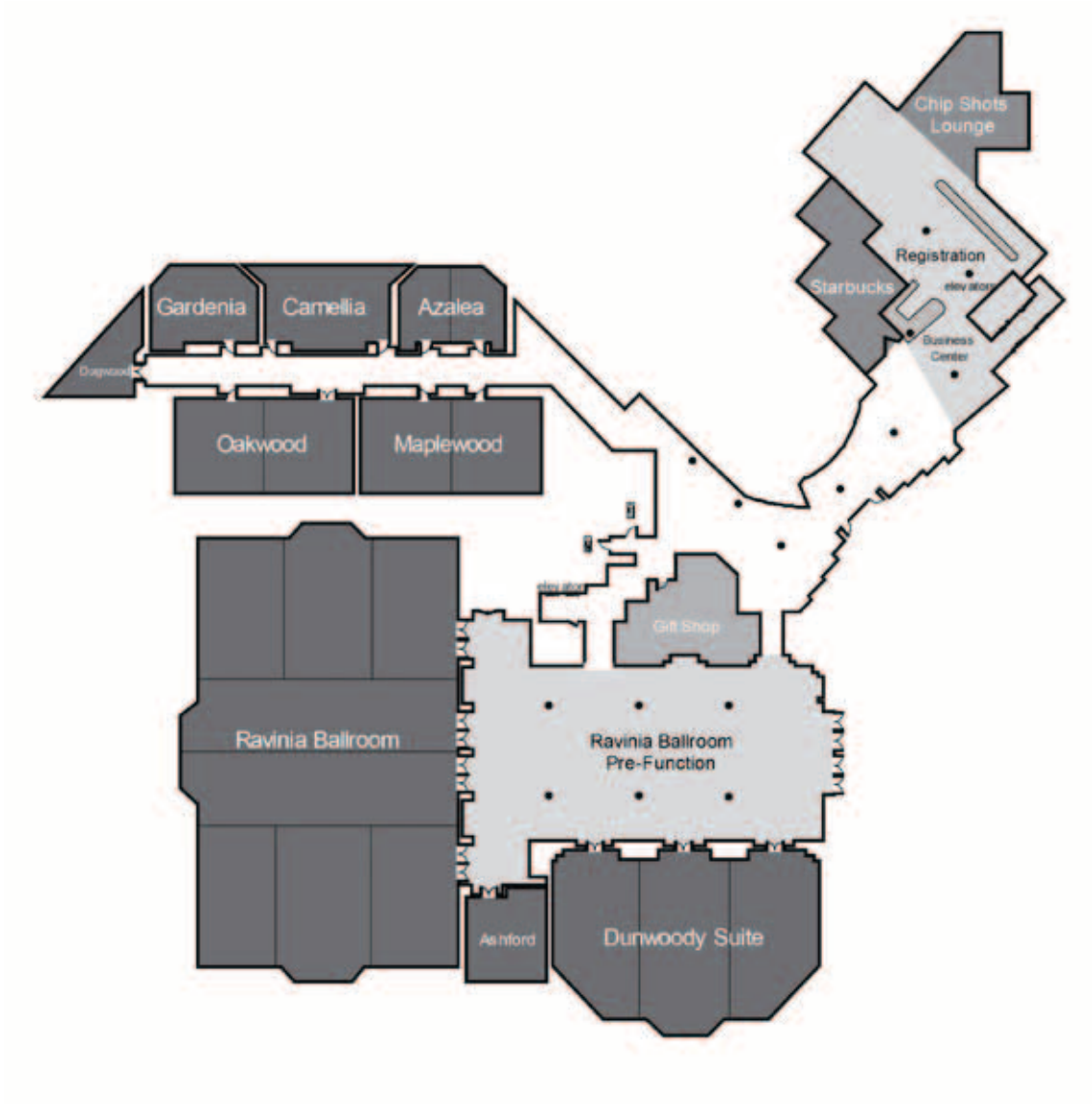
*Do not go where the path may lead; go instead where there is no path and leave a trail.*

—Ralph Waldo Emerson











U.S. Department of  
Health and Human Services  
Centers for Disease  
Control and Prevention

# Crowne Plaza Atlanta Perimeter at Ravinia Ballroom Floor Plan



## Name Tags Color Key

-  EIS Alumni
-  Current EIS Officers
-  Incoming EIS Officers
-  Conference Participants
-  Conference Staff
-  Field EIS Alumni
-  Recruiters
-  Media



62<sup>nd</sup> Annual  
**Epidemic Intelligence Service (EIS)  
Conference**

April 22–26, 2013

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**SAVE THE DATE**



**63<sup>rd</sup> ANNUAL  
EIS CONFERENCE**

**APRIL 28–MAY 2, 2014**

Centers for Disease Control and Prevention  
Atlanta, Georgia

[www.cdc.gov](http://www.cdc.gov)

# Preface

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Dear Friends of EIS:

Welcome to the 62<sup>nd</sup> Annual Epidemic Intelligence Service (EIS) Conference. I am delighted that you are able to attend our conference, which highlights the professional activities of EIS officers (EISOs). The scientific program this year includes 95 oral presentations and 31 poster presentations. In addition, your experience this week will be enriched by International Night, the EIS satirical revue, the Prediction Run, special award presentations, and other activities that are longstanding traditions at conference.

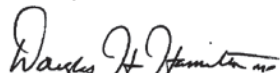
For me and for many others, this year's conference will be bittersweet. On one hand, we are welcoming the newest members of the EIS family, a group of incredibly talented persons who will carry on the EIS legacy. Yet, at the same time, we are saying goodbye to one of the patriarchs of our EIS family, Dr. Stephen B. Thacker. To honor his legacy, we are dedicating this year's conference to him. The next page highlights just a few of his extraordinary contributions to public health and ways that EIS will honor his memory this year and in perpetuity. We are also featuring Steve in this quarter's *EIS Bulletin* (be sure to pick up a copy at the conference). But perhaps that best way to acknowledge Steve's legacy is to introduce the newest class of EIS officers.

As always, we extend a special welcome to the incoming EISOs, members of the Class of 2013. We had about a 10% increase in the number of applications received this year, setting a new record high of 534 complete applications. Although this increases our initial screening process workload, we also recognize that we have a richer pool of candidates from which to choose the final class. I'm confident that we selected an excellent group of new officers!

This year's 81 red tags are a select group of men and women with a broad array of interests and skills. Fifty-seven of the new officers are women (70%), and 12 are citizens of other nations (15%). Besides the United States, this year's officers represent Cambodia, China, Kenya, Mongolia, Nepal, Nigeria [2], Peru, South Korea, Taiwan, Uganda, and the United Kingdom. Among the 70 U.S. citizens or permanent residents, 20 represent racial and ethnic minority groups (29%). There are 26 PhD-level scientists (33%), 44 physicians (54%), 9 veterinarians (11%), and 2 nurses (2%). Four of the DVMs, 3 of the MDs, and 1 of the nurses also hold PhDs. Nine members of the class accepted a prematch assignment in a state/local health department.

This year, we will again run concurrent oral sessions on Tuesday and Wednesday mornings, so please check your program carefully. There are also several special lunchtime sessions. On Monday, immediately following the Veterinarian's lunch, there is a session honoring *Dr. James H. Steele's 100<sup>th</sup> Birthday Celebration*. On Tuesday, there will be concurrent lunchtime special sessions, *New Vaccines in the Global Context and Chronic Disease Prevention Through Healthcare* and *Public Health Partnerships*. Wednesday's special session will focus on *Fungal Meningitis Associated with Injection of a Widely Distributed Steroid Product: Lessons Learned During the Response to the Largest Documented Healthcare-Associated Outbreak in U.S. History*. On Thursday, we encourage all attendees to join us for the *Stephen B. Thacker Memorial Tribute*.

The 2013 Conference provides you the opportunity to hear about many current applications of epidemiology to public health and prevention by EISOs. I hope you enjoy this exciting series of days and evenings in the EIS experience, and I hope you take this as an opportunity to learn, meet old and new friends, and welcome the incoming officers. I look forward to seeing you during the week.



**Douglas H. Hamilton, MD, PhD**

Director, Epidemic Intelligence Service

Division of Applied Sciences

Scientific Education and Professional Development Program Office



## *In Memoriam,* **Stephen B. Thacker**



We dedicate this EIS Conference to the memory of Dr. Stephen B. Thacker (EIS '76), who died on February 15, 2013, at age 65. Throughout his nearly 37 years at CDC, Steve was a preeminent leader of public health science and an ardent advocate for the professionals who practice such sciences. He held various leadership positions across the agency, both cross-cutting and in disease-specific areas. All who knew Steve also knew he was an avid reader and lover of literature. In that vein, we have included famous quotations as complements to the session topics in this year's program book. We believe Steve would have appreciated both the humorous and serious sides of these bits of wisdom.

Steve came to CDC in 1976 as an EIS officer and was stationed with the Washington, DC, Health Department. His early claim to fame was that, on his second day on the job, he was dispatched to Harrisburg to investigate an outbreak of an unknown illness among attendees of a statewide American Legion convention at the Bellevue-Stratford Hotel in Philadelphia. That now-famous investigation was the first time Legionnaires' disease was identified and remains today as a consummate example of the work of EIS officers.

During his tenure at CDC, Steve was a steadfast champion of epidemiology, public health surveillance, and other analytic methods for public health. He fostered efforts to identify, introduce, and disseminate innovative scientific methods and technology to enhance public health practice at CDC, nationally, and internationally. His scientific and leadership qualities were recognized through over 40 major awards and commendations, including the Distinguished Friend of EIS Award (2002) and the Charles C. Shepard Lifetime Scientific Achievement Award (2009). Steve was one of the most prolific public health scientists, authoring or coauthoring more than 240 papers and textbook chapters and serving as the editor of scientific papers and journal supplements on a broad range of public health topics (a comprehensive bibliography is available at <http://libguides.phlic.cdc.gov/Thacker>).

Steve was an especially dedicated steward of the EIS Program. He was committed to its quality, personally interviewing applicants and reviewing applications each year, and he ensured expansion of the proportion of women and minorities in each succeeding class. He could remember the background of every EIS officer admitted during his watch, and he never missed a day of the annual conference. He was known for his wall of pictures — the photos, names, and positions of current EIS officers and other training program participants displayed in his office — that demonstrated his commitment to the fellowships and the trainees who are the future of public health. He was also fiercely committed to documenting the history of EIS, also coediting a supplement to the American Journal of Epidemiology (December 2011) that described the 4,484 Epi-Aid investigations performed throughout the world by CDC's EIS officers and staff, 1946–2005 (copies of the supplement are available here at the conference or by contacting C. Kay Smith at [crs5@cdc.gov](mailto:crs5@cdc.gov)). The cover graphic and layout design of this year's program book is an homage to the American Journal of Epidemiology, a journal whose issues Steve never failed to read.

CDC has established several traditions in Steve's name, including an annual Stephen B. Thacker Science for Social Justice Award. The opening session of the EIS Conference, which was introduced by him for so many years, will hereafter be called the Stephen B. Thacker Opening Session in recognition of his breadth of scientific knowledge. The 2013 Conference is also the inaugural year for another new annual honor, the Stephen B. Thacker Excellence in Mentoring Award. After Steve's posthumous receipt of the award this year, future recipients will be persons who have been an inspiration to the EIS community and who have exhibited unwavering commitment to the EIS Program, officers, and alumni through demonstrated excellence in applied epidemiology training, mentoring, and contributions to building public health capacity. Finally, the CDC Foundation is also honoring Steve's life and service to public health and the EIS Program at <http://www.cdcfoundation.org/what/program/stephen-b-thacker-fund>.

We especially welcome the incoming EIS officers this week because they are the last class who could possibly have experienced the Steve Thacker interview. We contemplate with deep sadness their and our loss of his direct leadership and guidance. But we know that the legacy of someone like Steve lives forever. Thus, we hope that through their participation in this year's conference, especially the Thursday lunch memorial to him, and perhaps by reading the testimonials posted on the family's website (<http://www.teamthacker.com>), they will begin to get a sense of Steve's vast knowledge and skills, his quick wit, his joy in seeing public health practice at its best, and his constant refrain, "Here to serve." They will continue to experience Steve's influence throughout their entire 2 years as EIS officers. We all miss you, Steve!!

*Denise Koo*

**Denise Koo, MD, MPH (EIS '91)**

Director, Scientific Education and Professional Development Program Office



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# 62<sup>nd</sup> EIS Conference

## Scientific Program Committee

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Center for Global Health.....	Alexandre Macedo de Oliveira, Chair
National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention .....	Tracie Gardner, Chair Elect
Center for Global Health.....	Kathrine Tan
National Center on Birth Defects and Developmental Disabilities.....	Daisy Christensen
National Center for Chronic Disease Prevention and Health Promotion.....	Henraya Davis McGruder
National Center for Emerging and Zoonotic Infectious Disease.....	Dianna Blau and Julie Harris
National Center for Environmental Health/Agency for Toxic Substances and Disease Registry .....	Kanta Sircar
National Center for Health Statistics .....	Brian Kit
National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention.....	Elizabeth Torrone, Late-Breaker Committee
National Center for Immunization and Respiratory Diseases .....	Jennifer Verani
National Center for Injury Prevention and Control.....	Kevin Vagi, Late-Breaker Committee
National Institute for Occupational Safety and Health .....	Marie DePerio, Late-Breaker Committee
Scientific Education and Professional Development Program Office .....	Julie Magri and Randolph Daley, Late-Breaker Chair



**Front Row (left to right):** Brian Kit, Daisy Christensen, Henraya Davis McGruder, Julie Harris, Marie DePerio  
**Second Row (left to right):** Kevin Vagi, Elizabeth Torrone, Kathrine Tan, Kanta Sircar, Julie Magri, Dianna Blau, Jennifer Verani  
**Back Row (left to right):** Alexandre Macedo de Oliveira, Tracie Gardner

---

### Conference Program Production

Rachel Avchen, Anthony Jordan, C. Kay Smith, Julie Magri, Betsy Lescosky

### EIS Program Staff

Douglas H. Hamilton, Rachel Avchen, Ronald Edwards, Kathryn Green, Christa Hale, Korwaski Jeter, Anthony Jordan, Cynthia Kennedy, William Knoll, Sheila Porter, Deborah Sorgel, Shannon Souvinette, Thuy Nguyen

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### Acknowledgments/Disclaimer

The EIS Program extends a special thank you to the EIS Alumni Association for sponsoring the breaks at this year's 62<sup>nd</sup> Annual EIS Conference. The EIS Program gratefully acknowledges the valuable assistance and cooperation of the editorial, creative service, and support staff throughout CDC who contribute to the officers' presentations. Abstracts in this publication were edited and officially cleared by the respective national centers. Therefore, the EIS Program is not responsible for the content, internal consistency, or editorial quality of this material. Use of trade names throughout this publication is for identification only and does not imply endorsement by the U.S. Public Health Service or the U.S. Department of Health and Human Services. The findings and conclusions in this report are those of the author(s) and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

# The EIS Alumni Association

Founded in the 1960s, the Epidemic Intelligence Service Alumni Association (EISAA) represents more than 3,000 alumni worldwide. EISAA provides opportunities for alumni to connect with one another and fosters a spirit of loyalty to the EIS Program through its networking and support activities. EISAA supports a number of awards made during the conference, including the prestigious Alexander D. Langmuir Award, Distinguished Friend of EIS Award, Donald C. Mackel Memorial Award, J. Virgil Peavy Memorial Award, and the inaugural Stephen B. Thacker Excellence in Mentoring Award.

Additionally, EISAA provides competitive travel scholarships for prospective applicants to attend the EIS Conference each year. This year EISAA received 66 applications and awarded 10 scholarships to students. EISAA is also responsible for food and beverages provided between scientific sessions (identified as “breaks” throughout the program book).

**Learn More!** All EIS alumni and second-year EIS officers are encouraged to attend the **EISAA Annual Meeting** that occurs on Wednesday in the Dunwoody Suites at 5:30 pm.

An enthusiastic and engaged alumni base is crucial to our continued growth and development as an organization. We have much to gain from staying connected, both personally and professionally. Your support of EISAA will strengthen our network of EIS alumni in diverse career paths, geographic locations, and interests. It will also ensure a continued cadre of support for development of future EIS officers!

If you are not already a paid member, consider joining TODAY!

- Membership is easy and relatively inexpensive. Annual dues are \$25; a lifetime membership is \$350.
- **Join Now! You can join at the EISAA table during the conference, during the EISAA Annual meeting, or online at <http://www.cdcfoundation.org/eisaa/eisabout.htm> (select Pay Membership Dues).**
- **Stay Connected!** Join the LinkedIn® (<http://www.linkedin.com>) Epidemic Intelligence Service (EIS) — Alumni and Current group (more than 700 members and growing)!

We encourage you to get engaged and help us to improve EISAA to better serve all alumni. We hope you enjoy the conference and that you stop by the EISAA table or the Wednesday meeting to say hello!

Sincerely,



**Priti Patel, MD, MPH (EIS '02)**  
President, EIS Alumni Association



**Aimee Ahmed**  
Liaison, EIS Alumni Association  
Director of Stewardship  
CDC Foundation



# General Information

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## 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 the significance to public health, and maintain and increase their skills in determining the appropriateness of epidemiologic methods, presenting and interpreting results clearly, and developing appropriate conclusions and recommendations.

## OVERALL CONFERENCE GOALS

- To provide a forum for EIS officers, alumni, and other public health professionals 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 are available at the conference registration desk located outside the Ravinia Ballroom. Check-in and onsite registration are available Monday–Friday, 7:00 am–5:00 pm.

Please wear your conference badge at all times during the conference. Conference staff are wearing purple badges and are available to assist if you need additional information or misplace your badge.

## Cyber Café/Message Center

To facilitate conference networking, computers with Internet access are located in the Camellia Room. Preregistered attendees have immediate access to find, communicate, and network with other conference participants, speakers, and staff. LinkedIn® profiles can be uploaded easily to the conference messaging system, and you can upload a picture of yourself to facilitate easy identification. If you are not already registered, please see conference staff for assistance. Please limit computer time to 10 minutes per session to allow other conference attendees an opportunity to use the system as well.

## Speaker Ready Room

Located in the Dogwood Room, the speaker ready room is available for presenters who need to review or make changes to their presentations. Computers with PowerPoint® software, rewritable CD-ROM drives, and a printer will be available Monday–Thursday, 8:00 am–6:00 pm.

## Exhibit Hall

Open Monday–Thursday, 8:00 am–5:00 pm, in the Preconvene Area and the Ravinia Ballroom (E, F, and G).

## Environmental Considerations

Smoking is not permitted in any of the conference sessions, hallways, or meeting rooms. As a courtesy to presenters and all meeting attendees, please turn off ringers on cellular phones during conference sessions. Please limit use of cellular phones to the meeting room foyers and public areas outside the meeting rooms.

## Lactation Room

Please visit the EIS information table, next to the registration area, for access to the lactation room. A sign-up schedule and key will be available at the table Monday–Friday, 7:30 am–5:00 pm.


A dark blue silhouette of a world map is centered on a background of a lighter blue grid. The map shows the outlines of continents including North America, South America, Europe, and Africa. A white horizontal band is positioned across the middle of the page, containing the title text.

# **2013 EIS Conference Schedule At-a-Glance**

Schedule At-a-Glance

MONDAY

**SESSION A: Stephen B. Thacker Opening Session** — Ravinia Ballroom . . . . . 8:15–10:15 am

 **Award Presentation**  
Stephen B. Thacker Excellence in Mentoring Award


**SESSION B: Surveillance** — Ravinia Ballroom . . . . . 10:45–12:10 pm

**POSTER SESSION 1: Meet the Authors** — Ravinia Ballroom (E, F, and G). . . . . 12:30–1:30 pm

**SPECIAL SESSION Dr. James H. Steele 100<sup>th</sup> Birthday Celebration Luncheon** — Oakwood Room (A, B) . . . . . 12:30 pm

**SESSION C: Sexually Transmitted Diseases** — Ravinia Ballroom . . . . . 1:30–2:55 pm

**SESSION D: Vaccine-Preventable Diseases** — Ravinia Ballroom . . . . . 3:15–5:20 pm

 **Award Presentation**  
Iain C. Hardy Award

**EIS CONFERENCE SOCIAL** Conference Preconvene Area . . . . . 5:20 pm

TUESDAY

**CONCURRENT SESSION E1: Winnable Battles in Chronic Disease** — Ravinia Ballroom . . . . . 8:30–10:15 am

**CONCURRENT SESSION E2: HIV/AIDS** — Dunwoody Suites . . . . . 8:30–10:15 am

**CONCURRENT SESSION F1: Injury Prevention** — Ravinia Ballroom . . . . . 10:45 am–12:10 pm

**CONCURRENT SESSION F2: Zoonotic Diseases** — Dunwoody Suites . . . . . 10:45 am–12:10 pm

**SPECIAL SESSIONS**

**CONCURRENT LUNCHTIME SESSION**  
**New Vaccines in the Global Context** — Ravinia Ballroom . . . . . 12:30 pm

**CONCURRENT LUNCHTIME SESSION**  
**Chronic Disease Prevention Through Healthcare and Public Health Partnerships** — Dunwoody Suites. . . . . 12:30 pm

**SESSION G: International Health** — Ravinia Ballroom . . . . . 1:45–3:50 pm

**PREDICTION RUN** Liane Levetan at Brook Run Park Pavilion, Dunwoody . . . . . 6:00 pm

WEDNESDAY

**CONCURRENT SESSION H1: Respiratory** — Ravinia Ballroom . . . . . 8:30–10:15 am

**CONCURRENT SESSION H2: Occupational Health** — Dunwoody Suites . . . . . 8:30–10:15 am

**CONCURRENT SESSION I1: Tuberculosis** — Ravinia Ballroom . . . . . 10:30–11:55 am


**CONCURRENT SESSION I2: Maternal and Child Health** — Dunwoody Suites . . . . . 10:30–11:55 am

**SPECIAL SESSION Fungal Meningitis Associated with Injection of a Widely Distributed Steroid Product: Lessons Learned During the Response to the Largest Documented Healthcare-Associated Outbreak in U.S. History** — Dunwoody Suites . . . . . 12:30 pm

**POSTER SESSION 2: Meet the Authors** — Ravinia Ballroom (E, F, and G). . . . . 12:30–1:30 pm

**SESSION J: Foodborne and Waterborne Diseases** — Ravinia Ballroom . . . . . 1:30–3:35 pm

**SESSION K: Alexander D. Langmuir Memorial Lecture and Reception** — Ravinia Ballroom . . . . . 4:00–5:30 pm


 **Awards Presentation**  
Alexander D. Langmuir Prize Manuscript Award  
Distinguished Friend of EIS Award

**EIS ALUMNI ASSOCIATION MEETING** Dunwoody Suites . . . . . 5:30 pm

**SESSION L: International Night** — Ravinia Ballroom . . . . . 5:30–10:00 pm

Poster Session . . . . . 5:30–6:45 pm

Oral Presentations . . . . . 7:30–9:45 pm

 **Award Presentation, 2013 EIS International Night Awards** . . . . . 9:45–10:00 pm

THURSDAY

**SESSION M: Donald C. Mackel Award Finalists** — Ravinia Ballroom . . . . . 8:30–10:15 am


**SESSION N: Environmental Health and Preparedness** — Ravinia Ballroom . . . . . 10:30–11:55 am

**SPECIAL SESSION Stephen B. Thacker Memorial Tribute** — Ravinia Ballroom . . . . . 12:30 pm

**SESSION O: J. Virgil Peavy Memorial Award Finalists** — Ravinia Ballroom . . . . . 1:30–3:15 pm


**SESSION P: Money, Math, and Modeling** — Ravinia Ballroom . . . . . 3:30–4:55 pm

**EIS SATIRIC REVUE** Ravinia Ballroom . . . . . 8:30–11:00 pm

 **Awards Presentation**  
Philip S. Brachman Award

FRIDAY

**SESSION Q: Risk Factors** — Ravinia Ballroom . . . . . 8:30–9:55 am

 **Awards Presentation** — Ravinia Ballroom . . . . . 10:15 am

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

**SESSION R: Late-Breaking Reports** — Ravinia Ballroom. . . . . 10:30–11:55 am

**SESSION S: Healthcare-Associated Infections** — Ravinia Ballroom. . . . . 1:30–3:15 pm

**CLOSING REMARKS AND ADJOURNMENT** . . . . . 3:15 pm

## Monday, April 22, 2013

**7:00 REGISTRATION DESK OPENS**

**8:15 WELCOME AND CALL TO ORDER**

[Ravinia Ballroom](#)

Thomas R. Frieden, Director, Centers for Disease Control and Prevention

Denise Koo, Director, Scientific Education and Professional Development Program Office



**Presentation of the Stephen B. Thacker Excellence in Mentoring Award**

**8:30** *Here to serve. — Stephen B. Thacker*

**SESSION A: Stephen B. Thacker Opening Session**

[Ravinia Ballroom](#)

**MODERATOR:** Denise Koo

**8:35** Multi-State Outbreak of Fungal Meningitis and Other Infections Associated with Contaminated Methylprednisolone Acetate. *Anne E. Purfield*

**8:55** Recurrence of Dracunculiasis (Guinea Worm Disease) After a 10-Year Absence — Chad, 2012. *Nandini Sreenivasan*

**9:15** Sick and Retired, Prevalence of Pneumoconiosis Among Retired Coal Miners — 3 States, 2012. *Cara N. Halldin*

**9:35** Hantavirus Outbreak Investigation — Yosemite National Park, 2012. *Jonathan J. Nunez*

**9:55** Serogroup A Meningococcal Conjugate Vaccine Coverage After the First National Mass Immunization Campaign — Burkina Faso, 2011. *Sarah A. Meyer*

**10:15 BREAK** *Sponsored by the EIS Alumni Association*

**10:45** *There are three kinds of epidemiologists: those who can count and those who can't. — Author Unknown (adapted by John M. Cowden)*

**SESSION B: Surveillance**

[Ravinia Ballroom](#)

**MODERATORS:** Christine Casey and Kathleen Gallagher

**10:50** High-Risk Use of Prescription Opioids — Tennessee, 2007–2011. *Jane A. G. Baumblatt*

**11:10** BioSense Chief Complaint-Based Syndromic Data as a Near Real-Time Indicator of Norovirus Disease Activity — United States, 2007–2010. *Brian S. Rha*

**11:30** Communicable Disease Surveillance in New York City Evacuation Shelters After Hurricane Sandy — November 2012. *Alison D. Ridpath*

**11:50** Burden of Encephalitis-Associated Hospitalizations — United States, 1998–2010.  
*Neil M. Vora*

**12:10** **LUNCH**

**12:30** **Variety is the spice of life. —William Cowper**

**POSTER SESSION 1: Meet the Authors**

Ravinia Ballroom (E, F and G)

All posters presented during the conference will be on display Monday 9:00 am–Friday 12:00 pm.

The following authors will be present to discuss their studies on Monday, 12:30–1:30 pm.

- P1.1** Outpatient Antiviral Therapy for Influenza in Three Healthcare Systems — United States, 2011–2012. *Fiona P. Havers*
- P1.2** Seroprevalence of Measles and Rubella Antibodies in Pregnant Women — Haiti, 2012. *David L. Fitter*
- P1.3** Increasing Number and Disproportionate Morbidity and Mortality Associated with Multistate Foodborne Disease Outbreaks — United States, 1973–2010. *Von D. Nguyen*
- P1.4** No Bones About It: Human *Salmonella* Infantis Infections Linked to Dry Dog Food — United States and Canada, 2012. *Maho Imanishi*
- P1.5** Are You Prepared? Visitor Trip Planning and Safety Information Gathering at Zion National Park — Utah, 2012. *Erin M. Parker*
- P1.6** A Knowledge, Attitudes, and Practices Survey to Inform a Typhoid Fever Intervention Campaign — Kasese District, Rural Western Uganda, 2012. *Jolene H. Nakao*
- P1.7** Clam-Associated Vibriosis, United States — 1988–2010. *Rachel B. Slayton*
- P1.8** Behaviors Among HIV-Positive Ukrainian Street Youth Associated with a Risk of Bridging HIV-Infection to Non-Street Youth, 2008. *Lina M. Nerlander*
- P1.9** Findings from the Year of Population-Based Active Surveillance for Legionellosis — United States, 2011. *Kathleen L. Dooling*
- P1.10** Human Papillomavirus Vaccination Status and Current Contraception Choices in Young Women with Previous Sexual Experience: Data from the 2006–2010 National Survey of Family Growth (NSFG). *Kenneth B. Quinto*
- P1.11** Progress in Reducing National Burden of Invasive Methicillin-Resistant *Staphylococcus aureus* Infections — United States, 2005–2010. *Raymund B. Dantes*
- P1.12** Multi-District Marburg Hemorrhagic Fever Outbreak — Uganda, 2012. *Ilana J. Schafer*
- P1.13** National Estimates of Sickle Cell Disease with Pediatric Stroke Among African-Americans — United States, 1997–2009. *Charlotte Baker*
- P1.14** Use of Laboratory Reports as Predictors of West Nile Virus Disease Cases — Texas, 2008–2012. *Stephanie J. Yendell*

**P1.15** A Spicy Catch: *Salmonella* Bareilly and *Salmonella* Nchanga Infections Associated with a Raw Scraped Ground Tuna Product — United States, 2012. *W. Thane Hancock*

**12:30** **SPECIAL SESSION: Dr. James H. Steele 100<sup>th</sup> Birthday Celebration Luncheon**  
Oakwood Room (A, B)

**1:30** ***I don't know the question, but sex is definitely the answer.* — Woody Allen**

**SESSION C: Sexually Transmitted Diseases**

Ravinia Ballroom

**MODERATOR:** Gail Bolan

**1:35** Extragenital Gonorrhea Infection Among Men Who Have Sex with Men — Sexually Transmitted Disease Surveillance Network, United States, 2010–2012. *Monica E. Patton*

**1:55** Validating Elimination of Mother-to-Child Transmission of HIV and Congenital Syphilis — Chile, 2012. *Christine E. Ross*

**2:15** *Chlamydia trachomatis* Epidemiology and Coinfection Screening Practices — Veterans Affairs Palo Alto Health Care System, 2008–2011. *Alison M. Ludwig*

**2:35** Using a Mobile Phone Application for Contact Identification of Syphilis Cases Among Men Who Have Sex with Men — Kansas, 2010–2012. *Suparna Bagchi*

**2:55** **BREAK** *Sponsored by the EIS Alumni Association*

**3:15** ***Vaccines are the tugboats of preventive health.* — William H. Foege**

**SESSION D: Vaccine-Preventable Diseases**

Ravinia Ballroom

**MODERATORS:** Jane Seward and Stephen Hadler



**Presentation of the Iain C. Hardy Award**

**3:20** Effectiveness of Rotavirus Vaccination Against Severe Childhood Diarrhea — Guatemala, 2012. *Paul A. Gastañaduy*

**3:40** Duration of Protection Against Hepatitis A for the Current Two-Dose Vaccine Compared to a Three-Dose Vaccine Schedule in Children — Alaska, 1993–2011. *Gregory A. Raczniak*

**4:00** Severity of Invasive Pneumococcal Disease in the Era of Pneumococcal Conjugate Vaccine Introduction. *Kathleen L. Dooling*

**4:20** Rates of Invasive Pneumococcal Disease Among Older Children with Immunocompromising Conditions — United States, 2007–2009. *Aaron M. Harris*

**4:40** Seroprevalence of Measles, Mumps, Rubella, and Varicella Antibodies in the United States Population, 2009–2010. *Emmaculate Lebo*

**5:00** Nationwide Measles Outbreak — Democratic Republic of the Congo, 2010–2012. *Heather M. Scobie*



**5:20 EIS CONFERENCE SOCIAL** *Sponsored by the EIS Alumni Association*  
**CASH BAR**  
Conference Preconvene Area

## Tuesday, April 23, 2013

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**8:30** **Sometimes the questions are complicated, and the answers are simple.**  
—Dr. Seuss

### CONCURRENT SESSION E1: Winnable Battles in Chronic Disease

Ravinia Ballroom

**MODERATOR:** Ursula Bauer

- 8:35** Relationship Between Two Perceptions About Energy Drinks and the Prevalence of Energy Drink Use Among Youth — United States, 2011. *Gayathri S. Kumar*
- 8:55** Validation of Sodium Intake Estimates Based on 24-hr Dietary Recall Survey with 24-hr Urine Sodium Excretion Measurements Among Young Adults — Washington DC, 2011. *Carla I. Mercado*
- 9:15** Tobacco Cigarette Smoking Among HIV-Infected Adults in Care in the United States — Medical Monitoring Project, 2009. *Rennatus Mdodo*
- 9:35** Adverse Childhood Experiences and Adult Tobacco Use and Obesity — Nebraska, 2011. *Kristin M. Yeoman*
- 9:55** Environmental Tobacco Smoke (ETS) Exposure and All-Cause Mortality: A Prospective Cohort Analysis of the Third National Health and Nutrition Examination Survey (NHANES III). *Tala H. I. Fakhouri*

**8:30** **Knowledge is power.** —Sir Francis Bacon

### CONCURRENT SESSION E2: HIV/AIDS

Dunwoody Suites

**MODERATORS:** Linda Valleroy and Amy Lansky

- 8:35** Characteristics of HIV-Positive American Indians — Arizona, 1990–2012. *Seema Yasmin*
- 8:55** High HIV Prevalence in Western Equatoria State — Republic of South Sudan, 2012. *E. Kainne Dokubo*
- 9:15** Community-Based Electronic Data Collections for HIV Prevention Research with Black Men in Rural, Resource-Limited Settings — United States, 2011. *Kpandja Djawe*
- 9:35** Did CDC's 2006 Revised HIV Testing Guidelines Make a Difference? Evaluation of Self-Reported History of HIV Testing — United States, 2003–2010. *Joseph V. Woodring*
- 9:55** Increased HIV Testing Among Men Who Have Sex with Men — National HIV Behavioral Surveillance System, 20 U.S. Metropolitan Statistical Areas, 2008 and 2011. *Laura A. Cooley*

**10:15** **BREAK** *Sponsored by the EIS Alumni Association*

**10:45** ***The best laid schemes of mice and men often go awry.***  
*—adapted from Robert Burns*

**CONCURRENT SESSION F1: Injury Prevention**

Ravinia Ballroom

**MODERATOR:** James A. Mercy

**10:50** Do Adverse Childhood Experiences Add Up to Poor Adult Health? — Results from Ten U.S. States and the District of Columbia, 2010. *Leah K. Gilbert*

**11:10** Water-Related Unintentional Injuries and Fatalities — Lake Mead National Recreation Area, Arizona and Nevada, 2007–2011. *Carla L. Britton*

**11:30** Pedestrian Traffic Fatalities — Clark County, Nevada, 2008–2011. *Kaci L. Hickox*

**11:50** Risk Factors for Suicidal Ideation Among Bhutanese Refugees — United States, 2009–2012. *Trong T. Ao*

**10:45** ***If it looks like a duck and quacks like a duck, we have at least to consider the possibility that we have a small aquatic bird of the family Anatidae on our hands.*** —*Douglas Adams*

**CONCURRENT SESSION F2: Zoonotic Diseases**

Dunwoody Suites

**MODERATOR:** Christopher Paddock

**10:50** Lymphocytic Choriomeningitis Virus Outbreak and Risk Assessment — Multiple States, 2012. *Laura S. Edison*

**11:10** Extreme Rodeo: Results of a Rocky Mountain Spotted Fever Intervention Project — Eastern Arizona, 2012. *Suzanne R. Todd*

**11:30** Knowledge, Attitudes, and Practices Regarding Dog Ownership and Tick Control on an American Indian Reservation — Arizona, 2012. *Laura E. Adams*

**11:50** Tularemia: A Potential Public Health Emergency and Contact Investigation — Virginia, 2011. *Jennifer M. Espiritu*

**12:10** **LUNCH**

**12:30** **SPECIAL SESSIONS**

**CONCURRENT LUNCHTIME SESSION: New Vaccines in the Global Context**

Ravinia Ballroom

**MODERATOR:** Rana Hajjeh

**SPEAKERS:** Rana Hajjeh, Jacqueline E. Tate, Jennifer Verani, Sema Mandal, Susan Hariri

**12:30 CONCURRENT LUNCHTIME SESSION: Chronic Disease Prevention Through Healthcare and Public Health Partnerships**

[Dunwoody Suites](#)

**MODERATOR:** Ursula Bauer

**SPEAKERS:** Peter Briss, Wayne Giles, Leonard Jack, Kris Ernest

**1:45** ***You must be the change you wish to see in the world. —Mahatma Gandhi***

**SESSION G: International Health**

[Ravinia Ballroom](#)

**MODERATORS:** Pattie Simone and Rita Helfand

**1:50** Rapid Surveillance Documents Elevated Mortality Among Blue Nile Conflict Refugees — South Sudan, 2012. *Kevin R. Clarke*

**2:10** Prevalence of Malaria Parasitemia and Purchase of Artemisinin-Based Combination Therapies Among Drug Shop Clients — Tanzania, 2012. *Melissa A. Briggs*

**2:30** Changes in Coverage Rates of a Nationwide Micronutrient Powder Distribution Program — Kyrgyzstan, 2011–2012. *Kristie E. Appelgren*

**2:50** Incidence and Determinants of Adverse Events Following Initiation of First-Line Antiretroviral Therapy in HIV-Positive Adults — Mozambique, 2004–2007. *Spencer B. Lloyd*

**3:10** Epidemiology of Hospitalized Influenza Cases from a Population-Based Surveillance System — Guatemala, 2007–2012. *Trong T. Ao*

**3:30** Cholera Epidemic Associated with Unsafe Drinking Water and Street-Vended Water — Eastern Freetown, Sierra Leone, 2012. *Von D. Nguyen*

**3:50** **BREAK** *Sponsored by the EIS Alumni Association*

**6:00 PREDICTION RUN**

[Liane Levetan at Brook Run Park Pavilion, Dunwoody](#)

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**WEDNESDAY, APRIL 24, 2013**


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**8:30**

***Remember to breathe. It is, after all, the secret of life. —Gregory Maguire***

**CONCURRENT SESSION H1: Respiratory Diseases**

Ravinia Ballroom

**MODERATOR:** David Swerdlow

- 8:35** Respiratory Hospitalizations in Children with Neurologic Disorders — United States, 2010. *Fiona P. Havers*
- 8:55** Rates of Pediatric Hospital and Intensive Care Unit Admissions for Lower Respiratory Tract Infections from MarketScan Data — United States, 2010. *Adena H. Greenbaum*
- 9:15** Hispanic Infants Aged <6 Months and Factors Associated with an Increased Risk for Pertussis — Metropolitan Portland, Oregon, 2010–2012. *Kara M. Levri*
- 9:35** Vaccine Effectiveness Among Adolescents Vaccinated with Acellular Pertussis Vaccines, Washington, 2012. *Anna M. Acosta*
- 9:55** Bacterial Pneumonia and Standardized Interpretation of Chest Radiographs in Adults. *Jonathan M. Wortham*

**8:30**

***All labor that uplifts humanity has dignity and importance. —Dr. Martin Luther King, Jr.***

**CONCURRENT SESSION H2: Occupational Health**

Dunwoody Suites

**MODERATORS:** Henry A. Anderson and Kristin J. Cummings

- 8:35** Prevalence of Carpal Tunnel Syndrome Among Employees at a Poultry-Processing Plant — South Carolina, 2012. *Kristin M. Musolin*
- 8:55** Salivary Cortisol Response to a High-Protein Challenge and Metabolic Syndrome in Police Officers — New York, 2004–2009. *Penelope J. Baughman*
- 9:15** Self-Reported Gender-Based Violence Among Female Sex Workers — Kampala, Uganda, 2012. *Amee M. Schwitters*
- 9:35** Cancer Screening Non-Compliance Among Females Who Work Alternative Shifts — United States, 2010. *Rebecca J. Tsai*
- 9:55** Inhaled Mercury Exposure from Artisanal Gold Mining and Processing — Nome, Alaska, 2012. *Brian R. Yablon*

**10:15****BREAK** *Sponsored by the EIS Alumni Association***10:30**

***I do not cough for my own amusement. —Jane Austen***

**CONCURRENT SESSION I1: Tuberculosis**

Ravinia Ballroom

**MODERATOR:** Kenneth G. Castro

- 10:35** Negative Tuberculin Skin Test Result and Increased Risk of Death — United States, 1993–2008. *Sara C. Auld*
- 10:55** Relationship Between Cigarette Smoking and Secondhand Smoke Exposure and Latent Tuberculosis Infection Among U.S. Adults, National Health and Nutrition Examination Survey, 1999–2000. *Eugene Lam*
- 11:15** Enlarged Peripheral Lymph Nodes and Positive *Mycobacterium tuberculosis* Culture Among People Living with HIV — Cambodia, Thailand, and Vietnam, September 2006–July 2008. *Chimeremma D. Nnadi*
- 11:35** Drinking, Bootlegging, and an Outbreak of Drug-Resistant Tuberculosis — Rural Kentucky, 2007–2012. *Terrence Lo*

10:30

***Life can only be understood backwards, but it must be lived forwards.***  
—Soren Kierkegaard

**CONCURRENT SESSION I2: Maternal and Child Health**

Dunwoody Suites

**MODERATOR:** Wanda Barfield

- 10:35** Health Hazards Associated with Laundry Detergent Pods — United States, May–June 2012. *Satish K. Pillai*
- 10:55** Discontinuation of Hormonal Contraception Use Among Black Teenage Clients of an Urban Family Planning Clinic — Atlanta, Georgia, 2012. *Michael Lowe*
- 11:15** Evaluation of the Integration of Rapid Syphilis Testing into Routine Antenatal Services — Nyanza Province, Kenya, 2012. *Eleanor B. Fleming*
- 11:35** Relationship Between Use of Labor Pain Medication and Delayed Onset of Lactation — United States, 2005–2007. *Jennifer N. Lind*

11:55

**LUNCH**

12:30

***Of course we don't know what we are doing; that's why it's called research.***  
—Albert Einstein

**POSTER SESSION 2: Meet the Authors**

Ravinia Ballroom (E, F, and G)

*All posters presented during the conference will be on display Monday 9:00 am–Friday 12:00 pm. The following authors will be present to discuss their studies on Monday, 12:30–1:30 pm.*

- P2.1** Histoplasmosis Outbreak at a Day Camp — Nebraska, 2012. *Kristin M. Yeoman*
- P2.2** *Salmonella enterica* Serotype Typhimurium Infection Associated with Cantaloupe — Kentucky, 2012. *Elizabeth S. Russell*
- P2.3** Assessing Household Preparedness for Radiologic Emergencies — Michigan, 2012. *Mawuli K. Nyaku*

- P2.4** Cross-Transmission of *Ascaris* Infection from Pigs to Humans at an Organic Farm — Coastal Maine, 2012. *Leigh Ann Miller*
- P2.5** *Mycobacterium fortuitum* Surgical-Site Infections Associated with an Ambulatory Plastic Surgery Center — Los Angeles County, 2010–2012. *Christina A. Mikosz*
- P2.6** Diversion of Controlled Substances Among Prescription Overdose Deaths — New Mexico, 2011. *Carrie S. McNeil*
- P2.7** Tri-National Outbreak of *Salmonella enterica* Serotype Braenderup — The California Experience, July–September 2012. *Rachael H. Joseph*
- P2.8** Recognizing Laboratory Cross-Contamination: Two False-Positive Cultures of *Mycobacterium tuberculosis* — Oklahoma, 2011. *Matthew G. Johnson*
- P2.9** HIV-Related Mortality and Monitored Viral Load, by Zip Code — Cook County, Illinois, 2010. *Yoran T. Grant*
- P2.10** Animal-Related Unintentional Injury Deaths — Montana, 2003–2011. *Abbey J. Canon*
- P2.11** Central-Line–Associated Bloodstream Infection Reporting Through the CDC National Healthcare Safety Network — Kansas, January 2011–June 2012. *Suparna Bagchi*
- P2.12** Rapid Response to *Escherichia coli* O157 Outbreak — New York, 2012. *Nina Ahmad*
- P2.13** Where’s the Beef? Outbreaks of *Salmonella* Infections Attributed to Beef — United States, 1975–2011. *Alison S. Laufer*
- P2.14** Prevalence of Obesity in a Nationally Representative Sample of HIV-Infected Adults Receiving Medical Care in the United States — Medical Monitoring Project, 2009. *Angela M. Thompson-Paul*
- P2.15** Outbreak of Severe Enterovirus 71 Infections in Children — Cambodia, 2012. *Brian Rha*
- P2.16** Community Experiences, Perceptions, and Exposures to Hydrogen Sulfide and Methane from Geothermal Venting — Lake County, California, November 2012. *Cindy Chiu*

12:30

**SPECIAL SESSION: Fungal Meningitis Associated with Injection of a Widely Distributed Steroid Product: Lessons Learned During the Response to the Largest Documented Healthcare-Associated Outbreak in U.S. History**

[Dunwoody Suites](#)

**MODERATOR:** J. Todd Weber

**SPEAKERS:** Marion Kainer, Benjamin Park, Tom Chiller, Howard Sklamberg

1:30

***You won't be surprised that diseases are innumerable — count the cooks.***  
— *Seneca*

**SESSION J: Food and Waterborne Diseases**

[Ravinia Ballroom](#)

**MODERATORS:** Tim Jones and Ian Williams

- 1:35** *Salmonella enterica* Serotype Paratyphi B var. Java Gastroenteritis Outbreak Associated with Unpasteurized Tempeh — North Carolina, 2012. *Stephanie E. Griese*

- 1:55** Outbreak of Listeriosis Associated with Imported and Cross-Contaminated Cheeses — Multiple States, March–October 2012. *Michael Gronostaj*
- 2:15** *Salmonella enterica* Serotype Typhimurium Gastrointestinal Illness Associated with a University Microbiology Course — Maryland, 2011. *Maria A. Said*
- 2:35** Emergence of GI.6 Norovirus — United States, 2009–2012. *Eyal Leshem*
- 2:55** Sonic Salmonellosis: Multistate Outbreak of Human *Salmonella* Typhimurium Infections Linked to Pet Hedgehogs — United States, 2012. *Tara C. Anderson*
- 3:15** Detecting Hidden Outbreaks of Domestically Acquired Typhoid Fever — United States, 1999–2010. *Maho Imanishi*

**3:35** **BREAK** *Sponsored by the EIS Alumni Association*

**4:00** ***The suspense is terrible; I hope it lasts. — Willy Wonka***

**SESSION K: Alexander D. Langmuir Memorial Lecture and Reception**

Ravinia Ballroom

**MODERATOR:** Denise Koo

**SPEAKER:** Robert Phillips, MD, MSPH: **The Role of EIS in Communities of Solution: Using GIS and Epidemiology to Activate Health Partnerships.**



**Presentation of Awards**

**Alexander D. Langmuir Prize Manuscript Award**

**Distinguished Friend of EIS Award**

*This event is cosponsored by the EIS Alumni Association and the Scientific Education and Professional Development Program Office.*

**5:30** **EIS ALUMNI ASSOCIATION MEETING**

Dunwoody Suites

**5:30** ***Best of all possible worlds. — Gottfried Leibniz***

**SESSION L: International Night**

Conference Preconvene Area

**POSTER SESSION**

*The following authors will be present to discuss their studies on Monday, 6:00–7:00 pm.*

**IP1.** Target Intervention to Increase Measles Vaccination Coverage by Identifying Low-Coverage Areas Using Lot Quality-Assurance Sampling — Chennai, India, 2012.  
*Tony Fredrick*

**IP2.** Predictors of HIV Antiretroviral Treatment Failure Among Patients Attending the Comprehensive Care Clinic at Rift Valley Provincial General Hospital — Kenya, 2012.  
*Joyce Njeri Wamicwe*

- IP3.** E-Mail Survey as a Rapid Tool to Confirm Frozen Strawberries as the Vehicle of the Largest Foodborne Norovirus Outbreak Ever Reported in Germany, 2012. *Sebastian Haller*
- IP4.** Investigation of Outbreak of Cutaneous Anthrax Attributed to Butchering a Sick Cow in Jiangsu Province, China, 2012. *Liangliang Cui*
- IP5.** Outbreak of Conjunctivitis Due to Bacterial *Streptococcus pneumoniae* — District Sargodha, Pakistan, 2010. *Zafar H. Maken*
- IP6.** Imported Malaria in Guatemalan Soldiers Returning from the Democratic Republic of the Congo — Guatemala, 2011. *Maria L. Müller*
- IP7.** Schistosomiasis Outbreak Investigation, Empanjeni Ward, Mangwe District, Matabeleland South Province, Zimbabwe — June 2012. *Pugie T. Chimberengwa*
- IP8.** Case-Control Study for Diphtheria in East Java, Indonesia, 2012. *Dimas Panduasa*
- IP9.** Prevalence and Factors Associated with Hypertension and Obesity Among Civil Servants in Kaduna, Kaduna State — June 2012. *Abisola M. Oladimeji*
- IP10.** Risk Factors for Gastric Cancer in Latin America: A Meta-Analysis. *Patricia del Carmen Bonequi Alvarado*
- IP11.** Nested Case-Control Study Among Elementary Students in A Public School on Firecracker Use During the New Year Celebration — Philippines, 2012. *Alethea R. De Guzman*
- IP12.** Risk Factors of Surgical Site Infection in Hospital A, Bangkok, Thailand, August–September 2011. *Thanawadee Thantithaveewat*
- IP13.** Risk Factors of Underweight Among Under-Five Years Children in Rwanda, 2010. *Alphonse Rukundo*
- IP14.** Factors Affecting the Utilization of Antenatal Care Services Among Pregnant Women — Ashgabat, Turkmenistan, 2010. *Maral Aksakova*
- IP15.** *Neisseria meningitidis* Outbreak — Harenabuluk District, Ethiopia, 2011. *Haftom Taame*

**7:30****ORAL PRESENTATIONS**

Ravinia Ballroom

**WELCOME:** Linda Quick**MODERATORS:** Jimmy Kolker and Fadzilah Kamaludin

- 7:40** Prevalence and Geographic Distribution of Nodding Syndrome — Kilombero and Ulanga Districts, Tanzania, 2012. *Preetha Iyengar*
- 8:00** Outbreak of *Bacillus cereus* Food-Poisoning with a Fatality After a Feast — Bagli Village, Bursa Province, Turkey, September 2012. *Orhun Kalkan*
- 8:20** Human Cutaneous Anthrax Outbreak Associated with Contact with Livestock — Georgia, 2012, A Case-Control Study. *Archil Navdarashvili*



- 8:45** Outbreak Investigation of Typhoid Fever in Village Kuwardu, District Skardu, Gilgit-Blatistan (G-B), Pakistan, 2012. *Zakir Hussain*
- 9:05** Antiretroviral Therapy Initiating Regimens and Discontinuation Patterns — Medunsa National Pharmacovigilance Centre Cohort, South Africa, 2004–2011. *Mazvita N. Muropa*
- 9:25** Mumps Attenuated Live Vaccine Effectiveness: 1:1 Matched Case-Control Study — Zhongshan, China, 2011–2012. *Man Wang*



### Presentation of the 2013 EIS International Night Awards

Dunwoody Suites

*International Night is cosponsored by the Center for Global Health (CGH) and the Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET).*

*The posters and presentations featured during International Night are from participants in international programs in applied field epidemiology similar to that of EIS. Some of the programs are sponsored by CDC, CDC partners, or are independent programs. All conference attendees are invited to these sessions.*

## THURSDAY, APRIL 25, 2013

8:30

**Extraordinary claims require extraordinary evidence. — Carl Sagan**

### SESSION M: Donald C. Mackel Memorial Award Finalists

Ravinia Ballroom

**MODERATORS:** Rachel Kaufmann and Sherif Zaki

- 8:35** Acute Kidney Injury Associated with Synthetic Cannabinoid Use — Oregon, 2012. *Genevieve L. Buser*
- 8:55** Large Legionnaires' Disease Outbreak in a Hospital with a *Legionella* Disinfection System, Pennsylvania — 2011–2012. *Alicia Demirjian*
- 9:15** Soil-Transmitted Helminth Infection in School-Aged and Preschool-Aged Children in an Urban Slum — Kibera, Nairobi, 2012. *Stephanie M. Davis*
- 9:35** Carbapenem-Resistant *Klebsiella pneumoniae* Producing New Delhi Metallo-Beta-Lactamase at an Acute-Care Hospital — Denver, Colorado, 2012. *Erin E. Epton*
- 9:55** Active Surveillance for Variant Influenza Among Swine, the Environment, and Employees at Live Animal Markets — Minnesota, 2012. *Mary J. Choi*

10:15

**BREAK** *Sponsored by the EIS Alumni Association*

10:30

***Prepare for the unknown by studying how others in the past have coped with the unforeseeable and the unpredictable. — General George S. Patton***

**SESSION N: Environmental Health and Preparedness**

Ravinia Ballroom

**MODERATOR:** Thomas H. Sinks

- 10:35** The Perfect Storm: Shelter-Based Surveillance in the Aftermath of Hurricane Sandy — New Jersey, 2012. *Alice M. Shumate*
- 10:55** Assessment of Household Emergency Preparedness Supplies by Housing Type from a Community Assessment for Public Health Emergency Response (CASPER) — Michigan, 2012. *Michelle Murti*
- 11:15** When Public Health Messaging Still Is Not Enough: Postdisaster Carbon Monoxide Poisoning Outbreaks, Connecticut's Experience 1 Year Later — October 2012. *Timothy S. Styles*
- 11:35** Heat Illness: Predictors of Hospital Admissions Among Emergency Department Visits — Georgia, 2002–2008. *Satish K. Pillai*

11:55

**LUNCH**

12:30

**SPECIAL SESSION: Stephen B. Thacker Memorial Tribute**

Dunwoody Suites

**MODERATOR:** Denise Koo

**OPEN MICROPHONE:** Remarks from the EIS Community

1:30

***It is the mark of a truly intelligent person to be moved by statistics. — George Bernard Shaw***

**SESSION O: J. Virgil Peavy Memorial Award Finalists**

Ravinia Ballroom

**MODERATOR:** Maya Sternberg

- 1:35** Suicides Associated with Home Eviction and Foreclosure — United States, 2005–2010. *Katherine A. Fowler*
- 1:55** Getting Caught in the FoodNet: Determining Regional Profiles of Foodborne Disease Risk Represented by a Sentinel Surveillance System. *Alison S. Laufer*
- 2:15** Transmissibility of Variant Influenza from Swine to Humans: A Modeling Approach. *Karen K. Wong*
- 2:35** Associations of Short-Term Exposure to Ozone and Respiratory Outpatient Clinic Visits in a Rural Location — Sublette County, Wyoming, 2008–2011. *Kerry Pride*
- 2:55** Impact of Aerial Insecticide Spraying on West Nile Virus Disease — North Texas, 2012. *Duke J. Ruktanonchai*

**3:15** **BREAK** *Sponsored by the EIS Alumni Association*

**3:30** ***Being approximately right most of the time is better than being precisely right occasionally. — Author Unknown***

**SESSION P: Money, Math, and Modeling**

Ravinia Ballroom

**MODERATORS:** Benjamin Park and Barbara Marston

**3:35** Cost-Effectiveness of a Screening Program to Prevent Cryptococcal Meningitis Among HIV-Infected Persons — Vietnam. *Rachel M. Smith*

**3:55** Is *Clostridium difficile* Strain Type a Predictor of Disease Outcomes? *Isaac See*

**4:15** Economic Impact of a Public Health Response to a Measles Case — New York, 2012. *Nina Ahmad*

**4:35** Predicting Year of Tuberculosis Elimination Among U.S.-Born Populations, by State. *Courtney M. Yuen*

**8:30** **EIS SATIRIC REVUE**

Ravinia Ballroom



**Presentation of Philip S. Brachman Award**

**FRIDAY, APRIL 26, 2013**

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**8:30** ***Tell me your attributes, and I'll tell you your chances. — Author Unknown***

**SESSION Q: RISK FACTORS**

Ravinia Ballroom

**MODERATOR:** Robin Ikeda

**8:35** Examining the Relationship Between Food Security and Self-Reported Hypertension Among White, Black, and Hispanic Adults, Behavioral Risk Factor Surveillance System — 12 States, 2009. *Shalon M. Irving*

**8:55** Risk Factors for Diarrhea-Associated Death Among Children in Botswana in 2012. *Paul A. Gastañaduy*

**9:15** Association Between Housing Insecurity and Health Outcomes and Behaviors — Washington State, 2011. *Mandy A. Stahre*

**9:35** Obesity, Physical Activity, Screen Time, and Sugar-Sweetened Beverage Consumption Among Adolescents — Utah, 2011. *Joanna R. Watson*

**9:55** **BREAK** *Sponsored by the EIS Alumni Association*

**10:15**  **Presentation of Awards**

Ravinia Ballroom

**MODERATOR:** Douglas H. Hamilton**Donald C. Mackel Memorial Award****J. Virgil Peavy Memorial Award****Paul C. Schnitker International Health Award****James H. Steele Veterinary Public Health Award****Outstanding Poster Presentation Award****10:30** *You just tell me when and where, and not only will I be there, but I'll also be late. —Jarod Kintz***SESSION R: Late-Breaking Reports**

Ravinia Ballroom

**MODERATORS:** Douglas H. Hamilton and Randolph Daley**See supplement for presenters and abstracts.****11:55** **LUNCH****1:30** *A hospital is no place to be sick. —Samuel Goldwyn***SESSION S: Healthcare-Associated Infections**

Ravinia Ballroom

**MODERATORS:** Matthew Kuehnert and Tom Chiller**1:35** Postprocedural Fungal Endophthalmitis Associated with Sterile Products from a Single Compounding Pharmacy — Multiple States, 2012. *Christina A. Mikosz***1:55** Evolution of Clinical Manifestations of Fungal Infections Associated with Contaminated Steroid Injections — Multistate, 2012. *Duc B. Nguyen***2:15** Confirmed Donor-Derived Strongyloidiasis Cluster in Transplant Recipients — Pennsylvania, 2012. *Francisca A. Abanyie***2:35** *Clostridium difficile* Infection Among Children — United States, 2010–2011. *Joyanna M. Wendt***2:55** Invasive Group A Streptococcus Infections Associated with Outpatient Liposuction — Multiple States, August–September 2012. *Amanda L. Beaudoin***3:15** **CLOSING REMARKS AND ADJOURNMENT**Alexandre Macedo de Oliveira, MD, MSc, PhD,  
62<sup>nd</sup> EIS Conference Scientific Program Committee, Chair

# Awards

## Awards Descriptions and Committee Members

### Alexander D. Langmuir Prize Manuscript Award

The Alexander D. Langmuir Prize, established in 1966 by the EIS Alumni Association, recognizes a current EIS officer or recent alumnus (1 year) for excellence in a written report or an epidemiologic investigation or study.

**Committee:** *Priti Patel (Chair), Carol Ciesielski, Mary Kamb, Peter Kerndt, Alexandre Macedo de Oliveira, Alexandra Oster, and Katherine Stone*

### Philip S. Brachman Award

The Philip S. Brachman Award, sponsored by the graduating class of EIS officers, recognizes excellence in teaching epidemiology to EIS officers.

**Committee:** *EIS Class of 2011*

### Distinguished Friend of EIS Award

The Distinguished Friend of EIS Award, sponsored by the EIS Alumni Association, recognizes an individual for contributions to the health, welfare, and happiness of EIS officers and the EIS Program.

**Committee:** *Priti Patel (Chair), Carol Ciesielski, Mary Kamb, Peter Kerndt, Alexandre Macedo de Oliveira, Alexandra Oster, and Katherine Stone*

### Iain C. Hardy Award

The Iain C. Hardy Award, sponsored by the National Center for Immunization and Respiratory Diseases, recognizes a current EIS officer or alumnus (within 5 years) who has made an outstanding contribution to the control of vaccine-preventable diseases.

**Committee:** *David Swerdlow (Chair), John Modlin, William Schaffner, and Melinda Wharton*

### Donald C. Mackel Memorial Award

The Donald C. Mackel Memorial Award, sponsored by the EIS Alumni Association, recognizes a current EIS officer for the oral presentation that best exemplifies the effective application of a combined epidemiology and laboratory approach to an investigation or study.

**Committee:** *Kathrine Tan (Chair), Julu Bhatnagar, Dianna Blau, Vitaliano Cama, Elizabeth Hall, and Julie Magri*

### J. Virgil Peavy Memorial Award

The J. Virgil Peavy Memorial Award, established in 2003 by the EIS Alumni Association, recognizes a current EIS officer for the oral presentation that best exemplifies the effective and innovative application of statistics and epidemiologic methods in an investigation or study.

**Committee:** *Daisy Christensen (Chair), Julie Harris, Steven Leadbetter, Kanta Sircar, and Maya Sternberg*

### Outstanding Poster Presentation Award

The Outstanding Poster Presentation Award is sponsored by the EIS Alumni Association and is presented by the EIS Scientific Program Committee to a current EIS officer for the poster that best exemplifies scientific content, including originality, study design, and analysis; public health impact; and presentation effectiveness.

**Committee:** *Jennifer Verani (Chair), Henraya Davis McGruder, Brian Kit, and Betsy Lescosky*

### **Paul C. Schnitker International Health Award**

Paul C. Schnitker, MD, 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.

The Paul C. Schnitker International Health Award, sponsored by the Schnitker family, recognizes a current EIS officer or alumnus (1 year) who has made a significant contribution to international public health.

**Committee:** *Douglas H. Hamilton (Chair), Ezra Barzilay, J. Lyle Conrad, Tom Handzel, Asim Jani, and Donna Jones*

### **Mitch Singal Excellence in Occupational and Environmental Health Award**

The Mitch Singal Excellence in Occupational Safety and Environmental Health Award, co-sponsored by the National Institute for Occupational Safety and Health and the National Center for Environmental Health/Agency for Toxic Substances and Disease Registry, established in 2010 recognizes a current EIS officer for excellence in an oral presentation that best exemplifies the effective application of public health in the area of occupational or environmental health to an investigation.

**Committee:** *Yulia Iossifova-Carroll (Chair), Diana Bensyl, David Callahan, Ekta Choudhary, and Renee Funk*

### **James H. Steele Veterinary Public Health Award**

The James H. Steele Veterinary Public Health Award, sponsored by CDC veterinarians, recognizes a current EIS officer or alumnus (within 5 years) who has made outstanding contributions in the field of veterinary public health through outstanding contributions in the investigation, control, or prevention of zoonotic diseases or other animal-related human health problems.

**Committee:** *Casey Barton Behravesch (Chair), Barbara Knust, Adam Langer, Hugh M. Mainzer, Jennifer McQuiston, and Jennifer Wright*

### **Stephen B. Thacker Excellence In Mentoring Award**

The Stephen B. Thacker Excellence in Mentoring Award, sponsored by the EIS Alumni Association sponsor, will be awarded each year at the EIS Conference to an individual who is an inspiration to the EIS community and exhibits unwavering commitment to the EIS Program, officers, and alumni through demonstrated excellence in applied epidemiology training, mentoring, and building public health capacity.

**Committee:** *Priti Patel (Chair), Rachel Avchen, Douglas H. Hamilton, Denise Koo, and Alexandre Macedo de Oliveira*

## **Awards Presented at the 2012 EIS Conference**

### **Alexander D. Langmuir Prize Manuscript Award**

*Jeffrey T. McCollum*

### **Donald C. Mackel Memorial Award**

*Danielle E. Buttke*

### **Outstanding Poster Presentation**

*Brendan R. Jackson*

### **J. Virgil Peavy Memorial Award**

*Noha H. Farag*

### **Philip S. Brachman Award**

*Rachel N. Avchen*

### **Distinguished Friend of the EIS Award**

*Jeffrey P. Davis*

### **Paul C. Schnitker International Health Award**

*Sudhir Bunga and Janelle A. Routh*

### **Iain C. Hardy Award**

*Pretta K. Kutty*

### **James H. Steele Veterinary Public Health Award**

*Barbara Knust*

### **Mitch Singal Excellence in Occupational and Environmental Health Award**

*Danielle E. Buttke*

## Alexander D. Langmuir Lectures, 1972–2012

- 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 R. Frieden*
- 2008 Physical Activity and Public Health: Does the Environment Matter?  
*Ross C. Brownson*
- 2009 Epidemiology, Public Health, and Public Policy.  
*Jim Marks*
- 2010 Community Health Rankings — Epidemiology in Action.  
*Pat Remington*
- 2011 Skirmishes, Battles, and Wars: Tracking Infection Control Success in the Age of Social Networks.  
*Robert A. Weinstein*
- 2012 Prevention of Teen Pregnancy: What Do We Know? Where Do We Go?  
*Robert Blum*
- 1968 Salmonellosis from Chicken Prepared in Commercial Rotisseries: Report of an Outbreak. *Am J Epidemiol* 1969;90:429–37.  
*S.B. Werner, J. Allard, E.A. Ager*
- 1969 Outbreak of Tick-Borne Relapsing Fever in Spokane County, Washington. *JAMA* 1969;210:1045–50.  
*R.S. Thompson, W. Burgdorfer, R. Russell, B.J. Francis*
- 1970 Tularemia Epidemic: Vermont, 1968 — Forty-Seven Cases Linked to Contact with Muskrats. *N Engl J Med* 1969;280:1253–60.  
*L.S. Young, D.S. Bicknell, B.G. Archer, et al.*
- 1971 Tomato Juice-Associated Gastroenteritis, Washington and Oregon, 1969. *Am J Epidemiol* 1972;96:219–26.  
*W.H. Barker Jr., V. Runte*
- 1972 *Salmonella* Septicemia from Platelet Transfusions: Study of an Outbreak Traced to a Hematogenous Carrier of *Salmonella Choleraesuis*. *Ann Intern Med* 1973;78:633–41.  
*F.S. Rhame, R.K. Root, J.D. MacLowry, T.A. Dadisman, J.V. Bennett*
- 1973 Outbreak of Typhoid Fever in Trinidad in 1971 Traced to a Commercial Ice Cream Product. *Am J Epidemiol* 1974;100:150–7.  
*A. Taylor Jr., A. Santiago, A. Gonzales-Cortes, E.J. Gangarosa*
- 1974 Oyster-Associated Hepatitis: Failure of Shellfish Certification Programs To Prevent Outbreaks. *JAMA* 1975;233:1065–8.  
*B.L. Portnoy, P.A. Mackowiak, C.T. Caraway, J.A. Walker, T.W. McKinley, C.A. Klein Jr.*
- 1975 Staphylococcal Food Poisoning Aboard a Commercial Aircraft. *Lancet* 1975;2:595–9.  
*M.S. Eisenberg, K. Gaarslev, W. Brown, M. Horwitz, D. Hill*
- 1976 Nursery Outbreak of Peritonitis with Pneumoperitoneum Probably Caused by Thermometer-Induced Rectal Perforation. *Am J Epidemiol* 1976;104:632–44.  
*M.A. Horwitz, J.V. Bennett*
- 1977 Epidemic *Yersinia enterocolitica* Infection Due to Contaminated Chocolate Milk. *N Engl J Med* 1978;298:76–9.  
*R.E. Black, R.J. Jackson, T. Tsai, et al.*
- 1966 Complications of Smallpox Vaccination: I. National Survey in the United States, 1963. *N Engl J Med* 1967;276:125–32.  
*J.M. Neff, J.M. Lane, J.H. Pert, R. Moore, J.D. Millar, D.A. Henderson*
- 1967 An Outbreak of Neuromyasthenia in a Kentucky Factory — The Possible Role of a Brief Exposure to Organic Mercury. *Am J Epidemiol* 1967;86:756–64.  
*G. Miller, R. Chamberlin, W.M. McCormack*

## Alexander D. Langmuir Prize Manuscripts, 1966–2012



- 1978 Measles Vaccine Efficacy in Children Previously Vaccinated at 12 Months of Age. *Pediatrics* 1978;62:955–60.  
*J.S. Marks, T.J. Halpin, W.A. Orenstein*
- 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.  
*K. Kreiss, M.G. Gonzalez, K.L. Conright, A.R. Scheere*
- 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.  
*K.N. Shands, G.P. Schmid, B.B. Dan, et al.*
- 1982 Risk Factors for Heatstroke: A Case-Control Study. *JAMA* 1982;247:3332–6.  
*E.M. Kilbourne, K. Choi, T.S. Jones, S.B. Thacker*
- 1983 Epidemic Listeriosis C — Evidence for Transmission by Food. *N Engl J Med* 1983;308:203–6.  
*W.F. Schlech III, P.M. Lavigne, R.A. Bortolussi, et al.*
- 1984 Unexplained Deaths in a Children's Hospital: An Epidemiologic Assessment. *N Engl J Med* 1985;313:211–6.  
*J.W. Buehler, L.F. Smith, E.M. Wallace, C.W. Heath, R. Kusiak, J.L. Herndon*
- and*
- Medication Errors with Inhalant Epinephrine Mimicking an Epidemic of Neonatal Sepsis. *N Engl J Med* 1984;310:166–70.  
*S.L. Solomon, E.M. Wallace, E.L. Ford-Jones, et al.*
- 1985 The Use and Efficacy of Child-Restraint Devices: The Tennessee Experience, 1982 and 1983. *JAMA* 1984;252:2571–5.  
*M.D. Decker, M.J. Dewey, R.H. Hutcheson Jr., W.S. Schaffner*
- 1986 The Role of Parvovirus B19 in Aplastic Crisis and Erythema Infectiosum (Fifth Disease). *J Infect Dis* 1986;154:383–93.  
*T.L. Chorba, P. Coccia, R.C. Holman, et al.*
- 1987 Oral Contraceptives and Cervical Cancer Risk in Costa Rica: Detection Bias or Causal Association? *JAMA* 1988;259:59–64.  
*K.L. Irwin, L. Rosero-Bixby, M.W. Oberle, et al.*
- 1988 A Day-Care-Based Case-Control Efficacy Study of *Haemophilus influenzae* B Polysaccharide Vaccine. *JAMA* 1988;260:1413–8.  
*L.H. Harrison, C. Broome, A.W. Hightower, et al.*
- 1989 Group A Meningococcal Carriage in Travelers Returning from Saudi Arabia. *JAMA* 1988;260:2686–9.  
*P.S. Moore, L.H. Harrison, E.E. Telzak, G.W. Ajello, C.V. Broome*
- and*
- Transmission of *Plasmodium vivax* Malaria in San Diego County, California, 1986. *Am J Trop Med Hyg* 1990;42:3–9.  
*Y.A. Maldonado, B.L. Nahlen, R.R. Roberta, et al.*
- 1990 An Outbreak of Surgical Wound Infections Due to Group A *Streptococcus* Carried on the Scalp. *N Engl J Med* 1990;323:968–72.  
*T.D. Mastro, T.A. Farley, J.A. Elliott, et al.*
- 1991 An Investigation of the Cause of the Eosinophilia-Myalgia Syndrome Associated with Tryptophan Use. *N Engl J Med* 1990;323:357–65.  
*E.A. Belongia, C.W. Hedberg, G.J. Gleich, et al.*
- 1992 An Outbreak of Multidrug-Resistant Tuberculosis Among Hospitalized Patients with the Acquired Immunodeficiency Syndrome. *N Engl J Med* 1992;326:1514–21.  
*B.R. Edlin, J.I. Tokars, M.H. Grieco, et al.*
- 1993 Comparison of Prevention Strategies for Neonatal Group B Streptococcal Infection: A Population-Based Economic Analysis. *JAMA* 1993;270:1442–8.  
*J.C. Mohle-Boetani, A. Schuchat, B.D. Plikaytis, J.D. Smith, C.V. Broome*
- and*

- Retrospective Study of the Impact of Lead-Based Hazard Remediation on Children's Blood Lead Levels in St. Louis, Missouri. *Am J Epidemiol* 1994;139:1016–26.  
*C. Staes, T. Matte, C.B. Copley, D. Flanders, S. Binder*
- 1994 A Massive Outbreak in Milwaukee of *Cryptosporidium* Infection Transmitted Through the Public Water Supply. *N Engl J Med* 1994;331:161–7.  
*W.R. Mac Kenzie, N.J. Hoxie, M.E. Proctor, et al.*
- 1995 A Multistate Outbreak of *Escherichia coli* O157:H7-Associated Bloody Diarrhea and Hemolytic Uremic Syndrome from Hamburgers: The Washington Experience. *JAMA* 1994;272:1349–53.  
*B.P. Bell, M. Goldoft, P.M. Griffin, et al.*
- 1996 A Multistate Outbreak of *Salmonella* Enteritidis Infections Associated with Consumption of Schwan's Ice Cream. *N Engl J Med* 1996;334:1281–6.  
*T.W. Hennessy, C.W. Hedberg, L. Slutsker, et al.*  
*and*  
Passenger to Passenger Transmission of *Mycobacterium tuberculosis* Aboard Commercial Aircraft During Transoceanic Travel. *N Engl J Med* 1996;334:993–8.  
*T.A. Kenyon, S.E. Valway, W.W. Ihle, I.M. Onorato.*
- 1997 Epidemic Meningococcal Disease and Tobacco Smoke: A Risk Factor Study in the Pacific Northwest. *Pediatr Infect Dis J* 1997;16:979–83.  
*M.A. Fisher, K. Hedberg, P. Cardosi, et al.*
- 1998 Suicide After Natural Disasters. *N Engl J Med* 1998;338:373–8.  
*E.G. Krug, M. Kresnow, J.P. Peddicord, et al.*
- 1999 Legalized Physician-Assisted Suicide in Oregon — The First Year's Experience. *N Engl J Med* 1999;340:577–83.  
*A.E. Chin, K. Hedberg, G.K. Higginson, D.W. Fleming*
- 2000 Infantile Hypertrophic Pyloric Stenosis After Pertussis Prophylaxis with Erythromycin: A Case Review and Cohort Study. *Lancet* 1999;354:2101–5.  
*M.A. Honein, L.J. Paulozzi, I.M. Himmelright, et al.*
- 2001 *Salmonella* Typhimurium Infections Transmitted by Chlorine-Pretreated Clover Sprout Seeds. *Am J Epidemiol* 2001;154:1020–8.  
*J.T. Brooks, S. Rowe, P. Shillam, et al.*
- 2002 *Serratia liquefaciens* Bloodstream Infections from Contamination of Epoetin Alfa at a Hemodialysis Center. *N Engl J Med* 2001;344:1491–7.  
*L. A. Grohskopf, V. R Roth, D. R. Feikin, et al.*
- 2003 Transmission of West Nile Virus from an Organ Donor to Four Transplant Recipients. *N Engl J Med* 2003;348:2196–203.  
*M. Iwamoto, D.B. Jernigan, A. Guasch, et al., and the West Nile Virus in Transplant Recipients Investigation Team*
- 2004 Risk of Bacterial Meningitis in Children with Cochlear Implants. *N Engl J Med* 2003;349:435–45.  
*J. Reefhuis, M.A. Honein, C.G. Whitney, et al.*
- 2005 Changes in Invasive Pneumococcal Disease Among HIV-Infected Adults Living in the Era of Childhood Pneumococcal Immunization. *Ann Intern Med* 2006;144:1–9.  
*B.L. Flannery, R.T. Heffernan, L.H. Harrison, et al.*
- 2006 Case-Control Study of an Acute Aflatoxicosis Outbreak, Kenya, 2004. *Environ Health Perspect* 2005;113:1779–83.  
*E. Azziz-Baumgartner, K.Y. Lindblade, K. Gieseke, et al., and the Aflatoxin Investigative Group*
- 2007 Methamphetamine Use Is Independently Associated with Risky Sexual Behaviors and Adolescent Pregnancy. *J Sch Health* 2008; 78:641–8.  
*L.B. Zapata, S.D. Hillis, P.M. Marchbanks, K.M. Curtis, R. Lowry*
- 2008 Characteristics of Perpetrators in Homicide-Followed-by-Suicide Incidents: National Violent Death Reporting System — 17 US States, 2003–2005. *Am J Epidemiol* 2008;168:1056–64.  
*J. Logan, H.A. Hill, A.E. Crosby, D.L. Karch, J.D. Barnes, K.M. Lubell*
- 2009 Epidemiologic Investigation of Immune-Mediated Polyradiculoneuropathy Among Abattoir Workers Exposed to Porcine Brain. *PLoS ONE* 2009;5:e9782.  
*S.M. Holzbauer, A.S. DeVries, J.J. Sejvar, et al.*

- 2010 Increasing Compliance with Mass Drug Administration Programs for Lymphatic Filariasis in Orissa, India, 2009 — Impact of an Education and a Lymphedema Management Program. *PLoS Negl Trop Dis* 2010; 4:e728. *P.T. Cantey, J. Rout, G. Rao, J. Williamson, L. M. Fox*
- 2011 Effect of Rotavirus Vaccine on Healthcare Utilization for Diarrhea in US Children. *N E J Med* 2011;365;12:1108–17. *J. Cortes, A. Curns, et al.*
- 2012 Multistate Outbreak of *Escherichia coli* O157:H7 Infections Associated with In-Store Sampling of a Raw-Milk Gouda Cheese, 2010. *J. McCollum, N. Williams, S.W. Beam, et al.*

## Philip S. Brachman Awards, 1983–2012

- 1983 Philip Brachman  
 1984 Michael Gregg  
 1985 Howard Ory  
 1986 J. Lyle Conrad  
 1987 Andrew G. Dean  
 1988 Richard C. Dicker  
 1989 Carl W. Tyler, Jr.  
 1990 Richard C. Dicker  
 1991 Richard C. Dicker  
 1992 Jeffrey J. Sacks  
 1993 J. Lyle Conrad and Michael Toole  
 1994 Willard (Ward) Cates and Robert Breiman  
 1995 John Horan  
 1996 Polly Marchbanks  
 1997 William Mac Kenzie  
 1998 Laura A. Coker  
 1999 Christine Zahniser  
 2000 Jeffrey J. Sacks  
 2001 Douglas H. Hamilton  
 2002 Marcelle Layton, Steve Weirsma, James L. Hadler, Eddy Bresnitz, Elizabeth Barrett, Robert B. Stroube, Ross J. Brechner, David S.B. Blythe, Larry Siegel, Karyn Berry, Sherri Adams, John Eisold, and Greg Martin  
 2003 Deborah W. Gould  
 2004 Jim Alexander  
 2005 Julie Magri  
 2006 Ralph Henderson  
 2007 Joshua Mott and Peter Cegielski  
 2008 Lisa Pealer  
 2009 C. Kay Smith and Julie Magri  
 2010 Betsy Gunnels  
 2011 William Schaffner  
 2012 Rachel N. Avchen

## Distinguished Friend of EIS Awards, 1984–2012

- 1984 J. Virgil Peavy  
 1985 Bill Schaffner  
 1986 Mary Moreman  
 1987 James Chin  
 1988 Frances H. Porcher  
 1989 Not Awarded  
 1990 J. Lyle Conrad  
 1991 Alexander D. Langmuir  
 1992 Laurence R. Foster  
 1993 Kenneth L. Herrmann and William Roper  
 1994 Louise McFarland  
 1995 Mike Osterholm  
 1996 Jim Curran and Larry Schonberger  
 1997 Patsy Bellamy  
 1998 John Horan  
 1999 Not Awarded  
 2000 James Hadler  
 2001 Barbara R. Holloway and William R. Jarvis  
 2002 Patricia Fleming and Stephen B. Thacker  
 2003 Paul Blake  
 2004 David Sencer  
 2005 Not Awarded  
 2006 Robert V. Tauxe and Kashef Ijaz  
 2007 Dixie Snider  
 2008 Denise Koo  
 2009 Arjun Srinivasan  
 2010 Robert Quick  
 2011 Thomas Peterman  
 2012 Jeffrey P. Davis

## Iain C. Hardy Awards, 1996–2012

- 1996 Peter Strebel  
 1997 D. Rebeca Prevots  
 1998 Beth P. Bell  
 1999 Chares R. Vitek  
 2000 Linda Quick and Nancy Rosenstein  
 2001 Orin S. Levine  
 2002 Umesh D. Parashar  
 2003 Karen A. Hennessey  
 2004 Tim Uyeki and Montse Soriano-Gabarro  
 2005 Julie Jacobson-Bell  
 2006 Gustavo Dayan  
 2007 Brendan Flannery  
 2008 Mona Marin  
 2009 Amanda Cohn and Rosalyn O’Laughlin  
 2010 Amy A. Parker Fiebelkorn  
 2011 Jacqueline E. Tate  
 2012 Preeta Kutty

## J. Virgil Peavy Memorial Awards, 2003–2012

- 2003 Danice Eaton
- 2004 Lori A. Pollack
- 2005 Andrea Sharma
- 2006 Andrea Sharma
- 2007 Abhijeet Anand and David Lowrance
- 2008 Katherine Ellingson
- 2009 Michael L. Jackson
- 2010 Erin Murray
- 2011 Matthew Willis
- 2012 Noha H. Farag

## Donald C. Mackel Memorial Awards, 1987–2012

- 1987 Fatal Parathion Poisoning — Sierra Leone  
*Ruth A. Etzel*
- 1988 Multistate Outbreak of Legionnaires Disease Involving Tours to Vermont  
*Margaret Mamolen*
- 1989 Nosocomial Outbreak of Legionnaires Disease Associated with Shower Use: Possible Role of Amoebae  
*Robert F. Breiman*
- 1990 Legionnaires Disease Outbreak Associated with a Grocery Store Mist Machine  
*Frank J. Mahoney*
- 1991 Nosocomial Outbreak of Isoniazid- and Streptomycin-Resistant Tuberculosis Among AIDS Patients, New York City  
*Brian R. Edlin*
- 1992 Bacillary Angiomatosis, New Infectious Disease: Epidemiology, Clinical Spectrum, and Diagnostics  
*Janet C. Mohle-Boetani*
- 1993 Hepatitis B Virus Transmission Associated with Thoracic Surgery, Los Angeles  
*Rafael Harpaz*
- 1994 Schistosomiasis and Lake Malawi: A New Site of Transmission Posing a Serious Risk to Expatriates and Tourists  
*Martin S. Cetron*
- 1995 Use of Urinary Antigen Testing To Detect an Outbreak of Nosocomial Legionnaires Disease in Connecticut, 1994  
*Lisa A. Lepine*

- 1996 International Outbreak of *Salmonella* Infections Caused by Alfalfa Sprouts Grown from Contaminated Seed  
*Barbara E. Mahon*  
  
and  
*Malassezia pachydermatis* Fungemia in Neonatal Intensive Care Unit Patients: There's a [New] Fungus Among Us!  
*Huan Justina Chang*
- 1997 Epidemic of Deaths from Acute Renal Failure Among Children in Haiti  
*Katherine L. O'Brien*
- 1998 And Weighing in at 25 Million Pounds — A Multistate Outbreak of *Escherichia coli* O157:H7 Infections and the Largest Ground Beef Recall in United States History  
*M. Kathleen Glynn*
- 1999 Clinical Mismanagement of Community Outbreak? The Contribution of DNA Finger-Printing to the Analysis of Chronic, Drug-Resistant Tuberculosis in Buenaventura, Colombia, 1998  
*Kayla F. Laserson*
- 2000 *Serratia liquefaciens* Bloodstream Infections and Pyrogenic Reactions Associated with Extrinsically Contaminated Erythropoietin — Colorado  
*Lisa Grohskoph*
- 2001 When Beauty Is More Than Skin Deep: An Outbreak of Rapidly Growing Mycobacterial Furunculosis Associated with a Nail Salon — California, 2000  
*Kevin L. Winthrop*
- 2002 Dances with Cows?: A Large Outbreak of *E. coli* O157 Infections at Multi-Use Community Facility — Lorain County, Ohio, September 2001  
*Jay K. Varma*
- 2003 Hepatitis C Virus Transmission from an Antibody-Negative Organ and Tissue Donor  
*Barna D. Tugwell*
- 2004 Multiple Hepatitis A Outbreaks Associated with Green Onions Among Restaurant Patrons — Tennessee, Georgia, and North Carolina, 2003  
*Joseph J. Amon*
- 2005 Case-Control Study of an Acute Aflatoxicosis Outbreak  
*E Azziz-Baumgatner*

- 2006 Delayed Onset of *Pseudomonas fluorescens* Group Bloodstream Infections After Exposure to Contaminated Heparin Flush — Michigan and South Dakota  
*Mark Gershman*
- 2007 Epidemiologic and Molecular Investigation of an Outbreak of Hepatitis C Viral Infection at Hemodialysis Unit — Richmond Virginia, 2006  
*Nicola Thompson*
- 2008 Multistate Measles Outbreak Associated with an International Youth Sporting Event — Pennsylvania, Michigan, and Texas, August — September 2007  
*Tai-Ho Chen*
- 2009 Cardiac Events and Deaths in a Dialysis Facility Associated with Healthcare Provider — Texas, 2008  
*Melissa K. Schaefer*
- 2010 Fatal Case of Laboratory-Acquired Infection with an Attenuated *Yersinia pestis* Strain of Plague — Illinois, 2009  
*Andrew Medina-Marino*
- 2011 Outbreak of Nosocomial Listeriosis — Texas, 2010.  
*Noha H. Farag*
- 2012 Pyrrolizidine Alkaloid Toxicity as the Cause of Unknown Liver Disease — Tigray, Ethiopia, 2007–2011.  
*Danielle E. Buttke*
- 1991 Diarrheal Outbreak Associated with a Cyanobacteria (Blue-Green Algae)-Like Body, Chicago  
*Philip P. Huang*
- 1992 Response to One Dose of Inactivated Poliovirus Vaccine after Three Doses of Oral Poliovirus Vaccine, Abidjan, Cote d'Ivoire  
*Bernard J. Moriniere*
- 1993 Cholera Outbreak in Rumonge, Burundi  
*Maureen E. Birmingham*
- 1994 Salivary Testing as an Epidemiologic Tool During an Outbreak of Hepatitis A in an Amish Community in Indiana  
*Edmundo Muniz*
- 1995 Longitudinal Predictors of Initiation of Smokeless Tobacco Use  
*Scott L. Tomar*
- 1996 Nonvenomous Animal-Related Fatalities in the U.S. Workplace, 1992–1994  
*Constance C. Austin*
- 1997 Multidrug-Resistant Pneumococcal Meningitis in a Day Care Center — Tennessee  
*Allen Craig*
- 1998 Beliefs About the Tobacco Industry and Opinions About Anti-Tobacco Policies: How Tight Is the Link?  
*Arthur E. Chin*

## Outstanding Poster Presentation Award, 1986–2012

- 1986 Gender Gap in the Diaper Set: A Closer Look at Differences in Sex-Specific Mortality  
*Ray Yip*
- 1987 Socioeconomic Differences in Smoking Behavior in Selected States  
*Thomas E. Novotny*
- 1988 Late-Stage Diagnosis of Breast Cancer Among Women in Low Socioeconomic Groups, Connecticut, 1984–1985  
*Thomas A. Farley*
- 1989 Malaria Infection in Early Infancy, Malawi  
*Laurence Slutsker*
- 1990 Seroprevalence of Human Immunodeficiency Virus Type I Among College Students, United States  
*Brian R. Edlin*
- 1999 Cold Breakfast Cereal: A New Vehicle Implicated in a Multistate Outbreak of *Salmonella* Agona Infections  
*Thomas Breuer*
- 2000 Hurricane — Puerto Rico, 1998  
*Dan O'Leary*
- 2001 Counting Crows: Crow Mortality as a Sentinel for West Nile Virus Disease in Humans — Northeastern United States, 2000  
*Kathleen G. Julian*
- 2002 Outbreak of Echovirus 18 Meningitis at a Summer Camp — Alaska, 2001  
*Joseph B. McLaughlin*
- 2003 Surveillance for Chlamydia in Women — South Carolina, 1998–2001  
*Wayne A. Duffus*

- 2004 Hospitalizations Associated with Rotavirus Diarrhea — United States, 1996–2000  
*Myrna Charles*
- 2005 Risk of Secondary Transmission from Imported Lassa Fever — New Jersey, 2004  
*Ester Tan*
- 2006 Risk Factors for *Helicobacter pylori* in a Rural Community — Montana, 2005  
*Elizabeth Melius*
- 2007 Outbreak of *Escherichia coli* O157 Associated with Packaged Spinach — Wisconsin, 2006  
*Authur M. Wendel*
- 2008 The Power of Combining Routine Molecular Subtyping and Specific Food Exposure Interviews During *Escherichia coli* O157:H7 Outbreak — Minnesota, 2007  
*S.M. Holzbauer*
- 2009 Seroprevalence of Herpes Simplex 2 — National Health and Nutritional Examination Surveys, United State, 2005–2006  
*Sara E. Forhan*
- 2010 Travelers' Impressions of 2009 H1N1 Influenza National Health Messaging Campaign  
*Emily Jentes*
- 2011 *Vibrio mimicus* Infection After Consumption of Crayfish — Spokane, Washington, 2010  
*Meagan K. Kay*
- 2012 Associations Between *Salmonella* Serotypes and Particular Food Commodities — United States, 1998–2008.  
*Brendan R. Jackson*

## Paul C. Schnitker International Health Award, 1995–2012

- 1995 Leslie F. Roberts
- 1996 Peter Kilmarx
- 1997 Alexander K. Rowe and Eric L. Mouzin
- 1998 Etienne G. Krug
- 1999 Kayla F. Laserson
- 2000 John MacArthur and Peter Salama
- 2001 Valerie D. Garrett
- 2002 Robert D. Newman and Lorna E. Thorpe
- 2003 Puneet Dewan, Lisa Nelson, and Pratima Raghunathan
- 2004 Tracey Creek
- 2005 Oleg Bilukha

- 2006 Kevin Cain
- 2007 Avid Reza
- 2008 Sapna Bamrah and David Lowrence
- 2009 Rinn Song
- 2010 Andrew Auld
- 2011 W. Roodly Archer
- 2012 Sudhir Bunga and Janell A. Routh

## James H. Steele Veterinary Public Health Award, 1999–2012

- 1999 Frederick J. Angulo and Jordan W. Tappero
- 2000 David Ashford
- 2001 Mary Kathleen Glynn
- 2002 Kirk Smith
- 2003 Michael Bunnin
- 2004 Jennifer McQuiston
- 2005 John Crump
- 2006 Katherine Heldman and James Kile
- 2007 Jennifer Wright
- 2008 John R. Dunn
- 2009 Casey Barton Behravesh and Stacy Holzbauer
- 2010 Kendra Stauffer
- 2011 Matthew Willis
- 2012 Barbara Knust

## Mitch Singal Excellence in Occupational and Environmental Health Award, 2010–2012

- 2010 Surveillance and Prevention of Occupational Injury Deaths — Wyoming, 2003–2007  
*Paul Anderson*
- 2011 Unprecedented Outbreak of Acute Childhood Lead Poisoning — Zamfara State, Nigeria, 2010.  
*Carrie A. Dooyema*
- 2012 Pyrrolizidine Alkaloid Toxicity as the Cause of Unknown Liver Disease—Tigray, Ethiopia (2007–2011)  
*Danielle E. Buttke*

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# **2013 EIS Conference Abstracts**



## MONDAY, APRIL 22, 2013

*Here to serve.*  
—Stephen B. Thacker

### SESSION A: Stephen B. Thacker Opening Session 8:30–10:15 am

**Ravinia Ballroom**

**MODERATOR:** Denise Koo

### 8:35 Multi-State Outbreak of Fungal Meningitis and Other Infections Associated with Contaminated Methylprednisolone Acetate

**AUTHORS:** Anne E. Purfield, R.M. Smith, M. Schaefer, M. Kainer, M. Wise, J. Finks, J. Duwve, E. Fontaine, A. Chu, B. Carothers, A. Reilly, J. Fiedler, A. Wiese, C. Feaster, L. Gibson, S.E. Griese, A. Cleveland, K. Benedict, J. Harris, M. Brandt, D. Blau, J. Jernigan, J. Weber, B. Park, the Multistate Fungal Infection Outbreak Response Team

**BACKGROUND:** Outbreaks of fungal meningitis following epidural or spinal injection with contaminated product have a reported case-fatality rate of >40%. Starting September 21, 2012, we investigated an outbreak of fungal meningitis among persons injected with compounded methylprednisolone acetate (MPA); our aims were to characterize the scope of the outbreak, and encourage early infection recognition and treatment.

**METHODS:** A case was defined as meningitis, stroke due to presumed meningitis, or spinal, paraspinal or peripheral joint infection in a person injected with implicated MPA. To promote rapid case-finding, notification of all persons exposed to implicated MPA was recommended by CDC, and conducted by public health officials or staff at facilities administering MPA. We collected clinical data using standardized case report forms and evaluated isolates and clinical specimens for fungal presence using PCR, culture, and histopathology.

**RESULTS:** By October 19, >99% of 13,502 exposed persons

in 23 states were directly contacted. As of December 3, 541 case-patients were reported from 19 states; 36 (7%) died. Of 386 case-patients with data available, 233 (60%) were female, median age was 64 years (range 16–92), and median incubation was 20 days (range 0–120). Two-hundred-ninety-two (76%) case-patients had headache; 144 (38%) had back pain. Thirty-three (9%) case-patients had stroke. One-hundred-thirteen (21%) case-patients had laboratory evidence of fungal infection; 102 (90%) had *Exserohilum rostratum*, which was also identified from unopened MPA vials.

**CONCLUSION:** This outbreak was primarily due to contamination of MPA with *E. rostratum*. Further investigation will determine if the lower case-fatality rate observed in this outbreak, compared with previous similar outbreaks, was the result of public health actions, including direct patient notification.

**KEYWORDS:** central nervous system fungal infections, disease outbreaks, product recalls and withdrawals.

## 8:55 Recurrence of Dracunculiasis (Guinea Worm Disease) After a 10-Year Absence – Chad, 2012

**AUTHORS:** Nandini Sreenivasan, A. Weiss, J. Djatsa, F. Toe, N. Djimadoumaji, T. Ayers, M. Eberhard, E. Ruiz-Tiben, S. Roy

**BACKGROUND:** Dracunculiasis is a parasitic waterborne disease causing pain and disability as the worm emerges from the skin. It prevents patients from working or attending school, causing financial and social burdens. Dracunculiasis is targeted for global eradication; however, a decade after interrupting transmission in Chad, 20 cases occurred during 2010 and 2011. Responding to a request from the Chad Ministry of Public Health, CDC conducted an outbreak investigation in May 2012 to identify risk factors and provide recommendations for outbreak response.

**METHODS:** We performed a matched case-control study using a standardized questionnaire focusing on demographics, drinking water sources, food and beverages, and travel. Case-patients were persons with extracted worms during 2010–2011. Controls were persons without a history of dracunculiasis and were matched to case-patients by age, sex, and location. We used conditional logistic regression to calculate matched odds ratios (mOR).

**RESULTS:** We enrolled 19 case-patients and 45 controls. Only drinking water-related factors were statistically significant. Secondary water sources used outside the home were risk factors (mOR: 38.1; 95% confidence interval [CI]: 1.8–805.1), particularly lakes or ponds (mOR: 3.6; CI: 1.1–12.5) and unprotected wells (mOR: 12.7; CI: 1.9–87.5). Primary water sources used daily at home were not associated with dracunculiasis risk. We were unable to identify any water sources linking case-patients between years.

**CONCLUSION:** Although the origin of this outbreak remains uncertain, we identified no unusual modes of transmission. Prevention efforts should focus on public education about potentially contaminated water sources, with distribution of water filters and implementation of active surveillance in villages with confirmed local transmission. Widespread advertisement of financial rewards for confirmed cases could supplement surveillance in these villages.

**KEYWORDS:** dracunculiasis, guinea worm disease, Chad, water, disease outbreaks

## 9:15 Sick and Retired, Prevalence of Pneumoconiosis Among Retired Coal Miners – 3 States, 2012

**AUTHORS:** Cara N. Halldin, A. Wolfe, A. Laney

**BACKGROUND:** Inhalation of coal mine dust (CMD) can cause pneumoconiosis, a chronic, occupational lung disease. In recent years, coal workers' pneumoconiosis prevalence and severity have increased among working central Appalachian (Kentucky, Virginia, and West Virginia) miners. Historically, retired miners have not been systematically surveyed for pneumoconiosis, therefore little is known about this population. We investigated prevalent lung disease among retired coal miners in central Appalachia.

**METHODS:** From April to September 2012, we offered retired coal miners, who were notified through community outreach, chest radiographs and spirometry. Radiographs and spirometry were classified according to International Labour Office standards for pneumoconiosis and American Thoracic Society lung function interpretative strategies, respectively. We calculated prevalence of pneumoconiosis and abnormal lung function, comparing retired miners to a 2005–2009 survey of working central Appalachian coal miners (n = 6,645), using log binomial regression, adjusting for confounders.

**RESULTS:** We evaluated 527 retired miners' chest

radiographs; 35 (6.6%) had pneumoconiosis. Three-hundred retired miners performed spirometry; 106 (35.3%) had abnormal lung function. Of those with pneumoconiosis who performed spirometry, 52% (11/21) had abnormal lung function. Pneumoconiosis prevalence did not significantly differ between retired and working miners (6.6% vs. 5.5% respectively, PR = 0.8, 95% CI: 0.6–1.1, tenure adjusted). Abnormal spirometry prevalence was significantly elevated among retired miners (35.2% vs. 14.3%, PR = 2.4, CI: 2.0–2.8, tenure and smoking adjusted).

**CONCLUSION:** Compared to long-tenured working miners, pneumoconiosis prevalence in retired miners was slightly elevated and lung function abnormality prevalence was significantly elevated. Pneumoconiosis is a progressive disease that can develop or be identified after a miner has left employment. Fully characterizing the scope of CMD-related respiratory morbidity requires ongoing surveillance of both actively working and retired miners.

**KEYWORDS:** pneumoconiosis, coal mining, Appalachian region, respiratory surveillance

## 9:35 Hantavirus Outbreak Investigation – Yosemite National Park, 2012

**AUTHORS:** Jonathan J. Nunez, and the Hantavirus Outbreak Investigation Team: D. Buttke, B. Enge, C. Fritz, B. Knust, V. Kramer, S. Messenger, M. Novak, L. Osadebe, P. Rollin, D. Vugia, J. Watt, D. Wong

**BACKGROUND:** Hantavirus pulmonary syndrome (HPS) is a severe, frequently fatal, respiratory disease caused by inhalation of sin nombre virus (SNV) in aerosolized excreta from infected deer mice. During June–August, two cases of HPS among Yosemite National Park (YOSE) visitors were reported. Because HPS clusters are rare, we investigated the extent and source of disease.

**METHODS:** Cases were defined as any febrile illness with SNV antibodies or antigens after lodging at YOSE during June 1–August 28. Patients were located through YOSE visitor notifications and clinician health alerts. We reviewed clinical data and YOSE lodging records, and interviewed patients. We compared the number of cases by lodging type by using Fisher's exact test. We examined lodging facilities for rodent activity and collected mice for SNV serology.

**RESULTS:** Among 10 patients identified, nine experienced respiratory illness and three died. Median age was 44.5

years (range: 12–56). One had stayed in an area previously associated with HPS cases. Nine stayed in Curry Village (CV), an area not previously associated with HPS. All nine had stayed in signature tent cabins (STC), which differ from regular tent cabins in having an insulated shell. At CV, nine cases among 8,719 STC lodgers were reported, compared with none among 40,288 regular tent cabin lodgers ( $P < 0.001$ ). Rodent infestations were common in STC insulated spaces. Of 185 traps placed at CV during August, 73 (39%) successfully trapped deer mice; 14% were SNV-seropositive.

**CONCLUSION:** SNV-infected deer mice were present in CV. Infestation of insulated spaces likely increased the risk for hantavirus transmission in STCs, leading to this outbreak. All STCs were closed indefinitely, and multi-faceted rodent exclusion and control measures were implemented.

**KEYWORDS:** hantavirus, hantavirus pulmonary syndrome, deer mice, sin nombre virus

## 9:55 Serogroup A Meningococcal Conjugate Vaccine Coverage After the First National Mass Immunization Campaign – Burkina Faso, 2011

**AUTHORS:** Sarah A. Meyer, I. Medah, D. Yelbeogo, J. Kambou, J. Goodson, B. Flannery, R. Novak, T. Clark, N. Messonnier, A. Cohn, K. Wannemuehler

**BACKGROUND:** Serogroup A meningococcal (MenA) meningitis epidemics are a devastating cause of death and disability in Sub-Saharan Africa. In December 2010, MenAfriVac™, a new vaccine designed to eliminate MenA epidemics, was introduced in Burkina Faso through mass vaccination. Subsequent surveillance data revealed near-elimination of MenA disease. Accurate vaccination coverage estimates are critical for identification of undervaccinated subpopulations and measurement of vaccine impact on disease.

**METHODS:** A national coverage survey was conducted in December 2011 using stratified multistage cluster sampling. In the 13 strata (administrative regions), 25 enumeration areas were selected using probability proportional to size. Twenty households per enumeration area were selected after calculation of a sampling interval. Information on household characteristics and vaccination status was collected. Vaccination coverage estimates and 95% confidence intervals (CI), adjusted for the complex survey design, were calculated in SAS 9.3. A multivariable analysis was conducted in

SUDAAN to evaluate adjusted Relative Risks (aRR) of predictors for vaccination.

**RESULTS:** Among 6,455 households, 23,890 eligible persons were surveyed. National coverage was 95.9% (95% CI: 95.0%–96.7%): 74.3% by vaccination card and 21.6% by recall. Coverage was >90% in all regions, all target age groups (2–5 years, 6–15 years, 16–30 years), and both sexes. Multivariate analysis for all ages demonstrated that vaccination was associated with a head of household informed of the immunization campaign (aRR:1.31; 95% CI:1.19–1.44) and rural household setting (aRR:1.04; 95% CI:1.01–1.07).

**CONCLUSIONS:** High MenAfriVac™ coverage was achieved in all regions and target age groups in Burkina Faso, including hard-to-reach populations. Maintenance of population immunity through vaccination of new birth cohorts will be critical for sustained elimination of MenA epidemics in Burkina Faso.

**KEYWORDS:** serogroup A meningococcal meningitis, meningococcal vaccine, mass vaccination, sampling studies, Burkina Faso

*There are three kinds of epidemiologists:  
those who can count and those who can't.*  
—Author Unknown (adapted by John M. Cowden)

**SESSION B: Surveillance**  
**10:45–12:10 pm**

**Ravinia Ballroom**

**MODERATORS:** Christine Casey and Kathleen Gallagher

## 10:50 High-Risk Use of Prescription Opioids — Tennessee, 2007–2011

**AUTHORS:** Jane A.G. Baumblatt, C. Wiedeman, J.R. Dunn, W. Schaffner, L.J. Paulozzi, T.F. Jones

**BACKGROUND:** During 2003–2010, in Tennessee, drug overdose deaths increased from 422 to 1,059. More of these deaths involved prescription opioids than heroin and cocaine combined. The Tennessee Controlled Substances Monitoring Program (TNCSMP) was established in 2006 to monitor opioid-prescribing patterns. We analyzed the TNCSMP data to describe the prevalence of high-risk prescribing and dispensing patterns for opioid analgesics.

**METHODS:** We used TNCSMP data regarding patient-level opioid analgesic prescriptions during 2007–2011. We defined provider shoppers as patients who received opioid prescriptions from  $\geq 4$  providers/year, pharmacy shoppers as those who used  $\geq 4$  pharmacies/year to fill opioid prescriptions, and high-dosage users as those who received the equivalent of  $>36,500$  mg morphine per year, averaging  $>100$  mg morphine equivalents (MMEs)/day.

**RESULTS:** During 2007–2011, approximately 5.2 million Tennesseans received a total of 37.1 million opioid prescriptions. Of 37.1 million opioid prescriptions dispensed, hydrocodone was the most prescribed opioid, with 20.9

million (56%) prescriptions, followed by oxycodone with 7.3 million (20%) prescriptions. Prescriptions dispensed increased steadily from 6.3 million to 8.5 million/year, with a corresponding rate increase from 108.3/100 to 142.5/100 population/year. Of persons receiving opioid prescriptions during 2007–2011, provider shoppers increased from 98,222 (5.5%) to 130,801 (6.4%); pharmacy shoppers increased from 34,979 (1.9%) to 51,188 (2.5%); and high-dosage users increased from 30,349 (1.7%) to 56,993 (2.8%). During 2011, provider shoppers received 2.1 million prescriptions and 30% of total MMEs dispensed. A total of 5,480 patients received prescriptions from  $\geq 10$  providers and 440 received  $>1000$  MMEs/day.

**CONCLUSIONS:** High-risk use of opioids is frequent and increasing in Tennessee. TNCSMP data can be an effective tool for educating medical providers, developing targeted preventive interventions, and establishing public health policy.

**KEYWORDS:** analgesics, opioid; drug prescriptions; epidemiology

## 11:10 BioSense Chief Complaint-Based Syndromic Data as a Near Real-Time Indicator of Norovirus Disease Activity – United States, 2007–2010

**AUTHORS:** Brian S. Rha, S. Burrer, S. Park, U. Parashar, B. Lopman

**BACKGROUND:** Noroviruses are the leading cause of sporadic and epidemic gastroenteritis in the United States (US). Timely monitoring of norovirus activity can rapidly identify norovirus season onset and elevated levels of activity, thereby improving prevention and control efforts. We assessed whether BioSense, a national-level, near real-time, electronic surveillance system that maps emergency department visit data (ICD-9-CM codes and chief complaint text) to 78 sub-syndromes, can monitor norovirus activity.

**METHODS:** BioSense chief complaints for “Diarrhea” or “Nausea and Vomiting” (N/V) as a monthly proportion of all visits were compared with reported norovirus outbreaks from January 2007 to April 2010. Linear regression models were fitted separately for five age groups (0–4, 5–17, 18–64, ≥65 years, and all ages). For the 0–4 year group, laboratory-reported test data for rotavirus, a major cause of gastroenteritis in this age group, were also modeled. We restricted analysis to six states with uninterrupted (1) BioSense, (2) norovirus outbreak, and (3) rotavirus antigen test data (≥120 tests/year).

**RESULTS:** During the 40-month period, the six states reported 277,433 Diarrhea and 1,165,414 N/V visits, 1,048 norovirus outbreaks, and 32,455 rotavirus antigen tests (13% positive). The proportion of visits due to Diarrhea or N/V both had strong linear relationships with norovirus outbreaks in each age group ( $P < 0.001$ ), with stronger correlations for Diarrhea ( $r$  correlation coefficient: 0.826–0.903) than N/V ( $r$ : 0.552–0.828) for each age group. The proportion of positive rotavirus tests significantly improved the Diarrhea model in the 0–4 year group ( $P < 0.0001$ ).

**CONCLUSIONS:** BioSense Diarrhea chief complaint syndromic data correlated strongly with reported norovirus outbreaks, and could provide a near real-time indicator of US norovirus disease activity.

**KEYWORDS:** norovirus, biosurveillance, outbreaks, gastroenteritis, rotavirus

## 11:30 Communicable Disease Surveillance in New York City Evacuation Shelters After Hurricane Sandy – November 2012

**AUTHORS:** Alison D. Ridpath, B. Bregman, L. Jones, V. Reddy, H. Waechter, S. Balter

**BACKGROUND:** After Hurricane Sandy occurred on October 29, 2012, >8,000 New York City (NYC) residents required temporary shelter. Six days later, the NYC Department of Health and Mental Hygiene (DOHMH) learned of 12 persons with gastrointestinal illness at one shelter. Concern for spread of communicable diseases in congregate settings prompted DOHMH to develop a disease-monitoring system in shelters. We describe implementation of this surveillance system and the data collected.

**METHODS:** On November 5, DOHMH began daily calls to the 12 shelters for census and number of ill evacuees. Beginning November 8, a new system was established; shelter medical staff recorded demographic and symptom information for patients with gastrointestinal illness, fever, or emergency department transfer on logs that were collected daily by visiting DOHMH staff. Shelters were instructed to call DOHMH immediately if three or more patients had similar symptoms.

**RESULTS:** Implementation challenges included evacuees’ continual movement as shelters closed and consolidated and high turnover of shelter medical staff. The initial telephone system was unsuccessful, because shelter medical rooms did not have telephones or regular staff and some had no method for documenting visits; only 75% of sites reported. Under the revised system, completeness of daily reporting increased to 100%, and DOHMH received reports of 36 gastrointestinal illness cases, one case of fever, and 25 emergency department transfers. Three additional clusters were investigated: rash, conjunctivitis, and gastrointestinal illness. By November 19, all shelters were closed and surveillance ended.

**CONCLUSIONS:** Establishing effective surveillance in temporary shelters is challenging and required in-person visits by DOHMH staff to ensure completeness of daily reporting. After establishment, surveillance data were effectively used to identify clusters.

**KEYWORDS:** cyclonic storms; sentinel surveillance; New York City; communicable diseases

## 11:50 Burden of Encephalitis-Associated Hospitalizations – United States, 1998–2010

**AUTHORS:** Neil M. Vora, R. Holman, J. Mehal, S. Recuenco, J. Blanton

**BACKGROUND:** Encephalitis is an inflammatory process of the brain associated with neurologic dysfunction. Illness is generally severe and often requires hospitalization. Improving our understanding of the epidemiology of encephalitis could complement clinical management and inform public health interventions. We analyzed hospital discharge data to evaluate the burden of encephalitis in the United States.

**METHODS:** Encephalitis-associated hospitalizations during 1998 through 2010 were analyzed retrospectively using the Nationwide Inpatient Sample, a nationally representative sample of hospitalizations. An encephalitis-associated hospitalization was defined as a hospital discharge record with an *International Classification of Diseases, 9<sup>th</sup> Revision, Clinical Modification* code for encephalitis listed among the top 15 diagnoses. Using the Healthcare Cost and Utilization Project weighting methodology, robust national estimates of the number of encephalitis-associated hospitalizations were calculated. SUDAAN software was used to generate standard errors (SEs) and 95% confidence intervals (CIs). Etiology and outcome of encephalitis-associated hospitalizations were examined.

**RESULTS:** An estimated 263,352 (SE: + 3017) encephalitis-associated hospitalizations occurred in the United States during 1998 through 2010. A fatal outcome occurred in 5.8% (95% CI: 5.5%–6.0%) of all encephalitis-associated hospitalizations and in 10.1% (95% CI: 9.2%–11.2%) and 17.1% (95% CI: 14.3%–20.4%) of encephalitis-associated hospitalizations in which codes for HIV and tissue/organ transplant were listed, respectively. The proportion of encephalitis-associated hospitalizations with a known encephalitis cause and those for which the cause was unexplained were similar: 50.3% (95% CI: 49.3%–51.2%) and 50.3% (95% CI: 49.4%–51.3%), respectively.

**CONCLUSIONS:** Encephalitis is a major public health concern in the United States and should be monitored. Some of the unexplained encephalitides may be due to novel infectious and noninfectious etiologies.

**KEYWORDS:** encephalitis, hospitalization, United States

*Variety is the spice of life.*  
— William Cowper

**POSTER SESSION 1: Meet the Authors**  
**12:30–1:30 pm**  
**Ravinia Ballroom (E, F, and G)**

**Poster 1.1 Outpatient Antiviral Therapy for Influenza in Three Healthcare Systems — United States, 2011–2012**

**AUTHORS:** Fiona P. Havers, S. Thaker, M. Thompson, A. Fry

**BACKGROUND:** Influenza causes >200,000 U.S. hospitalizations annually; persons with chronic medical conditions and those at the extremes of age are at increased risk of hospitalization. Early antiviral treatment ( $\leq 2$  days since illness onset) of influenza reduces the probability of hospitalization and is recommended for those with suspected influenza who are at higher risk for influenza complications. We sought to describe outpatient antiviral prescription practices and physician compliance with current guidance.

**METHODS:** We analyzed data from three sites participating in the US Flu Vaccine Effectiveness Network Study during the 2011–2012 influenza season. Subjects were aged  $\geq 6$  months and presented to their outpatient provider for an acute respiratory illness of  $\leq 7$  days duration with fever or cough. Medical history and prescription information was collected by self-report and confirmed with medical record extraction.

**RESULTS:** Of 3,465 enrolled outpatients, 1,352 (39%) were at higher risk for influenza complications, including those

aged  $< 2$  or  $\geq 65$  years ( $n = 551$ ) or with  $\geq 1$  chronic medical condition ( $n = 980$ ). Of those, 29 (2.1%) were prescribed antiviral medication; the proportion did not differ among those without high-risk conditions (50/2113 (2.4%);  $P = 0.67$ ). Most treated patients (65%) presented to clinic  $\leq 2$  days since illness onset. Four hundred and nineteen (31%) persons with high-risk conditions presented to clinic  $\leq 2$  days since illness onset, among whom 14 (3.3%) were prescribed antiviral medication.

**CONCLUSION:** Antiviral treatment was prescribed infrequently among outpatients for whom therapy is recommended. Efforts to understand the reasons clinicians do not use antiviral treatment and to better communicate the benefits are needed. During the influenza season, high-risk persons should be encouraged to contact healthcare providers early after symptoms begin.

**KEYWORDS:** influenza, antiviral agents, oseltamivir, outpatients

## Poster 1.2 Seroprevalence of Measles and Rubella Antibodies in Pregnant Women – Haiti, 2012

**AUTHORS:** David L. Fitter, R. Anselme, B. Flannery, R. Tohme, B. Marston, G. Paluku, G. Rey, M. Griswold, J. Boncy, J. Tappero, J. Vertefeuille

**BACKGROUND:** Haiti set a goal to eliminate measles and rubella (MR), as well as congenital rubella syndrome (CRS). A 2007–2008 nationwide MR vaccination campaign reached only 79% of the target population. To assess whether population immunity was enough to support elimination, we conducted a serosurvey.

**METHODS:** We systematically selected 740 serum specimens from pregnant women enrolled in a 2012 antenatal HIV sentinel serosurvey across four age strata: 15–19, 20–24, 25–29 and 30–39 years. Sera were tested for MR immunoglobulin G antibodies (IgG) using commercial enzyme-linked immunosorbent assays. We classified sera as seropositive, seronegative or indeterminate per manufacturer's instructions, and analyzed seroprevalence according to age strata, and rural or urban residence. We assessed immunity by estimating antibody concentrations (in international units per milliliter, or IU/mL) for seropositive and indeterminate sera. Measles IgG concentrations >0.12 IU/mL and rubella IgG concentrations >10 IU/mL were considered evidence of immunity.

**RESULTS:** Overall, 696 (94.1%) of 740 sera were seropositive and 20 (2.7%) were indeterminate for measles IgG; of these 716 (96.8%) sera had evidence of measles immunity. For rubella IgG, 691 (93.4%) sera were seropositive and 1 (0.1%) was indeterminate; of these 687 (92.8%) had evidence of rubella immunity. Measles seropositivity varied across age strata ( $P = 0.0056$ ); seropositivity increased from 88.6% among 15–19 year olds to 98.4% among 30–39 year olds (Cochran-Armitage trend test = 0.0006). There were no statistical differences in rubella seropositivity across age strata or measles seropositivity in urban versus rural areas.

**CONCLUSION:** Despite previous low vaccination coverage, results from this serosurvey indicate high levels of MR immunity in pregnant women, and contribute to the evidence for MR and CRS elimination from Haiti.

**KEYWORDS:** measles, rubella, seroprevalence, vaccine, IgG antibody

## Poster 1.3 Increasing Number and Disproportionate Morbidity and Mortality Associated with Multistate Foodborne Disease Outbreaks – United States, 1973–2010

**AUTHORS:** Von D. Nguyen, S. Bennett, E. Mungai, L. Gieraltowski, L. Gould

**BACKGROUND:** Approximately 1,000 foodborne disease outbreaks are reported in the United States each year. Multistate outbreaks are a particularly important source of information about foods contaminated during production and then distributed widely, resulting in broadly dispersed illnesses. We analyzed the trends and characteristics of multistate foodborne disease outbreaks.

**METHODS:** We reviewed outbreaks detected and reported to CDC's Foodborne Disease Outbreak Surveillance System from 1973–2010. Multistate outbreaks were defined as  $\geq 2$  persons who developed illness after exposure to a common food in multiple states. Analyses examined the number of illnesses, hospitalizations, deaths, implicated foods, and etiologic agents.

**RESULTS:** From 1973–2010, multistate foodborne disease outbreaks accounted for 234 (0.8%) of 27,989 total outbreaks and resulted in 3% of all outbreak-associated illnesses, 10% of hospitalizations, and 16% of deaths. The number of multistate outbreaks increased from an average of 3.4/year during the

first five years of the surveillance period to 16.8/year in the most recent five years. Most multistate outbreaks were caused by *Salmonella* (49%) and Shiga toxin-producing *E. coli* (STEC, 26%). Among 96 *Salmonella* outbreaks with a food reported, most were attributed to fruits/nuts (24%), vine or stalk vegetables (20%), and sprouts (17%). Among 57 STEC outbreaks, most were attributed to beef (56%) and leafy green vegetables (23%).

**CONCLUSIONS:** From 1973–2010, reported multistate outbreaks accounted for an increasing number of foodborne disease outbreaks and contributed a disproportionate share of outbreak-associated morbidity and mortality. Knowing the implicated foods and pathogens can help to identify important sources of contamination and inform the interventions of regulatory agencies and industry to improve the safety of our food supply.

**KEYWORDS:** disease outbreak, foodborne diseases, food, *Salmonella*, *Escherichia coli*



## Poster 1.4 No Bones About It: Human *Salmonella* Infantis Infections Linked to Dry Dog Food – United States and Canada, 2012

**AUTHORS:** Maho Imanishi, C. Schwensohn, D. Rotstein, K. Arends, A. Hunt, L. Denny, M. Achen, J. Cui, J. Tataryn, D. Woody, R. Reimschuessel, C. Barton Behravesh

**BACKGROUND:** *Salmonella* infections linked to animal contact cause ~130,000 illnesses annually in the United States. Forty-six million (35%) U.S. households own a dog and many feed dry dog food. In April 2012, *Salmonella* Infantis (SI) was detected in an unopened bag of Company X dry dog food collected during routine retail surveillance. PulseNet, a national bacterial subtyping network, identified recent human infections of SI with the same genetic fingerprint found in the dog food sample (outbreak strain).

**METHODS:** A case was defined as illness in a person infected with the outbreak strain of SI occurring between 01/01/12–06/30/12. We collected information on exposures including pet foods from case-patients, and cultured animal, pet food, and environmental specimens for *Salmonella*. We conducted traceback investigations, and monitored FDA's consumer complaint system for animal illnesses.

**RESULTS:** We identified 52 cases in 21 states and Canada; 37% were children aged  $\leq 2$  years; 32% were hospitalized.

Seventy-six percent (28/37) reported dog contact; of 21 case-patients who remembered the dog food brand, 57% reported a brand produced at Plant X. The outbreak strain was isolated from opened and unopened bags of dog food produced at Plant X, and fecal specimens from dogs that ate Company X dog food. Company X recalled >30,000 tons of dry dog and cat food produced at Plant X. We identified 37 dog illnesses involving recalled products.

**CONCLUSIONS:** One health collaboration on epidemiologic, laboratory, and traceback investigations linked dry dog foods produced at Plant X to human and dog illnesses. More efforts are needed to increase awareness among pet owners, healthcare professionals, and the pet food industry on risk of illness associated with dry pet food and treats.

**KEYWORDS:** dog, food, outbreaks, pets, salmonellosis, zoonoses

## Poster 1.5 Are You Prepared? Visitor Trip Planning and Safety Information Gathering at Zion National Park – Utah, 2012

**AUTHORS:** Erin M. Parker, M.G. Johnson, S. Tarrant, M. Ballesteros, J. Gilchrist, S. Newman, T. Tomlinson, C. Purcell

**BACKGROUND:** Injury is the leading cause of death among Americans aged 1 to 44. Each year approximately 6,000 visitors are seriously injured in US National Parks. From 2006–2010, Zion National Park had 13 million visitors and responded to 581 injuries, including 15 fatalities, with falls the primary cause. In an effort to improve safety communication to visitors, Zion and the National Park Service invited CDC to conduct a survey on how visitors plan their trips and obtain safety information before and during their visits.

**METHODS:** From June 24–July 12, 2012, CDC fellows recruited a convenience sample of 500 park visitors aged 18+ at Zion. Respondents completed a self-administered questionnaire. Data were entered in Epi-Info™ 7 and descriptive statistics were generated using SAS® 9.2.

**RESULTS:** Among respondents, 69% decided to visit Zion at least one month prior, with 85% doing pre-trip information gathering. Eighty-one percent used the internet

to plan and 80% of those used the Zion website. Forty-three percent sought out safety information prior to visiting, and 48% sought out safety information at the park. However, 89% reported exposure to safety information from at least one source at Zion, most commonly the visitor center (60%), park rangers (31%), and shuttle stops (28%). The most frequently recalled in-park safety messages were related to flash flooding, feeding wildlife, and drinking water — the messages depicted on the backs of park shuttles.

**CONCLUSIONS:** Most visitors preplan and use the park website, but fewer than half seek out safety information. Zion can increase exposure to safety messages by using the website more strategically. Zion can also expand the use of key safety messaging on shuttle buses, ubiquitous in the park.

**KEYWORDS:** wounds and injuries, safety, recreation, communication

## Poster 1.6 A Knowledge, Attitudes, and Practices Survey to Inform a Typhoid Fever Intervention Campaign – Kasese District, Rural Western Uganda, 2012

**AUTHORS:** Jolene H. Nakao, M. Walters, K. Date, A. Blackstock, A. Mubiru, Y. Baseka, E. Mbidde, J. Lule, J. Sabiiti, B. Nygren, E. Mintz

**BACKGROUND:** Typhoid fever (TF) causes >21 million illnesses and 216,000 deaths annually worldwide. In Kasese District, Uganda, a persistent outbreak of TF from contaminated water resulted in >2,855 suspected cases since January 2008. To inform safe water and vaccine interventions, we conducted a household-level knowledge, attitudes, and practices survey in five subcounties with high TF incidence.

**METHODS:** Cluster sampling was used to randomly select up to six households from each of 50 randomly chosen villages. An adult in each household was interviewed about TF, vaccinations, water, sanitation and hygiene using a standardized questionnaire. We calculated frequencies and odds ratios.

**RESULTS:** Of 244 respondents, 194 (81%) had heard of TF; however, many of them could not correctly identify one cause (31%), symptom (28%), or prevention method (26%). Twenty-nine percent of respondents reported treating their drinking water within the preceding month; treatment by

boiling or chlorination was associated with knowledge that these practices prevent TF (OR: 3.25; 95% CI: 1.37–7.68). Almost all respondents (98%) were willing to receive a free TF vaccination, but indicated that before being vaccinated, they would want to know about the vaccine's purpose (68%) and safety (24%). Respondents preferred to receive health information through radio (62%), worship sites (40%), and village health teams (39%), and wanted local leaders (75%), village health teams (36%), health facilities (29%), and religious leaders (27%) to be involved in a vaccine campaign.

**CONCLUSIONS:** An intervention in Kasese should include information on causes, symptoms, and prevention of TF disseminated through local leaders, health facilities, religious gatherings, and radio. TF education may increase water treatment among Kasese residents. Typhoid vaccination is acceptable in Kasese and should be strongly considered.

**KEYWORDS:** typhoid fever; *Salmonella* Typhi; Uganda; vaccination; outbreaks; questionnaires

## Poster 1.7 Clam-Associated Vibriosis, United States – 1988–2010

**AUTHORS:** Rachel B. Slayton, A. Newton, A. DePaola, J. Jones, B. Mahon

**BACKGROUND:** An estimated 80,000 *Vibrio* illnesses, 500 hospitalizations, and 100 deaths occur annually in the United States. In 2007, the Council of State and Territorial Epidemiologists made all *Vibrio* infections nationally notifiable. Infections associated with clam consumption have been well documented; however, vibriosis prevention programs have focused largely on risk reduction strategies for oysters.

**METHODS:** We analyzed infections reported to Cholera and Other *Vibrio* Illness Surveillance (COVIS) from 1988 through 2010. We categorized domestically acquired, seafood-associated illnesses by whether the patient consumed “no clams” or “any clams” and defined a subset of patients in the “any clam” category who reported “only clams.” We analyzed demographic, clinical, and microbiological information and summarized clam preparation and harvest information.

**RESULTS:** Of 3,079 reports analyzed, 2,312 (75%) had clam consumption information. Clams were associated with at least 3% (“only clams”) and as many as 18% (“any

clams”) of these cases. Among patients who consumed “only clams,” *V. parahaemolyticus* was the most commonly reported species (72 reports, 77%), followed by *V. vulnificus* (4 reports, 4%). Illnesses may have been more severe in patients who consumed “only clams” than “no clams”; for *V. parahaemolyticus*, hospitalization rates were higher (29% v. 19%), and for *V. vulnificus*, both hospitalization (100% v. 92%) and death (50% v. 41%) rates were higher. Implicated clams were usually harvested from the Atlantic and eaten raw. Among 8 investigations of contributing factors, only a single case of improper storage, temperature, or cross-contamination, was reported.

**CONCLUSION:** Clam-associated infections account for a substantial minority of *Vibrio* infections and may be more severe than other *Vibrio* infections. Comprehensive prevention programs must address the risks associated with clams as well as oysters.

**KEYWORDS:** surveillance, foodborne diseases, Bivalvia, Vibrionaceae

## Poster 1.8 Behaviors Among HIV-Positive Ukrainian Street Youth Associated with a Risk of Bridging HIV-Infection to Non-Street Youth, 2008

**AUTHORS:** Lina M. Nerlander, L. Zapata, R. Yorick, H. Skipalska, R.M. Smith, D. Kissin, D. Jamieson, C. Vitek, S. Hillis

**BACKGROUND:** Among HIV-infected street youth (living part- or full-time on the streets) little is known about behaviors associated with HIV-transmission to youth not spending time on the streets (non-street youth). We aimed to determine prevalences and predictors of such “bridging behaviors”: inconsistent condom use and needle sharing between HIV-positive street youth and non-street youth.

**METHODS:** In 2008, 171 street youth in three Ukrainian cities were identified as HIV-infected after testing of eligible participants ages 15–24 following random selection of venues. Using data from these youth, we calculated prevalence estimates of bridging behaviors with non-street youth and assessed predictors using logistic regression.

**RESULTS:** Two-thirds of HIV-infected street youth exhibited bridging behaviors, including 78.3% of girls and 84.2% of those involved in transactional sex. More than 65% of girls, working youth, and youth who “never” or “sometimes” slept on the streets used condoms inconsistently.

More than 35% of boys, orphaned youth, and those on the streets  $\leq 2$  years shared needles. In multivariable analysis, inconsistent condom use was associated with being female (adjusted prevalence ratio [aPR]: 1.25, 95% CI: 1.09–1.44), working (aPR: 1.18, 95% CI: 1.03–1.36), multiple partners (aPR: 1.37, 95% CI: 1.19–1.58) and “never” (aPR: 1.35 95% CI: 1.14–1.61) or ‘sometimes’ (1.34 95% CI: 1.02–1.76) versus “always” sleeping on the street. Needle sharing was associated with being male (aPR: 1.41, 95% CI: 1.02–1.95), orphaned (aPR: 2.34, 95% CI: 1.82–3.01), and  $< 2$  years on the streets (aPR 1.76, 95% CI: 1.49–2.09).

**CONCLUSIONS:** Bridging behaviors between HIV-infected street youth and non-street youth are common. Efforts are needed to prevent HIV-transmission into the general population, including addressing the needs of street youth.

**KEYWORDS:** homeless, orphan, Ukraine, HIV, social networking, needle sharing, unsafe sex, epidemiology

## Poster 1.9 Findings from the Year of Population-Based Active Surveillance for Legionellosis – United States, 2011

**AUTHORS:** Kathleen L. Dooling, K. Toews, L. Hicks, L. Garrison, R. Carpenter, G. Giambone, E.M. Parker, S. Petit, J. Thompson, R. Najera, R. Mansmann, R. Lynfield, B. White, G. Langley

**BACKGROUND:** *Legionella*, a bacterium spread via inhalation of bacilli in aerosolized water, can cause severe pneumonia. According to national passive surveillance, age-adjusted legionellosis incidence increased from 0.4 to 1.3 cases/100,000 population between 2000 and 2011. We present the first year of population-based active surveillance for legionellosis to assess incidence, disease severity and opportunities for prevention.

**METHODS:** We initiated active legionellosis surveillance within the Active Bacterial Core surveillance (ABCs)/Emerging Infections Program Network. A confirmed case of legionellosis is defined as isolation of *Legionella* from respiratory culture, detection of *Legionella* antigen in urine or seroconversion. We analyzed 2011 case information collected from medical chart reviews. We used 2011 postcensal estimates for population denominators and to age-adjust incidence rates. We analyzed unadjusted odds of death by race.

**RESULTS:** The surveillance population was approximately 36 million people in 10 states. ABCs detected 483 confirmed

cases; 78% of patients were  $> 50$  years old and 63% were male. The age-adjusted incidence was 1.4 cases/100,000 population — 1.2 cases/100,000 in whites and 2.3 cases/100,000 in blacks. Hospitalization occurred in 473 (98%) cases, ICU admission in 184 (38%) and death in 46 (10%). Blacks were not more likely to die from legionellosis than non-blacks (odds ratio 0.6, 95% CI 0.3–1.3). Most patients (90%) lived in the community during disease incubation; 22 (5%) resided in healthcare settings.

**CONCLUSION:** Legionellosis incidence was similar in active and passive surveillance. Active surveillance elucidated racial disparities in incidence but not case fatality. Prevention efforts should ensure implementation of recommended measures to prevent legionellosis in healthcare settings along with studies to understand risks in the community. The underlying reasons for increasing incidence and racial disparity require further investigation.

**KEYWORDS:** pneumonia, legionellosis, racial disparity, healthcare-associated infection, active surveillance

## Poster 1.10 Human Papillomavirus Vaccination Status and Current Contraception Choices in Young Women with Previous Sexual Experience: Data from the 2006–2010 National Survey of Family Growth (NSFG)

**AUTHORS:** Kenneth B. Quinto, K. Schoendorf, S. Lukacs, L. Akinbami

**BACKGROUND:** Human papillomavirus (HPV) is the most common sexually transmitted infection (STI) in the US. Controversy over HPV vaccination includes possible risky sexual behavior due to perceived protection from STIs, though research has not supported this theory. No known studies show whether vaccine receipt affects contraception choices.

**METHODS:** Using 2006–2010 NSFG data, we included 1,629 women ages 15–24 years who reported knowing their HPV vaccination status and ever having sex, were not currently pregnant or seeking pregnancy, and were not postpartum. We assessed the relationship between HPV vaccination status and current contraceptive choices (non mutually exclusive categories: barrier, hormonal, none). Separate multivariate models (SUDAAN software) for each contraceptive option included race; religion; mother's education; poverty; health insurance; STI counseling, testing, or treatment in the past year; age at first intercourse; and number of lifetime male partners.

**RESULTS:** Overall, 29.5% of women used a barrier method, 45.3% hormonal methods, and 25.5% reported no contraception. There was no difference in barrier method use by vaccination status (adjusted odds ratio [aOR]: 0.96; 95% confidence interval [CI]: 0.6–1.5 for receipt versus not). Women who received the HPV vaccine had increased odds of hormonal contraception (aOR: 2.09; 95% CI: 1.6–2.8) and lower odds of no contraception (aOR: 0.59; 95% CI: 0.4–0.8).

**CONCLUSION:** HPV vaccinated young women were less likely than unvaccinated women to fail to use any contraception, were as likely to use a barrier method, and more likely to use hormonal methods. These results suggest that women who receive HPV vaccine are as likely to use protection effective against STIs and more likely to use effective contraception than women without vaccine receipt.

**KEYWORDS:** HPV vaccines, contraception, safe sex, barrier contraception, contraceptive agents

## Poster 1.11 Progress in Reducing National Burden of Invasive Methicillin-Resistant *Staphylococcus aureus* Infections — United States, 2005–2010

**AUTHORS:** Raymund B. Dantes, Y. Mu, R. Belflower, D. Aragon, G. Dumyati, L. Harrison, F. Lessa, R. Lynfield, J. Nadle, S. Petit, S. Ray, W. Schaffner, J. Townes, S. Fridkin

**BACKGROUND:** Methicillin-resistant *Staphylococcus aureus* (MRSA) continues to be one of the most common antimicrobial-resistant pathogens in community and healthcare settings. We describe national estimates of invasive MRSA infections in 2010 and compare them with 2005 estimates.

**METHODS:** Population-based surveillance for invasive MRSA in 9 metropolitan areas with approximately 19 million persons was performed from 2005 through 2010. A case was defined as MRSA cultured from a normally sterile body site without MRSA culture in the prior 30 days, and further classified as hospital-onset (HO, cultured >3 days after admission), health care-associated community-onset (HACO, cultured ≤3 days after admission and/or either dialysis, hospitalization, surgery, long-term care residence in the prior year, or presence of a central vascular catheter within 2 days prior to MRSA culture), or community-associated (CA) if none of the previous criteria were met. National estimates were calculated using US Census and US

Renal Data System data, adjusting for age, race, gender, and receipt of chronic dialysis.

**RESULTS:** An estimated 82,042 (95% confidence interval [CI]: 79,718–84,411) invasive MRSA infections occurred nationally in 2010 (compared to 111,345 in 2005); of these, 13,799 (95% CI: 12,875–14,789) were CA, 51,290 (95% CI: 49,461–53,197) were HACO, and 15,744 (95% CI: 14,758–16,796) were HO. Adjusted national estimated incidence rates have decreased since 2005: CA by 20.3% (18.5–22.1%), HACO by 22.7% (21.8–23.6%), and HO by 48.3% (47.4–49.4%,  $P < 0.001$  for all comparisons).

**CONCLUSION:** An estimated 29,300 fewer invasive MRSA infections occurred in the United States in 2010 compared to 2005, with greatest declines in hospital-onset infections. Effective strategies for preventing infections outside acute care settings will have the greatest impact on reducing the US national burden of invasive MRSA infections.

**KEYWORDS:** methicillin-resistant *Staphylococcus aureus*, surveillance

## Poster 1.12 Multi-District Marburg Hemorrhagic Fever Outbreak – Uganda, 2012

**AUTHORS:** Ilana J. Schafer, J.F. Wamala, B. Knust, T. Shoemaker, U. Ströher, S. Balinandi, A. Tumusiime, A. Gibbons, K. Dodd, S. Campbell, L. Nayakarahuka, S. Nichol, P. Rollin

**BACKGROUND:** On October 18, 2012, an outbreak of Marburg hemorrhagic fever (MHF) was identified in Kabale district, Uganda. Caused by Marburgvirus (family Filoviridae), MHF outbreaks produce devastating losses, with fatality rates reaching 90%. Retrospective and prospective epidemiologic and laboratory investigations were immediately launched to expeditiously characterize and control the outbreak.

**METHODS:** Case report forms detailing epidemiologic and clinical information were completed for patients meeting the case definition. Blood samples were tested by reverse-transcription polymerase chain reaction (RT-PCR) and antigen, immunoglobulin M, and immunoglobulin G serology. Cases were classified based on combined epidemiologic and laboratory data and preliminary descriptive analysis was performed.

**RESULTS:** Fifteen laboratory confirmed, 12 probable, and 11 suspect cases were identified across six districts. Retrospective case finding traced the outbreak origin to July, 2012. Nine (60.0%) confirmed cases demonstrated acute infections (RT-PCR positive) and six (40.0%) were

convalescent (RT-PCR negative but antibody positive). Among 27 confirmed and probable cases the case fatality rate was 55.6%. Age range was 8 days–70 years (median: 26 years) and 17 (63.0%) were female. The most common symptoms at presentation included fever (92.6%), appetite loss (77.8%), vomiting (74.1%), headache (70.4%), and fatigue (70.4%). Eleven (40.7%) demonstrated hemorrhagic symptoms, which was significantly associated with fatality (OR: 6.7;  $P = 0.03$ ). The last acute case was isolated 11 days after identification of the outbreak.

**CONCLUSIONS:** This was the largest MHF outbreak in Uganda's history, and one of three filovirus outbreaks in Uganda over a four month period. The majority of patients were female and had non-hemorrhagic and non-specific symptoms. Case fatality was lower than in previous large MHF outbreaks. Prompt investigation and response efforts quickly controlled the outbreak.

**KEYWORDS:** Marburg hemorrhagic fever, Filoviridae, infectious disease outbreaks, Uganda

## Poster 1.13 National Estimates of Sickle Cell Disease with Pediatric Stroke Among African-Americans – United States, 1997–2009

**AUTHORS:** Charlotte Baker, A. Grant

**BACKGROUND:** Sickle cell disease (SCD) is a known risk factor for stroke, an important and potentially preventable cause of death, disability, and hospitalization among children. A child with SCD has a stroke risk 333 times higher than a child without SCD or heart disease. The literature is inconsistent, but more than 20% of children with SCD have a stroke and are subject to repeat strokes. The purpose of this study is to determine the contribution of SCD to stroke among the African-American pediatric population.

**METHODS:** We used data from the Healthcare Cost and Utilization Project (HCUP) Kids' Inpatient Database (KID) 1997–2009. African-American patients aged 6 months to 18 years with  $\geq 1$  ICD-9-CM discharge diagnosis code for ischemic or hemorrhagic stroke were included. Data were weighted to provide national estimates and analyzed using SAS survey procedures. Medical conditions, including SCD, known to be risk factors for pediatric stroke were ranked by the frequency in which they appeared as co-existing diagnoses, first for all strokes and separately for ischemic and hemorrhagic stroke.

**RESULTS:** During the 13-year period, there were 2809 stroke diagnoses among 2,428,412 discharges for African-American children. A SCD diagnosis was present in 21% of stroke discharges overall, 29% of ischemic stroke discharges, and 8% of hemorrhagic stroke discharges. Most (87%) of the stroke and SCD cases were ischemic stroke. SCD was the most common co-existing diagnosis for African-American children with ischemic stroke and the 7<sup>th</sup> most common for hemorrhagic stroke.

**CONCLUSIONS:** SCD is a leading risk factor for pediatric stroke in African-American children. Reducing the number of strokes among children with SCD would have a significant impact on the rate of strokes among African-American children.

**KEYWORDS:** stroke; hemorrhagic; ischemic; hospitalization; anemia, sickle cell

## Poster 1.14 Use of Laboratory Reports as Predictors of West Nile Virus Disease Cases — Texas, 2008–2012

**AUTHORS:** Stephanie J. Yendell, J. Taylor, B. Biggerstaff, J. Schuermann, D. Hamaker, L. Tabony, J. Staples, M. Fischer

**BACKGROUND:** In 2012, Texas reported >1,750 West Nile virus (WNV) cases, twice that of any previous year. During the outbreak, questions arose about numbers of cases that had occurred but were not yet reported. We evaluated WNV laboratory reports as possible early indicators of WNV disease cases.

**METHODS:** WNV laboratory results reported to Texas Department of State Health Services (TxDSHS) through the National Electronic Disease Surveillance System (NEDSS) from January 2008–November 2012 were compared to confirmed and probable WNV disease cases reported to TxDSHS. We calculated sensitivity and positive predictive value (PPV) to estimate the number of cases expected for each positive laboratory report. We determined medians and interquartile ranges (IQR) for laboratory report lead times and compared them using Wilcoxon rank sum test.

**RESULTS:** Of 8,813 WNV laboratory reports, 5,205 (59%) were IgG antibody tests, 864 (10%) were duplicates, and 415 (5%) were negative results. Of the remaining 2,329 laboratory

reports consistent with recent WNV infection and 2,051 cases reported to TxDSHS, 1,759 reports were present in both systems. The laboratory database sensitivity was 86% (1,759/2,051) and PPV was 76% (1,759/2,329); therefore, for every 10 positive laboratory reports, we expect 8.8 (95% confidence interval: 8.4–9.2) cases to be reported. Most (92%) laboratory reports preceded case reports with an average lead time of 7 days (IQR 3–14). Electronic laboratory reports provided a longer lead time (median: 8 days; IQR: 4–14) than manually-entered reports (median: 2 days; IQR: 0–4) ( $P < 0.001$ ).

**CONCLUSION:** Appropriately filtered laboratory reports are useful for estimating numbers of WNV disease cases and might provide more timely information to plan and assess the utility of public health interventions.

**KEYWORDS:** West Nile virus, disease outbreaks, public health surveillance, disease notification, medical informatics, Texas

## Poster 1.15 A Spicy Catch: *Salmonella* Bareilly and *Salmonella* Nchanga Infections Associated with a Raw Scraped Ground Tuna Product — United States, 2012

**AUTHORS:** W. Thane Hancock, T. DeSalvo, L. Gaul, H. Hanson, D. Schoonmaker-Bopp, J. Vostok, L. Saathoff-Huber, Q. Phan, E. Luckman, T. DuVernoy, W. Culpepper, K. Blickenstaff, J. Cripe, S. Lance, C. Bailey, I. Williams, K. Neil, for the *Salmonella* Bareilly Outbreak Investigation Team

**BACKGROUND:** *Salmonella* causes ~1.2 million illnesses and 400 fatalities annually in the United States; *Salmonella* serotypes Bareilly (SBr) and Nchanga (SNc) are uncommon. In March 2012, states and CDC began investigating a multistate outbreak of SBr infections. In April 2012, a SNc outbreak was identified with similar demographic, geographic, and exposure characteristics as the SBr outbreak; the investigations were merged.

**METHODS:** A case was defined as infection with the outbreak strains of SBr or SNc occurring during 01/01/2012–07/25/2012. Case-patients were interviewed with hypothesis generating questionnaires. Traceback and environmental investigations were conducted.

**RESULTS:** We identified 425 cases in 28 states and District of Columbia. Fifty-five case-patients were hospitalized; none died. Forty-three (81%) of 53 case-patients interviewed reported eating sushi versus 5% of healthy persons who reported eating “sushi, sashimi or ceviche” in the 2006–2007

FoodNet Population Survey. Of the 43 who reported eating sushi, 36 (84%) consumed an item containing “spicy tuna.” Traceback investigations implicated frozen raw scraped ground tuna from Company A in India. An outbreak strain was isolated from 67 (92%) of 73 product samples. Company A’s importer recalled 58,828 pounds of raw tuna. FDA placed Company A’s products on Import Alert; another contaminated shipment of tuna was identified and denied entry into United States commerce.

**CONCLUSIONS:** The investigation implicated raw frozen tuna from India as the source of the outbreak. This is the first *Salmonella* outbreak linked to scraped ground tuna, and the first documented outbreak of SNc in the United States. The recall and Import Alert likely prevented additional illnesses. The outbreak demonstrates the global aspect of food production and the increasing reliance on food safety systems of other countries.

**KEYWORDS:** food poisoning, *Salmonella*, disease outbreaks

**SPECIAL SESSION: Dr. James H. Steele 100<sup>th</sup> Birthday  
Celebration Luncheon  
12:30 pm  
Oakwood Room (A, B)**

**Dr. James H. Steele (Honorary EIS '75)** was an early CDC leader and pioneer in the field of veterinary public health. The veterinarians and EIS alumni of CDC/ATSDR are hosting a special session immediately after the CDC Veterinarian's Lunch. Although Dr. Steele is unable to join us in Atlanta, he will share remarks through a short video presentation. Colleagues and past students will also make remarks about special memories and Dr. Steele's contributions to public health science and practice.

Dr. James H. Steele received his Doctor of Veterinary Medicine degree from Michigan State College in 1941 and a Master's of Public Health from Harvard University in 1942. He went on to establish the veterinary division of the Centers for Disease Control and Prevention (CDC) in 1947. He then boldly introduced the principles of Veterinary Public Health to the U.S. and countries all around the globe. His outstanding medical achievements have saved countless human and animal lives and has helped the world to realize higher standards of living through a better understanding of the epidemiology of diseases shared by animals and man — the zoonoses. As a U.S. Public Health Service officer, he became the first Assistant Surgeon General for Veterinary Affairs and later was appointed as Deputy Assistant Secretary for Health & Human Services at the rank of Admiral (two stars). He has received numerous awards over his illustrious career to include the Surgeon General's Medallion in 2006, presented by Surgeon General Richard H. Carmona. In 2012, Dr. Steele received the OIE (World Animal Health Organization) Medal of Merit. Through the years, he has been a brilliant veterinary leader and supporter of the philosophy of One Health, aspiring to improved quality of life for people and animals around the world. Dr. Steele founded the American Board of Veterinary Public Health in 1950 which later became the American College of Veterinary Preventive Medicine.

Dr. Steele celebrated his 100<sup>th</sup> birthday on April 3, 2013.



*I don't know the question, but sex is definitely the answer.*  
—Woody Allen

MONDAY

**SESSION C: Sexually Transmitted Diseases**  
1:30–2:55 pm

**Ravinia Ballroom**

**MODERATOR:** Gail Bolan

**1:35 Extragenital Gonorrhea Infection Among Men Who Have Sex with Men – Sexually Transmitted Disease Surveillance Network, United States, 2010–2012**

**AUTHORS:** Monica E. Patton, S. Kidd, M. Stenger, J. Braxton, L. Asbel, K. Bernstein, M. Eaglin, M. Jespersen, R. Kerani, C. Mettenbrink, M. Mohamed, P. Pathela, C. Schumacher, A. Stirland, J. Stover, R. Kirkcaldy, H. Weinstock

**BACKGROUND:** Gonorrhea is the second most commonly reported notifiable disease in the United States and is associated with increased risk of HIV transmission. In particular, rectal gonorrhea is a risk factor for HIV acquisition among men who have sex with men (MSM). Because extragenital (pharyngeal or rectal) gonorrhea is often asymptomatic, CDC recommends that MSM be screened annually for gonorrhea at exposed urethral, pharyngeal, and rectal sites. We sought to describe extragenital gonorrhea testing and infections among MSM attending sexually transmitted disease (STD) clinics.

**METHODS:** The STD Surveillance Network (SSuN) collects standardized data from all patients attending 42 STD clinics in 10 states. We examined records of MSM attending these clinics during July 2011–June 2012 and assessed the proportion tested for extragenital gonorrhea and the positivity of those tests during the preceding 12 months.

**RESULTS:** During our study period, 23,023 MSM attended

clinics that participate in SSuN. Of these, 19,165 (83.2%) had been tested for urogenital gonorrhea, 12,696 (55.1%) for pharyngeal gonorrhea, and 9,658 (41.9%) for rectal gonorrhea at least once during the past year. Of MSM tested, 11.5% had at least one positive test result for gonorrhea at the urethra, 7.6% at the pharynx, and 10.1% at the rectum. Of MSM tested at the urethra and an extragenital site, 72% with pharyngeal gonorrhea and 73% with rectal gonorrhea tested negative for uro-genital gonorrhea and would not have been treated if treatment were based on urethral testing alone.

**CONCLUSIONS:** Extragenital gonorrhea is common in MSM tested at STD clinics, but many MSM are not tested. Extragenital testing can detect additional infections and may help identify MSM at high risk of acquiring or transmitting HIV.

**KEYWORDS:** gonorrhea, sexually transmitted diseases, STDs, extragenital testing



## 1:55 Validating Elimination of Mother-to-Child Transmission of HIV and Congenital Syphilis – Chile, 2012

**AUTHORS:** Christine E. Ross, K. Hoover, A. San Martin, G. Tao, M. Alonso, R. De Aguila, M. Kamb

**BACKGROUND:** The Pan American Health Organization (PAHO) has committed to eliminating mother-to-child transmission (MTCT) of HIV and congenital syphilis (CS) in Latin America and the Caribbean by 2015. In September 2012, we piloted a method for validating elimination of MTCT of HIV and CS in Chile, a country with an established elimination program and preliminary reports suggesting elimination had been achieved.

**METHODS:** We used PAHO targets: three consecutive years with CS incidence of  $\leq 0.5$  cases per 1,000 live births (LB); pediatric HIV incidence of  $\leq 0.3$  cases per 1,000 LB; and HIV MTCT rate of 2% (percentage of infants born to HIV-infected mothers and HIV-positive by virologic testing or by serologic testing at 18 months). We analyzed Chile's national surveillance data for 2009–2011 to calculate target measures and assess their stability, and used linear regression to determine trends for one region's data for 1999–2011.

**RESULTS:** National CS incidence was 0.24 cases per 1,000

LB in 2011 and was stable during 2009–2011. Two of 15 regions exceeded the CS target (1.12 and 1.26 cases per 1,000 LB in 2011); one of these regions had an increasing trend ( $P = 0.014$ ). Pediatric HIV incidence was 0.04 cases per 1,000 LB in 2011 and was stable during 2009–2011. The HIV MTCT rate consistently exceeded the target and was 5.1% in 2011.

**CONCLUSIONS:** The piloted method was useful in validating elimination of MTCT of HIV and CS. Although Chile achieved the national CS elimination target, regional challenges remain. Failure to reach the HIV MTCT target despite a low pediatric HIV incidence suggests that further work is needed to address gaps in services for hard-to-reach populations.

**KEYWORDS:** HIV, syphilis, infectious disease transmission, vertical/prevention and control, Pan American Health Organization, Chile

## 2:15 *Chlamydia trachomatis* Epidemiology and Coinfection Screening Practices – Veterans Affairs Palo Alto Health Care System, 2008–2011

**AUTHORS:** Alison M. Ludwig, P. Schirmer, C. Lucero-Obusan, R. Ryono, M. Holodniy

**BACKGROUND:** Chlamydia is the most commonly reported bacterial sexually transmitted disease in the United States and can cause pelvic inflammatory disease, infertility, and ectopic pregnancy. Little is known about chlamydia epidemiology within the Veterans Affairs Palo Alto Health Care System (VAPAHCS). We described chlamydia epidemiology and coinfection screening practices at VAPAHCS.

**METHODS:** We reviewed *Chlamydia trachomatis* nucleic acid amplification and cultures performed at VAPAHCS for 2008–2011. We identified positive test results by using infection control records, diagnostic and procedure code queries of patient visits, and direct queries of VA electronic medical records. Chart reviews of patient demographics, laboratory results, and clinical course were performed.

**RESULTS:** During 2008–2011, a total of 3,039 chlamydia tests were performed. A total of 133 (4.4%) tests were positive for chlamydia. Among Veterans with chlamydia (median age: 29 years; range: 20–80 years), 21 (16%) were female. Among 122 veterans with race/ethnicity identified, 56 (46%) were

non-Hispanic white; 17 (14%) were non-Hispanic black; 27 (22%) were Hispanic; and 22 (18%) were other races/ethnicities. Compared with male Veterans, a significantly higher proportion of female Veterans were asymptomatic (women, 62%; men, 32%;  $P = 0.009$ ). Among Veterans eligible for *Chlamydia* reinfection screening 3–12 months after diagnosis, only 12/91 (13%) were rescreened. Screening for coinfection occurred among all patients for gonorrhea, 86/133 (65%) for HIV, and 16/44 (36%) for syphilis.

**CONCLUSION:** Although women comprise only 5% of Veterans served by VAPAHCS, 16% of chlamydia cases were among women and 62% were asymptomatic, indicating chlamydia among female Veterans might be underrecognized. Increased education of clinicians regarding chlamydia rescreening and screening for coinfection should be considered.

**KEYWORDS:** *Clostridium difficile*, norovirus, coinfection, cross infection

## 2:35 Using a Mobile Phone Application for Contact Identification of Syphilis Cases Among Men Who Have Sex with Men – Kansas, 2010–2012

**AUTHORS:** Suparna Bagchi, D.C. Hunt, I. Garrison, K. Bisgard, J. Vandeveld

**BACKGROUND:** During 2000–2010 in United States, reported syphilis rates increased from 2.1 to 4.5/100,000 population, attributed to men who have sex with men (MSM) transmission, accounting for 67% of reported cases. MSM anonymous partner-finding often involves using Grindr,<sup>®</sup> a mobile device location-based social networking tool. Disease intervention specialists (DIS) use traditional investigations (named contact interviews) but often cannot identify anonymous partners. To augment investigations, on April 15, 2012, Kansas DIS began using Grindr in addition to traditional methods. We evaluated the enhanced MSM syphilis contact identification and management.

**METHODS:** We reviewed all reported MSM-syphilis cases for October 1, 2010–October 31, 2012. After April 15, 2012 (enhanced case-finding period), DIS identified anonymous contacts by using Grindr user-identification on a mobile device. We compared the proportion of social and sexual partners successfully contacted and treated per MSM-syphilis case during enhanced case-finding period to those identified prior to that date.

**RESULTS:** Of the 129 MSM-syphilis cases, 42 (32.6%) were reported during enhanced case-finding period. Per MSM-syphilis case, the number of social partners contacted during enhanced case-finding (median: 6.5; range: 0–57) was higher than prior time-period (median: 1.0; range: 0–25;  $P < 0.001$ ) and not different by median number of sexual partners contacted. Compared with MSM-syphilis cases investigated prior to April 15, 2012, the proportion of sexual partners (24.3% versus 44.5%) and social partners (3.9% versus 16.3%) successfully treated was higher among MSM in the enhanced case-finding period ( $P < 0.001$ ).

**CONCLUSIONS:** The number of sexual and social partners successfully contacted and treated increased by using the Grindr social network. Health departments should consider using social networking tools to enhance MSM-syphilis investigations.

**KEYWORDS:** syphilis, prevention and control, Internet, homosexuality

***Vaccines are the tugboats of preventive health.***  
 — William Foege

**SESSION D: Vaccine-Preventable Diseases**  
**3:15–5:20 pm**

**Ravinia Ballroom**

**MODERATORS:** Jane Seward and Stephen Hadler

**3:20 Effectiveness of Rotavirus Vaccination Against Severe Childhood Diarrhea — Guatemala, 2012**

**AUTHORS:** Paul A. Gastañaduy, I. Contreras, J. McCracken, S. Benoit, C. Bernart, B. Chinchilla, U. Parashar, M. Patel

**BACKGROUND:** Concerns remain about lower effectiveness and waning immunity of oral rotavirus vaccines in poor populations, where enteric co-infections, co-morbidities, malnutrition, and unusual rotavirus strains are common. We evaluated vaccine effectiveness against severe rotavirus disease in Guatemala, one of the first low-income countries to implement routine rotavirus vaccination in 2010.

**METHODS:** A case-control evaluation was conducted in inpatient and emergency department settings in 4 hospitals during 2012. Card-confirmed vaccine history was compared between case-patients (children with laboratory-confirmed severe rotavirus diarrhea) and 2 sets of controls: non-diarrhea hospital controls (matched by date of birth  $\pm 30$  days) and rotavirus-negative diarrhea controls (adjusted for birth quarter). Vaccine effectiveness ((1-odds ratio of vaccination)  $\times 100\%$ ) was computed using logistic regression models.

**RESULTS:** We enrolled 190 case-patients, 564 non-diarrhea controls, and 243 rotavirus-negative controls. Case-patients and controls were similar for breastfeeding, birthweight,

maternal education, and socioeconomic variables. An uncommon G12P[8] strain, heterotypic to the vaccine strain, was identified in 90% of rotavirus cases. Effectiveness of a full vaccine series against severe rotavirus diarrhea was 75% (95% confidence interval [CI]: 51%–87%) with non-diarrhea controls, and 61% (CI: 22%–80%) with rotavirus-negative controls; partial vaccination (one dose) was 59% (CI: -58%–89%) and 62% (CI: -1%–86%) effective, respectively. No significant differences in effectiveness were observed between infants 6–11 months (61%; CI: -69–91) compared to children  $\geq 12$  months of age (78%; CI: 47–91) ( $P = 0.5$ ).

**CONCLUSIONS:** Rotavirus vaccination provides sustained protection through 2 years of life against severe rotavirus diarrhea caused by a heterotypic strain among Guatemalan children. This supports broader implementation of rotavirus vaccination in low-income countries where  $>90\%$  of the half million annual global deaths from rotavirus occur.

**KEYWORDS:** rotavirus, diarrhea, vaccine effectiveness, Guatemala

### 3:40 Duration of Protection Against Hepatitis A for the Current Two-Dose Vaccine Compared to a Three-Dose Vaccine Schedule in Children — Alaska, 1993–2011

**AUTHORS:** Gregory A. Racznik, L. Bulkow, M. Bruce, S. Negus, M. Snowball, C. Zanis, P. Spradling, E. Teshale, T. Hennessy, B. McMahon

**BACKGROUND:** The CDC estimated 17,000 hepatitis A infections for the United States in 2010. Vaccination for hepatitis A is recommended for all US children starting at age 12 months. Protection needs to last into adulthood when symptomatic disease is likely; however, the duration of vaccine protection and the need for booster doses is unknown. To address these questions, we evaluated antibody persistence in two groups of young adults that were vaccinated in childhood.

**METHODS:** We determined the geometric mean concentration (GMC) of hepatitis A antibody (anti-HAV) in a cross-sectional convenience sample of 12–24 year-olds vaccinated on a two-dose schedule (720 EU/dose) at ages 3–7 years. Results were compared to a cohort that received a three-dose schedule (360 EU/dose) at ages 3–7 years and who has been followed for 17 years. Anti-HAV levels were log-transformed and analyzed using simple (two-dose schedule) and repeated measures (three-dose schedule) analysis of

variance. A protective level was defined as anti-HAV  $\geq 20$  mIU/mL.

**RESULTS:** Throughout the follow-up period, anti-HAV protective levels were observed in 24 (100%) of 24 and 215 (96%) of 225 for the two- and three-dose recipients, respectively. No significant differences in GMC were observed between the cohorts at 10 ( $P = 0.467$ ), 12 ( $P = 0.496$ ), and 14 years ( $P = 0.175$ ) post-immunization. Protective antibody levels remain for 14 and 17 years for the two- and three-dose cohorts, respectively. GMCs remained stable for both groups for the last 5 years of follow-up.

**CONCLUSION:** The two- and three-dose schedules provide protective antibody levels for at least 14 years after vaccination, indicating a booster dose is not needed. Plateauing anti-HAV GMC levels suggest protective antibody levels may persist.

**KEYWORDS:** hepatitis A virus, inactivated hepatitis A vaccine, RNA viruses, enterovirus infections

### 4:00 Severity of Invasive Pneumococcal Disease in the Era of Pneumococcal Conjugate Vaccine Introduction

**AUTHORS:** Kathleen L. Dooling, A. Thomas, W. Schaffner, S. Petit, D. Aragon, A. Reingold, L. Harrison, M. Nichols, N. Bennett, M. Farley, B. Beall, R. Lynfield, C. Whitney, T. Pilishvili

**BACKGROUND:** Pneumococcus is a leading cause of pneumonia and meningitis deaths. Following 7-valent pneumococcal conjugate vaccine (PCV7) introduction in the U.S. in 2000, overall invasive pneumococcal disease (IPD) incidence and mortality declined, whereas non-PCV7-serotype IPD incidence increased. We evaluated if increases in non-vaccine type IPD led to changes in hospitalization or case fatality ratio (CFR) during 1998–2009.

**METHODS:** IPD cases, defined as pneumococcus isolated from a sterile site in a resident of an Active Bacterial Core surveillance jurisdiction, were classified as vaccine type (VT) and non-vaccine type (NVT). Using chi-square, we evaluated changes in CFRs, proportion of case-patients hospitalized, and proportion of case-patients with comorbid indications for pneumococcal vaccination, in two-year periods during 1998–2009. We evaluated predictors of CFR and hospitalization in multivariable logistic regression models separately for children and adults.

**RESULTS:** From 1998/99 to 2008/09, hospitalization among cases increased from 75.6% to 88.1% ( $P < 0.0001$ ),

whereas CFR was 10.2% pre-vaccine, 13.5% in 2001/02 ( $P < 0.0001$ ) and 10.3% in 2008/09 ( $P < 0.0001$  vs. 2001/02). The proportion of patients with comorbidities increased from 38.2% to 65.5% ( $P < 0.0001$ ). In a model including age and time period, comorbidities (odds ratio [OR] 2.2, 95% CI 1.8–2.6) and NVT (OR 1.2, 95% CI 1.0–1.3) were associated with increased odds of hospitalization among pediatric case-patients. Likewise, for adult patients, comorbidities (OR 1.3, 95% CI 1.2–1.4) and NVT (OR 1.2, 95% CI 1.1–1.3) were associated with increased odds of death.

**CONCLUSION:** Following PCV7 introduction, persons with IPD were more likely to have comorbidities, and comorbidities were the strongest independent predictor of severe outcomes, especially in children. IPD caused by NVT was associated with more severe outcomes than VT IPD.

**KEYWORDS:** pneumococcus, pneumococcal conjugate vaccine, case fatality ratio, serotype, risk factor

#### 4:20 Rates of Invasive Pneumococcal Disease Among Older Children with Immunocompromising Conditions – United States, 2007–2009

**AUTHORS:** Aaron M. Harris, R. Gierke, A. Payne, R. Link-Gelles, J. King, M. Chen, W. Schaffner, S. Petit, A. Thomas, N. Bennett, M. Farley, R. Lynfield, D. Aragon, A. Reingold, L. Harrison, M. Nichols, M. Moore, T. Pilishvili

**BACKGROUND:** Children with immunocompromising conditions (IC) are at highest risk of invasive pneumococcal disease (IPD), a leading cause of morbidity and mortality. CDC recommends use of 13-valent pneumococcal conjugate vaccine (PCV13) for all children aged <2 years, and 2–5 years with IC, including HIV/AIDS, sickle cell disease (SCD), or hematologic malignancies (HM). We evaluated IPD rates and outcomes to help determine whether CDC should extend the recommendation for 6–18 year olds with IC.

**METHODS:** IPD cases, defined as pneumococcus isolation from a sterile site, were identified among children with and without IC through the Active Bacterial Core Surveillance during 2007–2009, and projected to US population. The corresponding denominators were estimated using neonatal screening data for SCD, the National Program of Cancer Registries for HM, and CDC's HIV surveillance report. We estimated IPD rates (cases per 100,000 population) among children 6–18 years for HM and SCD (African-Americans only), and for <19 years for HIV.

**RESULTS:** During 2007–2009, 394 IPD cases were identified among 6–18 year-olds; 43 (11%) had IC (24 HM, 14 SCD, and 8 HIV/AIDS). IPD rates were higher among children with HM (2,564/100,000 vs. 2.4/100,000; Rate Ratio (RR): 1068), SCD (148/100,000 vs. 3.4/100,000; RR: 43.5), and HIV/AIDS (1,265/100,000 vs. 7.9/100,000; RR: 158) compared to those without. IPD case-children with IC had increased hospitalizations (72% vs. 68%;  $P<0.001$ ) and case-fatality ratios (7% vs. 3%;  $P=0.017$ ) compared to children without IC. PCV13-types caused 50% (HM), 38% (SCD), 75% (HIV), and 57% (without IC) of IPD.

**CONCLUSION:** Children aged 6–18 years with IC are at markedly increased risk of IPD and could benefit from routine vaccination with PCV13.

**KEYWORDS:** pneumococcal conjugate vaccine, *Streptococcus pneumoniae*, immunocompromising conditions, HIV/AIDS, sickle cell disease, hematologic malignancies

#### 4:40 Seroprevalence of Measles, Mumps, Rubella, and Varicella Antibodies in the United States Population, 2009–2010

**AUTHORS:** Emmaculate Lebo, D. Kruszon-Moran, W. Bellini, M. Marin, S. Bialek, G. Wallace, H. McLean

**BACKGROUND:** The United States documented the elimination of endemic measles in 2000 and endemic rubella and congenital rubella syndrome (CRS) in 2004. Reported mumps and varicella cases are at record low levels. It is necessary to monitor population immunity to these diseases to ensure that measles, rubella, and CRS elimination is maintained and incidence remains low for mumps and varicella.

**METHODS:** We tested samples collected from persons aged 6–49 years in the National Health and Nutrition Examination Survey during 2009–2010. Results from virus specific immunoglobulin G (IgG) testing were used to evaluate seroprevalence of antibodies to measles, rubella, mumps, and varicella by age, sex, race/ethnicity, and birthplace.

**RESULTS:** Of 5,652 participants, 5,054 (89.4 %) had samples for antibody testing. Measles, rubella, and mumps seroprevalence was 92.0% (95% Confidence Interval [CI]: 90.9%–93.0%), 95.3% (CI: 94.3%–96.2%), and 87.6% (CI: 85.8%–89.2%), respectively. Seroprevalence was significantly

higher for all 3 viruses in those aged 6–11 years compared to other age groups and among non-Hispanic blacks compared to non-Hispanic whites for measles and rubella ( $P<0.05$ ). Measles seroprevalence was lowest in those aged 30–39 years (87.9%, CI: 84.8%–90.6%). Mumps seroprevalence was lower in US-born persons compared with non-US born persons (86.6% vs. 92.3%;  $P<0.001$ ). Varicella seroprevalence was 97.8% (CI: 97.1%–98.3%), and lower in non-US born persons compared with US-born persons (95.6% vs. 98.2%;  $P<0.01$ ).

**CONCLUSIONS:** Seroprevalence was high for all 4 viruses in the US population during 2009–2010, however, measles and mumps seroprevalences were below the estimated population immunity levels (93%–95% and 90%–92%, respectively) needed for theoretical herd immunity. The lower seroprevalence among some groups suggest that they may represent populations at increased risk when importations occur in the U.S.

**KEYWORDS:** measles, mumps, rubella, chickenpox, seroepidemiologic studies, antibodies

**5:00 Nationwide Measles Outbreak – Democratic Republic of the Congo, 2010–2012**

**AUTHORS:** Heather M. Scobie, S. Calixte, E. Pukutu, R. Obama, S. Smit, T. Coulibaly, B. Masresha, M. Alleman, J. Goodson

**BACKGROUND:** Measles is a potentially fatal disease, and high population immunity (>93%) is necessary to prevent transmission. A large measles outbreak began in the Democratic Republic of the Congo (DRC) in mid-2010, despite introducing case-based measles surveillance, increasing estimated first dose measles-containing vaccine (MCV1) coverage from 57% to 71%, and conducting multiple subnational supplemental immunization activities (SIAs) to provide a second MCV dose, during 2004–2011. We evaluated surveillance and immunization program data to identify reasons for the ongoing outbreak.

**METHODS:** We defined the outbreak period as July 1, 2010–June 30, 2012. We analyzed aggregate and case-based measles surveillance data (including age, vaccination status and laboratory results), timing and extent of SIAs, and calculated national and subnational cumulative attack rates by dividing measles cases reported during the outbreak period (2 years) by the 2011 population.

**RESULTS:** Overall, 161,217 suspected measles cases were reported to aggregate surveillance from all 11 provinces

(attack rate: 206 cases/100,000 population). The median attack rate was 34 cases/100,000 (range: 7–92) in 5 provinces where SIAs occurred every 2–3 years, compared with 292 cases/100,000 (range: 34–722) in 6 provinces with a 4–5 year gap between SIAs. Case-based surveillance detected 5,781 suspected measles cases, among which 2,939 (51%) were confirmed. Children aged 9 months–4 years accounted for 1,750 (60%) confirmed cases; of these, 1,151 (66%) were unvaccinated or had unknown MCV vaccination status.

**CONCLUSIONS:** Low MCV1 coverage and delays between SIAs contributed to DRC's 2010–2012 measles outbreak. Strengthening case-based surveillance, increasing MCV1 coverage and performing high-quality, nation-wide SIAs every 2–3 years could aid in achieving the 2020 regional measles elimination goal.

**KEYWORDS:** measles, disease outbreak, measles vaccine, Democratic Republic of the Congo (DRC)

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**TUESDAY, APRIL 23, 2013**


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*Sometimes the questions are complicated,  
and the answers are simple.*

—Dr. Seuss

**CONCURRENT SESSION E1: Winnable Battles in Chronic Disease**  
8:30–10:15 am

**Ravinia Ballroom**

**MODERATOR:** Ursula Bauer

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**8:35 Relationship Between Two Perceptions about Energy Drinks  
and the Prevalence of Energy Drink Use Among Youth —  
United States, 2011**

**AUTHORS:** Gayathri S. Kumar, S. Park, S. Onufrak

**BACKGROUND:** Energy drinks (EDs), which are popular among youth, are often marketed as boosting energy and athletic performances. However, because most EDs contain high concentrations of caffeine and sugar, they increase risk of dehydration, provide excess calories, and can cause serious consequences like cardiac arrest. We examined the prevalence of ED consumption and its relationship with ED perceptions in youth.

**METHODS:** Using data from the 2011 YouthStyles Survey of US youth aged 12–17 years ( $n = 779$ ), we assessed the prevalence of self-reported ED consumption during the previous 7 days and ED perceptions — both overall and by certain sociodemographic and behavioral characteristics — and used multivariate logistic regression analyses to assess the relationship between consumption and respondents' agreement with two perceptions about EDs: "Energy drinks are safe drinks for teens" and "Energy drinks are a type of sports drink."

**RESULTS:** Overall, 8% of respondents reported consuming EDs during the previous week, 19.5% agreed that EDs are safe drinks, and 12.9% agreed that EDs are a type of sports drink. The proportion who reported consuming EDs during the previous week was highest among those aged 16–17 (11.4%) and those physically active 3–6 times/week (10.9%). The likelihood of consuming EDs during the previous week was significantly higher among youth who agreed that EDs are safe drinks (odds ratio [OR]: 6.8; 95% confidence interval [CI]: 3.1, 14.8) and those who agreed that they are a type of sports drink (OR: 4.5; 95% CI: 2.1, 9.7) than among those who did not.

**CONCLUSIONS:** These findings suggest that many youth have misperceptions about EDs, and efforts to increase awareness among youth about the possible adverse effects of consuming EDs are needed.

**KEYWORDS:** energy drinks, perception, consumption, youth

## 8:55 Validation of Sodium Intake Estimates Based on 24-hr Dietary Recall Survey with 24-hr Urine Sodium Excretion Measurements Among Young Adults – Washington DC, 2011

**AUTHORS:** Carla I. Mercado, M. Cogswell, A. Valderrama, C. Wang, C. Loria, A. Moshfegh

**BACKGROUND:** Mean U.S. sodium intake reduction of 400mg is estimated to prevent 28,000 deaths and save \$7 billion in health care costs annually. Average sodium intake (3,300 mg/d) is above the Healthy People 2020 target (2,300 mg/d). Currently, sodium intake is estimated mostly from 24-hour dietary recalls (24DR), but data on its accuracy is limited. Our objective is to assess the accuracy of 24DR for estimating sodium intake.

**METHODS:** Using data from a convenience sample of 407 participants (18–39 years) in a sodium calibration study, we estimated mean sodium intake using 24DR and 24-hour urine sodium excretion (24UE, referent). Agreement between measures was assessed by: Spearman's correlation (*P*), relative ratio (rr), difference (diff), and percent difference (%diff). Estimates with 95% confidence intervals were presented stratified by gender, race and BMI.

**RESULTS:** About half of the participants were African-American (48%) and 54% were women. Mean sodium intakes from 24DR (4929 mg/d men, 3591 mg/d women) were

higher than 24UE estimates (3,933 mg/d men, 3,431 mg/d women). Agreement was greater among women (*P* = 0.23, rr = 1.04 [0.97,1.11], diff = 151.4 [-86.6,389.4], and %diff = 0.18 [0.09,0.27]) than men (*P* = 0.17, rr = 1.25 [1.15,1.35], diff = 995.6 [636.9,1354.4], and %diff = 0.48 [0.35,0.62]). Estimates did not vary by race, but agreement was better among obese than normal or overweight participants. Results based on usual intake/excretion estimates were not substantially different.

**CONCLUSION:** In this group of young adults, disparities in agreement between 24DR and 24UE were greater among men than women, suggesting gender differences in dietary recall. Agreement differences by BMI may contribute to lack of association previously observed between sodium intake and BMI. Analysis examining associations of sodium intake/excretion and health outcomes should be stratified by gender and BMI.

**KEYWORDS:** sodium, validation studies, diet, biological markers

## 9:15 Tobacco Cigarette Smoking Among HIV-Infected Adults in Care in the United States – Medical Monitoring Project, 2009

**AUTHORS:** Rennatus Mdodo, E. Frazier, C. Mattson, M. Sutton, J. Brooks, J. Skarbinski

**BACKGROUND:** Among HIV-infected persons, smoking tobacco cigarettes increases risk for HIV-associated and non-HIV-associated morbidity and mortality. Reports suggest that as many as 40%–70% of HIV-infected persons smoke, but national prevalence estimates are lacking. We report the first cigarette smoking prevalence estimates from a nationally representative sample of HIV-infected adults in care.

**METHODS:** Using 2009 data from the Medical Monitoring Project, a nationally representative cross-sectional interview survey of 4,317 HIV-infected adults (aged >18 years) in care, we estimated weighted prevalence of cigarette smoking stratified by demographic and behavioral characteristics. We compared these estimates to estimated smoking prevalences for the general U.S. adult population, using data from the 2009 National Health Interview Survey to calculate standardized prevalence ratios (PRs).

**RESULTS:** Of the estimated 421,186 HIV-infected adults in care, 42.4% (confidence interval [CI]: 39.7–45.1) were current cigarette smokers, 20.3% (CI: 18.6–22.1) were former

smokers, and 37.3% (CI: 34.9–39.6) had never smoked. Compared with the U.S. population, in which an estimated 20.6% of adults smoked cigarettes in 2009, HIV-infected adults in care were more than twice as likely to smoke (PR: 2.1; CI: 1.9–2.3). Compared with prevalence in the general population, prevalence of smoking among HIV-infected persons was higher among persons aged >65 years (PR: 2.3; CI: 1.8–2.7), among women (PR: 2.3; CI: 2.0–2.4), and among Hispanics (PR: 2.4; CI: 2.1–2.5).

**CONCLUSION:** The prevalence of cigarette smoking among U.S. HIV-infected adults is twice the national average. Reducing cigarette smoking can reduce risk for morbidity and mortality. Providers should take advantage of the frequent health care contacts necessitated by HIV infection and incorporate smoking cessation into routine care of HIV-infected adults.

**KEYWORDS:** HIV-infected adults, prevalence, cigarette smoking, United States



## 9:35 Adverse Childhood Experiences and Adult Tobacco Use and Obesity – Nebraska, 2011

**AUTHORS:** Kristin M. Yeoman, B. Buss, T. Safranek, B. Cadwell, D. Mannino

**BACKGROUND:** Adverse childhood experiences (ACEs) are associated with risk behaviors and adverse health outcomes in adulthood. Analysis of state-level ACE data can inform policymakers for childhood maltreatment prevention and well-being programs. We determined ACE prevalence and association with tobacco use and obesity among Nebraska adults.

**METHODS:** We analyzed data from 9,262 randomly selected respondents who completed the state-added optional ACE module for Nebraska's 2011 Behavioral Risk Factor Surveillance System, a telephone survey of a representative sample of noninstitutionalized adults. Direct ACEs were defined as reported childhood exposure to physical, sexual, or verbal abuse. Environmental ACEs were defined as reported childhood household exposure to mental illness, substance abuse, divorce, or incarceration, or witnessing abuse among household adults. We estimated ACE prevalence, accounting for complex survey design, and adjusted relative risk (aRR) of current tobacco use (lifetime use of  $\geq 100$  cigarettes, currently smoking "some days") and obesity (body mass index  $\geq 30$ )

by ACE status by using logistic regression with predicted margins, controlling for age, sex, and education.

**RESULTS:** Prevalence of direct and environmental ACEs was 32.2% (95% confidence interval [CI]: 30.5%–34.0%) and 44.1% (95% CI: 42.2%–46.0%), respectively; 53% (95% CI: 51.1%–54.9%) experienced  $\geq 1$  ACE. Direct and environmental ACEs were both associated with current tobacco use (aRR: 1.7; 95% CI: 1.4–2.0 and aRR: 2.1; 95% CI: 1.8–2.5) and obesity (aRR: 1.2; 95% CI: 1.03–1.3 and aRR: 1.2; 95% CI: 1.05–1.3), respectively. A dose-response relation existed between total number of individual ACEs per person and both outcomes.

**CONCLUSIONS:** ACEs are common and associated with disease risk factors among Nebraska adults. Strategies to identify children experiencing ACEs and provide effective interventions during childhood might reduce smoking and obesity in adulthood.

**KEYWORDS:** tobacco, obesity, child abuse, child of impaired parents, domestic violence, Behavioral Risk Factor Surveillance System

## 9:55 Environmental Tobacco Smoke (ETS) Exposure and All-Cause Mortality: A Prospective Cohort Analysis of the Third National Health and Nutrition Examination Survey (NHANES III)

**AUTHORS:** Tala H.I. Fakhouri, B. Kit, L. Mirel, D. Brody, C. Ogden, K. Flegal

**BACKGROUND:** A 2006 report by the U.S. Surgeon General concluded that ETS exposure has adverse health effects. Although the risk of mortality associated with ETS has been previously described, most studies have relied on self-reported ETS exposure and none have been nationally representative of the U.S. population. In this study, we sought to examine all-cause mortality associated with biomarker-measured ETS exposure in a nationally representative sample of U.S. adult nonsmokers.

**METHODS:** We prospectively followed a cohort of 6,480 nonsmokers in NHANES III from 1988 to 2006. Mortality information was based on the results of a probabilistic match between NHANES III and the National Death Index. Analysis included participants who were  $\geq 40$  years of age at baseline. Because a safe level of ETS exposure may not exist, exposure was defined as serum cotinine levels  $\geq 0.05$  ng/ml, which was the detection limit for cotinine. We used Cox proportional hazard regression analysis to determine the relative risk of

all-cause mortality, with adjustments for birth cohort, gender, race and ethnicity, income, physical activity, diet, and former smoking status.

**RESULTS:** Median time of follow-up was 14.2 years. After adjusting for potential confounders, the relative risk of all-cause mortality was higher (Hazard Ratio: 1.25, 95% CI [1.06–1.47]) among ETS exposed participants compared to those not exposed to ETS ( $P < 0.05$ ). Additionally, higher serum cotinine levels were associated with higher risk of all-cause mortality ( $P < 0.05$  for trend).

**CONCLUSION:** In a nationally representative sample of the U.S. population, environmental tobacco smoke exposure is associated with all-cause mortality. Interventions designed to reduce ETS exposure may be informed by these findings.

**KEYWORDS:** tobacco smoke pollution, biological markers, cotinine, mortality, follow-up studies, prospective studies

*Knowledge is power.*  
—Sir Francis Bacon

## CONCURRENT SESSION E2: HIV/AIDS

8:30–10:15 am

Dunwoody Suites

**MODERATORS:** Linda Valleroy and Amy Lansky

TUESDAY

### 8:35 Characteristics of HIV-Positive American Indians — Arizona, 1990–2012

**AUTHORS:** Seema Yasmin, R. Mdofo, H. Huentelman, P. Bloomquist, M. Taylor

**BACKGROUND:** American Indians (AIs) bear a disparate burden of human immunodeficiency virus (HIV) morbidity and mortality in the United States, with the third highest HIV rate compared with other racial/ethnic groups. Knowledge is limited regarding HIV/acquired immunodeficiency syndrome (AIDS) epidemiology among AIs. We describe the clinical characteristics of patients at the largest Indian Health Service HIV clinic.

**METHODS:** We reviewed comorbidity and risk factor data for AIs with physician-diagnosed HIV/AIDS during January 1, 1982–November 1, 2012 who received care at the clinic during January 1, 1990–November 1, 2012. Univariate analyses were conducted using chi square and Wilcoxon tests.

**RESULTS:** Records for 468 patients were reviewed; median age at entry-to-care was 34 years (range: 18–62 years). Among 448 patients with known sex, 83.9% were male. Men having sex with men (MSM) was the primary HIV risk factor for 257/373 (68.9%) men for whom data were available. The

primary HIV risk factor was heterosexual contact for 34/70 (48.6%) women and intravenous drug use (IDU) for 24/70 (34.3%) women for whom data were available. During the study period, 184/373 (49.3%) patients with available data were obese; 205/300 (68.3%) reported excessive alcohol intake; 78/110 (70.9%) had syphilis and 33/110 (30%) had gonorrhea. AIDS was diagnosed among 320/461 (69.4%); 130/461 (28.2%) died (median years from HIV diagnosis to death: 4). Patients with AIDS lived further from the clinic (mean distance: 185 miles versus 125;  $P = 0.1$ ).

**CONCLUSIONS:** Findings highlight the prevalence of risk factors for HIV transmission, including sexually transmitted infections and IDU. High rates of comorbidities (e.g., obesity and excessive alcohol use) and distance to the clinic present challenges in providing care to this population.

**KEYWORDS:** Indians, North American, human immunodeficiency virus, acquired immunodeficiency syndrome, United States Indian Health Service

## 8:55 High HIV Prevalence in Western Equatoria State – Republic of South Sudan, 2012

**AUTHORS:** E. Kainne Dokubo, K.R. Clarke, M. St. Louis, J.J. Neal, S. Cookson, A. Jervase, S.P. Baba

**BACKGROUND:** The HIV epidemic in Republic of South Sudan (RSS) threatens to worsen among post-conflict communities. In 2009, estimated HIV prevalence based on antenatal clinic (ANC) surveillance data was 3.0% nationally, and 7.2% in Western Equatoria State (WES). The Ministry of Health and CDC aimed to investigate the high HIV prevalence in WES to guide the public health response.

**METHODS:** We abstracted and analyzed HIV testing data from three voluntary counseling and testing (VCT) facilities and four ANCs in WES from 2012. HIV services provided were observed and documented for one day. From June 10–30, 2012, we conducted interviews and focus group discussions to identify HIV risk factors using standardized inquiry domains with 75 adult key informants, including healthcare workers and persons living with HIV.

**RESULTS:** HIV seropositivity by facility ranged from 6.0% to 12.5% among 469 first-visit ANC women and 7.9% to 20.6% among 389 VCT attendees. Only 10.5% of VCT attendees

reported condom use at last sexual intercourse. Limited HIV prevention services, most notably availability of condoms and access to HIV testing, limited HIV care and treatment services, and healthcare worker shortages were observed. Key informants indicated sexual behavior as the driver of HIV transmission; the most common risk factors reported were multiple concurrent sexual partners, inconsistent condom use, and early sexual debut.

**CONCLUSIONS:** WES should be prioritized in the national HIV response, with a comprehensive prevention strategy including ensured access to condoms; prevention interventions focused on at-risk groups, especially young women and their sexual partners; expanded HIV testing and counseling; and strengthened HIV care and treatment services. Continued surveillance is needed to fully characterize the HIV epidemic in RSS.

**KEYWORDS:** HIV, South Sudan

## 9:15 Community-Based Electronic Data Collections for HIV Prevention Research with Black Men in Rural, Resource-Limited Settings – United States, 2011

**AUTHORS:** Kpandja Djawe, E. Brown, Z. Gaul, M. Sutton

**BACKGROUND:** Black men are disproportionately affected by HIV; reducing HIV-related health disparities is a National HIV/AIDS Strategy (NHAS) goal. In Florida, the HIV case rate among black men is five times the rate among white men. Data regarding sexual behavior, HIV testing, and other sensitive topics are needed to inform HIV interventions. However, concerns of trust with traditional public health department venues and the sharing of sensitive information make data collection using face-to-face interviews challenging. We evaluated the feasibility of using audio computer-assisted self-interview (ACASI) to collect sensitive, HIV-related information from black men in rural, resource-limited areas.

**METHODS:** During April–October 2011, we conducted community-based recruitment of black men from three rural Florida counties. Participants completed ACASI in community settings (e.g., parks, barber shops) to report sexual behaviors, HIV testing history, and data collection preferences. We used logistic regression to estimate associations between ACASI feasibility and participant characteristics.

**RESULTS:** Of 636 men approached, 586 (92%) responded (median age: 38 years, interquartile range 25–52); 578 (98.6%) were heterosexual; 474 (80.9%) had never participated in a research study; and 490 (83.6%) had never completed a computer survey. Most participants (99.5%) responded to questions about HIV testing and sexual behaviors. Respondents reported that ACASI was easy to use (82.3%), enjoyable (82.5%), and adequately protected sensitive personal information (84.2%). Respondents, of whom only 36.8% had regular computer access, would prefer ACASI compared with face-to-face interviews for future HIV-related surveys (OR: 2.26; confidence interval: 1.37–3.71).

**CONCLUSION:** Community-based recruitment and the use of ACASI for data collection are feasible in HIV prevention research in rural, resource-limited settings and are additional tools for informing NHAS disparity-reducing goals.

**KEYWORDS:** community survey, data collection, feasibility, HIV, black

## 9:35 Did CDC's 2006 Revised HIV Testing Guidelines Make a Difference? Evaluation of Self-Reported History of HIV Testing – United States, 2003–2010

**AUTHORS:** Joseph V. Woodring, D. Kruszon-Moran, G. McQuillan

**BACKGROUND:** Nearly 25% of HIV-positive people in the U.S. are unaware of their HIV-positivity and subsequently transmit over 50% of new HIV infections. Males, African Americans, and men who have sex with men (MSM) have been disproportionately affected by the HIV epidemic. In September 2006, CDC recommended routine HIV screening for all 13 to 64 year olds in all healthcare settings. This study examines changes in self-reported history of HIV testing following the revised guidelines.

**METHODS:** Analysis included 19,375 persons aged 16–64 years who participated in the 2003–2010 National Health and Nutrition Examination Survey, a nationally representative survey. Weighted estimates of persons who reported prior HIV testing were produced using SAS and variances were calculated using SUDAAN to account for the complex survey design. Prevalence of any self-reported HIV testing before and after 2006 was compared using t-tests and further examined by demographic groups, healthcare access and HIV risk factors.

**RESULTS:** The overall prevalence of HIV testing increased from 39.3% during 2003–2006 to 41.8% during 2007–2010 ( $P = 0.05$ ). This indicates that approximately 7.9 million more people reported HIV testing after the revised recommendation. HIV testing significantly increased among males (35.3% to 39.4%;  $P = 0.006$ ); non-Hispanic blacks (53.0% to 59.4%;  $P = 0.006$ ); 50–64 year olds (28.3% to 34.2%;  $P = 0.004$ ); and those who did not access the healthcare system in the past year (31.2% to 37.4%;  $P = 0.008$ ). HIV testing did not change significantly among MSM (72.3% to 65.4%;  $P = 0.3$ ).

**CONCLUSIONS:** After CDC's HIV testing recommendations were revised in 2006, national survey data showed some vulnerable subgroups had higher HIV testing prevalence, i.e., males and non-Hispanic blacks, while no significant change was shown among MSM.

**KEYWORDS:** HIV, population surveillance, health status disparities, healthcare disparities, risk factors, Centers for Disease Control and Prevention

## 9:55 Increased HIV Testing Among Men Who Have Sex with Men – National HIV Behavioral Surveillance System, 20 U.S. Metropolitan Statistical Areas, 2008 and 2011

**AUTHORS:** Laura A. Cooley, A. Oster, C. Wejnert, B. Le, G. Paz-Bailey

**BACKGROUND:** In 2010, an estimated 29,800 new HIV infections occurred among U.S. men who have sex with men (MSM); 35.6% were among black MSM. CDC began expanded HIV testing initiatives in 2007, focusing initially on African Americans and broadening to include MSM in 2010. HIV testing can lead to engagement in care, treatment, and viral suppression, resulting in reduced transmission. We assessed changes in HIV testing behavior among MSM.

**METHODS:** We analyzed data from the National HIV Behavioral Surveillance System. Men in the analysis sample were recruited and interviewed in 2008 and 2011 at venues in 20 metropolitan statistical areas (MSAs), were  $\geq 18$  years old, reported at least one male sex partner (past 12 months), and did not report a positive HIV test result. We compared the proportions tested recently (past 12 months) and the temporal changes for black and white MSM (chi-square and Breslow-Day tests). To determine whether interview year was associated with HIV testing, we used multivariable logistic regression.

**RESULTS:** We included 15,794 MSM (2008: 7,821; 2011: 7,973). The proportion recently tested increased from 62.4% in 2008 to 66.8% in 2011 ( $P < 0.0001$ ). The proportion of black MSM recently tested increased from 61.6% to 69.9% ( $P < 0.0001$ ). The increase was greater for black than white MSM ( $P < 0.001$ ). Adjusted for race/ethnicity, age, education, income, and MSA, proportions tested were higher in 2011 than 2008 (odds ratio: 1.25; confidence interval: 1.17–1.34).

**CONCLUSIONS:** HIV testing increased after implementation of expanded testing initiatives, and the increase was greater among black MSM, a population of particular interest for prevention. Testing initiatives appear to be successful and are an integral part of HIV prevention efforts.

**KEYWORDS:** HIV; homosexuality, male; African Americans; tests, diagnostic

*The best laid schemes of mice and men often go awry.*  
—adapted from Robert Burns

**CONCURRENT SESSION F1: Injury Prevention**  
**10:45 am–12:10 pm**

**Ravinia Ballroom**

**MODERATOR:** James A. Mercy

**10:50 Do Adverse Childhood Experiences Add Up to Poor Adult Health? —  
Results from Ten U.S. States and the District of Columbia, 2010**

**AUTHORS:** Leah K. Gilbert, M. Breiding, S. Dhingra, D. Ford, M. Merrick, W. Thompson

**BACKGROUND:** Adverse childhood experiences (ACEs), which include child abuse and family dysfunction, have been linked to leading causes of adult morbidity and mortality. However, prior ACE studies were based on a non-representative sample of patients from a health maintenance organization in Southern California. The objective of the current study was to determine if ACE exposure was associated with a range of chronic disease and disability outcomes using, for the first time, a large sample of adults representative of multiple U.S. states.

**METHODS:** Ten states and the District of Columbia included an optional ACEs module in the 2010 Behavioral Risk Factor Surveillance Survey, a national cross-sectional, random-digit-dial telephone survey of adults. Respondents were asked about nine ACEs including physical, sexual, and emotional child abuse as well as house-hold member mental illness, alcoholism, drug abuse, imprisonment, divorce, and intimate partner violence. An ACE score was calculated for each subject by summing the number of ACE items endorsed.

Weighted adjusted odds ratios were calculated examining eight health outcomes given exposure to 0, 1–3, 4–6, or 7–9 ACEs after controlling for sociodemographic variables.

**RESULTS:** Individuals who experienced 7–9 ACEs were significantly more likely than those who experienced no ACEs to report: fair/poor health; frequent mental distress; diabetes; myocardial infarction; heart disease; stroke; asthma; and disability. In addition, evidence for a dose-response effect was found when examining these health outcomes across all levels of ACEs.

**CONCLUSIONS:** The results replicate previous findings that ACEs increase the odds of serious chronic health conditions and disability for the first time using a large, representative sample. These findings underscore the importance of child maltreatment prevention as a means to mitigate adult morbidity and mortality.

**KEYWORDS:** child abuse, domestic violence, chronic disease, child abuse, sexual

## 11:10 Water-Related Unintentional Injuries and Fatalities – Lake Mead National Recreation Area, Arizona and Nevada, 2007–2011

**AUTHORS:** Carla L. Britton, P. Paul, S. Lam, S. Newman, J. Cheng-Dobson, M. Hinson, J. Gilchrist, K. Carter

**BACKGROUND:** During 2007–2011, among 397 National Park Service units, the highest number of reported visitor fatalities ( $n = 65$ ; 40 [62%] on water), occurred at Lake Mead National Recreation Area (LMNRA). Because the nonfatal injury burden was unknown among LMNRA's approximately 6.5 million annual visitors, and to inform injury prevention efforts, we characterized fatal and nonfatal water-related unintentional injuries and factors associated with fatality.

**METHODS:** We identified water-related (on, or intended to enter, water) unintentional injuries from LMNRA's 2007–2011 emergency medical service records. We matched records by name, birth date, and incident date to hospital, trauma registry, and U.S. Coast Guard Boating Accident Report Database records. We calculated injury frequencies and compared fatal with nonfatal injuries by using log-binomial regression to calculate adjusted prevalence ratios (PRs).

**RESULTS:** We identified 436 total injuries; 53 (12%) were fatal. Males experienced 272 (62%) injuries (49 [92%]

deaths). Motorized boat users experienced 253 (58%) injuries (13 [5%] deaths). Swimmers experienced 119 (27%) injuries (35 [29%] deaths). Among 206 (47%) injuries where alcohol or drug use (ADU) status at time of injury was documented, ADU was reported in 72 (35%) cases (19 [26%] fatal). The unadjusted PR for ADU-associated fatality was 2.0 (95% confidence interval [CI]: 1.2–3.8); after adjusting for sex and activity at time of injury, only male sex (PR: 6.6; 95% CI: 1.6–27.0) and swimming (PR: 3.6; 95% CI: 1.8–7.3) remained significant fatality predictors.

**CONCLUSIONS:** Among injured visitors at LMNRA, males and swimmers were at higher risk for fatality; public health interventions should target these groups. ADU documentation on every injury report can improve assessment of ADU as a risk factor for fatality.

**KEYWORDS:** wounds and injuries, drowning, recreation, lakes, swimming, accident prevention

## 11:30 Pedestrian Traffic Fatalities – Clark County, Nevada, 2008–2011

**AUTHORS:** Kaci L. Hickox, N. Williams, T. Coleman, S. Lyss, J. Fudenberg, B. Robinson, J. Middaugh

**BACKGROUND:** During 2010, pedestrians represented ~14% of traffic-related fatalities in Nevada. Despite roadway engineering and safety campaigns in Clark County, reported pedestrian fatalities have remained consistent. We sought to describe epidemiologic characteristics of Clark County pedestrian traffic fatalities to develop intervention strategies.

**METHODS:** We identified pedestrian deaths (on foot, wheelchair, or skateboard) hit by motor vehicles in Clark County during 2008–2011 by using both coroner's data and death certificates, and reconciled results through individual case reviews. Demographic information and collision details were abstracted from coroner's case reports. We calculated rates by using 2008–2011 Nevada state demographer census data, 2009 and 2011 homeless census surveys, and 2008–2011 Las Vegas Convention and Visitors Authority profiles.

**RESULTS:** During 2008–2011, a total of 140 pedestrian traffic fatalities were reported (107 residents, 19 visitors, and 14 homeless persons). Decedents mean age was 48 years (range: 6–93 years and one intrauterine fetal demise); 100

(71%) were male. Residents' fatality rate was 1.4/100,000; visitors', 1.1/100,000; and homeless persons', 30.7/100,000. Among residents, fatality rate for non-Hispanic blacks was 3.0/100,000; for non-Hispanic whites, 1.4/100,000; and for Hispanics, 0.9/100,000. Visitor pedestrian fatalities were concentrated near the Las Vegas Strip; residents' and homeless persons' deaths were more evenly distributed. Resident fatality rates increased and visitor rates decreased with increasing age. Of homeless deaths, 50% occurred Monday–Friday, 6 pm–midnight, compared with 19% among nonhomeless.

**CONCLUSIONS:** Non-Hispanic blacks and homeless persons were at highest risk for pedestrian fatality in Clark County; interventions should target these demographic groups. Differences in age-specific rates and geographic location among residents and visitors should also influence prevention efforts.

**KEYWORDS:** accidents, traffic; motor vehicles; walking; homeless persons; death

## 11:50 Risk Factors for Suicidal Ideation Among Bhutanese Refugees – United States, 2009–2012

**AUTHORS:** Trong T. Ao, E. Lankau, E. Taylor , C. Blanton, S. Shetty, B. Lopes Cardozo

**BACKGROUND:** Since 2008, >56,000 Bhutanese refugees resettled in the United States. Between February 2009 and February 2012, 16 suicides among Bhutanese refugees were officially reported, prompting an Epi-Aid investigation to identify risk factors for suicidal ideation (i.e. seriously thinking about suicide). Understanding risk factors for suicidal ideation in this community is critical for future suicide prevention interventions.

**METHODS:** We conducted a cross sectional survey among randomly selected Bhutanese refugees aged >18 years in Arizona, Georgia, New York, and Texas (N = 423) by collecting data on: demographics; mental health history; post resettlement difficulties; and symptoms of anxiety, depression, and post-traumatic stress disorder (PTSD) using standard instruments. Differences between men and women were assessed using chi-squared test. We estimated odds ratios (OR) and 95% confidence intervals (CI) for association with suicidal ideation using conditional logistic regression.

**RESULTS:** Of 423 participants, 221 (52%) were men.

Median age was 34 years (range = 18–83). Thirteen (3%) reported suicidal ideation. Mental illness symptoms prevalence was: 19% anxiety (15% men, 23% women;  $P = 0.038$ ); 20% depression (16% men, 26% women;  $P = 0.008$ ), and 5% PTSD (3% men, 6% women;  $P = 0.173$ ). Significant associations existed between suicidal ideation and not being a family provider (OR: 6.6, CI: 1.4–31.9); family conflict (OR: 22.6, CI: 5.59–2.6); not finding employment (OR: 11.1, CI: 2.4–51.5); symptoms of anxiety (OR: 38.1, CI: 7.9–185.1), depression (OR: 11.2, CI: 2.9–42.1), and PTSD (OR: 9.3, CI: 2.1–41.0).

**CONCLUSION:** High prevalence of mental illness symptoms indicates potentially under-diagnosed mental illnesses in this community, especially among women. Addressing this and post resettlement difficulties will be important in a comprehensive suicide prevention strategy.

**KEYWORDS:** suicidal ideation, refugees, Bhutan, mental health

*If it looks like a duck and quacks like a duck,  
we have at least to consider the possibility that we have  
a small aquatic bird of the family Anatidae on our hands.*

—Douglas Adams

## CONCURRENT SESSION F2: Zoonotic Diseases

10:45 am–12:10 pm

Dunwoody Suites

**MODERATOR:** Christopher Paddock

TUESDAY

### 10:50 Lymphocytic Choriomeningitis Virus Outbreak and Risk Assessment – Multiple States, 2012

**AUTHORS:** Laura S. Edison, C. Drenzek, J. Gabel, B. Knust, B. Petersen, P. Rollin, U. Stroehler, S. Nichol, J. House, D. Thoroughman, S. Robeson, K.A. Fowler

**BACKGROUND:** Lymphocytic choriomeningitis virus (LCMV), a rodentborne arenavirus, can cause aseptic meningitis, encephalitis, and severe birth defects among humans. In May 2012, four employees of an Indiana rodent-breeding facility experienced aseptic meningitis caused by LCMV. An epidemiologic investigation revealed exposure to LCMV infected mice originating from a Kentucky breeding facility (Facility A) as the cause. We investigated Facility A to determine the extent of the outbreak and prevent further cases.

**METHODS:** We performed LCMV serologic testing for all Facility A employees and conducted interviews to assess their infection control practices and potential risk factors for seroconversion. We reviewed shipping records and contacted facilities that had received potentially infected mice to encourage euthanization of the mice and assess employees' risk for exposure. Pregnant, sick, or immunocompromised pet store employees were offered serologic testing.

**RESULTS:** Among 32 Facility A employees, 11 (34%) were

LCMV-seropositive, and one experienced aseptic meningitis; the one pregnant employee tested negative. Twenty-nine (91%) reported wearing gloves, and 13 (41%) using a mask. No risk factors were significantly associated with seroconversion. Feeder mice bred as reptile food at Facility A comingled with wild mice, the presumed source of infection. Among facilities from 21 states that received these mice, 264/521 (51%) pet stores and 7/11 (64%) distributors still had >500,000 potentially infected mice, which were subsequently euthanized. Thirty-five pet store employees from six states tested negative for LCMV.

**CONCLUSION:** LCMV can pose a serious health risk to persons who work with or handle mice. Rodent breeding facilities should ensure that wild mice are separated from mice intended for distribution. Personal protective equipment and education regarding its use should be provided to employees who handle mice.

**KEYWORDS:** mice, humans, lymphocytic choriomeningitis virus, arenavirus, zoonoses, occupational diseases



## 11:10 Extreme Rodeo: Results of a Rocky Mountain Spotted Fever Intervention Project – Eastern Arizona, 2012

**AUTHORS:** Suzanne R. Todd, N. Drexler, A. Brock, F. Dahlgren, L. Adams, E. Weis, T. Shelhamer, S. Piontkowski, J. Francies, K. Komatsu, M. Miller, J. Gerding, J. McQuiston

**BACKGROUND:** Rocky Mountain spotted fever (RMSF), a tickborne rickettsial disease transmitted by brown dog ticks parasitizing free-roaming dogs, is a serious public health problem in Arizona on some tribal lands. The RMSF Rodeo, a pilot intervention project addressing the many causes of RMSF transmission, was implemented in summer 2012 on one reservation. The project included: (1) treating community dogs with a long-acting tick collar; (2) applying pesticide treatments to yards; (3) no-cost spay/neuter clinics; and (4) encouraging pet restraint.

**METHODS:** To assess efficacy of the project, we surveyed 595 households selected through stratified random sampling. Survey data were weighted and compared between RMSF Rodeo and non-intervention houses. Tick counts were assessed by visual examination of dogs. CO2 traps were placed monthly to evaluate environmental tick loads.

**RESULTS:** Almost all dogs (99.2%) at RMSF Rodeo houses were tick-free compared to dogs in the non-intervention area (36.1%). Numbers of trapped brown dog ticks in the RMSF

Rodeo area decreased to zero at project conclusion, whereas the non-intervention area experienced increasing numbers through August. More (73.8%) RMSF Rodeo dog owners reported restraining their dogs always or sometimes vs. non-intervention dog owners (55.0%,  $P < 0.001$ ). RMSF Rodeo dog owners reported some or all of their eligible dogs were spayed (41.0%) or neutered (30.5%), compared to owners in non-intervention homes (11.4% and 24.7%,  $P < 0.001$  and  $P < 0.001$ ).

**CONCLUSION:** The intervention area experienced overall dramatic decrease in ticks that transmit RMSF. Additionally, we found evidence of an increase in positive dog ownership practices which limit free-roaming dogs and aid in reducing ticks and transmission of RMSF. Expanding the intervention project reservation-wide could reduce exposure to ticks in over 1,000 households.

**KEYWORDS:** Rocky Mountain spotted fever, tick, animal control

## 11:30 Knowledge, Attitudes, and Practices Regarding Dog Ownership and Tick Control on an American Indian Reservation – Arizona, 2012

**AUTHORS:** Laura E. Adams, N. Drexler, A. Brock, F. Dahlgren, S.R. Todd, E. Weis, T. Shelhamer, S. Piontkowski, J. Francies, K. Komatsu, M. Miller, J. Gerding, K. Bisgard, J. McQuiston

**BACKGROUND:** During 2003–2012, Rocky Mountain spotted fever (RMSF), an expanding tickborne disease on Arizona American Indian lands, caused >200 human cases and 19 deaths. RMSF ecology is uniquely linked to dogs, which carry brown dog ticks that transmit *Rickettsia rickettsii*. Additionally, dog bites injure American Indian children at a higher rate than other U.S. children. To evaluate social behaviors, we assessed the knowledge, attitudes, and practices influencing dog ownership and tick control among residents on one Arizona reservation.

**METHODS:** We randomly selected 315 households with proportional sampling by housing district of the total reservation. We interviewed 1 consenting adult/household. Data were weighted before analysis.

**RESULTS:** Among 234 respondents (response rate: 74.3%), 62.0% owned  $\geq 1$  dog; 69.6% of dog owners reported treating their dogs for ticks. The majority (61.7%) agreed that all dogs should be restrained (e.g., tied, fenced, or kept inside), although only 28.3% reported always restraining their dog.

The majority of residents (74.5%) stated the number of owned dogs per person should be limited, with less support (48.2%) among persons aged 18–25 years, and stronger support (80.8%) among persons aged  $\geq 26$  years ( $P < 0.001$ ). Adults residing with children were more likely to support an animal control program (89.2%) than those without children (75.8%;  $P < 0.05$ ). Dog owners rarely reported (9.4%) all their dogs being neutered. An animal shelter was supported by 85.1%; 77.3% supported an animal control program including euthanasia.

**CONCLUSIONS:** On this reservation, the majority of residents, including adults who might reside with children, favored increased dog control measures. Combating RMSF and dog bites in this community might include increased dog ownership limitations and regulation and requirements to restrain dogs.

**KEYWORDS:** Rocky Mountain spotted fever, *Rickettsia rickettsii*, prevention and control, tick control

## 11:50 Tularemia: A Potential Public Health Emergency and Contact Investigation – Virginia, 2011

**AUTHORS:** Jennifer M. Espiritu, C. Sikorski, M. Tipple

**BACKGROUND:** Tularemia occurs naturally in many species. Caused by the bacterium, *Francisella tularensis*, it can also be a biological weapon. Cases represent a potential public health emergency requiring prompt investigation. In 2011, a military hospital admitted a service member for worsening acute respiratory distress after presenting to another military clinic. Tularemia was not initially suspected and was not confirmed by Virginia's public health laboratory until hospital Day 9. We examined the intentional exposure potential and investigated the healthcare workers' risk for tularemia.

**METHODS:** The patient and close-contacts were interviewed to assess the intentional exposure risk. We conducted a cohort study of healthcare workers exposed to the patient's respiratory samples from presentation to confirmation because routine pathogens are processed on an open bench. Workers at low risk were those potentially exposed to respiratory secretions, which are not contagious. Those at high risk were present within 3 feet of isolate processing. Workers at very high risk handled patient isolate plates.

**RESULTS:** Interviews with the patient and close contacts identified no risk factors besides rabbit exposure while mowing, a known risk factor for human pulmonary infection. Assessment of healthcare workers identified 27 workers at risk. Eleven were at low risk and instructed to watch for fever symptoms. Nine were at high risk, interviewed for symptoms, and instructed to watch for fever. Seven were at very high risk, resulting from direct contact with plates during processing, and received antibiotic prophylaxis.

**CONCLUSIONS:** Bioterrorism was ruled out due to no unusual risk factors or additional cases, and the patient recovered. After confirmation, hospital, clinic, and health department staff promptly responded to assess worker risk and provide prophylaxis, potentially averting more cases.

**KEYWORDS:** tularemia, occupational exposure, bacterial infections, safety

**SPECIAL SESSIONS**  
**CONCURRENT LUNCHTIME SESSION: New Vaccines**  
**in the Global Context**  
**12:30 pm**

**Ravinia Ballroom**

**MODERATOR:** Rana Hajjeh

**SPONSORS:** NCIRD and NCHHSTP

The session will focus on recent progress in the introduction of new vaccines in resource-poor settings. Historically, introduction of new and underutilized vaccines in low- and middle-income countries has lagged years behind high-income countries. However, in recent years, efforts to promote the uptake and sustained use of new vaccines in the world's poorest countries has resulted in much greater access to life-saving vaccines among children worldwide. We highlight four vaccines to illustrate the progress and challenges in introducing new vaccines and the role of epidemiologic studies/surveillance in guiding decisions about new vaccines in resource-poor settings.

The four highlighted vaccines — rotavirus, pneumococcal conjugate, meningococcal A conjugate, and human papillomavirus vaccines — have tremendous potential public health impact to decrease severe disease burden including mortality across the age spectrum. The rotavirus and pneumococcal conjugate vaccines, which protect against diarrhea and pneumonia respectively, target the two leading killers of children worldwide. The meningococcal A vaccine has the potential to eliminate epidemic meningitis due to this pathogen in the African meningitis belt. The human papillomavirus vaccine prevents the second-most common type of cancer among women worldwide. All four vaccines

protect against diseases which disproportionately kill people in the developing world, and have been introduced in growing numbers of low- and middle-income countries over the past few years with support from GAVI and other partners.

High-quality epidemiologic and surveillance data, including laboratory data, are crucial for building the evidence base for new vaccines. Data on burden of disease and the impact and effectiveness of new vaccines in real-world, resource-poor settings are necessary to guide and monitor policy decisions. The proposed talks will emphasize the role of epidemiologic studies and surveillance (including some conducted by EIS officers) in new vaccine introduction and sustained use.

**SPEAKERS:**

- Introduction: Use of New Vaccines in Resource-Poor Settings. *Rana Hajjeh*
- Rotavirus Vaccine. *Jacqueline E. Tate*
- Pneumococcal Conjugate Vaccine. *Jennifer Verani*
- Meningococcal A Conjugate Vaccine. *Sema Mandal*
- Human Papillomavirus Vaccine. *Susan Hariri*

## CONCURRENT LUNCHTIME SESSION: Chronic Disease Prevention Through Healthcare and Public Health Partnerships

12:30 pm

Dunwoody Suites

**MODERATOR:** Ursula Bauer

**SPONSOR:** NCCDPHP

The Affordable Care Act (ACA) prioritizes increasing access to care, promoting community engagement, preventing disease, increasing quality of care and improving population health. Passage and implementation of the ACA and Meaningful Use (MU) regulations have multiple implications for public health surveillance, policy, and prevention, all of which will be of great interest to epidemiologists. Multiple changes inside and outside of CDC, HHS, and government make it imperative that public health increases its capacity to work with the health care system and healthcare stakeholders to achieve public health objectives. In response to these immense changes, CDC and NCCDPHP must be able to bridge public health and health care leadership across topical areas. This special session will focus on current efforts to reduce chronic disease burden in the U.S. through better linkages between public health, community health, and health care. Opportunities to link with health care systems include engaging key stakeholder partnerships with regulators, educators, providers, payers, insurers, advocacy organizations, and citizens.

The presentations will describe (1) current efforts to drive public health improvements through better linkages between public health and health care; (2) partnering with the healthcare system to promote increased use of electronic health records (EHRs), team based care, consistent quality measurement and other strategies to drive improvements

in the prevention of cardiovascular disease; (3) partnering with payers to increase the delivery and sustainability of the National Diabetes Prevention Program, an effective and cost-effective community approach to preventing diabetes among high risk people; (4) efforts to support state public health departments in promoting clinical and public health linkages; (5) promoting policy and systems change to reduce the burden of chronic disease at the population level through the Community Transformation Grants.

### SPEAKERS:

- Millions Hearts Initiative: Clinical and Community Linkages to Prevent Cardiovascular Disease. *Peter Briss*
- Strengthening Chronic Disease Prevention and Health Promotion Programs within State Health Departments. *Wayne Giles*
- Preventing Chronic Diseases with Policy and System Change Through the Community Transformation Grants. *Leonard Jack*
- Public and Private Partnerships Are Preventing Diabetes — The National Diabetes Prevention Program. *Kris Ernest*

*You must be the change you wish to see in the world.*  
—Mahatma Gandhi

## SESSION G: International Health

1:45–3:50 pm

Ravinia Ballroom

**MODERATORS:** Pattie Simone and Rita Helfand

### 1:50 Rapid Surveillance Documents Elevated Mortality Among Blue Nile Conflict Refugees — South Sudan, 2012

**AUTHORS:** Kevin R. Clarke, M. Brennan, B. Dineen, C. Navarro-Colorado, J. Ahmed, M. Schilperoord

**BACKGROUND:** Armed conflict and aerial bombings in Sudan's Blue Nile state increased the refugee population in Maban County, South Sudan from 65,000 to 110,000 between March and July, 2012. Recent arrivals were malnourished and the region faced widespread flooding. The United Nations High Commissioner for Refugees (UNHCR) requested CDC support to implement mortality surveillance.

**METHODS:** Deaths were reported weekly from three refugee camps. A weekly line list for each camp was compiled from data provided by camp health facilities, community leaders, camp administrators, and a single referral hospital. Duplicates were identified and removed. Community health workers conducted household visits to confirm reported deaths. Population size was determined using UNHCR registration data which tallies all refugees soon after arrival. The weekly crude mortality rate (CMR) and under-five mortality rate (U5MR) were calculated as deaths/10,000 persons/day from July 9–September 2, 2012.

**RESULTS:** The U5MR in Yusuf Batil camp was 9.3, over

four times the emergency threshold of 2/10,000/day during the first week of surveillance and declined thereafter to 2.0/10,000/day following comprehensive interventions in health, nutrition, water and sanitation. The CMR declined from a peak of 3.2 (three times the emergency threshold of 1/10,000/day) to 1.2 during the same period. The U5MR and CMR in Jamam camp declined from 1.9 to 0.9/10,000/day and 1.8 to 1.0/10,000/day, and in Doro camp, fluctuated between 0.7–2.8/10,000/day and 0.3–0.9/10,000/day, respectively.

**CONCLUSION:** Rapidly established mortality surveillance promptly identified high mortality rates in one camp, allowing targeting of humanitarian aid and a mechanism to monitor its impact. Forced migration resulted in a highly vulnerable recent arrival population. Rapid mortality surveillance offers critical real-time data to guide response during humanitarian emergencies.

**KEYWORDS:** refugees, mortality, epidemiology, South Sudan, emergencies

## 2:10 Prevalence of Malaria Parasitemia and Purchase of Artemisinin-Based Combination Therapies Among Drug Shop Clients – Tanzania, 2012

**AUTHORS:** Melissa A. Briggs, A. Kalolella, K. Bruxvoort, G. Lopez, C. Festo, P. Lyaruu, M. Kenani, S. Abdulla, C. Goodman, S.P. Kachur

**BACKGROUND:** Malaria is a leading cause of fever and mortality in Africa. Many people seek care for fever in private-sector drug shops. In Tanzania, the Affordable Medicines Facility-malaria program subsidized artemisinin-based combination therapies (ACTs), a first-line antimalarial, to increase their accessibility in the private sector. This study assessed malaria prevalence and ACT purchase among drug shop clients in the setting of these subsidies.

**METHODS:** We conducted a cross-sectional survey of drug shop attendants and clients purchasing medications for fever or malaria. Clients were recruited from a stratified randomized sample of 73 drug shops in two regions, one region with a government accreditation program for drug shops and one without, during March–May 2012. Malaria testing was performed after medication purchase. We modeled predictors of ACT purchase using multiple logistic regression.

**RESULTS:** Of the 784 drug shop clients, 21% had purchased ACTs, of which 72% were subsidized. Malaria prevalence was 21% in children <5 years, 35% in children 5–14 years, and 7% in persons >15 years. Of clients with malaria, only 31% purchased ACTs, and only 20% of clients who purchased ACTs had malaria. Clients were more likely to have purchased ACTs if the participant was <5 years (adjusted odds ratio [aOR]: 6.6; 95% confidence interval [95% CI]: 3.7–11.6) or their drug shop attendant had >5 years' experience (aOR: 2.9; 95% CI: 1.3–6.3). Having malaria was only a predictor of ACT purchase in the region with an accreditation program for drug shops (aOR: 2.9; 95% CI: 1.4–5.8).

**CONCLUSION:** Many drug shop clients have malaria. The high proportion of persons with malaria not receiving ACTs, and persons without malaria receiving ACTs demonstrates a need to better target ACTs in the private sector.

**KEYWORDS:** malaria, artemisinins, private sector, Tanzania

## 2:30 Changes in Coverage Rates of a Nationwide Micronutrient Powder Distribution Program – Kyrgyzstan, 2011–2012

**AUTHORS:** Kristie E. Appelgren, M. Serdula, K. Sullivan, R. Flores-Ayala

**BACKGROUND:** In 2011, Kyrgyzstan, which has an anemia prevalence >50% in children aged 6–23 months, became one of the first countries to institute nationwide distribution of micronutrient powders (MNPs). Declining coverage in the maintenance phase is a frequent problem for nutritional supplementation programs. This analysis uses monitoring data to compare initial MNP coverage rates in 2011 with those in 2012 in order to inform evidence-based interventions.

**METHODS:** In each of 48 districts, 24 households with a child aged 6–23 months were randomly selected and administered a questionnaire on their child's current MNP use. On a district level, the coverage benchmark was failed if <14 out of 24 households reported current MNP use. National estimates of MNP coverage were calculated by weighting the results by target population size in each district (SAS 9.3).

**RESULTS:** In 2011, 4 (8.3%) of 48 districts failed to meet the coverage benchmark; in 2012, 16 (33.3%) failed to do so.

Nationwide, coverage dropped from 76.0% to 66.8% ( $P<0.05$ ). The drop was significant in rural areas (from 77.7% to 67.5%,  $P<0.05$ ), but not in urban areas. There was a significant decrease in 18–23 month age group coverage (from 74.2% to 62.9%,  $P<0.05$ ), but not in the 6–11 month or 12–17 month age groups.

**CONCLUSIONS:** At the end of the program's first year, nationwide coverage had declined by 9.2 percentage points. Four times as many districts failed to meet the coverage benchmark in 2012 as compared to 2011; resources to improve coverage will be targeted to these failing districts. Nationwide, interventions to increase coverage will be targeted towards older children and those in the rural areas.

**KEYWORDS:** micronutrients, nutritional deficiency, public health surveillance, Kyrgyzstan

## 2:50 Incidence and Determinants of Adverse Events Following Initiation of First-Line Antiretroviral Therapy in HIV-Positive Adults – Mozambique, 2004–2007

**AUTHORS:** Spencer B. Lloyd, F. Mbofana, A. Auld, C. Alfredo, L. Nelson, R. Shiraishi, K. Jobarteh, S. Agolory, T. Spira, T. Ellerbrock

**BACKGROUND:** In Mozambique, about 1.4 million persons are HIV infected and about 74,000 HIV/AIDS deaths occur annually. In response, the government has rapidly expanded access to life-saving antiretroviral therapy (ART). By 2011, over 300,000 persons had started ART. However, little is known about ART-related adverse events (AEs), which can significantly decrease ART adherence and increase morbidity and mortality during ART.

**METHODS:** We conducted a retrospective cohort study in Mozambique among a nationally representative sample of 2,596 adults initiating ART during 2004–2007. Incidence of ART-related AEs (e.g., neuropathy, rash, and diarrhea) and patient characteristics associated with AE incidence were investigated. Adjusted hazard ratios (AHR) were estimated using Cox proportional hazards regression models. Missing covariates were imputed via multiple imputation.

**RESULTS:** AEs were documented for 475 (18%) of 2,596 patients; 11% had neuropathy, 5% rash, and 2% diarrhea. Compared with ART enrollees with less advanced World Health Organization (WHO) HIV disease stage (stage

I/II), patients with end-stage disease (stage IV) had higher AE incidence (AHR: 1.53; 95% confidence level (CI): 1.00–2.35). Compared with patients with better immune status (CD4<sup>+</sup> T-cell count >200/μL), patients with severe immune-suppression (CD4<sup>+</sup> T-cells <50/μL), had higher AE risk (AHR: 1.25; 95% CI: 1.05–1.48). Most patients (88%) were prescribed three-drug ART regimens containing stavudine, while zidovudine replaced stavudine in 11% of regimens. Compared with patients prescribed stavudine, patients prescribed zidovudine had 45% lower AE risk (AHR: 0.55; 95% CI: 0.34–0.89).

**CONCLUSION:** Advanced HIV disease and the use of stavudine-containing regimens were associated with higher AE incidence. Earlier diagnosis and initiation of ART with non-stavudine-containing regimens could reduce AE incidence and enhance patient adherence which could improve HIV morbidity and mortality.

**KEYWORDS:** HIV, antiretroviral therapy, adverse events, Mozambique

## 3:10 Epidemiology of Hospitalized Influenza Cases from a Population-Based Surveillance System – Guatemala, 2007–2012

**AUTHORS:** Trong T. Ao, M.R. Lopez, F. Muñoz, C. Bernart, J. McCracken, J. Bryan, L. Peruski

**BACKGROUND:** Influenza is a vaccine-preventable disease affecting 5–15% of the world population annually. Although a small proportion of all infections, hospitalized influenza patients incur substantial health complications and financial burden to health systems. We describe the epidemiology of laboratory-confirmed hospitalized influenza infection from a facility-based surveillance system in Guatemala.

**METHODS:** We analyzed surveillance data from 2007 to 2012 at three sites (Quetzaltenango [QU], Santa Rosa [SR], Guatemala City [GC]). Demographic, clinical, and epidemiological data were collected for enrolled patients meeting respiratory syndrome eligibility. Nasopharyngeal swabs were tested for influenza by real-time reverse-transcriptase polymerase chain reaction. Patient characteristics were tabulated by site and compared using the chi-squared test for categorical and the Wilcoxon-Mann-Whitney test for continuous variables. We calculated age-specific hospitalized influenza incidence and 95% confidence intervals (CI) using Poisson distribution.

**RESULTS:** Of 6,326 hospitalized patients, 446 (7.0%) had

lab-confirmed influenza; of these, 360 (81%) had influenza A, 82 (18%) had influenza B, and 4 (1%) were co-infected. Median age was 2 years (QU: 6 years, SR: 2 years, GC: 1 year;  $p < 0.01$ ); 254 (57%) were male. Median length of hospitalization was 5 days (range = 0–77). Eighty (19%) patients required intensive care; 28 (6.3%) died. Overall crude incidence rates of hospitalized influenza infection were: QU: 16.9/100,000 (CI: 14.7–19.2); SR: 12.6/100,000 (CI: 11.6–15.8). Age-specific incidence was highest in children <5 years old: QU: 55.3/100,000 (CI: 45.5–66.6); SR: 49.4/100,000 (CI: 42.9–64.9).

**CONCLUSION:** Influenza is an important cause of hospitalization in Guatemala, especially among children <5 years old. Pregnant women and children aged >6 months should be vaccinated for seasonal influenza. Interventions to improve clinical management will reduce influenza-associated morbidity and mortality.

**KEYWORDS:** influenza, Guatemala, hospitalization, epidemiology, incidence

### 3:30 Cholera Epidemic Associated with Unsafe Drinking Water and Street-Vended Water – Eastern Freetown, Sierra Leone, 2012

**AUTHORS:** Von D. Nguyen, N. Sreenivasan, E. Lam, D. Kargbo, F. Dafaie, A. Jambai, W. Alemu, T. Ayers, S. Stroika, C. Bopp, E. Mintz, R. Quick, J. Brunkard

**BACKGROUND:** *Vibrio cholerae* causes an estimated 3 million illnesses and 100,000 deaths annually. During 2012, Sierra Leone experienced a severe cholera epidemic with 22,252 reported cases and 292 deaths. In August 2012, CDC assisted the Ministry of Health and Sanitation (MOHS) in an outbreak investigation.

**METHODS:** We conducted a matched case-control study to assess risk factors for cholera. Cases were defined as acute watery diarrhea requiring IV hydration in persons  $\geq 5$  years old, presenting to a health facility from September 10–21. Controls were matched by age and neighborhood. Stool samples collected from case-patients were analyzed by culture and polymerase chain reaction (PCR) for *V. cholerae*; isolates were subtyped by pulsed-field gel electrophoresis (PFGE). Conditional multivariate logistic regression was performed to investigate cholera risk factors.

**RESULTS:** We enrolled 49 cases and 98 matched controls. Virtually all cases (96%) and controls (96%) obtained drinking

water from improved water sources, such as boreholes and public taps. Consuming unsafe water (matched odds ratio [mOR]: 3.4; 95% confidence interval [CI]: 1.1, 11.0), street-vended water (mOR: 9.4; 95% CI: 2.0, 43.7) and crab (mOR: 3.3; 95% CI: 1.03, 10.6) were significant risk factors for cholera infection. Of 31 stool samples from cases, 13 (42%) showed PCR evidence of *V. cholerae* O1, El Tor. Three isolates were culture positive. Their PFGE patterns were previously observed in seven countries.

**CONCLUSIONS:** Despite near universal access to improved water sources, consuming unsafe water and street-vended water were risk factors for cholera infection. We recommended that prevention efforts focus on enhancing the microbiologic quality of improved water sources, promoting household chlorination, and improving street vendor water handling practices.

**KEYWORDS:** cholera, *Vibrio cholerae*, water, Sierra Leone



## WEDNESDAY, APRIL 24, 2013

*Remember to breathe. It is, after all, the secret of life.*  
—Gregory Maguire

### CONCURRENT SESSION H1: Respiratory Diseases

8:30–10:15 am

Ravinia Ballroom

**MODERATOR:** David Swerdlow

### 8:35 Respiratory Hospitalizations in Children with Neurologic Disorders — United States, 2010

**AUTHORS:** Fiona P. Havers, A. Fry, J. Chen, D. Christensen, C. Moore, G. Peacock, L. Finelli, C. Reed

**BACKGROUND:** Children with neurologic disorders are at increased risk for complications from influenza and other respiratory infections. Although neurologic disorders are uncommon, one third of recent influenza-associated pediatric deaths in the United States occurred in this population. The annual hospitalization rate for respiratory infections for children <15 years of age is approximately 50/10,000 children, but rates are unknown in children with neurologic disorders. We sought to characterize respiratory infection hospitalizations in this population.

**METHODS:** We used data from the Medstat MarketScan Commercial Claims and Encounters Database, collected from U.S. insurance plans. We identified children <18 years of age as of January 2010 who, in the previous 12 months, had at least one visit with an ICD-9 diagnosis code for a specified neurologic disorder. To determine hospitalization rates, we identified hospitalizations during January–December 2010 with primary or secondary diagnosis codes indicating respiratory infection.

**RESULTS:** Among 67,028 children with neurologic

disorders, 10,122 hospitalizations were identified; 1,153 (11%) were attributed to a respiratory infection (184/10,000 person-years). The respiratory infection hospitalization rate was 71/10,000 person-years in 21,325 (32%) children with isolated epilepsy; 36/10,000 person-years in 16,035 (24%) children with autism spectrum disorder; 293/10,000 person-years in 10,966 (16%) children with neural tube defects; and 371/10,000 person-years in 9,738 (15%) children with cerebral palsy (CP). Among those with CP, children with concomitant epilepsy had a rate of 800/10,000 person-years versus 202/10,000 person-years in those without epilepsy.

**CONCLUSION:** Children with neurologic disorders are at high risk for hospitalization from respiratory infections, although hospitalization rates vary widely by disorder type and co-morbidities. Optimizing prevention strategies in these populations, including improving annual influenza vaccination levels, should be aggressively pursued.

**KEYWORDS:** respiratory tract infections, nervous system diseases, pediatrics, hospitalization

## 8:55 Rates of Pediatric Hospital and Intensive Care Unit Admissions for Lower Respiratory Tract Infections from MarketScan Data – United States, 2010

**AUTHORS:** Adena H. Greenbaum, J. Chen, C. Reed, L. Finelli, A. Fry

**BACKGROUND:** Lower respiratory tract infections (LRTI) account for 3–18% of U.S. pediatric hospitalizations and are the leading cause of infectious disease-related deaths in children. We characterized severe LRTI infections among children to inform strategies to reduce LRTI-related morbidity and mortality and assist with pandemic planning.

**METHODS:** We analyzed children enrolled in Medstat MarketScan Database, collected from health insurance plans; current analysis limited to 2010 (12.5 million children 0–18 years). LRTI hospitalizations were identified by a primary LRTI discharge code and those with intensive care unit (ICU) admission were defined as LRTI ICU hospitalizations. Underlying conditions were determined from discharge codes.

**RESULTS:** During 2010, 20,201 LRTI hospitalizations (161 per 100,000 person-years) and 2,171 (11%) LRTI ICU hospitalizations (11 per 100,000 person-years) were identified. Rates of LRTI and LRTI ICU hospitalizations per 100,000 person-years were highest in infants (809 and

89, respectively) and decreased with age (1 to <2 years: 677 and 58, 2–4 years: 250 and 26, 5–9 years: 91 and 10, 10–18 years: 34 and 5, respectively). Median hospital stay was 2 days (interquartile range (IQR) 1,3) and 4 days (IQR 2,7) for LRTI and LRTI ICU hospitalizations. Among children with LRTI and LRTI ICU hospitalization, 34% and 47% had underlying medical conditions ( $P < 0.01$ ). Among LRTI ICU hospitalizations, respiratory conditions (18%) and complications during gestation (9%) were most common among children <1 year.

**CONCLUSIONS:** Infants and young children are at greatest risk for LRTI hospitalization and severe LRTI. Pandemic preparedness should consider the high burden of respiratory disease among children, especially those <5 years. Prevention strategies, including influenza and pneumococcal vaccination, should be encouraged especially for those with respiratory comorbidities.

**KEYWORDS:** respiratory tract infections; intensive care units, pediatrics; hospitalization

## 9:15 Hispanic Infants Aged <6 Months and Factors Associated with an Increased Risk for Pertussis – Metropolitan Portland, Oregon, 2010–2012

**AUTHORS:** Kara M. Levri, L. Reynolds, J. Liko, B. Robinson, P. Cieslak

**BACKGROUND:** During January–November 2012, the highest number of *Bordetella pertussis* cases was reported in Oregon since 1950. The greatest morbidity occurred among infants aged <6 months, whose pertussis rates were higher among Hispanics than non-Hispanics. To develop hypotheses to explain this disparity, we analyzed enhanced pertussis surveillance data.

**METHODS:** We compared Hispanic with non-Hispanic pertussis illnesses diagnosed among infants aged <6 months during January 2010–September 2012 by using Oregon's Metro Area Pertussis Surveillance data. Denominators were obtained from Oregon vital statistics data. We evaluated differences in medians with the Wilcoxon rank-sum test, and differences in proportions with Pearson's chi-square test. Infants aged <8 weeks were excluded from up-to-date vaccination analysis.

**RESULTS:** We identified 77 pertussis cases; 76 (99%) were laboratory-confirmed. Of 75 patients with known ethnicity, 27 (36%) were Hispanic, and 48 (64%) non-Hispanic. Pertussis incidence was higher for Hispanic (1,048/100,000/

year), compared with non-Hispanic infants (465/100,000/year); proportion of patients requiring hospitalization was similar for Hispanics (29.6%) and non-Hispanics (29.2%). Median household size was larger for Hispanic (6.0; range: 3.0–11.0) than for non-Hispanic patients (4.5; range: 2.0–14.0;  $P < 0.02$ ). Hispanic and non-Hispanic patients did not differ significantly by child care attendance (8.0% versus 4.9%;  $P = 0.61$ ), up-to-date vaccination status (21.4% versus 31.2%;  $P = 0.50$ ), or age (proportion <8 weeks, 40.7% versus 33.3%;  $P = 0.52$ ).

**CONCLUSION:** Hispanic ethnicity is associated with increased risk for pertussis among infants in metropolitan Portland. Results of this analysis indicate that household size might contribute to this increased risk. Further research is needed to more fully assess the roles of child care attendance, vaccination status, and age distribution. Multivariable analysis with multistate data is planned.

**KEYWORDS:** *Bordetella pertussis*, Hispanic, immunization, contacts

## 9:35 Vaccine Effectiveness Among Adolescents Vaccinated with Acellular Pertussis Vaccines – Washington, 2012

**AUTHORS:** Anna M. Acosta, C. DeBolt, M. Lewis, A. Tasslimi, L. Misegades, N. Messonnier, T. Clark, S. Martin, M. Patel

**BACKGROUND:** Beginning in 1997, acellular pertussis (aP) vaccines replaced whole-cell vaccines for the entire childhood vaccination series. A sixth dose of pertussis-containing vaccine, tetanus toxoid, reduced diphtheria toxoid and acellular pertussis (Tdap), was recommended for 11–12 year olds in 2005. In 2012, Washington declared an epidemic with 4,744 cases reported — the largest number of cases since the 1940s. An unexpectedly high incidence was observed in young adolescents, the first birth cohort to be vaccinated exclusively with aP vaccines.

**METHODS:** To assess Tdap vaccine effectiveness (VE), we conducted a case-control study in Washington counties reporting greater than 50 cases. Adolescents aged 11–14 years with reported pertussis according to surveillance case definitions from January 1 to June 30, 2012 were included. Three controls were matched by healthcare provider and birth year to each case. Vaccination history was obtained through medical records, the state immunization registry and parent interviews. The odds ratio (OR) comparing Tdap receipt

between cases and controls was calculated using conditional logistic regression. VE was estimated as  $(1 - OR) \times 100\%$ .

**RESULTS:** Incidence among 11–14 year olds was 235/100,000 in 2012 compared to 55/100,000 in 2011. The analysis included 93% (466/499) of eligible cases. Tdap receipt or non-receipt status was confirmed in 86% of subjects; confirmation is ongoing in the remaining subjects. Excluding unconfirmed subjects, 85% (344/403) of cases and 92% (1098/1195) of controls received Tdap. Preliminary analysis showed an overall VE of 57% (95% confidence interval: 34–72%).

**CONCLUSIONS:** This is the first Tdap VE estimate among adolescents vaccinated solely with aP vaccines. Despite high rates of vaccination, Tdap VE in acellular recipients may be lower than previous estimates among whole-cell recipients (65–78%).

**KEYWORDS:** whooping cough, diphtheria-tetanusacellular pertussis vaccines, adolescent, case-control studies, vaccine effectiveness

## 9:55 Bacterial Pneumonia and Standardized Interpretation of Chest Radiographs in Adults

**AUTHORS:** Jonathan M. Wortham, J. Gray, J. Verani, C. Lucia Contreras, C. Bernart, F. Moscosa, A. Roldan, J. Moir, J. Hernandez, R. Castellan, W. Arvelo, K. Lindblade, J. McCracken

**BACKGROUND:** Bacterial pneumonia is a leading infectious cause of illness and death worldwide, but quantifying the burden is difficult due to insensitive diagnostics and chest radiograph (CXR) interpretations. A World Health Organization (WHO) protocol standardizes pediatric CXR interpretation for epidemiologic studies. Because pneumonia etiologies and radiographic patterns may differ in adults, the utility of this protocol on adult CXRs is unknown.

**METHODS:** Patients (age  $\geq 15$  years) admitted with acute respiratory infections to two Guatemalan hospitals underwent testing for bacterial infections (urine antigen for *Streptococcus pneumoniae* and/or blood cultures) and viral infections (polymerase chain reaction for respiratory syncytial virus, human metapneumovirus, influenzae A/B, parainfluenza virus 1/2/3, adenovirus). CXR were performed when clinically indicated, and classified per WHO protocol as endpoint consolidation, other infiltrate, or normal. We examined associations between end-point consolidation and bacterial and viral infections.

**RESULTS:** During 11/2007–3/2012, 721 patients had

CXR plus urine antigen and/or blood culture results; 385 (53%) had endpoint consolidation, and 253 (35%) had other infiltrate. Bacterial infection was detected in 112 (16%); 12 by blood culture (*S. pneumoniae* n = 6, *Staphylococcus aureus* n = 5, *Klebsiella pneumoniae* n = 1), and 100 by *S. pneumoniae* urinary antigen. Compared to patients with normal CXRs, bacterial infection was significantly more common among those with endpoint consolidation (20% vs. 8%) [Odds Ratio (OR) = 2.99; 95% Confidence Interval (CI): 1.35–7.94], but not other infiltrate (20% vs. 12%) (OR = 1.64; CI: 0.70–4.50). Viral infection was not significantly associated with endpoint consolidation (OR = 1.21; CI: 0.67–2.30).

**CONCLUSIONS:** Standardized interpretation of adult CXRs identified patients with acute respiratory diseases more likely to have bacterial infections. This approach can help measure the burden of bacterial pneumonia and impact of interventions in adults.

**KEYWORDS:** pneumonia, *Streptococcus pneumoniae*, radiography, bacterial pneumonia

*All labor that uplifts humanity has dignity and importance.  
—Dr. Martin Luther King, Jr.*

**CONCURRENT SESSION H2: Occupational Health**  
**8:30–10:15 am**

**Dunwoody Suites**

**MODERATORS:** Henry A. Anderson and Kristin J. Cummings

**8:35 Prevalence of Carpal Tunnel Syndrome Among Employees  
at a Poultry-Processing Plant — South Carolina, 2012**

**AUTHORS:** Kristin M. Musolin, J. Gibbins, B. Bernard, J. Ramsey, C. Mueller

**BACKGROUND:** In 2011, approximately 224,000 U.S. poultry abattoir employees slaughtered approximately nine billion birds for human consumption. These employees may be at risk for carpal tunnel syndrome (CTS) from a combination of forceful exertions, high repetition, and extreme postures. Redesigning the work process can prevent illness and early intervention and treatment can lead to improved outcomes. We evaluated the risk of CTS at one poultry-processing plant.

**METHODS:** In August 2012, we undertook a cross-sectional survey concerning symptoms and occupational risk factors among employees. Jobs were grouped into lower, moderate, and higher-risk using the Threshold Limit Value<sup>®</sup> for Hand Activity and forceful exertion categorization. We performed nerve conduction studies (NCS) to assess median nerve damage in the hand and wrist. A CTS case was defined as an employee with (1) self-reported pain, numbness, burning, or tingling in the hand and wrist of an established frequency, duration, and location, and (2) abnormal NCS results. We used log-binomial regression to evaluate the

relationship between CTS and exposure group adjusted for nonoccupational factors.

**RESULTS:** A total of 126 (42%) of 300 participants had CTS. The prevalence of CTS by exposure group was 36% for lower-risk, 43% for moderate-risk, and 48% for higher-risk. In the adjusted analysis the higher-risk exposure group had a CTS prevalence that was significantly higher than the lower-risk exposure group (PR: 1.39;  $P = 0.01$ ).

**CONCLUSIONS:** Increasing levels of force and hand activity were associated with increased CTS prevalence among employees. Recommendations provided to managers and employees to reduce these risk factors included increasing the number of line workers, providing appropriate rest breaks; ensuring early medical intervention, and instituting annual surveillance of symptoms.

**KEYWORDS:** occupational, poultry, carpal tunnel syndrome, prevalence

## 8:55 Salivary Cortisol Response to a High-Protein Challenge and Metabolic Syndrome in Police Officers – New York, 2004–2009

**AUTHORS:** Penelope J. Baughman, M. Andrew, C. Burchfiel, D. Fekedulegn, J. Violanti, D. Miller

**BACKGROUND:** Policing is considered a high-stress occupation and officers have elevated cardiovascular morbidity and mortality. To investigate this potential connection, we evaluated the association between salivary cortisol response to a standardized challenge and the metabolic syndrome (MetSyn), a subclinical disorder associated with increased cardiovascular risk.

**METHODS:** Cross-sectional data from the Buffalo Cardio-Metabolic Occupational Police Stress Study (2004–2009) were analyzed. MetSyn was defined as three or more of five components: abdominal obesity, hypertension, elevated triglycerides, reduced high-density lipoprotein cholesterol, and glucose intolerance. Officers provided five salivary cortisol samples, one before challenge (ingestion of a lunchtime high-protein shake) and four at 15-minute intervals thereafter, where increase represents normal response. Age- and sex-adjusted regression models were used to examine trends in mean number of MetSyn components across quartiles of area under the curve (AUC) salivary cortisol. Patterns of

mean cortisol response were assessed by MetSyn status using repeated measures analysis of covariance.

**RESULTS:** The study included 373 officers (74.0% men) with a mean age of 41.0 years. Prevalence of MetSyn was 25.7%. The mean count of MetSyn components decreased (1.89, 1.75, 1.55, 1.37;  $P < 0.01$ ) across increasing quartiles of AUC salivary cortisol. The pattern of mean salivary cortisol decreased from baseline (5.55, 4.58, 4.47, 4.79, 4.75 nmol/L) in officers with MetSyn and increased (5.08, 5.82, 5.92, 5.82, 5.60 nmol/L) in their counterparts. The test for interaction between MetSyn status and sample timing was statistically significant ( $P < 0.001$ ).

**CONCLUSION:** A reduced cortisol response to a high-protein meal challenge may be associated with MetSyn. Future longitudinal studies could provide useful evidence for planning intervention studies on cardiovascular risk among the 794,000 police officers in the United States.

**KEYWORDS:** metabolic syndrome, cortisol, cardiovascular diseases, police

## 9:15 Self-Reported Gender-Based Violence Among Female Sex Workers – Kampala, Uganda, 2012

**AUTHORS:** Ameer M. Schwitters, T. Durant, N. Borse, R. Bosa, I. Benech, S. Mital, W. Hladik

**BACKGROUND:** Gender-based violence (GBV) includes sexual, physical, and verbal abuse. The 2006 Uganda Demographic Health Survey reported 28.2% (lifetime) and 52.3% (12-months) of Kampala females in the general population experienced sexual and physical abuse, respectively. Up to 72% of sub-Saharan African female sex workers (FSWs) report abuse during their lifetime, but limited research exists on GBV among FSWs in Uganda. Research shows FSWs frequently experience GBV perpetrated by partners, clients, and others. To better understand prevalence and type of GBV among FSWs in Kampala, we examined behavioral survey data.

**METHODS:** Data from a 2012 Kampala respondent-driven sampling survey, a probability-based, peer-recruitment sampling method, were analyzed. We estimated duration of sex work, prevalence and 95% confidence intervals (CI) for self-reported verbal and physical abuse and rape using RDSAT, adjusting for the non-random sampling frame. Participants were >15 years. Interviews utilized recall

timeframes of 6-months (abuse and rape frequency), lifetime (rape), and last occurrence (rape perpetrator).

**RESULTS:** Among 1,489 FSW respondents, median duration of sex work was two years. Verbal and physical abuse prevalence perpetrated by clients was 77.5% (95% CI: 74.7–80.3) and 73.1% (95% CI: 70.0–76.2), respectively. Almost half (49.8%; 95% CI: 47.3–52.4) of FSWs reported being raped. Median number of rape occurrences was two (6-months). Rape perpetrators were sex partners (36.3%; 95% CI: 32.8–39.7), strangers (36.1%; 95% CI: 32.6–39.9), and others (27.6%; 95% CI: 21.6–33.6).

**CONCLUSIONS:** Prevalence of verbal and physical abuse and rape among FSWs in Kampala is frequent. Physical abuse is more common among FSWs than among women in the general population. Comprehensive programs, including those targeting cultural norms supporting GBV are needed to reduce violence among FSWs.

**KEYWORDS:** sex workers, female, violence, Uganda

## 9:35 Cancer Screening Non-Compliance Among Females Who Work Alternative Shifts – United States, 2010

**AUTHORS:** Rebecca J. Tsai, S. Luckhaupt, M. Haring Sweeney, G. Calvert

**BACKGROUND:** Alternative shift work (work hours falling outside typical daytime shifts) was classified as a probable human carcinogen by the International Agency for Research on Cancer in 2007, based primarily on increased breast cancer risk. Twenty-seven percent of employed females in the U.S. work alternative shifts (N ≈ 8,700,000). Given the effectiveness of certain cancer screening tests to increase survival, the associations between alternative shift work and non-compliance with breast, cervical and colon cancer screening recommendations issued by the United States Preventive Services Task Force were investigated.

**METHODS:** The 2010 National Health Interview Survey was used to examine these associations. Analyses were restricted to females employed within 12 months of interview. SUDAAN® and Poisson regression were used to compare the prevalence of non-compliance with cancer screening recommendations between females employed on alternative shifts and those employed on typical daytime shifts. Analyses by 42 industries and occupations were also performed.

**RESULTS:** The analyses included 9,009 females. Workers on alternative shifts, compared to workers on daytime shifts, were significantly more likely to be non-compliant with screening recommendations for breast (34% versus 23%; prevalence ratio [PR] = 1.35; 95% confidence interval [CI]: 1.17–1.55) and colorectal cancer (55% versus 48%; PR = 1.10; CI: 1.00–1.21). Additionally, significant non-compliance with screening recommendations for more than one cancer was observed for workers on alternative shifts in two industries (“Manufacturing” and “Accommodation/Food Services”) and three occupations (“Food Preparation/Serving”, “Personal Care Services” and “Production”), compared to all workers on daytime shifts.

**CONCLUSIONS:** The Affordable Care Act eliminates out-of-pocket screening expenses for these three cancers. Greater efforts are needed to promote this benefit, particularly among female workers with demonstrated non-compliance.

**KEYWORDS:** early detection of cancer, industry, occupation, occupational exposure

## 9:55 Inhaled Mercury Exposure from Artisanal Gold Mining and Processing – Nome, Alaska, 2012

**AUTHORS:** Brian R. Yablon, A. Hamade, D. Fearey, J. McLaughlin

**BACKGROUND:** Mercury, a potent toxin that can cause brain and kidney damage, has long been used by miners to bind and thus extract gold. Consequently, gold unearthed in heavily mined areas is commonly amalgamated to mercury, which can be released through heating. In June 2012, we responded to concerns relayed by Alaska’s Department of Environmental Conservation that artisanal miners in Nome were potentially inhaling mercury vapor while heating gold.

**METHODS:** Through press release, radio, and newspaper advertisements, we targeted persons exposed to gold mining or processing. We surveyed a convenience sample to assess risk factors. We analyzed urine to determine creatinine-normalized mercury levels, using a literature-derived reference (20 µg/g creatinine) to assess potential health risk.

**RESULTS:** Of 40–50 people approached, 18 participants completed surveys and submitted urine. Seventeen (94%) were male; 14 (78%) were miners. No miner heated gold ≥15 minutes/week. Participants’ urine mercury levels ranged

from 0.2 to 106.1 µg/g (median: 0.9 µg/g). Subject A, the only participant whose urine mercury concentration exceeded the health-risk level, was a processor who heated gold inside his home 2–3 hours/day. His two neighbors — nonminers concerned about frequent unpleasant fumes from subject A’s home — had the next highest levels (6.4 and 5.4 µg/g). Subject A denied symptoms, and his urine mercury level decreased to 50 µg/g after the summer gold-processing season ended. Safe practice recommendations were distributed to miners and posted throughout Nome.

**CONCLUSION:** Subject A was exposed to potentially toxic mercury levels while heat-processing gold indoors. His neighbors were likely exposed through fumes released from his home. Artisanal miners and processors need education about safe purification practices to limit personal and community exposure.

**KEYWORDS:** mercury poisoning, mining, occupational exposure, environmental exposure

*I do not cough for my own amusement.*  
—Jane Austen

**CONCURRENT SESSION I1: Tuberculosis**  
**10:30–11:55 am**

**Ravinia Ballroom**

**MODERATOR:** Kenneth Castro

**10:35 Negative Tuberculin Skin Test Result and Increased Risk of Death — United States, 1993–2008**

**AUTHORS:** Sara C. Auld, E. Click, C. Heilig, K. Cain, R Miramontes, G. Bisson, W. MacKenzie

**BACKGROUND:** Tuberculin skin testing (TST) has historically been used as a marker of tuberculosis (TB) infection and to evaluate risk of progression to active TB. However, studies suggest that a positive TST result may indicate beneficial immune system response to TB. We explored whether a positive TST result was associated with decreased risk of death among case-patients reported with active TB in the United States.

**METHODS:** We analyzed data on TB case-patients reported to CDC during 1993–2008 who had a positive culture result and documented susceptibility to first-line drugs and who had completed TB therapy or died of any cause after initiating therapy. TST result was categorized by size of induration (<5mm [negative], 5–9 mm, 10–14 mm, and ≥15 mm). We estimated associations between size of TST induration and death by using logistic regression adjusted for HIV status, nativity, age, sex, site of disease, and cavitation on radiograph.

**RESULTS:** Of 36,149 case-patients included in the analysis, 5,284 (15%) had a negative TST result, 21,918 (61%) had a TST result of ≥15 mm and 1,614 (4%) died. Compared to case-patients with a negative TST result, case-patients with a positive result were less likely to die: TST result of 5–9 mm (adjusted odds ratio [aOR]: 0.46; CI: 0.45–0.46); result of 10–14 mm (aOR: 0.38; CI: 0.38–0.38); result of ≥15 mm (aOR: 0.31; CI: 0.31–0.31).

**CONCLUSIONS:** Case-patients with active, culture-confirmed TB who have a negative TST result are more likely to die than are patients with TB who have a positive TST result. Among persons with active TB disease, the TST may help identify patients at greater risk for death.

**KEYWORDS:** tuberculosis, tuberculin test, death, immunology

## 10:55 Relationship Between Cigarette Smoking and Secondhand Smoke Exposure and Latent Tuberculosis Infection Among U.S. Adults, National Health and Nutrition Examination Survey, 1999–2000

**AUTHORS:** Eugene Lam, M.L. Pearson, I.V. Rolle, R. Caraballo

**BACKGROUND:** An estimated 11 million U.S. residents are infected with *Mycobacterium tuberculosis* (TB). Identifying and treating groups with a high prevalence of latent TB infection (LTBI) are essential to TB elimination efforts. Although cigarette smoking has been implicated as a risk factor for active TB disease, limited evidence is available regarding the relationship between LTBI and either cigarette smoking or exposure to secondhand smoke (SHS).

**METHODS:** In multivariable logistic regression analyses, we used data from the 1999–2000 National Health and Nutrition Examination Survey to examine the associations between LTBI and smoking status (never, former, or current cigarette smoker based on both self-report and serum cotinine levels) or SHS exposure among those aged  $\geq 20$  years. Participants with a tuberculin skin test measurement of  $\geq 10$  mm were classified as having LTBI.

**RESULTS:** Of 3,408 survey participants whose data we analyzed, 5.2% had LTBI, 25.9% were current smokers, 23.1%

former smokers, and 51.0% never smokers. Compared with LTBI prevalence among never smokers, prevalence was significantly higher among current smokers (adjusted odds ratio [aOR]:3.1; 95% confidence interval [CI]:1.8–5.2), and former smokers (aOR:2.5; 95% CI:1.0–6.3). Former smokers exposed to SHS were more likely to have LTBI compared to never smokers who were not exposed to SHS (aOR:3.4; 95% CI:1.1–10.9). LTBI was also associated with male sex (aOR:1.7; 95% CI:1.0–3.0), age  $\geq 50$  years (aOR:2.3; 95% CI:1.1–4.7), foreign birth (aOR:6.9; 95% CI:3.3–14.6), and living in a household with TB disease (aOR:2.8; 95% CI:1.4–5.7).

**CONCLUSION:** Our findings that both smoking and SHS exposure were associated with LTBI among U.S. adults suggest that tobacco control efforts could contribute to U.S. TB elimination efforts.

**KEYWORDS:** tobacco, tuberculosis, latent tuberculosis infection (LTBI), cotinine, NHANES

## 11:15 Enlarged Peripheral Lymph Nodes and Positive *Mycobacterium tuberculosis* Culture Among People Living with HIV – Cambodia, Thailand, and Vietnam, September 2006–July 2008

**AUTHORS:** Chimeremma D. Nnadi, C. Heilig, P. Moonan, K. McCarthy, J. Varma, K. Cain

**BACKGROUND:** Tuberculosis (TB) accounts for 25% of all HIV deaths. In 2010, 350,000 people died of HIV-associated TB. Diagnosing TB in people living with HIV (PLHIV) can be difficult: symptoms are often atypical, and some people cannot produce sputum for examination. Diagnostic delays contribute to the high mortality rate. PLHIV commonly have enlarged peripheral lymph nodes (EPLNs). EPLNs can be aspirated for *Mycobacterium tuberculosis* (MTB) culture, potentially expediting TB diagnosis. We determined factors associated with a positive MTB culture among PLHIV with EPLNs.

**METHODS:** During September 2006–July 2008, 1,988 PLHIV attending 8 outpatient facilities in Cambodia, Thailand, and Vietnam underwent an extensive standardized TB diagnostic evaluation, including EPLN aspiration for MTB culture. EPLN was defined as a peripheral lymph node of  $>1$  centimeter or  $>2$  centimeters in the inguinal region. We analyzed clinical characteristics associated with EPLNs. Then, for patients with EPLN culture results, we used multivariate

logistic regression to analyze characteristics associated with MTB-positive aspirates.

**RESULTS:** EPLNs were present in 237 (12%) patients. EPLNs were associated with CD4  $<150$  cells/mm<sup>3</sup>, abnormal chest radiograph, self-reported fever, and self-reported weight loss. EPLN culture results were available for 101 patients: 45 were MTB-positive. In multivariate analysis, positive EPLN aspirate culture was associated with CD4  $<150$  cells/mm<sup>3</sup> (adjusted odds ratio [aOR]: 7.0; confidence interval [CI]: 2.1–22.9), weight loss (aOR: 9.3; CI: 2.1–40.1), and abnormal chest radiograph (aOR: 5.7; CI: 1.6–19.8).

**CONCLUSION:** Enlarged peripheral lymphadenopathy was associated with reduced immune status. Aspiration and culture of EPLNs may facilitate early TB diagnosis among PLHIV, potentially reducing TB morbidity and mortality.

**KEYWORDS:** *Mycobacterium tuberculosis*; HIV; diagnostics; bacteriological techniques; Asia, Southeastern



## 11:35 Drinking, Bootlegging, and an Outbreak of Drug-Resistant Tuberculosis – Rural Kentucky, 2007–2012

**AUTHORS:** Terrence Lo, E.S. Russell, M. Patterson, E. Johnson, D. Thoroughman, T. Goins, S. Morris

**BACKGROUND:** Treatment of tuberculosis (TB) is generally curative and interrupts transmission by rendering a case-patient noninfectious. Treatment of drug-resistant TB is less effective, enabling the spread of *Mycobacterium tuberculosis*. Genotyping of *M. tuberculosis* strains confirmed an outbreak of drug-resistant TB during January 2007–April 2012 involving six patients in southeastern Kentucky. We investigated these six patients and their contacts to recommend control measures.

**METHODS:** We reviewed medical records and interviewed patients, their proxies, and health department personnel to identify the source of the outbreak, chains of transmission, and barriers to TB control. Tuberculin skin test (TST) results ( $\geq 5$  mm) were used to estimate prevalence of latent TB infection (LTBI) among contacts.

**RESULTS:** Of six case-patients, five were culture confirmed. Five were contacts to a putative source of an outbreak involving 47 drug-resistant cases beginning in 1988; this patient operated an illegal drinking venue and alcohol distribution

network (i.e., bootlegging). Before 2007, two of these five case-patients were not fully evaluated for LTBI. Among all case-patients, excessive alcohol use and covert lifestyles associated with boot-legging hindered TB control efforts. Of 105 contacts named during the current investigation, 32 did not have TST results; 18 (25%) of the 73 with TST results tested positive.

**CONCLUSIONS:** Epidemiologic and genotypic links to the source case of a previous outbreak suggest that the current outbreak resulted from reactivation of infection acquired in the distant past. One-quarter of recent contacts were infected, which, if untreated, could lead to future drug-resistant cases. Given the prevalence of excessive alcohol use and drug resistance among this network, partnerships with alcohol treatment programs and increased efforts to complete contact investigations and provide treatment are needed.

**KEYWORDS:** tuberculosis; alcohol drinking; tuberculosis, multidrug-resistant

*Life can only be understood backwards,  
but it must be lived forwards.*  
—Soren Kierkegaard

## CONCURRENT SESSION I2: Maternal and Child Health

10:30–11:55 am

Dunwoody Suites

MODERATOR: Wanda Barfield

### 10:35 Health Hazards Associated with Laundry Detergent Pods — United States, May–June 2012

**AUTHORS:** Satish K. Pillai, M.C. Beuhler, F.M. Henretig, P. Gala, P. Meaney, H. Wolfe, J. Schier, R. Law, M. Punja, S. Kieszak, L. Lewis

**BACKGROUND:** Sales of concentrated liquid detergent capsules, known as laundry detergent pods (LDPs), are increasing in the United States' (U.S.) detergent market where market share has risen over twofold to 6% in 2012. Concern regarding LDP exposures began in spring 2012 when two poison centers reported four children with respiratory distress following ingestion of LDP contents. An investigation to elucidate LDP-exposure risk factors and health effects was undertaken.

**METHODS:** On May 17, 2012, the American Association of Poison Control Centers and CDC developed a code for poison center (PC) staff to use for LDP exposures. LDP exposures were identified in the national PC reporting database, National Poison Data System (NPDS), between May 17–June 17, 2012. Non-pod laundry detergent (NPLD) exposures reported to NPDS during the same timeframe were used as a comparison group. Statistics for exposure intentionality, route, age, and adverse health events were calculated using chi-square or Fisher's exact test.

**RESULTS:** Of 1,008 laundry detergent exposures, 485 (48%) involved LDPs. LDP exposures were more frequently unintentional (99%) and associated with ingestion (90%) compared to NPLD exposures (94% and 81%, respectively,  $P < 0.001$  for both). Children aged  $\leq 5$  years were more likely to have a LDP exposure compared to those aged 11–20 years and 20+ years ( $P < 0.001$  for both). Among children aged  $\leq 5$  years, LDP-exposed individuals more frequently had adverse health events (80%), including vomiting, coughing and lethargy, compared to NPLD exposed individuals (63%) ( $P < 0.001$ ).

**CONCLUSIONS:** LDPs represent an emerging public health hazard, potentially resulting in more severe health effects in young children compared to NPLD. Laundry products should be kept out of sight and reach of children.

**KEYWORDS:** detergent, poisoning, children, risk factor

## 10:55 Discontinuation of Hormonal Contraception Use Among Black Teenage Clients of an Urban Family Planning Clinic — Atlanta, Georgia, 2012

**AUTHORS:** Michael Lowe, M. Whiteman, P. Marchbanks

**BACKGROUND:** More than 300,000 infants are born to U.S. teens annually and rates are highest among minorities. Although more than half of sexually active U.S. teens have used hormonal contraceptives, little is known about factors associated with their discontinued use of these methods.

**METHODS:** In 2012, 350 sexually active black female clients of an Atlanta family planning clinic responded to a computer-assisted questionnaire concerning their contraceptive history and sexual behavior. We used multivariable logistic regression to examine factors associated with discontinuing hormonal contraceptive methods.

**RESULTS:** Sixty-six percent of respondents reported having used some type of hormonal contraception: 47% injectable contraception (DMPA), 34% oral contraceptives (OCs), 10% the patch, 6% the vaginal ring, and 24% >1 method. Of those who ever used a hormonal method, 51% reported no longer using one, and 40% of former users reported using no contraceptives the last time they had sex. Respondents frequently cited perceived body or menstrual cycle changes

as a reason for discontinuation (55%, DMPA; 33%, OCs). Additionally, one-third of respondents discontinuing OCs cited trouble using them. Characteristics independently associated with discontinuing hormonal methods included having  $\geq 4$  versus  $< 4$  lifetime sexual partners (adjusted odds ratio [aOR]: 1.7; 95% confidence interval [CI]: 1.0–3.0) and having a mother who did not complete high school (aOR: 2.7; 95% CI: 1.5–4.9).

**CONCLUSIONS:** More than half of respondents who had ever used hormonal contraceptives reported they had discontinued doing so, and many reported using no form of contraception the last time they had sex. These findings suggest a need for strategies to improve continuation of hormonal contraceptives among teens or to encourage selection of highly effective user-independent methods, such as intrauterine devices or implants.

**KEYWORDS:** family planning methods; oral contraceptives; contraceptive agents, adverse effects; contraceptive method switching; healthcare disparities

## 11:15 Evaluation of the Integration of Rapid Syphilis Testing into Routine Antenatal Services — Nyanza Province, Kenya, 2012

**AUTHORS:** Eleanor B. Fleming, K. O'Connor, I. Sadumah, J. Oremo, S. Kola, S. Oswago, C. Zeh, R. Quick, M. Kamb

**BACKGROUND:** Syphilis infection results in perinatal death or disability in approximately 60% of untreated pregnant women. Nyanza Province has the highest syphilis burden (2.3% of reproductive-aged women) and the second highest neonatal mortality rate (39 per 1,000 live births) in Kenya. We evaluated how integrating rapid syphilis tests (RSTs) and penicillin treatment kits into routine antenatal clinic (ANC) services affected syphilis testing, diagnosis, and treatment in 2 rural districts in Nyanza.

**METHODS:** In February 2011, nurses from 8 rural clinics were trained in using RSTs and documenting test results and treatment. During March 2011–February 2012, free RSTs and treatment kits were provided to clinics for use during the first ANC visits. We analyzed antenatal registry data during the 12-month periods before and during RST program implementation and used chi-square tests to compare syphilis testing, diagnosis and treatment during the 2 periods.

**RESULTS:** Syphilis testing at first ANC visit increased from 18% (279 of 1,586 attendees) in the 12 months before the intervention to 70% (1,123 of 1,614 attendees) during the 12-month intervention period ( $P < 0.001$ ); 35 women (3%) tested positive during the intervention period compared with 1 (<1%) during the previous 12 months ( $P < 0.001$ ). None of the 8 clinics recorded syphilis treatment according to training recommendations. However, 6 of the clinics identified 28 RST-positive women and recorded 34 treatment kits as used (1.2:1 ratio of treatment to positive results).

**CONCLUSIONS:** Integrating RSTs into rural ANC services increased syphilis testing and detection. Better record keeping of the treatment of syphilis in RST-positive women is needed.

**KEYWORDS:** congenital syphilis, prenatal care, Kenya, female urogenital diseases, pregnancy complications

## 11:35 Relationship Between Use of Labor Pain Medication and Delayed Onset of Lactation – United States, 2005–2007

**AUTHORS:** Jennifer N. Lind, C. Perrine, R. Li

**BACKGROUND:** Delayed onset of lactation (DOL) is associated with early cessation of breastfeeding; shorter breastfeeding duration is associated with a higher risk for infections and sudden infant death syndrome in infancy and for obesity and diabetes later in life. Despite estimates that 86% of mothers in the United States receive pain medications during labor/delivery, little research has been done on how use of these medications affects onset of lactation.

**METHODS:** In multivariable logistic regression analyses of data from the 2005–2007 Infant Feeding Practices Study II, a longitudinal study of mothers and infants, we assessed the relationship between mothers' self-reported use of labor pain medication (classified as none, spinal/epidural only, spinal/epidural plus another medication, or only labor pain medication other than a spinal/epidural) and DOL (milk coming in  $\geq 4$  days after delivery). Fully adjusted models controlled for potential confounders identified in bivariate analyses ( $P < 0.05$ ).

**RESULTS:** Among women who initiated breastfeeding ( $n = 2,586$ ), 23.6% experienced DOL. Compared with women who received no labor pain medication, women who received a spinal/epidural only (adjusted odds ratio [aOR]: 2.10; 95% confidence interval [CI]: 1.47, 3.00), those who received a spinal/epidural plus another medication (aOR: 2.31; 95% CI: 1.55, 3.45), and those who received only labor pain medication other than a spinal/epidural (aOR: 2.25; 95% CI: 1.43, 3.54) had more than twice the odds of experiencing DOL.

**CONCLUSIONS:** Mothers who received pain medications during labor/delivery were more likely to experience DOL. Pregnant women should be informed that use of labor pain medications may delay onset of lactation. Interventions aimed at providing additional breastfeeding support in the early postpartum period to women who receive labor pain medications may help improve breastfeeding outcomes.

**KEYWORDS:** breastfeeding, lactation, labor pain, obstetrical analgesia, obstetrical anesthesia, risk factors

*Of course we don't know what we are doing;  
that's why it's called research.  
—Albert Einstein*

**POSTER SESSION 2: Meet the Authors**  
**12:30–1:30 pm**

**Ravinia Ballroom (E, F, and G)**

**Poster 2.1 Histoplasmosis Outbreak at a Day Camp — Nebraska, 2012**

**AUTHORS:** Kristin M. Yeoman, B. Buss, T. Safranek, A. O'Keefe, J. Frederick, B. Harmon, B. Cadwell, B. Park

**BACKGROUND:** *Histoplasma capsulatum*, a fungus endemic to Nebraska, can cause respiratory illness from inhaling soil contaminated with bird or bat droppings. On June 21, Nebraska health authorities were notified of acute respiratory illnesses among counselors at a children's day camp. We investigated the outbreak's extent and source to prevent further infections.

**METHODS:** We reviewed camp records, administered questionnaires to counselors and attendees' parents, and inspected the site. A confirmed case was a serum or urine test positive for *H. capsulatum* anytime after camp arrival. A suspected case was illness comprising fever and  $\geq 1$  additional symptom (headache, chest pain, shortness of breath, cough)  $\geq 3$  days after camp arrival. A retrospective cohort study evaluated associations between counselor activities, campsite assignments, and illness. We compared illnesses among children by campsite assignment (campsites with, or  $\leq 20$  yards from, guano versus those  $\geq 21$  yards away [referent group]) by using multilevel logistic regression with a random effect for campsite.

**RESULTS:** Among 32 counselors, 19 cases (18 confirmed) occurred; no activities or campsite assignments were associated with illness. Among 797 children, data were obtained for 153; 17 cases (5 confirmed) occurred. Bat guano was noted on picnic tables and dirt floors at 2 of 12 campsites. Children assigned to campsites with, or  $\leq 20$  yards from, guano had 2.4 (95% confidence interval [CI]: 0.5–11.4) and 2.2 (95% CI: 0.5–8.2) times the illness odds, respectively. Illness odds decreased as distance from guano-affected campsites increased (Cochran-Armitage  $P = 0.04$ ).

**CONCLUSIONS:** Campsite contamination by bat guano, which likely became aerosolized during activities, probably caused this outbreak. The day camp was relocated; we identified no further cases. Camp administrators were instructed in campsite biohazard mitigation.

**KEYWORDS:** histoplasmosis, histoplasma, respiratory tract diseases, logistic models

## Poster 2.2 *Salmonella enterica* Serotype Typhimurium Infection Associated with Cantaloupe – Kentucky, 2012

**AUTHORS:** Elizabeth S. Russell, T. Sugg, S. Adams, L. Iwig, J. Tobias, W. Grooms, M. Reed, K. Humbaugh, T. Vaughn, D. Thoroughman

**BACKGROUND:** In July 2012, the Kentucky Department for Public Health identified an increase in reported salmonellosis cases >3 times the Kentucky weekly average. These included an outbreak of *Salmonella* Typhimurium with a pulsed-field gel electrophoresis (PFGE) pattern rarely reported in Kentucky and that PulseNet matched to cases in other states. We investigated to identify the vehicle and source of the Kentucky outbreak and prevent additional cases.

**METHODS:** We defined a case as laboratory-confirmed *Salmonella* Typhimurium matching the outbreak PFGE pattern isolated from a Kentucky resident during July 7–September 30, 2012. Telephone interviews provided patient food histories for 72 hours before illness onset. We visited grocery stores, collected samples of implicated items, and performed a traceback investigation. Environmental samples for laboratory testing were collected from the farm that grew sampled cantaloupes.

**RESULTS:** We identified 70 matching cases of *Salmonella* Typhimurium with illness onsets July 11–August 22. Median

patient age was 58 years (range: 3–100 years); 49 (70%) reported hospitalization, and 3 (4%) died. Among 32 patients interviewed, 27 (84%) reported having consumed cantaloupe. Site visits to grocery stores of interest revealed opportunities for cross-contamination through use of common surfaces and utensils for cutting produce. The outbreak strain was isolated from two cantaloupes collected from a grocery store with a single cantaloupe supplier, Farm A, and from cantaloupes sampled from Farm A fields. PulseNet ultimately linked the outbreak to 240 illnesses in 20 states.

**CONCLUSIONS:** Epidemiologic and laboratory investigations traced an outbreak of salmonellosis to a cantaloupe vehicle and through the supply chain to Farm A. The proportion of patients hospitalized was higher than expected for *Salmonella* Typhimurium, even when considering patients' age.

**KEYWORDS:** foodborne diseases; *Salmonella* infections; electrophoresis, gel, pulsed-field

## Poster 2.3 Assessing Household Preparedness for Radiologic Emergencies – Michigan, 2012

**AUTHORS:** Mawuli K. Nyaku, S. Bies, M. Stanbury, J. McFadden, A. Schnall, A. Wolkin, T. Bayleyegn, M. Murti

**BACKGROUND:** Approximately 1 million persons in Oakland County, Michigan, reside within 50 miles of the Fermi Nuclear Power Plant. In support of radiation emergency response plans, we assessed Oakland County households' preparedness for a radiologic emergency by using a Community Assessment for Public Health Emergency Response (CASPER) survey.

**METHODS:** During September 2012, we used a two-stage cluster sampling design to select 210 representative households in Oakland County. Through in-person surveys, we assessed the proportion of households with essential supplies, how they would respond to public health instructions during a radiologic emergency, and their main source for information. Data were weighted to account for the complex sampling design.

**RESULTS:** Among the 210 selected households, 192 (91.4%) surveys were completed; 85.6% and 62.5% of households indicated a 3-day supply of nonperishable food and water, respectively; 96.6% had a 7-day supply of prescription

medication for each person who needed it. Additionally, 66.8% had a carbon monoxide detector, and 51.3% had a backup heat source. In response to instructions from public health officials, 92.5% of all households would report to a radiation screening center; 94.7% would evacuate; and 90.1% would shelter-in-place. During a radiologic emergency, 55.3% of households indicated their main source of information would be television, followed by radio (25.0%) and the Internet (11.4%).

**CONCLUSION:** Oakland County households should be educated to maintain personal emergency stocks of food, water, and essential medications and access to a backup heat source for sheltering-in-place. Approximately 90% of county residents will follow instructions from public health officials, and communication plans should target television, radio, and the Internet, with contingency plans for situations where electricity is unavailable.

**KEYWORDS:** disaster planning, needs assessment, radiologic health, Civil Defense

## Poster 2.4 Cross-Transmission of *Ascaris* Infection from Pigs to Humans at an Organic Farm – Coastal Maine, 2012

**AUTHORS:** Leigh Ann Miller, S. Sears, E. McEvoy, P. Carson, B. Mathison, M. de Almeida, A. Dasilva, H. Bishop, S.P. Montgomery

**BACKGROUND:** Human infection with *Ascaris*, a soil-transmitted roundworm, is rare in the United States but common globally. Adult worms live in the small intestine and can cause intestinal blockages. Pig and human ascarids, *Ascaris suum* and *Ascaris lumbricoides*, respectively, are indistinguishable morphologically. The role of *Ascaris* cross-transmission from pigs to humans is undetermined. In September 2012, *Ascaris* infections were reported in two U.S.-born female apprentices working on an organic vegetable farm. We investigated to confirm the cases and determine whether cross-transmission had occurred.

**METHODS:** We visited the farm, interviewed the apprentices, inspected pig-farming practices, and collected pooled pig feces and worms from pigs and one apprentice for analysis.

**RESULTS:** Farm apprentices had direct daily contact with the farm's 10 pigs, beginning May 2012, and had onset of nausea and malaise in September. Both women had excreted multiple worms and received anthelmintic treatment; only

one apprentice provided a worm for testing. Farm pigs were treated with dewormer in July; however, the September pooled fecal sample contained *Ascaris* ova, and when the 10 pigs were slaughtered in October worms were recovered from half of the pigs. Molecular speciation of the apprentice's and pigs' worms is ongoing. Farm practices reflected industry standards. Dirt was noted on the apprentices' hands, neither wore gloves during pig contact, and pig manure might have been used for vegetable compost.

**CONCLUSIONS:** The timing of illness at this farm suggests that cross-transmission from pigs to humans probably occurred. To prevent further human *Ascaris* infections, we recommended better hand hygiene, excluding pig manure from compost, growing vegetables away from areas where pigs are penned, and thorough washing of vegetables possibly contaminated by *Ascaris* ova.

**KEYWORDS:** *Ascaris suum*, *Ascaris lumbricoides*, organic agriculture, Maine

## Poster 2.5 *Mycobacterium fortuitum* Surgical-Site Infections Associated with an Ambulatory Plastic Surgery Center – Los Angeles County, 2010–2012

**AUTHORS:** Christina A. Mikosz, M. Kim, C. Tyson, L. Eusebio, H. Rivas, M. Luarca, J. Sturgeon, C. Landowski, H. O'Connell, T. MacCannell, L. Mascola

**BACKGROUND:** *Mycobacterium fortuitum* is a ubiquitous environmental bacterium increasingly associated with surgical-site infections (SSIs), causing disfiguring infections that require prolonged antibiotic regimens. In October 2011, an outbreak of five *M. fortuitum* SSIs was reported among patients at a Los Angeles County ambulatory plastic surgery center (Facility A). We investigated to identify the source and stop transmission.

**METHODS:** Cases were SSIs presenting >30 days after surgery at Facility A during December 2010–October 2012. A case-control study was conducted; control subjects were well patients selected randomly from months without cases. Pulsed-field gel electrophoresis (PFGE) was performed on available *M. fortuitum* isolates. Site visits were conducted for chart review, observation of infection control practices, and environmental sampling.

**RESULTS:** Seven case-patients were identified, including a second cluster that underwent surgery during June–July 2012. Case-patients and control subjects did not differ by

surgical staff, patient order, day of week, or surgery length. PFGE of isolates from case-patients undergoing surgery over a 14-month period in this outbreak was indistinguishable, suggesting a common source. Infection control breaches were observed, including medication vials opened with a nonsterile tool for wound irrigation and a microwave shared for sterile solutions and food. Approximately 100 specimens were collected, including water from multiple sources. All were *M. fortuitum* culture-negative, except for a sample from an upstairs aquarium that had previously leaked into Facility A's ceiling; PFGE of this isolate is pending.

**CONCLUSIONS:** Strict adherence to aseptic technique, including sterile access of medication vials intended for wound irrigation and dedication of equipment for surgical use, might have prevented this outbreak. Oversight of infection control practices in ambulatory surgical centers, which differs widely, may prevent outbreaks.

**KEYWORDS:** nontuberculous mycobacteria; surgical wound infection; surgery, plastic; infectious disease outbreaks

## Poster 2.6 Diversion of Controlled Substances Among Prescription Overdose Deaths – New Mexico, 2011

**AUTHORS:** Carrie S. McNeil, M. Landen, J. Roeber, J. Davis, B. Whorton, S. Lathrop

**BACKGROUND:** New Mexico has had the highest rate of drug overdose deaths in the nation. During the past decade, prescription-drug overdose deaths and opiate sales have increased dramatically. An investigation of New Mexico prescription-drug overdose deaths was conducted to determine how controlled substances had been accessed.

**METHODS:** Prescription Monitoring Program data were linked by decedent name and birth date to prescription-drug overdose decedents during 2011, as identified by the Office of the Medical Investigator. Diversion was defined as lacking a current prescription for any controlled substances causing death. For current prescriptions, days of pharmacy-supplied medication overlapped date of death. We compared decedents' characteristics with and without diversion by demographics, pharmaceutical category, and substance abuse or mental illness history.

**RESULTS:** Diversion of one or more controlled substances was identified in 67% of 312 decedents and of all controlled substances in 45%. More men (70%) and American Indians (91%) had evidence of diversion, compared with

women (63%), Hispanics (55%), and non-Hispanic whites (62%). Diversion was greater among those overdosing on benzodiazepines (73%) and combinations of opiates and sedative hypnotics (71%) than opiates alone (61%). Diversion was common among those who died from prescription-drug and alcohol (78%) or prescription-drug and illicit-drug (71%) combinations or had history of mental illness (63%), overdose (57%), and alcohol (67%), illicit-drug (70%), or prescription-drug (62%) abuse.

**CONCLUSION:** The majority of decedents accessed controlled substances through diversion. Diversion was most evident among men, American Indians, and decedents who had taken benzodiazepines or who had substance abuse or mental illness. Future deaths might be averted through educating these groups about life-threatening risks of taking controlled substances without a prescription or with illicit drugs or alcohol.

**KEYWORDS:** prescription drug misuse, substance abuse, substance abuse detection, controlled substances, medication therapy management

## Poster 2.7 Tri-National Outbreak of *Salmonella enterica* Serotype Braenderup – The California Experience, July–September 2012

**AUTHORS:** Rachael H. Joseph, A. Kimura, D. Gilliss, J. Lidgard, J. Pringle

**BACKGROUND:** *Salmonella* is a leading cause of foodborne infections and hospitalizations in the United States. An increasingly globalized food market has led to potential for multinational outbreaks of *Salmonella*. In August 2012, the California Department of Public Health, CDC, and Canadian health officials identified clusters of *Salmonella* Braenderup infections with indistinguishable pulsed-field gel electrophoresis patterns. CDPH initiated an investigation to determine the outbreak source and prevent further illness.

**METHODS:** A case was defined as an outbreak strain isolate of *Salmonella* Braenderup from a California resident on or after July 1, 2012. We conducted an age- and ethnicity-matched case-control study. Control patients were selected from the state *Salmonella* registry among persons without the outbreak strain. Purchase information was collected from interview respondents to assist in a traceback investigation.

**RESULTS:** Of 127 cases identified in the United States, 102 (80%) were California residents; of these, 78% were Hispanic. Fresh mango was the only food significantly associated with

illness in a matched case-control study of 37 case-patients and 46 control patients (odds ratio = 4.6; *P* value: 0.001). A traceback investigation identified a mango producer in Mexico as the source of mangoes consumed by case-patients in California, other U.S. states, and Canada. These mangoes were voluntarily recalled by distributors beginning in late August and placed on import alert on September 13, 2012. Although *Salmonella* was isolated from recalled mangoes tested by the U.S. Food and Drug Administration, the outbreak strain was not detected.

**CONCLUSIONS:** The epidemiologic investigation conducted in California identified the source of a multistate, trinational outbreak of *Salmonella* Braenderup. Findings were shared with U.S., Canadian, and Mexican health officials. This investigation highlights the increasing importance of transnational communication when outbreaks cross borders.

**KEYWORDS:** *Salmonella*, foodborne diseases, mango, case-control studies



## Poster 2.8 Recognizing Laboratory Cross-Contamination: Two False-Positive Cultures of *Mycobacterium tuberculosis* – Oklahoma, 2011

**AUTHORS:** Matthew G. Johnson, K. Bradley, P. Lindsey, C. Harvey

**BACKGROUND:** *Mycobacterium tuberculosis* (MTB) isolation from clinical specimens is the standard for tuberculosis (TB) diagnosis and activates a public health response that can include long-term antibiotic therapy and extensive contact investigations. Positive MTB cultures are rarely questioned, but false-positive culture rates are 2%–4%. During December 2011, two smear-negative culture-positive TB cases were reported to the Oklahoma State Department of Health (OSDH) in persons without TB signs or symptoms. We investigated to determine if these were actual TB cases.

**METHODS:** OSDH TB control staff interviewed physicians and laboratorians, reviewed patient charts, traced epidemiologic links, and ordered microbiologic studies.

**RESULTS:** For both patients, TB cultures were ordered without specific clinical suspicion. Both MTB specimens were processed on the same day, at the same laboratory, under the same hood, and by the same technician sequentially after a strongly smear-positive TB specimen. No epidemiologic links were identified among the three persons. Spoligotyping and

mycobacterial interspersed repetitive unit typing of the three specimens were indistinguishable. Only liquid media grew MTB from both questionable specimens; a splash incident was suspected, whereby all three liquid media sample lids were open during inoculation rather than being opened one at a time, causing cross-contamination. Also, both questionable specimens were incubated for 2–3 weeks longer than standard protocol before MTB growth was observed. One of the two patients, an organ transplant recipient, began 4-drug anti-TB therapy, and an investigation was initiated for transplant-associated TB; both were ultimately discontinued.

**CONCLUSIONS:** Two false-positive MTB cultures resulted from laboratory cross-contamination. Adherence to strict laboratory techniques and recognizing the possibility of false-positive MTB cultures, especially when inconsistent with clinical data, are essential in preventing erroneous TB diagnoses.

**KEYWORDS:** tuberculosis, laboratories, medical errors, case reports

## Poster 2.9 HIV-Related Mortality and Monitored Viral Load, by Zip Code – Cook County, Illinois, 2010

**AUTHORS:** Yoran T. Grant, F. Ma, A. Satcher Johnson, K. Soyemi

**BACKGROUND:** Human immunodeficiency virus (HIV)-related mortality remains disproportionately high among specific demographic groups despite advances in care. Individual quality-of-care measures (e.g., viral load results) aid in predicting mortality risk, but do not explain differences in mortality between groups in the same geographic region. By examining a community-level quality-of-care measure, monitored viral load, we assessed correlation between quality of care and HIV-related mortality in Cook County, Illinois.

**METHODS:** We calculated HIV geometric mean viral load (GMVL) by using viral load results from Illinois' Enhanced HIV/AIDS Reporting System (eHARS). We calculated HIV-specific mortality rates by zip codes by using 2010 vital statistics data for the numerator and 2010 eHARS HIV prevalence data for the denominator. To assess variability in HIV-related mortality by GMVL, we fit a hierarchical linear model (HLM). For validation, we fit a comparable Bayesian model by using 2009 data.

**RESULTS:** Among the 17,962 persons with HIV reported

through December 31, 2009, 403 (2.2%) died in 2010, and 4,670 (26%) had  $\geq 1$  reported viral load result during 2010. The GMVL was 186 copies/mL (22.5–276,400). The HIV-specific mortality ratio of zip codes with GMVL  $> 75,000$ , compared with zip codes with lower GMVL, was 1.47 (95% confidence interval: 0.87–6.73). Validation analysis revealed HLM had higher standard errors for parameter estimates than Bayesian analyses.

**CONCLUSIONS:** Monitored viral load might be useful for understanding differences in HIV-related mortality; however, high data completion for viral load results in surveillance data will be necessary. Analyses using community-level markers (e.g. GMVL) might aid in targeting interventions to improve care access and antiretroviral adherence to communities at highest risk. Bayesian methods might improve the precision of model estimates by reducing error.

**KEYWORDS:** HIV, health status disparities, community health services, viral load

## Poster 2.10 Animal-Related Unintentional Injury Deaths – Montana, 2003–2011

**AUTHORS:** Abbey J. Canon, C. Custis, S. Helgerson, R. Nett

**BACKGROUND:** Agriculture and recreation provide opportunities for human-animal contact and for human injury and death. In the United States annually during 1991–2001, excluding animal-vehicle collisions and zoonoses, an average of 177 deaths (0.06/100,000 population) resulted from animal encounters. To develop prevention programs, we investigated and characterized animal-related injury deaths in Montana.

**METHODS:** We reviewed death certificates from unintentional injury deaths in Montana for 2003–2011. Vehicular and nonvehicular animal-related deaths were identified by using *International Classification of Diseases-10* (ICD-10) codes and keywords, which were included if animal contact directly or indirectly resulted in death. Zoonoses-related deaths were excluded. Rates were calculated by using 2010 Census data.

**RESULTS:** Among 5,349 unintentional injury deaths identified, 109 (2.0%) were animal-related. Median age of the 109 decedents was 50 (range: 4–89) years. Seventy-one (65.1%) animal-related deaths were among males (rate 1.59/100,000 population), 1.5 times higher than among females (1.06/100,000 population). Eighty-four (77.1%)

deaths occurred during April–September. Fifty-eight/109 (53.2%) animal-related deaths were caused by animal-vehicle collisions, with deer causing 38 (65.5%) of those. Horses caused 30/51 (58.8%) nonvehicular deaths; head injuries contributed to 22/29 (75.9%) horse-caused deaths. Venomous animals caused two fatalities. Compared with using only ICD-10 codes in ascertaining deaths, keyword searches identified all 58 animal-vehicle collisions and an additional 24 nonvehicular deaths. For only ICD-10-coded deaths, the average rate of nonvehicular animal-related deaths was 0.30/100,000 population, and when keywords were included, 0.57/100,000 population.

**CONCLUSION:** Using both keywords and ICD-10 codes allowed a more comprehensive evaluation of animal-related deaths; compared with prior national estimates, the nonvehicular animal-related death rate in Montana was 9.5-fold higher. Efforts should focus on equestrian safety and preventing animal-vehicle collisions in Montana.

**KEYWORDS:** Montana, wounds and injuries, animals, horses, death certificates, International Classification of Diseases

## Poster 2.11 Central-Line–Associated Bloodstream Infection Reporting Through the CDC National Healthcare Safety Network – Kansas, January 2011–June 2012

**AUTHORS:** Suparna Bagchi, D.C. Hunt, R. Geist, K. Bisgard, J. Scaletta

**BACKGROUND:** Annually in the United States, 18,000 central-line–associated bloodstream infections (CLABSIs) occur in hospital intensive care units, with 12%–25% mortality and costing ~\$25,000/event. In January 2011, voluntary CLABSI reporting was initiated in Kansas by using CDC’s Internet-based National Healthcare Safety Network (NHSN). Because CLABSI surveillance is new in Kansas, we evaluated its attributes.

**METHODS:** We reviewed data for January 2011–June 2012 from participating acute-care hospitals (ACHs) with >25 beds to measure timeliness (proportion of events reported ≤30 days from month’s end) and data quality (data completeness and denominator reporting). In September 2012, we surveyed infection preventionists (IPs) from all Kansas hospitals to measure simplicity (data sources accessed to generate reportable data, understanding of NHSN CLABSI case definition, and IP training experience).

**RESULTS:** During January 2011–June 2012, CLABSI was monitored in 93% (38/41) of ACHs; reporting timeliness

increased from 50% to 89%. During January 2012–June 2012, completeness of CLABSI denominator reporting was 97%; required data regarding CLABSI reporting forms were 100% complete, whereas nonrequired data were 20%–40% complete. Eighty (59%) of 136 IPs responded to the survey; a median of 8 (range: 7–10) data sources were accessed monthly to report CLABSI. NHSN was used by 52 (65%) of 80 respondents; regarding understanding of CLABSI case definitions, 62% self-rated “good/excellent,” and 8% self-rated “somewhat/not at all.” Formal required online training to meet NHSN enrollment requirements was reported by 34 (65%) of 52 IPs.

**CONCLUSIONS:** CLABSI reporting through NHSN is timely but complex. Our survey results indicate that additional IP training and CLABSI validation can help strengthen surveillance.

**KEYWORDS:** cross infection, infection control practitioners, prevention and control, Kansas

## Poster 2.12 Rapid Response to *Escherichia coli* O157 Outbreak – New York, 2012

**AUTHORS:** Nina Ahmad, J. Karr, G. Smith, K. Burzlaff, T. Nguyen, L. Gieraltowski, M. Anand, A. Newman, D. Schoonmaker-Bopp, T. Root, J. Egan, D. Nicholas, N. Dumas, K. Musser, E. Sawyer, J. Luker, T. Quinlan, T. Halse, C. Hidalgo

**BACKGROUND:** Shiga-toxin-producing *Escherichia coli* causes ~265,000 illnesses annually in the United States, of which ~96,000 are caused by *E. coli* O157:H7 (O157). During October–November 2012, public health officials investigated a cluster of five O157 infections in western New York to determine extent of the cluster, identify the source, and prevent further illness.

**METHODS:** A case was O157 infection in a New York resident with an isolate having one of two related pulsed-field gel electrophoresis (PFGE) patterns. We interviewed the five initial patients with hypothesis-generating questionnaires and calculated binomial probabilities by using the 2006–2007 FoodNet Population Survey, analyzed shopper card data, cultured prepackaged leafy greens from patients' homes and grocery stores for *E. coli* O157, and conducted trace-back investigations.

**RESULTS:** All five initial patients recalled eating grocery store Chain A-brand prepackaged leafy greens; consumption of prepackaged leafy greens was significantly higher than

among the reference population ( $P = 0.007$ ). Twenty-three cases were identified, all with exposure to prepackaged leafy greens; median patient age was 25 years (range: 6–66 years); 16 (70%) were female; and illness onsets occurred October 18–November 3. The outbreak strain was recovered from leftover prepackaged leafy greens from four patients' homes. Within 8 days of the initial O157 report, Chain A issued a product recall on the basis of initial laboratory and epidemiologic results plus product package labels from patients revealing a common lot code and sell-by date. No further cases were identified.

**CONCLUSIONS:** Prompt investigation, close cooperation between public health authorities and industry, and timely interventions were successful in controlling this outbreak associated with prepackaged leafy greens. Investigations of a common source for the product are ongoing.

**KEYWORDS:** *Escherichia coli* O157, foodborne diseases, disease outbreaks, electrophoresis, gel, pulsed-field

## Poster 2.13 Where's the Beef? Outbreaks of *Salmonella* Infections Attributed to Beef – United States, 1975–2011

**AUTHORS:** Alison S. Laufer, J. Grass, L. Gould

**BACKGROUND:** *Salmonella* is the most common bacterial cause of foodborne illness in the U.S., estimated to cause >1 million illnesses annually. Although beef is frequently implicated in outbreaks of salmonellosis, *Salmonella* is not usually considered a beef adulterant. We present the epidemiology of beef-attributed outbreaks of salmonellosis in the U.S. during 1975–2011.

**METHODS:** We reviewed the Foodborne Disease Outbreak Surveillance System, National Antimicrobial Resistance Monitoring System, and literature for outbreaks ( $\geq 2$  cases of similar illness) of salmonellosis attributed to beef during 1975–2011. Variables analyzed included geographic distribution, outbreak size, and antimicrobial susceptibility.

**RESULTS:** Ninety-five outbreaks were reported, resulting in 3,643 illnesses, 318 hospitalizations, and five deaths. Of 18 beef cuts reported, two predominated, roasts (25 outbreaks; 26%) and ground beef (22; 23%). Eighty percent of roast outbreaks occurred during 1975–1991, whereas 77% of ground beef outbreaks occurred during 2002–2011. Ground

beef was implicated in nine of 11 multistate outbreaks. A higher percentage of case-patients were hospitalized in ground beef outbreaks than in all other outbreaks (median: 15% versus 7%) ( $P = 0.04$ ). Seven (54%) of 13 outbreaks with antimicrobial susceptibility data available were caused by resistant strains; ground beef was the implicated vehicle in all seven. A higher percentage of case-patients were hospitalized (30%) in outbreaks caused by resistant strains than in outbreaks caused by pansusceptible strains (9%) ( $P = 0.03$ ).

**CONCLUSION:** Ground beef emerged as an important vehicle in beef-attributed outbreaks of salmonellosis in the 2000s. Ground beef outbreaks had more hospitalizations than other outbreaks, were frequently multistate, and were often caused by resistant strains. Stronger measures are needed to decrease contamination of ground beef with *Salmonella*, especially resistant strains.

**KEYWORDS:** *Salmonella* food poisoning; infectious disease outbreak; food supply; cattle; drug resistance, bacterial

## Poster 2.14 Prevalence of Obesity in a Nationally Representative Sample of HIV-Infected Adults Receiving Medical Care in the United States – Medical Monitoring Project, 2009

**AUTHORS:** Angela M. Thompson-Paul, S. Wei, C. Mattson, J. Skarbinski

**BACKGROUND:** Both obesity and HIV infection are associated with increased cardiovascular disease risk, but nationally representative prevalence estimates of obesity among HIV-infected persons have not been reported.

**METHODS:** We analyzed 2009 data from the Medical Monitoring Project (MMP), a national probability sample of HIV-infected adults receiving medical care. We included participants aged  $\geq 20$  years with available body mass index (BMI) data ( $n = 4,013$ ); analyses accounted for complex survey design. Obesity prevalence (BMI  $>30.0$  kg/m<sup>2</sup>) estimated from MMP was age-adjusted and compared with estimated prevalence of obesity in the general population from the National Health and Nutrition Examination Survey (NHANES), 2009–2010. To identify factors associated with obesity in MMP data, we performed logistic regression, using predicted marginal means in SUDAAN to calculate adjusted prevalence ratios.

**RESULTS:** Obesity prevalence was lower in MMP (23.0%, confidence interval [CI]: 21.2–24.9 versus NHANES (36%).

However, obesity prevalence was higher among women aged  $<40$  years in MMP (44.7%, CI: 38.2–51.4) versus NHANES (31.9%). In MMP, obesity was twice as likely among women versus men (adjusted prevalence ratio [aPR]: 2.1; CI: 1.9–2.4) and 40% more likely among those without a 12<sup>th</sup> grade education versus college graduates (aPR: 1.4, CI: 1.1–1.8). Obesity was 30% less likely among those with AIDS (aPR: 0.7; CI: 0.6–0.9). Race/ethnicity, poverty, and viral suppression did not significantly predict obesity.

**CONCLUSIONS:** Although obesity is less common among HIV-infected adults than among the general population, obesity affects nearly 1 in 4 HIV-infected adults in the United States and 45% of HIV-infected women aged  $<40$  years. Comprehensive HIV care should include prevention and treatment of obesity to reduce morbidity and mortality from adverse long-term outcomes.

**KEYWORDS:** HIV, obesity, cardiovascular diseases, morbidity, mortality

## Poster 2.15 Outbreak of Severe Enterovirus 71 Infections in Children – Cambodia, 2012

**AUTHORS:** Brian S. Rha, G. Abedi, P. Kitsutani, B. Sar, A. Lor, C. Hales, C. Chow, S. Gerber, E. Schneider

**BACKGROUND:** Outbreaks of enterovirus 71 (EV71) infections in Southeast Asia have caused disease ranging from mild febrile illness to fatal neuropulmonary disease, but little is known about risk factors for severe disease. From April–August 2012, 103 children in Cambodia with severe neuropulmonary disease were reported. We conducted an investigation to generate hypotheses for risk factors and describe severe EV71 disease.

**METHODS:** Cases were defined as hospitalized, laboratory-confirmed EV71-positive children  $<15$  years old with fever, neurological and respiratory signs/symptoms within 7 days of illness onset. From September 11–26, 2012, we conducted open-ended interviews (case-patient families, medical providers) and medical record reviews for accessible cases.

**RESULTS:** Twenty-nine accessible cases from 12 provinces were investigated through 22 chart reviews and interviews of 25 families, 20 clinics/pharmacies, and 7 physicians. Sixteen case-patients (55%) had significant respiratory distress and/or died, consistent with severe neuropulmonary disease; at

least 8 were intubated, 12 (75%) died. The remaining 13 case-patients had milder disease and were discharged. The majority of case-patients were young (median age: 19 months; range: 3 months–9 years), previously healthy (7% with chronic underlying conditions [e.g., asthma], 28% underweight), and from rural areas (64%) with a median household annual income of \$600. Although 85% received treatment prior to hospitalization, 67% received medications they could not identify. No other attributes were identified as potential risk factors for severe disease.

**CONCLUSIONS:** This is the first described outbreak of severe EV71 disease in Cambodia. Common features of case-patients included rural residence and receiving unknown medications prior to hospitalization. Characterizing outpatient prescribing practices and evaluating sentinel surveillance may be helpful in future efforts to identify risk factors for severe disease.

**KEYWORDS:** human enterovirus 71, Cambodia, infectious disease outbreaks, sentinel surveillance

## Poster 2.16 Community Experiences, Perceptions, and Exposures to Hydrogen Sulfide and Methane from Geothermal Venting – Lake County, California, November 2012

**AUTHORS:** Cindy H. Chiu, M. Lozier, T. Bayleyegn, K. Tait, T. Barreau, L. Copan, R. Roisman, R. Cohen, S. Smorodinsky, B. Christensen, J. Wilken, R. Kreutzer, S. Vagi, F. Yip, A. Wolkin

**BACKGROUND:** Hydrogen sulfide and methane gases from geothermal venting can cause health effects and pose risk of explosion. In Lake County, California, a region with geothermal activity, these gases have resulted in evacuating a mobile home, vacating an office building, and anecdotal reporting of possible health effects. The objective of this investigation was to assess Lake County community exposures to and perceptions of geothermal gases using the Community Assessment for Public Health Emergency Response (CASPER).

**METHODS:** We used a two-stage cluster sampling design (7 interviews in 30 clusters) to select 210 households to interview regarding geothermal venting. We also measured outdoor levels of hydrogen sulfide and methane in 173 locations in the community.

**RESULTS:** We completed 161 household interviews (completion rate: 76.7%). We found that 109 (67.7%) households were aware of geothermal gases, and 33 (20.5%) had experience with geothermal venting in or around their

home, including 23 (14.3%) who noticed a rotten egg smell and 11 (6.8%) who saw unusual corrosion on metal surfaces. Fifty-eight (36.0%) had concerns about potential effects; 55 (34.2%) were concerned about their family's health. The highest hydrogen sulfide reading was 5 parts per billion (ppb); median readings in the different regions ranged from 0 to 4 ppb. Methane levels detected were  $\leq 1\%$  lower explosive limit.

**CONCLUSIONS:** Lake County residents are aware of geothermal venting, and some have reported concerns. Both hydrogen sulfide and methane were detected below acute health effect levels. We recommend providing geothermal venting information to the community, documenting community concerns, and conducting longer term air monitoring to better understand exposure risks and seasonal variations. We will also examine the association between measured levels and survey responses.

**KEYWORDS:** hydrogen sulfide, methane, hydrothermal vents, environmental health, air pollutants, gases

## **SPECIAL SESSION: Fungal Meningitis Associated with Injection of a Widely Distributed Steroid Product: Lessons Learned During the Response to the Largest Documented Healthcare-Associated Outbreak in U.S. History**

**12:30 pm**

**Dunwoody Suites**

**MODERATOR:** J. Todd Weber

**SPONSOR:** NCEZID

The 2012–2013 outbreak of fungal infections involved a contaminated product distributed throughout the United States and injected into more than 10,000 patients. Due to the serious nature of fungal meningitis, the response, once the contaminated product was identified, had to be rapid and to reach all exposed persons. In addition, CDC needed to ensure that only one product was contaminated and causing disease, and generate clinical guidelines in real time based on limited data for a previously rarely reported infection. The teams responding to the outbreak elected to collect all case reports from anyone ill who had been exposed to any product from the implicated company, work with FDA to test multiple products, and collaborate with multiple groups to ensure direct contact of all exposed persons and collect available clinical data to develop treatment guidelines. The scope and nature of the response to a previously undescribed infection were different from other outbreaks, and multiple lessons were learned that could be applied to outbreaks in the future.

The fungal meningitis outbreak was widely reported and of interest to many people; because of the commonness of these

injections, nearly everyone knew someone who might be at risk. Incoming and existing EIS officers and staff would be exposed to the complexity of responding to such an outbreak, and the requirement for flexibility and innovation during a situation for which few staff had direct previous experience.

- Introduction to the Outbreak: Lessons Learned in Outbreak Detection from the State Perspective. *Marion Kainer*
- Lessons Learned in Outbreak Response from the Mycotic Diseases Branch, CDC. *Benjamin Park*
- Lessons Learned in Development of Clinical Guidelines for a Previously Unknown Pathogen. *Tom Chiller*
- How Regulation and Oversight of Compounding Pharmacies Changed as a Result of the Outbreak. *Howard Sklamberg*

*You won't be surprised that  
diseases are innumerable — count the cooks.  
— Seneca*

**SESSION J: Food and Waterborne Diseases**  
**1:30–3:35 pm**

**Ravinia Ballroom**

**MODERATORS:** Tim Jones and Ian Williams

**1:35** ***Salmonella enterica* Serotype Paratyphi B var. Java Gastroenteritis Outbreak  
Associated with Unpasteurized Tempeh — North Carolina, 2012**

**AUTHORS:** Stephanie E. Griese, A. Fleischauer, J. MacFarquhar, Z. Moore, A. Valiani, S. Morrison, D. Sweat, J.M. Maillard, D. Griffin, D. Springer, M. Davies, M. Mikoleit, A.E. Newton, B. Jackson, T. Nguyen, S. Bosch

**BACKGROUND:** On March 30, 2012, the North Carolina Division of Public Health (NCDPH) was notified by the state laboratory of five *Salmonella enterica* serotype Paratyphi B var. Java infections among residents of County A with a novel pulsed-field gel electrophoresis (PFGE) pattern. Although *Salmonella* is a leading cause of foodborne illness, only 1.1% of *Salmonella* isolates are serotype Paratyphi B var. Java. We investigated to identify the vehicle and prevent further illnesses.

**METHODS:** We defined a confirmed case as laboratory-confirmed *Salmonella* Paratyphi B var. Java with the outbreak PFGE pattern (outbreak strain) and a probable case as gastroenteritis in an epidemiologically linked person. We reviewed PulseNet data and 89 case report forms, identified frequent exposures, and reinterviewed 41 patients for exposure to frequently implicated food items and restaurants. We conducted restaurant site visits and reviewed product invoices.

**RESULTS:** We identified 89 cases (87 confirmed, 2 probable)

in 5 states with illness onsets during February 29–May 8. Median age was 26 years (range: 4–74 years); 8 (9%) had been hospitalized; and none died. Eighty-three (93%) reported travel to County A. Among 41 patients interviewed, 18 (44%) reported consuming unpasteurized Brand A tempeh; all reported visiting establishments where Brand A Tempeh, originating from a common, local producer, was served. The outbreak strain was identified in samples of Brand A Tempeh and the mold ingredient used for fermentation. We observed inconsistent hand hygiene and preparation of unpasteurized, uncooked tempeh on shared surfaces at the implicated restaurants.

**CONCLUSIONS:** This is the first reported outbreak caused by exposure to contaminated unpasteurized tempeh. Consistent hand hygiene and separation of uncooked tempeh from ready-to-eat foods should be encouraged.

**KEYWORDS:** *Salmonella* Paratyphi B, foodborne diseases, soy foods, food handling

## 1:55 Outbreak of Listeriosis Associated with Imported and Cross-Contaminated Cheeses – Multiple States, March–October 2012

**AUTHORS:** Michael Gronostaj, K.E. Heiman, B. Garalde, M. Adams-Cameron, S. Beam, L. Joseph, Z. Kucerova, J. Lando, P. LeBlanc, M. Metz, G. Ray, E. Ricotta, A. Sabol, A. Saupe, H. Waechter, A. Wellman, R. Tauxe, P.M. Griffin, B. Silk

**BACKGROUND:** Listeriosis causes ~255 U.S. deaths annually. In July 2012, a case was reported to Allegheny County (Pennsylvania) Health Department. *Listeria monocytogenes* was isolated from two different soft cheeses from the patient's refrigerator and one at a retail outlet. PulseNet identified four patient isolates with indistinguishable pulsed-field gel electrophoresis (PFGE) patterns. CDC, FDA, and health officials investigated to identify the source and prevent further illness.

**METHODS:** We defined cases as *Listeria* infection with the outbreak strain during March–October 2012. We compared patients' food exposures reported on standard questionnaires with those of patients with sporadic listeriosis reported to CDC during 2008–2012. We reviewed retail inventories to prioritize cheese testing. Isolates were characterized by using PFGE and multilocus variable-number tandem-repeat analysis (MLVA).

**RESULTS:** Fourteen states reported 22 cases (4 deaths, 1 fetal loss). Soft-cheese consumption was reported more commonly

among outbreak-associated than sporadic patients (odds ratio = 17.3; 95% confidence interval: 2.0–825.7); no specific cheese was initially reported by  $\geq 2$  patients. In follow-up interviews, 10/11 (91%) patients reported consuming 10 different cut and repackaged soft cheeses. The outbreak strain was isolated from four cut and repackaged cheeses from wholesale, retail, and residential locations, and from multiple intact wheels of Italian ricotta salata cheese. Fourteen (78%) of 18 patients interviewed were linked to  $\geq 1$  soft cheese; seven were directly linked to the ricotta salata. FDA issued an import alert, and the U.S. distributor recalled the cheese. Four outbreak-related PFGE subtypes were indistinguishable by MLVA.

**CONCLUSIONS:** Imported ricotta salata was the outbreak source. Cross-contamination of cut and repackaged cheeses expanded the outbreak. This first U.S. listeriosis outbreak associated with cross-contaminated cheeses led to a multinational recall.

**KEYWORDS:** listeriosis, *Listeria*, foodborne diseases, cheese

## 2:15 *Salmonella enterica* serotype Typhimurium Gastrointestinal Illness Associated with a University Microbiology Course – Maryland, 2011

**AUTHORS:** Maria A. Said, S. Smyth, J. Wright-Andoh, R. Myers, J. Razeq, D. Blythe

**BACKGROUND:** In November 2011, the Maryland Department of Health and Mental Hygiene (DHMH) identified two *Salmonella* Typhimurium isolates indistinguishable by pulsed-field gel electrophoresis (PFGE). Both patients were enrolled in University A's introductory microbiology laboratory course, which required working with unknown specimens ("mystery broths") not thought to include *Salmonella*, a biosafety level 2 (BSL-2) organism. We investigated to identify additional cases and exposure source.

**METHODS:** Cluster-associated salmonellosis was defined by gastrointestinal illness and isolation of PFGE-matching *Salmonella* Typhimurium from a clinical specimen. Patients were interviewed using a standard questionnaire, and DHMH case reports since 2002 were reviewed for other cases with laboratory exposures. Health department personnel inspected the laboratory, reviewed the course syllabus and procedures, interviewed faculty, and assisted faculty with organism testing.

**RESULTS:** Three indistinguishable isolates were identified with University A exposure, including the two initially identified and a third patient who became ill while taking

the course during 2010. No other common exposures were identified. *Salmonella* Typhimurium had been removed from use in 2008 because of safety concerns; however, testing demonstrated that a culture thought to be *Citrobacter freundii* was actually *Salmonella* Typhimurium. Multilocus variable-number tandem repeat analysis and PFGE testing from the mislabeled *Salmonella* Typhimurium and the three patients' isolates were indistinguishable. These cases were part of a larger, multistate cluster associated with exposure to microbiology laboratories.

**CONCLUSION:** Organism mislabeling contributed to three salmonellosis cases among University A microbiology students. In response, University A implemented enhanced safety procedures, including removal of all BSL-2 organisms from mystery broths; CDC issued recommendations to encourage increased laboratory safety. This cluster demonstrates the importance of safe practices in labeling, storage, and manipulation of organisms in academic facilities.

**KEYWORDS:** *Salmonella* Typhimurium, *Salmonella*, microbiology, laboratory infection, molecular typing



## 2:35 Emergence of GI.6 Norovirus – United States, 2009–2012

**AUTHORS:** Eyal Leshem, L. Barclay, M. Wikswo, N. Gregoricus, J. Vinjé, U. Parashar, A. Hall

**BACKGROUND:** Noroviruses are the leading cause of epidemic gastroenteritis in the United States. Emergence of new variants has been associated with increased outbreak activity. During 2011–2012, a previously rare genotype (GI.6) was associated with an increased number of outbreaks reported to CaliciNet. We describe the characteristics of reported GI.6 outbreaks.

**METHODS:** We identified all GI.6 outbreaks reported to CaliciNet during 2009–2012. Supplemental clinical and demographic data were extracted from the National Outbreak Reporting System (NORS). When data was not available through NORS, state health departments were queried. Chi square test for trend was used to assess the increase in proportion of outbreaks caused by GI.6 viruses.

**RESULTS:** During September 2011–August 2012, 76 (7.4%) of the 1032 norovirus outbreaks reported to CaliciNet were attributed to GI.6 compared with 11 (1.7%) and 24 (3.2%) during September 2009–August 2010 and September 2010–August 2011 respectively ( $P < 0.001$ ). These outbreaks

occurred in 26 states and affected >2,908 persons. The most common mode of transmission was person to person (54%), followed by foodborne (24%). Long-term care facilities were the most frequently reported setting (32% of outbreaks). Among reported patients, 64% were female and 50% were over 75 years old. Common symptoms included diarrhea (60%), fever (45%) and vomiting (43%); 1.1% of patients were hospitalized and 0.16% died.

**CONCLUSION:** Emergence of norovirus strains might result in increased outbreak activity. While GI.6 viruses remain responsible for a relatively small proportion of all reported norovirus outbreaks there was an increase in GI.6 outbreaks in the United States since 2011. Continued surveillance for norovirus outbreaks through Calici-Net and NORS will enable further assessment of the public health implications and significance of GI.6 noroviruses.

**KEYWORDS:** norovirus, gastroenteritis, disease outbreaks, public health surveillance, United States

## 2:55 Sonic Salmonellosis: Multistate Outbreak of Human *Salmonella* Typhimurium Infections Linked to Pet Hedgehogs – United States, 2012

**AUTHORS:** Tara C. Anderson, N. Marsden-Haug, J. Morris, W. Culpepper, J.K. Adams, S. Bidol, S. Meyer, J. Schmitz, C. Barton Behravesh

**BACKGROUND:** *Salmonella* infections linked to animal contact cause ~130,000 illnesses annually in the United States. Five million (~4%) households own small pet mammals, and there are ~3,000 hedgehogs in USDA licensed facilities in the U.S. From January to November 2012, PulseNet, a national bacterial subtyping network, identified human infections of a historically rare *Salmonella* Typhimurium (ST) strain (outbreak strain) that we investigated.

**METHODS:** A case was defined as illness in a person infected with the outbreak strain of ST identified between 01/01/12–11/30/12. We collected information on exposures including animal contact from case-patients, and cultured animal and environmental specimens for *Salmonella*. We conducted traceback investigations of USDA licensed pet hedgehog breeders.

**RESULTS:** We identified 16 cases in 7 states. Illness onset dates ranged from 12/26/2011–11/02/2012. The median patient age was 11 years (range: <1–62 years); 64% were female. Three case-patients were hospitalized; no deaths

were reported. Of the 12 case-patients for which information was available, 12 (100%) reported direct and/or indirect pet hedgehog contact in the week before illness began. The outbreak strain was isolated from a MN environmental sample of a container and sink in which a pet hedgehog was bathed. Hedgehogs were purchased from at least 6 identified hedgehog breeders (5 were USDA licensed) in several geographically distant states. Traceback investigations have not revealed a common source of infection.

**CONCLUSIONS:** Public and animal health collaboration on epidemiologic, laboratory, and traceback investigations linked pet hedgehog contact to human infections of ST, highlighting the importance of a One Health investigative approach. More efforts are needed to increase awareness among hedgehog breeders, pet owners, and healthcare professionals on risk of illness associated with pet hedgehogs.

**KEYWORDS:** hedgehogs, outbreaks, pets, salmonellosis, zoonoses

### 3:15 Detecting Hidden Outbreaks of Domestically Acquired Typhoid Fever — United States, 1999–2010

**AUTHORS:** Maho Imanishi, A. Newton, G. Gonzalez-Aviles, M. Kendall, K. Manikonda, N. Maxwell, J. Halpin, M. Freeman, T. Ayers, G. Derado, B. Mahon, A. Vieira, E. Mintz

**BACKGROUND:** Typhoid fever (TF) is transmitted by ingestion of food or water contaminated with *Salmonella enterica* serotype Typhi (Typhi) from an infected person. Outbreaks may be caused by asymptomatic carriers who shed the bacterium sporadically over many years. Detecting TF outbreaks among apparently sporadic cases is important for public health control of this serious infection.

**METHODS:** Domestically acquired typhoid fever (DATF) was defined as a compatible illness in a person with culture-confirmed Typhi infection who denied foreign travel in the 30 days preceding illness onset. We searched the National Typhoid Fever Surveillance database for DATF cases and identified their isolates in PulseNet, the national molecular subtyping database. Using SaTScan™ software, we performed space-time scan statistics and identified clusters of  $\geq 2$  DATF cases. Based on reports of DATF outbreaks in the literature and Foodborne Disease Outbreak Surveillance System, and subtyping and epidemiologic data from state health departments, we classified clusters as confirmed outbreaks

(common exposure identified), non-outbreaks (common exposure unlikely), or possible outbreaks (insufficient data).

**RESULTS:** DATF accounted for 612 (18%) of 3,346 TF cases with known travel status during 1999–2010; 71% (413/581) were hospitalized. We identified 24 confirmed outbreaks, 14 non-outbreaks, and 8 possible outbreaks among 46 space-time clusters. Possible outbreaks occurred in five states and had a median duration of eight months (range: 2–25) and size of 2.5 cases (range: 2–5).

**CONCLUSIONS:** DATF cases warrant thorough investigation. We are collaborating with state health departments to identify potential sources for the possible outbreaks. Space-time scan statistics was a useful and novel screening tool for detecting DATF outbreaks. However, molecular subtyping and shoe-leather epidemiology are still needed to confirm outbreaks and identify carriers.

**KEYWORDS:** typhoid fever, *Salmonella typhi*, outbreak, space-time clustering

*The suspense is terrible;  
I hope it lasts.  
— Willy Wonka*

## **SESSION K: Alexander D. Langmuir Memorial Lecture and Reception**

**4:00–5:00 pm**

**Ravinia Ballroom**

**MODERATOR:** Denise Koo

## **The Role of EIS in Communities of Solution: Using GIS and Epidemiology to Activate Health Partnerships**

**SPEAKER:** Robert Phillips, MD, MSPH

Dr. Robert Phillips is well-known throughout the health policy community as an effective leader, communicator, and investigator. Under his leadership, the Robert Graham Center emerged as an authoritative source of information to guide policy, particularly as it relates to primary care and improving the cost-effectiveness of healthcare. In 2012, Dr. Phillips moved to the American Board of Family Medicine as Vice President for Research and Policy to contribute to the research base underpinning primary care improvement and to continue as a translator of evidence into policy.

Dr. Phillips has deep experience in designing and implementing health services research pertinent to policy development and a history of prodigious productivity. His passion for underserved populations stems from growing up in a rural community that is considered both a “Health Professions Shortage Area” and “Medically Underserved Area,” currently served by two Rural Health Clinics. His passion grew from experience working in a Federally Qualified Health Center within a Federal Housing Project. Dr. Phillips was selected by the U.S. Secretary of the Department of Health and Human Services to serve on a Federal Negotiated Rule Making Committee for the redesignation of shortage and underservice areas. He also recently served as Vice-Chair

of the US Council on Graduate Medical Education, and he continues to advise federal and state governments on health education policy. Dr. Phillips’ recent leadership on workforce studies for AHRQ produced primary care workforce estimates embraced by both HRSA and ASPE, and can be reviewed on the AHRQ website. He is currently principal investigator on a study of graduate medical education accountability measures, which will inform issues of stewardship related to \$13 billion spent on these programs annually.

Dr. Phillips recently completed a month-long consultation to the Australian National University and Australian Government on the data systems they need to implement new geographically organized population health systems, and he was a Fulbright Specialist to the Netherlands in 2012 consulting on general practice research translation for policy. Dr. Phillips is a graduate of the Missouri University of Science and Technology and the University of Florida College of Medicine. He completed residency training in family medicine, as well as health services research and public health training, at the University of Missouri. He was elected to the Institute of Medicine of the National Academies of Science in 2010.

*Best of all possible worlds.*  
—Gottfried Leibniz

## SESSION L: International Night

5:30–10:00 pm

### Poster Presentations

5:30–6:45 pm

### Conference Preconvene Area

### Oral Presentations

7:30–9:45 pm

### Ravinia Ballroom

**MODERATORS:** Jimmy Kolker and Fadzilah Kamaludin

*See supplement for complete list of presenters and abstracts.*

## 7:40 Prevalence and Geographic Distribution of Nodding Syndrome – Kilombero and Ulanga Districts, Tanzania, 2012

**AUTHORS:** Preetha J. Iyengar, J. Maeda, S. Kabamanya, A. Shamte, J. Mghamba, S. Wiersma, E. Farnon, J. Sejvar

**BACKGROUND:** Nodding syndrome (NS) is a seizure disorder of unknown etiology resulting in neurological deterioration. NS was first described in Mahenge, Tanzania during the 1960s. NS epidemics have been recently described in Uganda and South Sudan, predominantly affecting children under age 15 years and clustering in villages. The presence of NS outside of Mahenge has not been described.

**METHODS:** We assessed the prevalence of possible NS cases by adding a screening question to the standardized Ifakara Demographic Surveillance System (DSS) survey conducted from October–December 2012. The DSS covers all individuals in 25 villages in two circumscribed areas of Kilombero and Ulanga districts 40 kilometers from Mahenge. A possible case was defined as any person with reported head nodding. The head of household was interviewed and shown a video demonstrating NS. Descriptive statistics were performed.

**RESULTS:** Approximately 127,000 persons (30,000 households) in 25 villages have been screened as of December 7th.

Head nodding was reported in 226 persons in 211 households, yielding an overall prevalence of 1.8 per 1,000 persons, and 0.5 per 1,000 in children 0–15 years. The median age of possible NS case-patients at interview was 47 years (range, 2–94 years), and 121 (54%) were female. Cases were reported from 24/25 (96%) villages, with a median of six cases per village (range, 0–29); 120 (53%) were reported from five villages.

**CONCLUSION:** We identified possible NS cases outside of the previously described area in Mahenge, however our survey may have misclassified or overestimated cases. Possible case median age is older than the typical age range reported in South Sudan and Uganda, suggesting differences in the progression of NS in Tanzania.

**KEYWORDS:** seizure disorder, Tanzania, prevalence, epidemiologic characteristics

## 8:00 Outbreak of *Bacillus cereus* Food-Poisoning with a Fatality After a Feast – Bagli Village, Bursa Province, Turkey, September 2012

**AUTHORS:** Orhun Kalkan, M. Gulay, B. P. Zhu, F. Temel, M. B. Sucakli, M.A. Torunoglu

**BACKGROUND:** On 11 September 2012, residents of Bagli Village in northwestern Turkey reported a diarrheal disease outbreak, including one death. We investigated to identify the cause and mode of transmission, and to implement control measures.

**METHODS:** A probable case was onset of diarrhea ( $\geq 3$  episodes/day) plus  $\geq 1$  of the following symptoms during 9-12 September: nausea, vomiting, self-reported fever, abdominal pain. We reviewed medical records in the village's two hospitals for case-finding. In a case-control investigation, we compared exposures of case-patients with control-patients randomly selected among asymptomatic village residents, frequency-matched to case-patients by age group. We used the horizontal method for enumerating bacteria in food samples for pathogen identification.

**RESULTS:** Of 26 case-patients identified, 23 (including one child that died) were residents of the village (attack rate: 5.5%). The main symptoms included diarrhea (100%), self-reported fever (87%), nausea (83%), abdominal pain (83%), and vomiting (48%). A village-wide feast occurred on Sunday,

9 September; only one course (mixed rice and chicken) was served. Leftover food stayed at room temperature (range: 13.8-29.5°C) overnight and was distributed to village residents on Monday. The epidemic curve showed a small peak after Sunday's meal, followed by a large peak following Monday's meal. Half (50%) of case-patients vs. 20% of control-persons consumed Sunday's meals (OR<sub>matched</sub>=5.4, 95% CI: 2.0-15); 82% of case-patients vs. 2% of control-persons consumed Monday's leftover food (OR<sub>matched</sub>=176, 95% CI: 31-1689). *B. cereus* was identified in the leftover food in high concentration ( $3.3 \times 10^8$  bacteria/g). Autopsy showed multi-organ congestion suggesting sepsis as the cause for child's death.

**CONCLUSION:** This *B. cereus* outbreak was likely due to consumption of contaminated food stored at room temperature. Village residents were educated on safe food preparation and preservation practices.

**KEYWORDS:** *Bacillus cereus*, outbreak, foodborne, case-control

## 8:20 Case-Control Study of Human Cutaneous Anthrax Outbreak Associated with Contact of Livestock – Georgia, 2012

**AUTHORS:** Archil Navdarashvili, T. Doker, A. Folkema, G. Kharod, D. Haberling, M. Geleishvili, T. Rush, E. Maes, S. Shadomy

**BACKGROUND:** Georgia's National Centers for Disease Control (NCDC) registered increased human cutaneous anthrax in 2011–2012 (81, 143 respectively) compared to 2009–2010 (43, 27, respectively). We investigated to detect infection source and implement control measures.

**METHODS:** We conducted a 1:2 matched case-control study in two high incidence regions, Kvemo Kartli, [KK] and Kakheti [Ka]. Cases were identified by disease surveillance and confirmed by PCR or culture. Two controls, matched by residence (within 250m) and gender were recruited. Matched analysis and conditional logistic regression were used to analyze data.

**RESULTS:** We interviewed 70 cases and 140 controls. Case-patients were 18–72 years of age (median 40), 87% male; 79% from KK region. 17% disposed of dead animal (OR=20.1; 95%CI 2.6-156); 24% contacted sick animal (OR=14; 95%CI 3.2-61.5), 43% slaughtered animal (OR=7.3; 95%CI 3-17.9), 77% raised animals (OR=6.3; 95%CI 2.6-15.4), 50% contacted animal products (OR=4.2; 95%CI 2-8.8), 31% ate meat from

their own farm (OR=3.9; 95%CI 1.5-10.4). Buying meat from butcher shop was protective (OR=0.4; 95%CI 0.2-0.8). 33% of case-patients reported soil-contact, but that was not associated with disease. In 2011 and 2012, 21 and 25 animal anthrax cases were reported, respectively.

**CONCLUSION:** Anthrax is an ongoing problem in Georgia. It is unclear why the number of cases increased in 2012, however, several risk factors for disease were identified. The source of human anthrax was most likely contact with a sick animal, slaughtering or disposing of carcass. We recommended use of personal protective equipment when slaughtering animals, enforcement of regulations to prevent slaughtering and sale of meat from sick animals, and vaccination of animals against anthrax. Vaccination of animals against anthrax in KK and KA was conducted in autumn 2012.

**KEYWORDS:** cutaneous anthrax, case-control study, outbreak, Georgia

## 8:45 Outbreak Investigation of Typhoid Fever in Village Kuwardu, District Skardu, Gilgit-Blatistan (G-B) – Pakistan, 2012

**AUTHORS:** Z. Hussain, J. Ansari, M. Salman, R.J. Asghar

**BACKGROUND:** On 8th may, 2012, civil dispensary Kuwardu village (5000 population) of district Skardu Gilgit-Blatistan (G-B) reported unusual increase in number of cases with high grade fever, abdominal discomfort and anorexia. A team from health department was deputed to investigate the outbreak with the objectives to identify the associated risk factors and provide recommendations for control.

**METHODS:** A Case was defined as a person living in village Kuwardu with fever  $>38^{\circ}\text{C}$  and with one of the following symptoms; abdominal discomfort, vomiting, diarrhea and positive Typhidot test (IgM) between 30 April - 27 May, 2012. Cases were enrolled through active case finding. Equal numbers of age and sex matched controls were enrolled from the neighborhood. Descriptive statistics, univariate and multivariate analysis was done. Qualitative assessment of the environment was also done.

**RESULTS:** A total of 98 cases were identified in which 66% (n= 65) were female. Mean age was 32 years (12-65 years).

Age group 21-30 years (n= 32, 32.7%) were the most affected group. Drinking water from the storage tanks (OR=16.6), living in the same house (OR=20.28) were associated with illness. Six water samples were tested and found unfit for human consumption. Multiple logistic regression shows association of household size ( $>5$  person in room of house) (OR 7.46), typhoid patients handling and cooking food (OR=13.43) and drinking water from storage tank (OR 12.62) with disease.

**CONCLUSION:** Awareness campaign was initiated. The importance of hand-washing practices before cooking and after attending the toilet was highlighted. Developing toilets away from drinking water sources were advocated. Based on our recommendation Public Health Engineering Department has prioritized setting up treated water system and have sent request for funds allocation.

**KEYWORDS:** waterborne, case control, typhoid, Pakistan

## 9:05 Antiretroviral Therapy Initiating Regimens and Discontinuation Patterns – Medunsa National Pharmacovigilance Surveillance Cohort, South Africa, 2004–2011

**AUTHORS:** Mazvita Naome Muropa, RS Summers, NM Dube, LR Kuonza, KS Tint

**BACKGROUND:** An estimated 1.6million HIV infected patients are on antiretroviral therapy (ART) in South Africa. ART is life-long and reduces morbidity and mortality in HIV-infected patients. Discontinuation of ART leads to inferior clinical outcomes and increases the risk of drug resistance. This study determined ART initiating and discontinuation patterns in a cohort of patients in South Africa.

**METHODS:** Retrospective analysis of Medunsa National Pharmacovigilance ART surveillance data. ART initiation was defined as “starting an ART naive patient on an ART drug regimen”, and ART discontinuation was defined as “discontinuation of all ART drugs being taken by a patient by a prescribing clinician, at any time in the surveillance period, for a specified or unspecified reason.”

**RESULTS:** A total of 2979 patients’ data was analysed. Most, (68.1%) were females. Mean age at ART initiation was 38.2 years (standard deviation: 37.8; 38.5). Most (99.5%) patients were initiated on a standard first line ART regimen. ART was

discontinued at least once in 103/2979 (3.5%) patients. The highest proportion (25%) of ART discontinuation occurred in patients initiated on non-standard drug regimens. Reasons for ART discontinuation included poor adherence (38.0%), drug-related toxicity (26.1%), non-adherence 12.0%, loss to follow-up (9.9%) and treatment failure (8.5%). Initiating patients on non-standard drug regimens (Relative risk (RR) =7.42; 95% confidence interval (CI):2.73-20.14), and initiating treatment in patients below 26 years of age (RR=7.9 CI: 1.76-4.78) were associated with ART discontinuation.

**CONCLUSION:** Young age at ART initiation and use of non-standard drug regimens are predictors of ART discontinuation. Clinicians should be encouraged to initiate patients on standard ART regimens. Poor and non-adherence accounted for half of the reasons for ART discontinuation. Predictors of non-adherence to ART should be investigated.

**KEYWORDS:** ART, HIV, surveillance, cohort, ART regimens

**9:25 Mumps Attenuated Live Vaccine effectiveness: 1:1 Matched Case-Control Study – Zhongshan, China, 2011-2012****AUTHORS:** Man Wang, Hm. Luo, T. Wang

**BACKGROUND:** Mumps-containing vaccine (MuV) was licensed in the 1990s, and a single dose has been administered routinely to children aged 18-24 months since 2008 in China. However, an increased number of mumps cases during 2009-2012 in China required evaluation of the effectiveness of single dose MuV. In 2011, the number of reported mumps case in Zhongshan (located at the Pearl River Delta region in south China) reported the highest number cases since 1997, with incidence rate 62.9 per 100 000 population.

**METHODS:** A 1:1 matched case-control study was conducted. The reported clinical mumps cases during May 2011- April 2012 in Zhongshan, born 2003 to 2009, were selected. A control was chosen for each case through the vaccination information system, matched by age group, gender and living place. The system was also used to collect mumps vaccination status for each case and control. VE was calculated as one minus the adjusted matched odds ratio  $\times$  100%.

**RESULTS:** 435 cases and 435 controls were included for data analysis. Among 435 cases, 209 (48.0%) had not been vaccinated, 183(42.1%) had received 1 dose, and 43 (9.9%) received 2 doses. Among 435 controls, 144(33.1%) had not been vaccinated, 241 (55.4%) had received 1 dose, and 50 (11.5%) received 2 doses. Overall the VE of the MuV against clinical mumps in children was 54% (95%CI: 37% - 67%). The estimated VE for one dose was 53% (95%CI: 34% - 66%), and 64% (95%CI: 1% - 87%) for two doses

**CONCLUSION:** Single dose of MuV is not effective enough to interrupt community transmission of mumps. Adjusting mumps vaccine strategy is recommended in China.

**KEYWORDS:** mumps attenuated live vaccine, vaccine effectiveness, matched case-control study, China

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**THURSDAY, APRIL 25, 2013**


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*Extraordinary claims require  
extraordinary evidence.*

—Carl Sagan

**SESSION M: Donald C. Mackel Award Finalists**

**8:30–10:15 am**

**Ravinia Ballroom**

**MODERATORS:** Rachel Kaufmann and Sherif Zaki

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**8:35 Acute Kidney Injury Associated with Synthetic Cannabinoid Use — Oregon, 2012**

**AUTHORS:** Genevieve L. Buser, R. Hendrickson, B.Z. Horowitz, R. Gerona, J.H. Moran, K. Vian, S. Su, R. Leman

**BACKGROUND:** Synthetic cannabinoids are illegal drugs that cause adverse neurologic and sympathomimetic effects. During 2010, synthetic cannabinoids resulted in >11,000 U.S. emergency department visits. Synthetic cannabinoids are increasingly popular; nationally, 11.4% of high school seniors reported smoking them during the previous 12 months. In August 2012, clinicians reported acute kidney injury (AKI) in an adolescent after he smoked a synthetic cannabinoid. Oregon's Public Health Division and Poison Center investigated to determine the problem's scope.

**METHODS:** Cases were defined as AKI (creatinine >1.3 mg/dL) treated in Oregon since April 2012 among persons without known renal disease and aged 13–40 years who reported smoking synthetic cannabinoids. We queried poison centers, distributed health alerts, contacted nephrologists, and issued a press release. We interviewed patients, collected specimens, and abstracted medical records. Drug enforcement teams seized implicated products. Toxicology laboratories used liquid chromatography and time-of-flight mass spectrometry (LC-TOF/MS) to test clinical and product specimens for synthetic cannabinoids and metabolites.

**RESULTS:** We identified nine cases with onset during April–October 2012. All patients were male, aged 15–27 (median: 18) years, who reported intense nausea and emesis, with and without abdominal pain. Peak creatinine levels were 2.6–17.7 (median: 6.6) mg/dL. All patients were hospitalized; one required dialysis; none died. Six patients completed interviews. They easily purchased synthetic cannabinoids at convenience, tobacco, and adult stores, believing them legal and safe. One clinical and two product samples contained evidence of a novel synthetic cannabinoid, XLR-11.

**CONCLUSIONS:** Active case finding, investigation, and state-of-the-art toxicology testing identified a novel epidemiologic link between smoking synthetic cannabinoids and AKI. LC-TOF/MS analyses to identify other toxins and animal kidney models to elucidate nephrotoxic mechanisms are ongoing.

**KEYWORDS:** cannabinoids; acute kidney injury; substance-related disorders; gas chromatography-mass spectrometry; spectrometry, mass, electrospray ionization



## 8:55 Large Legionnaires' Disease Outbreak in a Hospital with a *Legionella* Disinfection System, Pennsylvania, 2011–2012

**AUTHORS:** Alicia Demirjian, C. Lucas, L. Garrison, N. Kozak, S. States, E. Brown, J.M. Wortham, A.L. Beaudoin, M. Casey, C. Marriott, A. Ludwig, L. Hicks

**BACKGROUND:** Legionnaires' disease (LD), a preventable form of pneumonia commonly caused by inhalation of *Legionella* in potable water, is a leading cause of waterborne outbreaks and has a 30% case-fatality rate in healthcare-associated outbreaks. We characterized an outbreak's extent and evaluated contributing environmental factors in a hospital using copper-silver ionization, a method widely used to prevent *Legionella* growth in water.

**METHODS:** Through medical chart review at Hospital A in November 2012, we identified patients diagnosed with LD during 2011–2012. Laboratory-confirmed cases were categorized as definite, probable, and not healthcare-associated based on time spent in Hospital A during their incubation period. We performed an environmental assessment and collected environmental samples for *Legionella* culture. Clinical and environmental isolates were compared by monoclonal antibody (MAB) and sequence-based typing (SBT). Copper and silver concentrations were measured in 11 water samples using inductively coupled plasma and optical emission spectroscopy.

**RESULTS:** We identified five definite and 16 probable healthcare-associated LD cases during 2011–2012; five case-patients died. Of 44 environmental samples, 29 showed *Legionella* growth; twenty-three isolates were MAb2-positive *Legionella pneumophila* serogroup 1. Ten were identical to three available clinical isolates by SBT. Mean concentrations were 0.32 and 0.23 parts per million (ppm) at five central and six peripheral sites, respectively, for copper, and 0.03 and 0.02 ppm for silver, within the manufacturer's recommended ranges for *Legionella* control. All 11 samples showed *Legionella* growth.

**CONCLUSION:** We identified an LD outbreak linked to a hospital potable water system despite copper-silver ionization use. Our data suggest that the recommended copper and silver concentrations did not prevent *Legionella* growth in this system, which should prompt reassessment of this technology's effectiveness elsewhere.

**KEYWORDS:** Legionnaires' disease, *Legionella pneumophila*, disease outbreaks, copper, silver

## 9:15 Soil-Transmitted Helminth Infection in School-Aged and Preschool-Aged Children in an Urban Slum – Kibera, Nairobi, 2012

**AUTHORS:** Stephanie M. Davis, C. Worrell, P. Suchdev, L. Ruth, G. Lopez, R. Wiegand, K. Odero, L. Cosmas, J. Neatherlin, S. Njenga, J. Montgomery, L. Fox

**BACKGROUND:** Soil-transmitted helminth (STH) infections cause anemia, vitamin A deficiency (VAD), and malnutrition. Drug-based deworming reduces STH infections and their morbidities. Currently, prevalence and morbidity studies, and deworming programs, focus on rural areas and school-aged children (SAC). Better definition of disease in urban slums, particularly among preschool-aged children (PSAC), is needed to inform program design.

**METHODS:** We studied pediatric STH infection prevalence and morbidity in the Kibera slum, Nairobi, Kenya. PSAC (6–59 months) and SAC (5–14 years) were randomly selected from CDC's International Emerging Infections Program registry. Data included 3 stools tested by the Kato-Katz method for STH ova, anthropometry, hemoglobin and micronutrient status. Subjects with  $\geq 1$  stool ( $n = 493$  PSAC, 1225 SAC) were assessed for STH prevalence and for correlation of infection with anemia, VAD and moderate or severe malnutrition by WHO standards, using multivariable regression weighted for selection probability and nonresponse.

**RESULTS:** Infection prevalences were: any STH: PSAC 39.0%, SAC 43.6%; *Ascaris*: PSAC 25.8%, SAC 25.1%; *Trichuris*: PSAC 21.9%, SAC 30.1%; hookworm  $<0.1\%$ . VAD was found in 11.8% of PSAC and was associated with *Ascaris* (adjusted prevalence ratio [aPR]: 2.9; 95% confidence interval [CI]: 1.23–6.81) and *Trichuris* (aPR: 2.93; 95% CI: 1.20–6.73) infections. VAD was found in 4.7% of SAC and was associated with *Ascaris* infection (aPR: 2.46; 95% CI: 1.05–5.78). Malnutrition was found in 29.7% of PSAC, with prevalence nonsignificantly increased in subjects with any STH infection (aPR: 1.49; 95% CI: 0.96–2.31).

**CONCLUSIONS:** STH infection is common in Kibera. Infection has similar prevalence among PSAC and SAC and is associated with morbidity in each group. Deworming programs should include slums and should be expanded to younger children.

**KEYWORDS:** helminths, poverty areas, morbidity, developing countries, malnutrition, vitamin A

## 9:35 Carbapenem-Resistant *Klebsiella pneumoniae* Producing New Delhi Metallo-Beta-Lactamase at an Acute-Care Hospital – Denver, Colorado, 2012

**AUTHORS:** Erin E. Epton, J.M. Wendt, L. Pisney, D. MacCannell, S. Jackson Janelle, B. Kitchel, H. O’Connell, J. K. Rasheed, B. Limbago, C. Gould, A. Kallen, M. Barron, W. Bamberg

**BACKGROUND:** Carbapenem-resistant *Klebsiella pneumoniae* (CRKP) are highly transmissible and cause health care-associated infections with >40% mortality. New Delhi metallo-beta-lactamase (NDM)-producing CRKP are rare in the United States. After two patients at a Denver hospital were identified with NDM-producing CRKP during July–August 2012, an investigation was conducted to characterize the outbreak and prevent transmission.

**METHODS:** CDC tested CRKP isolates by polymerase chain reaction for NDM. A case had NDM-producing CRKP isolated from clinical or active surveillance cultures (ASC) of rectal swabs collected during January 1–October 30. Cases were identified through microbiology record reviews and six rounds of ASC on units where affected patients had resided. Medical records were reviewed for epidemiologic links; relatedness of CRKP isolates was evaluated by pulsed-field gel electrophoresis (PFGE) and whole-genome sequence analysis (WGS).

**RESULTS:** A third patient, admitted in May, was identified through microbiology records review. ASC identified five

additional cases. Patients were aged 23–75 years and had resided on 11 different units (median stay: 18 days; range: 12–83 days) before case identification; three were treated for infection; five were asymptotically colonized, and none died. All isolates were highly related by PFGE. WGS suggested three primary clusters of CRKP. Combining WGS results with epidemiology identified three units as likely transmission sites.

**CONCLUSIONS:** A 4-month outbreak of NDM-producing CRKP occurred at one hospital, highlighting the risk for spread of these organisms. PFGE did not sufficiently differentiate among case isolates, but combining rapid WGS with epidemiologic links indicated transmission primarily occurred on three units and might be useful for guiding control measures in real time. ASC, combined with reinforcing infection prevention measures, were required to control transmission.

**KEYWORDS:** cross infection, drug resistance, microbial, beta-lactamases, sequence analysis, DNA

## 9:55 Active Surveillance for Variant Influenza Among Swine, the Environment, and Employees at Live Animal Markets – Minnesota, 2012

**AUTHORS:** Mary J. Choi, M. Torremorell, J. Bender, D. Her, M. Jhung, T. Uyeki, K.K. Wong, S. Vetter, D. Boxrud, J. Ertl, J. Nguyen, K. Smith, R. Danila, R. Lynfield

**BACKGROUND:** Variant influenza (VI) in humans is caused by swine-origin influenza A viruses (IAVs). Because swine can support genetic material exchange between avian, swine, and human IAVs, emergence of variant viruses with pandemic potential is a serious concern. During 2012, a VI outbreak linked to agricultural fairs sickened >300 persons in the United States. In Minnesota, half of all VI cases from 2008–2011, and the first VI cases of the 2012 outbreak, occurred among live animal market patrons. We initiated surveillance at two markets to identify factors contributing to VI transmission.

**METHODS:** We collected weekly air samples during October 8–November 12 from swine enclosures, environmental samples from high hand-contact surfaces (swine enclosure railings, door knobs, and patron sinks), pooled swine saliva samples, and slaughtered pigs’ lungs. Employees submitted weekly nasal swabs. Real-time reverse-transcription polymerase chain reaction for IAV gene targets was performed on all samples.

**RESULTS:** IAVs were detected in 10/26 (38%) swine enclosure air samples, 4/16 (25%) swine enclosure railing samples, 21/27 (78%) swine saliva samples, and 29/70 (41%) swine lungs. Ill swine were observed. Weekly coughing scores (percent of pigs coughing) ranged from 2% to 18%. IAVs were detected in samples from 5/14 (36%) asymptomatic employees. Variant hemagglutinin3 gene segments were identified in 2/14 (14%) asymptomatic employees.

**CONCLUSIONS:** Live animal markets facilitate close human-swine contact and represent a venue where interspecies IAV transmission can occur. This investigation confirmed the widespread presence of IAV at live animal markets, underscoring the potential for zoonotic transmission in this setting. Public health officials, employees, and patrons of live animal markets should understand the risk for variant IAV infection and take steps to minimize transmission.

**KEYWORDS:** influenza A virus, swine, disease outbreaks, sentinel surveillance, zoonoses

*Prepare for the unknown by studying  
how others in the past have coped  
with the unforeseeable and the unpredictable.  
—General George S. Patton*

## **SESSION N: Environmental Health and Preparedness**

**10:30–11:55 am**

**Ravinia Ballroom**

**MODERATOR:** Thomas H. Sinks

### **10:35 The Perfect Storm: Shelter-Based Surveillance in the Aftermath of Hurricane Sandy — New Jersey, 2012**

**AUTHORS:** Alice M. Shumate, E. Yard, M. Casey-Lockyer, A. Schnall, M. Murti, C. Tan, R. Noe, A. Wolkin

**BACKGROUND:** Hurricane Sandy made landfall in New Jersey on October 29, 2012, causing widespread infrastructure damage and power outages and prompting one of the largest American Red Cross disaster responses to date. Approximately 7,000 residents were relocated to at least thirty Red Cross shelters. CDC and New Jersey Department of Health conducted shelter-based surveillance to track morbidity, and designed and implemented sustainable methods for shelter staff to report morbidity data remotely.

**METHODS:** Red Cross staff recorded demographic data, primary complaint(s), disposition, and referral data for each client health visit. Aggregate morbidity tallies of individual interactions for each 24-hour period were compiled, reported to CDC daily, and shared with local health departments for potential follow-up. At each shelter, CDC developed a sustainable method for daily reporting based on available technology, which included reporting by e-mail, text message, or fax.

**RESULTS:** During November 5–21, we collected aggregate

morbidity data in the 21 shelters housing >30 residents overnight. Shelters reported 5,189 health services visits, which addressed 7,101 health needs. Fifty-two percent of health needs involved acute illness, 32% follow-up care (e.g., wound care, blood pressure or blood glucose checks, and medication refills), 13% chronic illness exacerbations, and 3% injury. Within 1 week, 100% of shelters transitioned to remote reporting, with all but two using smartphones to text or e-mail pictures of forms.

**CONCLUSIONS:** Acute care was the most common need; chronic illness exacerbations and follow-up care were also substantial. We successfully demonstrated timely capture of standardized morbidity data by using a unique reporting method. As a result of this response, expanding and institutionalizing smartphone technology for reporting shelter surveillance data is being considered.

**KEYWORDS:** disasters, emergency shelter, population surveillance, health services needs

## 10:55 Assessment of Household Emergency Preparedness Supplies by Housing Type from a Community Assessment for Public Health Emergency Response (CASPER) – Michigan, 2012

**AUTHORS:** Michelle Murti, M. Stanbury, S. Bies, M.K. Nyaku, A. Schnall, T. Bayleyegn, D. Flanders, E. Yard, A. Wolkin

**BACKGROUND:** Disaster preparedness plans recommend households have at least 72 hours of emergency supplies. Persons in multi-unit dwellings may be disadvantaged compared to those in single-family homes because of less storage or outdoor space; however, little is known about household emergency preparedness by housing type.

**METHODS:** We used interview data on household emergency preparedness from a two-stage cluster design CASPER survey in Oakland County, Michigan, in 2012, to estimate the association between housing type and nine recommended emergency supplies (e.g., first aid kit). We used three logistic regression models—survey, conditional, and random effects—to assess the association in the sampled population, confounding by cluster (Census block), and intra-cluster correlation, respectively.

**RESULTS:** Of 192 households interviewed (91% completion rate), 149 (78.9%) were single-family homes and 40 (19.5%) were multi-unit dwellings. In survey regression models,

single-family homes were more likely ( $P<0.05$ ) than multi-unit dwellings to have copies of important documents, a way to cook food without utilities, and a backup heat source. After adjusting for confounding by cluster, these outcomes continued to be important, along with owning an emergency kit and 72 hours of water ( $P<0.05$ ). Only the emergency kit model had intra-cluster correlation ( $P<0.05$ ), whereas cluster-adjusted estimates changed  $>10\%$  for six of the nine supplies.

**CONCLUSIONS:** Oakland County multi-unit dwellings had fewer recommended emergency supplies than single-family homes, adjusting for similarities by Census block. Emergency planners should consider the influence of household type and potential strategies for improving preparedness in multi-unit dwellings. The innovative use of these regression methods to analyze these cluster-sampled data represents an important development for future CASPER analyses.

**KEYWORDS:** emergency preparedness, housing, survey, logistic models, Michigan

## 11:15 When Public Health Messaging Still Is Not Enough: Postdisaster Carbon Monoxide Poisoning Outbreaks, Connecticut's Experience 1 Year Later – October 2012

**AUTHORS:** Timothy S. Styles, P. Przysiecki, G. Archambault, B. Toal, L. Sosa, M. Cartter

**BACKGROUND:** During October 2011 a large carbon monoxide (CO) poisoning outbreak (133 cases and 5 deaths) occurred in Connecticut following a snowstorm-related power outage. In response, the Connecticut Department of Public Health (CDPH) sought to improve prevention messaging for future storms. On October 29, 2012, Hurricane Sandy caused extensive power outages and another CO poisoning outbreak in Connecticut. We characterized these cases.

**METHODS:** On October 26, CDPH launched an enhanced, multimedia CO-warning campaign that continued through November 7, including mass-media announcements, Facebook postings, tweets in multiple languages, alerts to local health departments, posters in high-traffic public areas, and household door hangers. Disaster-related CO poisoning cases were defined as carboxyhemoglobin levels  $\geq 9\%$  (physician- and laboratory-reportable in Connecticut) during October 29–November 7, in which CO exposure was related to the storm or power outage. We interviewed patients or proxies with a standardized questionnaire and reviewed medical records.

**RESULTS:** We identified 30 cases from 11 CO exposure incidents. Median patient age was 40 years (range: 9–92); 50% were foreign-born; 53% were non-Hispanic white, 37% Hispanic, and 10% other. One patient had heard CO-warning messaging during the previous year; no patients reported hearing or seeing warning messaging immediately before or during the 2012 storm. Although geographic areas affected by the 2011 and 2012 storms differed, the number of homes without power and most common CO exposure source (portable generators, 91%) were similar.

**CONCLUSIONS:** Despite attempts at well-targeted, well-timed warning messages and outreach to diverse populations, postdisaster CO poisonings occurred, albeit with fewer cases and no deaths. Foreign-born persons were disproportionately affected. In addition to public health messaging, other methods of CO poisoning prevention are needed.

**KEYWORDS:** hazardous substances, carbon monoxide, poisoning, environmental exposure, communications media, disaster

## 11:35 Heat Illness: Predictors of Hospital Admissions Among Emergency Department Visits – Georgia, 2002–2008

**AUTHORS:** Satish K. Pillai, R. Noe, M. Murphy, A. Wolkin, A. Vaidyanathan, R. Young, S. Kieszak, G. Freymann, W. Smith, C. Drenzek, L. Lewis

**BACKGROUND:** Heat-related illnesses (HRI) are the most frequent cause of environmental-exposure related injury treated in U.S. emergency departments (ED). Understanding factors associated with hospitalization among individuals presenting to the ED with HRI can help public health practitioners identify groups that may benefit from additional outreach efforts.

**METHODS:** ICD9- or E-codes for heat-related disorders from statewide ED and hospital discharge data, collected by the Georgia Department of Public Health, were used to identify cases of HRI occurring during May through September, 2002–2008. Demographic characteristics, county of residence and medical comorbidities were identified for each case. County-level daily temperature information from CDC's Environmental Public Health Tracking Network was used to determine whether the ED visit occurred during an extreme heat event (EHE), defined as  $\geq 2$  consecutive days above the 99<sup>th</sup> percentile daily maximum temperature. A multivariate logistic regression model was generated to

identify factors associated with ED-related hospitalization versus discharge to home.

**RESULTS:** Among 13,935 ED visits with HRI, there were 12,889 (92.5%) discharges to home and 1,046 (7.5%) hospital admissions. Controlling for medical comorbidities, men (OR 1.26;  $P = 0.012$ ), African-Americans (OR 1.26;  $P = 0.029$ ), and residents of the Coastal region (OR 1.46;  $P < 0.0001$ ) had a greater odds of admission with HRI compared to women, Whites, and residents of Georgia's central Piedmont region, respectively. Compared to individuals aged 20–29 years, the highest admission odds admission was among those aged  $\geq 80$  (OR 6.27;  $P < 0.0001$ ). EHE did not predict hospitalization (OR 1.14;  $P = 0.28$ ).

**CONCLUSIONS:** Increased educational efforts throughout the summer months targeting the elderly, men, African-Americans, and Coastal region residents may help reduce ED-related hospitalizations for HRI in Georgia.

**KEYWORDS:** heat illness, hospitalization, disparities, Georgia

*Never say goodbye because goodbye means going away  
and going away means forgetting.*  
—J.M. Barrie, *Peter Pan*

## **SPECIAL SESSION: Stephen B. Thacker Memorial Tribute**

**12:30 pm**

**Dunwoody Suites**

**Moderator: Denise Koo**

**Sponsor: OSELS/SEPDPO**

Please join us and add your voice to ours as we honor the life of Stephen B. Thacker. Stand up and share your memories, admiration, funny stories, or accolades.

### **Come share your Steve story!**

Although Steve's legacy to public health science is unquestionable, he also had an uncanny ability to make each person he encountered feel special. Whether you knew him only because he interviewed you for EIS or if you were lucky enough to work with him, he treated you with dignity, respect, and regard for your feelings. He encouraged each of us to strive to be our best whether we were a colleague, a current officer, or an alumnus/alumnae. What impact did he have on you?

### **Come share your Steve story!**

For those of us fortunate enough to know and work with Steve, we can safely say that we never met anyone more dedicated to the continuing success of the EIS Program, to the development of the officers, and to maintaining ties with the alumni. For well over two decades, he was the rock on which this program has been built. He was a mentor as we faced a changing public health environment. He was a champion whenever the EIS Program or an individual officer needed one. Above all, he was truly the best friend of EIS. What did his friendship mean to you?

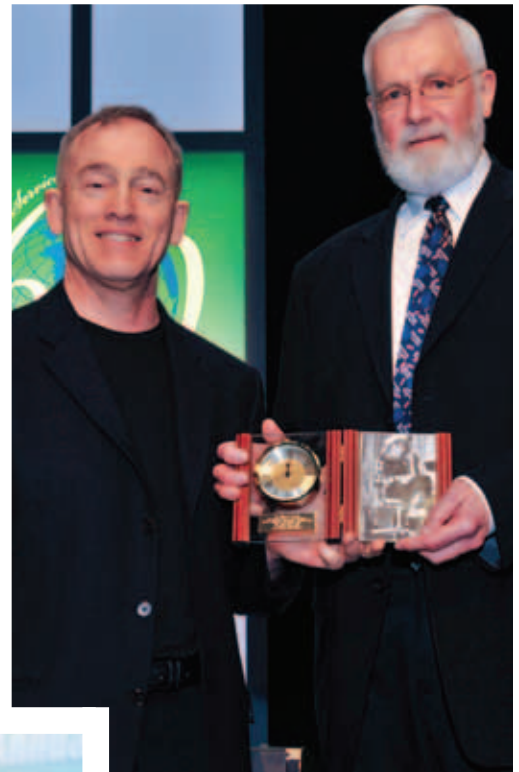
### **Come share your Steve story!**

For those of you who did not have the opportunity to meet or know this extraordinary man, you should join us to learn more about him and what he meant to so many others. We encourage you to come and connect.

### **It is all about Steve!**

**Speakers:** Open microphone; remarks will be shared from the EIS community, including brief commentaries by

**Philip S. Brachman (EIS '54), Lyle Conrad (EIS '65), Douglas Hamilton (EIS '91), and Stephanie Zaza (EIS '91)**



September 17, 2012

Stephen B. Thacker, M.D., M.Sc., RADM (RET), U.S.P.H.S.  
 Director, Office of Surveillance, Epidemiology and  
 Laboratory Services  
 Centers for Disease Control and Prevention  
 Century Boulevard, Mailstop E-04  
 Atlanta, Georgia 30345


Dear Dr. Thacker:

Thank you for participating in the 40<sup>th</sup> Annual CDC and ATSDR Honor Awards Ceremony held on September 5, 2012. This event honors the groups and individuals who have particularly distinguished themselves in service to public health.

Your willingness to act as a presenter at this year's ceremony was greatly appreciated.

The skill, dedication, and professionalism of all CDC and ATSDR employees make us the world's premier public health agency here at home and around the world. Thank you again for your help in congratulating them for their exceptional efforts.


Sincerely,

  
 Thomas R. Frieden, M.D., M.P.H.  
 Director CDC







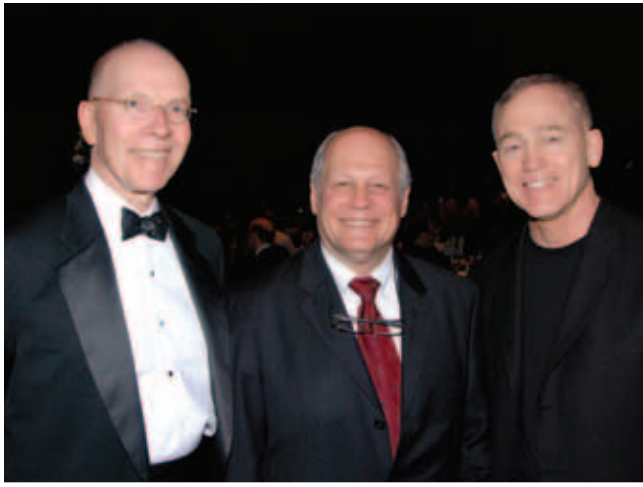
  
Julie Louise Gerberding, M.D., M.P.H.  
Director

Steve -  
Best wishes for a wonderful 2005! I'm so grateful for your acceptance of your latest leadership role at CDC. No one has served the agency better! Thank you for everything you're doing to help negotiate the many changes - just your thought you might enjoy this photo - not a slight on CDC but a tribute to the extraordinary effort it takes to achieve science-based public health. That is your biggest contribution to the agency, your many mentees, & the people around the world who benefit. Best regards, Julie

*Photo presented to the Community Unit...*

DEPARTMENT OF HEALTH AND HUMAN SERVICES  
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*It is the mark of a truly intelligent person  
to be moved by statistics.*

—George Bernard Shaw

**SESSION O: J. Virgil Peavy Memorial Award Finalists**  
1:30–3:15 pm

**Ravinia Ballroom**

**MODERATOR:** Maya Sternberg

**1:35 Suicides Associated with Home Eviction and Foreclosure — United States, 2005–2010**

**AUTHORS:** Katherine A. Fowler, M. Gladden, K. Vagi, J. Barnes, L. Frazier

**BACKGROUND:** In 2010, suicide was the 10<sup>th</sup> leading cause of death in the United States; 2<sup>nd</sup> among adults aged 25–34, and 4<sup>th</sup> for adults aged 35–54. Suicide is influenced by many factors, including economic crises like the U.S. housing crisis that began in 2007. Although the media has reported suicides associated with eviction/foreclosure, detail about these events is lacking.

**METHODS:** We used 2005–2010 data from the National Violent Death Reporting System (NVDRS) to determine the frequency and circumstances of suicide deaths involving eviction/foreclosure. We conducted chi-squared tests to determine significance of year-to-year changes, and latent class analyses to model risk factor profiles.

**RESULTS:** From 2005–2010, N = 1,023 eviction/foreclosure-associated suicides were identified. The number of eviction or foreclosure-associated suicides doubled from 2005–2010 (2005: n = 88, 2010: n = 176;  $P < 0.01$ ). Overall, foreclosure-related suicides increased 253% from 2005–2010. Increases in foreclosure-related suicides began in late 2007, paralleling

the timing of the housing crisis. Most of the decedents were white (87%), and/or male (79%). The median age was 48. Most suicides occurred before the actual housing loss (80%). In 37% of cases there was an eviction/foreclosure crisis event < 2 weeks prior to death. Latent class analyses revealed three subtypes of decedents with differing patterns of risk factors: (1) untreated mental health problems, substance abuse, (2) mental health problems, treatment, prior suicide attempts, and (3) financial problems only.

**CONCLUSIONS:** Eviction/foreclosure-related suicides increased significantly from 2005–2010. Prevention strategies include: support service referrals for those projected to lose homes, intervention prior to the move-out date, and recognition that eviction/foreclosure is a crisis event. The National Strategy for Suicide Prevention recommends training a range of professionals, including financial professionals, to recognize suicidal thoughts and behaviors.

**KEYWORDS:** suicide, economic recession, multivariate analysis, surveillance

## 1:55 Getting Caught in the FoodNet: Determining Regional Profiles of Foodborne Disease Risk Represented by a Sentinel Surveillance System

**AUTHORS:** Alison S. Laufer, W. Gu, S. Crim, O. Henao, A. Vieira, D. Cole

**BACKGROUND:** Approximately 48 million domestically acquired foodborne illnesses occur annually in the United States. The Foodborne Diseases Active Surveillance Network (FoodNet) serves as a sentinel surveillance system for major foodborne pathogens, tracking illness in ten states. FoodNet covers 15% of the nation's population, but how well it reflects regional differences in sociodemographic factors associated with enteric disease is unclear. As the first step toward generating nationally representative foodborne disease incidence estimates, we used cluster analysis to identify groups of states with populations represented by specific FoodNet sites.

**METHODS:** Demographic (age, race, ethnicity), socioeconomic (education, urbanization, poverty), and healthcare access variables describing each FoodNet site and all 50 states were selected from U.S. Census data and the Primary Care Service Area Project. Before cluster analysis, variable distributions and heat maps were assessed. Variables were standardized; disjoint cluster analyses based on the *k*-means method were performed with 2–10 clusters. Four

statistical parameters were used to identify the optimal number of clusters.

**RESULTS:** The optimal cluster solution consisted of seven distinct population profiles, each including 1–13 U.S. states. Three profiles were each represented by a single FoodNet site (New York, New Mexico, Minnesota); a fourth by two sites (Georgia, Tennessee); a fifth by the remaining five sites (California, Colorado, Connecticut, Maryland, Oregon). Three states (Utah, Louisiana, Mississippi) belonged to two profiles not represented by a FoodNet site. Based on clustering, FoodNet represents 96% of the US population.

**CONCLUSION:** We used cluster analysis to identify states sharing sociodemographic risk profiles represented by FoodNet sentinel surveillance. Our results provide a basis for population weighting of FoodNet data to extrapolate national foodborne disease incidence estimates.

**KEYWORDS:** foodborne diseases, sentinel surveillance, cluster analysis, incidence

## 2:15 Transmissibility of Variant Influenza from Swine to Humans: A Modeling Approach

**AUTHORS:** Karen K. Wong, M. Gambhir, L. Finelli, D. Swerdlow, S. Ostroff, C. Reed

**BACKGROUND:** Respiratory illness was reported among humans and swine at a 2011 agricultural fair; three human novel influenza A (H3N2) variant [H3N2v] virus infections were confirmed. The virus had reassorted with the 2009 pandemic strain, and its transmissibility was unclear. We sought to estimate H3N2v swine-human transmissibility.

**METHODS:** We developed a population dynamic model (susceptible-exposed-infectious-recovered) of H3N2v transmission and fit it to observed respiratory illnesses among an agricultural club cohort at the fair. Assumptions about swine-human contact, age-specific immunity, incubation period, and transmission among swine were based on the epidemiologic investigation or on prior studies. Disease state transitions were defined by differential equations which were solved for swine-human transmission probability. A stochastic model using a Poisson distribution around the best-fit transmission probability and a Gaussian distribution around incubation period was run for 100 simulations to illustrate possible outcomes around the deterministic estimate. Using

the best-fit transmission probability, we simulated the number of infections among all fairgoers.

**RESULTS:** The best-fit swine-human transmission probability was 0.024 per minute of swine contact. Among 14,910 fairgoers with swine contact, we estimated 80 (95% confidence interval [CI]: 40–133) H3N2v infections among persons aged <20 years and 58 (95% CI: 29–96) among persons aged ≥20 years.

**CONCLUSIONS:** Assessing transmission risk can be difficult with few cases, but this model using early data allowed rapid estimation of the zoonotic transmissibility of H3N2v. By showing that cases will likely occur when swine are infectious at highly attended fairs, this model helped inform the recommendation that high-risk fair-goers avoid swine contact and prompted several fairs to enhance screening of swine for illness. These interventions likely prevented many H3N2v illnesses and perhaps deaths.

**KEYWORDS:** influenza A virus, zoonoses, swine, transmission, theoretical models

## 2:35 Associations of Short-Term Exposure to Ozone and Respiratory Outpatient Clinic Visits in a Rural Location – Sublette County, Wyoming, 2008–2011

**AUTHORS:** Kerry Pride, J. Peel, B. Robinson, A. Busacker, F. Yip, J. Grandpre, T. Murphy

**BACKGROUND:** Ozone is ubiquitous throughout the atmosphere; elevated levels ( $\geq 75$  ppb) are common in large urban areas. Exposure to ground-level ozone can result in respiratory health effects. During 2008–2011, Sublette County (population  $\sim 10,000$ ; 2.1 persons/mile<sup>2</sup>) had documented elevated ground-level ozone; we sought to determine if ground-level ozone concentrations were associated with respiratory-related clinic visits in Sublette County.

**METHODS:** Respiratory-related clinic visits were ascertained from the only two area clinics' electronic billing records for 2008–2011. The Wyoming Department of Environmental Quality provided daily ground-level ozone measurements and weather data. We used a bidirectional (before and after event) time-stratified (1-month) case-crossover design (each case serves as its own control), adjusted for temperature and humidity, to investigate associations between ground-level ozone concentrations and respiratory clinic visits. We examined interactions by age category and sex.

**RESULTS:** The final data set included 12,742 case-days

and 43,285 control-days. Females accounted for 52.7% (6,717) of the case-days. Median patient age was 28.6 years (range: 4 months–98 years). The median ground-level ozone concentration was 47 ppb (range: 19–84 ppb). For every 10-ppb ozone increase, during the following day, clinic visits increased by 4.8% (adjusted odds ratio: 1.048; 95% confidence interval: 1.003–1.095). Because of the limited sample size, we were unable to stratify by ozone season or year. We identified no other statistically significant interactions.

**CONCLUSIONS:** Prior studies have not examined potential health effects of ground-level ozone in nonurban communities. Consistent with extant literature, our results indicate an association between ground-level ozone concentrations and respiratory clinic visits among persons residing in Sublette County. Education efforts can help the public limit their exposure and understand health effects of ozone.

**KEYWORDS:** ozone, Wyoming, air pollutants, environmental exposure, respiratory tract diseases

## 2:55 Impact of Aerial Insecticide Spraying on West Nile Virus Disease – North Texas, 2012

**AUTHORS:** Duke J. Ruktanonchai, S.K. Pillai, S. Stonecipher, N. Lindsey, K. Horiuchi, M. Delorey, B. Biggerstaff, T. Sidwa, J. Zoretic, J. McAllister, R. Nasci, M. Fischer, S. Hills

**BACKGROUND:** West Nile virus (WNV) is the leading cause of mosquito-borne disease in the United States. During 2012, four north Texas counties reported  $>840$  WNV cases, six times more than any previous year. In response, larviciding and ground-based adulticide spraying were performed variably throughout the area and, for the first time in north Texas, aerial insecticide spraying was used for WNV control with two counties treated in August. We evaluated aerial spraying's impact on WNV disease.

**METHODS:** We defined a case as a resident of one of the four counties who, in 2012, had laboratory-confirmed WNV neuroinvasive disease using the national surveillance case definition. Patients were categorized as living within or outside the aerial-sprayed area. We calculated incidence rate ratios (IRRs) in treated and untreated areas by comparing incidence rates before and after spraying; for unsprayed areas, before and after periods were defined by using spray dates from a corresponding sprayed area. We evaluated aerial

spraying's impact by using the ratio and 95% confidence intervals (CIs) of IRRs in treated and untreated areas.

**RESULTS:** In treated areas, the incidence before and after spraying was 7.47 and 0.28 per 100,000 persons, respectively; the IRR was 27.00 (95% CI: 12.70–57.41). In untreated areas, the before and after incidence was 4.80 and 0.45 per 100,000 persons, respectively; the IRR was 10.57 (95% CI: 6.11–18.29). The ratio of these IRRs was 2.55 (95% CI: 1.01–6.49).

**CONCLUSIONS:** WNV neuroinvasive disease incidence decreased in the after-spray period in both areas, but the relative change was significantly greater in aerial-sprayed areas. Further studies should assess possible confounding factors (e.g., ground spraying) and evaluate the impact of earlier spraying implementation.

**KEYWORDS:** West Nile virus, disease outbreaks, mosquito control, insecticides

*Being approximately right most of the time  
is better than being precisely right occasionally.*  
—Author Unknown

**SESSION P: Money, Math, and Modeling**  
**3:30–4:55 pm**

**Ravinia Ballroom**

**MODERATORS:** Benjamin Park and Barbara Marston

**3:35 Cost-Effectiveness of a Screening Program to Prevent Cryptococcal Meningitis Among HIV-Infected Persons – Vietnam**

**AUTHORS:** Rachel M. Smith, T. Nguyen, H. Ha, P. Thang, C. Thuy, L. Truong, H. Bui, T. Le, B. Struminger, M. McConnell, R. Fanfair, B. Park, J. Harris

**BACKGROUND:** Approximately 66,000 HIV-associated cryptococcal meningitis (CM) deaths occur yearly in South and Southeast Asia; early diagnosis and treatment improves survival. The World Health Organization (WHO) recommends screening HIV-infected adults with CD4<100 cells/mm<sup>3</sup> for serum cryptococcal antigen (CrAg), a marker of early cryptococcal infection, in areas of high CrAg prevalence. We evaluated CrAg prevalence and cost-effectiveness of CrAg screening in Vietnam.

**METHODS:** HIV-infected, anti-retroviral-naïve patients presenting to care in 12 clinics during 2009–2012 in Hanoi and Ho Chi Minh City, Vietnam, were prospectively enrolled. Sera from patients with CD4<100 cells/mm<sup>3</sup> underwent CrAg testing. Cost estimates were obtained from laboratory staff and clinicians in Vietnam; key assumptions, such as mortality rates, were based on the literature. Cost-effectiveness was evaluated using cost/life-year gained (LYG); we performed sensitivity analysis at varying CrAg prevalence levels. WHO defines a ‘very cost-effective’ intervention in Vietnam as one

with an incremental cost/LYG (vs. no intervention) <\$6,948.

**RESULTS:** We tested sera from 226 patients [104 (46%) from northern and 122 (54%) from southern Vietnam]. Median CD4 count was 40 (range: 0 – 99) cells/mm<sup>3</sup>. Nine (4%; 95% confidence interval [CI]: 2–7%) specimens were CrAg-positive; prevalence was similar in southern (6%; 95% CI: 3–11%) and northern Vietnam (2%; 95% CI: 0–6%) ( $P = 0.18$ ). The incremental increases in cost/LYG for screening at CrAg prevalences of 2%, 4%, and 8% were \$190, \$137, and \$119, respectively. At a 4% CrAg prevalence, the number needed to screen to prevent one CM case or death was 228 and 321, respectively.

**CONCLUSIONS:** A CrAg screening program is likely to be very cost-effective in Vietnam. Public health officials in Vietnam should consider adding CrAg screening to local HIV care guidelines.

**KEYWORDS:** cryptococcus; meningitis, fungal, cost-effectiveness, opportunistic infections

### 3:55 Is *Clostridium difficile* Strain Type a Predictor of Disease Outcomes?

**AUTHORS:** Isaac See, Y. Mu, J. Cohen, Z. Beldavs, L. Winston, G. Dumyati, J. Dunn, M. Farley, S. Holzbauer, C. Lyons, H. Johnston, E. Phipps, L. Wilson, L. Anderson, F. Lessa

**BACKGROUND:** An estimated 14,000 deaths/year in the United States are attributed to *Clostridium difficile* infection (CDI). Recent increases in CDI morbidity and mortality might be attributed to the emergence of a previously uncommon strain, North American Pulsed-field gel electrophoresis (NAP) type NAP1. We describe strain types causing CDI and evaluate their association with patient outcomes.

**METHODS:** We analyzed data from 10 geographic areas participating in active population-based CDI surveillance. A case was defined as a positive stool toxin or molecular assay for *C. difficile* during 2009–2012 in a surveillance area resident without a positive test in the prior eight weeks. A convenience sample of case isolates underwent pulsed-field gel electrophoresis typing. Severe disease was defined as ileus, toxic megacolon, pseudomembranous colitis, white blood count  $\geq 15,000$ , or ICU admission after positive test. We performed logistic regression to calculate adjusted odds ratios (aOR) and confidence intervals (CI) for the associations of strain type with severe disease and death.

**RESULTS:** NAP typing results were available for 2,086 cases. Severe disease occurred in 403/2,086 (19.3%) cases and death in 81/2,086 (3.9%). NAP1 was the most common strain type (27.9%), followed by NAP4 (10.0%) and NAP11 (9.3%). In univariate analysis, only NAP1 was associated with severe disease (OR: 2.02;  $P < 0.0001$ ) and death (2.37;  $P < 0.0001$ ). After controlling for age, prior healthcare exposures, and patient comorbidities, NAP1 remained associated with both severe disease (aOR: 1.62; 95% CI: 1.26–2.09) and death (aOR: 1.80; 95% CI: 1.12–2.90).

**CONCLUSION:** The NAP1 strain type accounted for over one quarter of cases and was a predictor for both severe disease and death. Strategies to reduce CDI morbidity may need to target strain-specific factors.

**KEYWORDS:** *Clostridium difficile*, mortality, risk factors, bacterial typing techniques

### 4:15 Economic Impact of a Public Health Response to a Measles Case — New York, 2012

**AUTHORS:** Nina Ahmad, D. Demeter, J. Nerone, D. Blog, C. Schulte, E. Rausch-Phung, P. Kutty, I. Ortega-Sanchez

**BACKGROUND:** Measles is a highly communicable, vaccine-preventable, viral illness that caused 139,300 deaths worldwide during 2010. In 2000, endemic measles was declared eliminated in the United States; however, prompt public health response to imported cases remains crucial for preventing spread to susceptible persons. On September 14, 2012, an unvaccinated male aged 9 years with an imported case of measles exposed a highly unvaccinated population at his private school in New York. We assessed the economic impact of preventing spread of measles in this community.

**METHODS:** We evaluated public health resources and costs during September 18 (when the case was reported) to October 15 (when control efforts ceased) from the state and local public health perspective. We used standardized economic surveys to calculate personnel hours and associated direct costs, including prorated salaries, and costs of materials and other response-related expenditures.

**RESULTS:** Overall, 269 potentially exposed persons were

identified, including 182 (68%) at the school. Among school contacts, 107 (59%) had no evidence of measles immunity; 34 received measles-containing vaccine as an outbreak control measure, and the remaining 73 were excluded for 21 days. During the response, six public health departments, 18 public health officers, and three laboratories were involved. Public health personnel expended ~495 person-hours, including 44 overtime hours. Among response activities, planning and coordination efforts demanded 50% of personnel time. Preliminary estimated costs to public health were \$20,115. No secondary measles cases were identified.

**CONCLUSIONS:** Extensive public health resources and time were expended to prevent measles spread in an unvaccinated setting. These costs emphasize the importance of complying with routine recommended vaccine policy to decrease the burden on public health.

**KEYWORDS:** measles, public health, communicable disease control, medical economics



## 4:35 Predicting Year of Tuberculosis Elimination Among U.S.-Born Populations by State

**AUTHORS:** Courtney M. Yuen, M. Chen, T. Navin

**BACKGROUND:** Despite declining tuberculosis (TB) rates in the United States, nearly 4,000 TB cases in U.S.-born persons were reported to CDC in 2011. To determine factors that might affect TB elimination in the U.S.-born population, we estimated each state's projected time to TB elimination and investigated if time-to-elimination was associated with TB case-patient characteristics.

**METHODS:** We used a piecewise log-linear regression model based on annual reported TB case rates during 1994–2011 to predict when each state will achieve TB elimination (1 case/1,000,000 population annually), in its U.S.-born population. We performed multivariate linear regression to determine ecologic correlations between predicted year of elimination for each state and average annual percentage of case-patients with Hispanic ethnicity, black race, white race, age >64 years, age <15 years, and TB risk factors (e.g., residence in a correctional institution).

**RESULTS:** Of the states, 75% were predicted to achieve

TB elimination in their U.S.-born populations within 50 years (median: 30 years; interquartile range: 18–50 years). Percentage of cases in correctional institutions at time of diagnosis and percentage of cases in Hispanic persons were significantly associated with delay in TB elimination. Time-to-elimination was predicted to increase by 5.4 years for each 1% of cases in correctional institutions ( $P < 0.001$ ) and by 0.56 years for each 1% of cases in Hispanic persons ( $P = 0.004$ ).

**CONCLUSIONS:** We predict that most states will achieve TB elimination in their U.S.-born populations within the coming decades but expect variation among states. To accelerate TB elimination in their U.S.-born populations, states with high proportions of cases in correctional institutions and in Hispanic persons should consider increasing their efforts to eliminate TB in these populations.

**KEYWORDS:** tuberculosis, disease elimination, United States, epidemiology

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**FRIDAY, APRIL 26, 2013**


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*Tell me your attributes,  
and I'll tell you your chances.  
— Author Unknown*

**SESSION Q: Risk Factors**  
**8:30–9:55 am**

**Ravinia Ballroom**

**MODERATOR:** Robin Ikeda

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**8:35     Examining the Relationship Between Food Security and Self-Reported Hypertension Among White, Black, and Hispanic Adults, Behavioral Risk Factor Surveillance System — 12 States, 2009**

**AUTHORS:** Shalon M. Irving, R. Njai, P. Siegel, Y. Liao

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**BACKGROUND:** Food security is a modifiable social determinant of health. Lack of food security — which is linked with increased stress and in turn the risk of hypertension — is inversely associated with socioeconomic status (SES). Our objective is to examine whether food security is protective against hypertension independent of SES.

**METHODS:** We analyzed 2009 data on black, white, and Hispanic adults from 12 states deploying the Behavioral Risk Factor Surveillance System's Social Context Module (N = 66,581). Respondents reporting rarely/never being worried about having enough money to buy nutritious meals were defined as food secure; self-reported hypertension was defined as having been told by a health professional that they have high blood pressure. We used logistic regression to estimate adjusted prevalence ratios (aPR) and 95% confidence intervals (CI) for food security in relation to hypertension, both overall and by selected demographic characteristic, while adjusting for three measures of SES: education, health insurance and poverty-income ratio.

**RESULTS:** Overall, the prevalence of food security was 80.8%, the prevalence of hypertension was 29.4%, and food security was inversely associated with hypertension after adjustments for SES measures (aPR: 0.84; 95% CI: 0.77–0.91). The relationship differed little by race/ethnicity but was substantially stronger among men than among women (aPR: 0.76; 95% CI: 0.66–0.86 versus aPR 0.91; CI: 0.82–1.00) and was strongest among respondents aged 18–34 (aPR: 0.52; 95% CI: 0.39–0.70).

**CONCLUSION:** Even after adjustments for three SES factors, food security remained associated with a decreased risk for hypertension in all demographic groups assessed. These results support the hypothesis that interventions intended to increase food security may be effective in reducing participants' risk for cardiovascular disease without modifying their SES.

**KEYWORDS:** hypertension, food supply, socioeconomic status

## 8:55 Risk Factors for Diarrhea-Associated Death Among Children in Botswana in 2012

**AUTHORS:** Paul A. Gastañaduy, J. Houston, O. Ratshipa, S. Modi, H. Dale, D. Simpson, M. Patel, U. Parashar

**BACKGROUND:** Diarrhea is a leading cause of child mortality in Botswana, a country with high prevalence of childhood malnutrition (~11%) and adult HIV (~25%). For HIV-exposed infants (born to an HIV-infected mother), formula feeding is recommended. A two-fold increase in reported nationwide childhood diarrheal deaths between January–June 2012 prompted an investigation of risk factors to improve prevention and control efforts.

**METHODS:** A case-control study was conducted at main referral hospitals of 5 districts with the highest diarrhea case-fatality rates. Case-patients (children <5 years who died with gastroenteritis between January 1–June 30, 2012) were compared to age frequency-matched controls (children presenting to surrounding child welfare clinics [CWC]). CWC cards were reviewed for information on malnutrition (weight-for-age z-score <-2), HIV exposure, and exclusive breastfeeding through 6 months of life. Bivariate and multivariate logistic regression were performed to identify risk factors.

**RESULTS:** Sixty-three case-patients and 126 controls were enrolled. Among case-patients, 34 (54%) were male, median age at death was 4 months (range: 0–18 months), 65% had severe dehydration on presentation, and 90% received intravenous fluids. Compared to controls, children who died were more likely to be HIV-exposed (97% versus 34%; adjusted odds ratio [aOR] = 32; 95% confidence interval [CI]: 2–530), not exclusively breastfed (94% versus 28%; aOR = 13; 95% CI: 2–84), and malnourished (44% versus 2%; aOR = 42; 95% CI: 4–427).

**CONCLUSIONS:** The vast majority of diarrhea deaths in Botswana occur among HIV-exposed infants who were not exclusively breastfed. Our findings support WHO recommendations to promote breastfeeding regardless of HIV exposure status and for effective treatment of malnutrition as key childhood survival interventions, and could contribute to efforts in Botswana to develop similar policies.

**KEYWORDS:** diarrhea, mortality, HIV, breastfeeding, malnutrition, Botswana

## 9:15 Association Between Housing Insecurity and Health Outcomes and Behaviors – Washington State, 2011

**AUTHORS:** Mandy A. Stahre, J. VanEenwyk, R. Njai, P. Siegel

**BACKGROUND:** Social determinants of health (e.g., housing insecurity) are a new focus area for *Healthy People 2020*. Housing insecurity is associated with stress and unhealthy behaviors. Studies establishing this association are not population-based and do not attempt to control for the effect of socioeconomic status. We sought to examine associations between housing insecurity and indicators of poor health or risk behaviors.

**METHODS:** Respondents to the 2011 Washington State Behavioral Risk Factor Surveillance System (WABRFSS) who answered always, usually, or sometimes to how often they worried about paying their rent or mortgage during the past year were classified as housing insecure. We estimated adjusted prevalence ratios (aPRs) and 95% confidence intervals (CIs), adjusting for sex, income, education, insurance coverage, Hispanic ethnicity, marital and veteran status, and adverse childhood experiences. All analyses were conducted by using SUDAAN® to account for weighting of individual responses.

**RESULTS:** During 2011, among 14,114 WABRFSS participants, ~29% reported housing insecurity. Housing insecure residents were twice as likely to report poor or fair health (16% versus 8%; aPR: 2.05; 95% CI: 1.62–2.59) or that poor health interfered with daily activities (12% versus 6%; aPR: 2.13; 95% CI: 1.57–2.90). Delay in seeking medical care was 3 times more common among residents who were housing insecure than not (21% versus 6%; aPR: 3.35; 95% CI: 2.59–4.33). Housing insecurity was also associated with an increased prevalence of smoking (16% versus 11%; aPR: 1.41; 95% CI: 1.11–1.79).

**CONCLUSIONS:** The association between housing insecurity and health is substantial even after controlling for potential confounders. This information is useful for more fully assessing the influence of social policies aimed at improving health.

**KEYWORDS:** housing; socioeconomic factors; health behavior; Behavioral Risk Factor Surveillance System

## 9:35 Obesity, Physical Activity, Screen Time, and Sugar-Sweetened Beverage Consumption Among Adolescents – Utah, 2011

**AUTHORS:** Joanna R. Watson, M. Friedrichs

**BACKGROUND:** Adolescent obesity is associated with increased cardiovascular disease, diabetes, and all-cause mortality during adulthood. To assess obesity risk factors for Utah adolescents, we analyzed 2011 Utah Prevention Needs Assessment (PNA) Survey data. We evaluated three risk factors, physical activity, screen time, and sugar-sweetened beverage (SSB) consumption.

**METHODS:** The 2011 Utah PNA was an anonymous survey of 16,667 students weighted to be representative of 8<sup>th</sup>-, 10<sup>th</sup>-, and 12<sup>th</sup>-grade Utah public school students. All data were self-reported and analyses were performed using weighted survey methods. Proportions were calculated for obesity ( $\geq 95^{\text{th}}$  percentile on sex-specific BMI-for-age growth charts), physical activity ( $\geq 60$  minutes/day with increased heart rate or breathing hard some of the time), screen time (watching television, playing video or computer games, or using a computer for nonschoolwork activities,  $\leq 2$  or  $> 2$  hours/day) and SSB consumption (glass/can of soda/other sugar-sweetened drink, 0–3 times/week or  $\geq 4$  times/week).

Adjusted and unadjusted odds ratios were calculated using logistic regression. We adjusted for sex, age, race/ethnicity, and parental education.

**RESULTS:** Obesity prevalence was 7.5% (95% confidence interval [CI]: 7.04–7.90). Of Utah adolescents, 81.3% (95% CI: 80.64–81.88) had  $< 60$  minutes/day of physical activity; 50.0% (95% CI: 49.01–50.90) had  $> 2$  hours/day of screen time; and 44.4% (95% CI: 43.43–45.31) consumed SSBs  $> 4$  times/week. Adjusted odds ratios for obesity were as follows: lack of physical activity, 1.62 (95% CI: 1.30–2.01);  $> 2$  hours screen time, 1.57 (95% CI: 1.38–1.77); and SSB consumption  $> 4$ /week, 1.17 (95% CI: 1.02–1.33).

**CONCLUSIONS:** Lack of physical activity, increased screen time, and SSB consumption were associated with adolescent obesity. Results support implementation of the Utah Nutrition and Physical Activity Plan 2010–2020.

**KEYWORDS:** obesity, exercise, beverages, television, video games, adolescent

*You just tell me when and where,  
and not only will I be there, but I'll also be late.*  
—Jarod Kintz

**SESSION R: Late-Breaking Reports**  
**10:30–11:45 am**

**Ravinia Ballroom**

**MODERATORS:** Douglas H. Hamilton and Randolph Daley

*See supplement for presenters and abstracts.*

*A hospital is no place to be sick.*  
—Samuel Goldwyn

**SESSION S: Healthcare-Associated Infections**  
**1:30–3:15 pm**

**Ravinia Ballroom**

**MODERATORS:** Matthew Kuehnert and Tom Chiller

**1:35 Postprocedural Fungal Endophthalmitis Associated with Sterile Products from a Single Compounding Pharmacy – Multiple States, 2012**

**AUTHORS:** Christina A. Mikosz, R.M. Smith, M. Kim, C. Tyson, K. OYong, K.K. Trivedi, E.H. Lee, S. Straif-Bourgeois, R. Sowadsky, B. Sun, S. Millay, S. Black, Y.T. Grant, J. Conway, W. Bamberg, Y. Vasquez, J. Harris, S. Lockhart, T.J. Török, L. Mascola, B.J. Park

**BACKGROUND:** Fungal endophthalmitis is a rare but serious infection that can cause vision loss. In March 2012, the California and Los Angeles County Departments of Public Health were notified of nine fungal endophthalmitis cases after retinal surgery at a California ambulatory surgical center. We investigated to identify the source and prevent additional cases.

**METHODS:** Probable cases were defined as ophthalmologist-diagnosed fungal endophthalmitis after an intraocular procedure performed after August 23, 2011, the production date of a suspected product. Confirmed cases had fungi identified by culture, histopathology, or polymerase chain reaction. Case-finding occurred through *Epi-X* posts, FDA MedWatch alerts, e-mails to ClinMicroNet laboratories and two ophthalmologist professional associations, and sales record review. Microbiologic and genetic testing were performed on patient specimens and available suspected product. Patient charts were reviewed.

**RESULTS:** We identified 43 confirmed and probable cases in nine states; 21 had prior exposure to Brilliant

Blue-G (BBG) dye during retinal surgery, and 22 had prior intravitreal injection of triamcinolone acetonide (TAC). Both BBG and TAC were compounded at Pharmacy X. *Fusarium incarnatum-equiseti* species complex mold was identified in specimens from BBG-exposed case-patients and from unopened Pharmacy X BBG vials. *Bi-polaris hawaiiensis* mold was identified in specimens from TAC-exposed case-patients. Of 40 patients with available data, 39 (98%) suffered vision loss, and 36 (90%) required repeat ophthalmic surgery. CDC advised avoidance of Pharmacy X sterile compounded products, which were recalled on May 21, 2012.

**CONCLUSIONS:** We describe a multistate outbreak of postprocedural fungal endophthalmitis associated with two compounded products labeled as sterile from a single compounding pharmacy, resulting in widespread Pharmacy X product recall. Clinicians should be aware that contamination of sterile compounded products can occur.

**KEYWORDS:** eye infections, fungal; endophthalmitis; disease outbreaks; epidemiology; drug compounding

## 1:55 Evolution of Clinical Manifestations of Fungal Infections Associated with Contaminated Steroid Injections, Multistate, 2012

**AUTHORS:** Duc B. Nguyen and members of the Fungal Infection Outbreak Clinical Team

**BACKGROUND:** Fungal infections are a rare complication of steroid injections to treat chronic back pain, and the clinical course of disease is largely unknown. In September 2012, we investigated an outbreak of fungal infections associated with injections of contaminated preservative-free methylprednisolone acetate (MPA) produced by a single compounding pharmacy. We describe the clinical presentations and outcomes of infected patients.

**METHODS:** Probable cases were defined as meningitis, stroke, and/or parameningeal infections in persons exposed to implicated MPA after May 21, 2012. Confirmed cases met the probable case definition and had laboratory evidence of *Exserohilum rostratum* or *Aspergillus fumigatus*. We abstracted detailed information from medical records of a subset of case-patients in Florida, Indiana, Michigan, New Jersey, Tennessee, and Virginia to better characterize clinical features.

**RESULTS:** As of November 19, 2012, data from 341 cases (100 [29.3%] confirmed) were available. Median incubation period was 19 days (range: 0–86 days) from last injection

to symptom onset. Meningitis, parameningeal infections (e.g., epidural abscess) and stroke occurred in 249 (73.0%), 111 (32.6%), and 34 (10.0%) cases, respectively. Majority of meningitis (89.2%) and strokes (94.1%) occurred in the first 5 weeks of the outbreak, whereas the majority of parameningeal infections (65.8%) occurred later. Ninety percent of case-patients (n = 308) received antifungal therapy. Twenty-eight (11.2%) and 16 (6.4%) meningitis case-patients subsequently developed parameningeal infections and stroke, respectively. Twenty-six (7.6%) case-patients died; deaths occurred more frequently among confirmed than probable cases (14.0% vs. 5.0%,  $P = 0.004$ ).

**CONCLUSIONS:** Clinical presentations evolved during the outbreak, reflecting possible variation in pathogenic mechanisms. Current emphasis should be on appropriate spinal imaging to detect and treat parameningeal infections. Continued close follow-up is needed in light of these dynamic clinical manifestations.

**KEYWORDS:** fungal infection, contaminated steroid injections

## 2:15 Confirmed Donor-Derived Strongyloidiasis Cluster in Transplant Recipients – Pennsylvania, 2012

**AUTHORS:** Francisca A. Abanyie, E. Bosserman, S. Montgomery

**BACKGROUND:** Transplant-associated *Strongyloides stercoralis* infection is an emerging public health concern among solid-organ transplant recipients. The source of infection in these patients is not always apparent and may have implications for the establishment of screening guidelines. We investigated a cluster of patients infected with *Strongyloides* who received solid-organ transplants from a single donor to determine the source of infection.

**METHODS:** We examined details of the procurement and transplantation of solid-organs for recipients who developed strongyloidiasis post-transplant and determined the donor and recipients' risk of *Strongyloides* infection by reviewing medical and laboratory records. Pre-transplant serum from each recipient and banked donor serum samples were tested at CDC's Parasitic Diseases Reference Laboratory via enzyme immunoassay (EIA) to determine if strongyloidiasis was donor-derived infection or reactivation of chronic infection in the recipients.

**RESULTS:** Of four recipients, three were confirmed to have evidence of strongyloidiasis by detection of parasite larvae on

endoscopy. The fourth had no evidence of strongyloidiasis. There was no known history of illness compatible with prior infection with *Strongyloides* in the donor or recipients. Banked donor serum testing results were positive (13.68 units/uL). Pre-transplant serum samples obtained from all four recipients were negative. Two recipients expired due to pulmonary complications unrelated to strongyloidiasis; the remaining two were successfully treated with albendazole and ivermectin.

**CONCLUSIONS:** We identified the source of *Strongyloides* infection as donor-derived based on EIA testing of the donor and recipients' serum samples. This cluster is one of four clusters of donor-derived strongyloidiasis in 2012, highlighting the emergence of this public health concern. Organ procurement organizations and transplant medicine physicians should consider testing to assess risk of donors from endemic areas to improve transplant safety.

**KEYWORDS:** *Strongyloides* infection, strongyloidiasis, solid-organ transplant, transplant-associated infections, screening guidelines

## 2:35 *Clostridium difficile* Infection Among Children – United States, 2010–2011

**AUTHORS:** Joyanna M. Wendt, J. Cohen, Y. Mu, G. Dumyati, J. Dunn, S. Holzbauer, L. Winston, W. Bamberg, J. Meek, M. Farley, L. Wilson, E. Phipps, Z. Beldavs, C. Gould, F. Lessa

**BACKGROUND:** *Clostridium difficile* infections (CDI) are an increasing public health threat; however, little is known about the epidemiology among children including those <3 years of age in whom colonization is common and pathogenicity less certain. We used active surveillance data to describe CDI incidence, exposures, and clinical characteristics among children.

**METHODS:** We analyzed population-based CDI data for children aged 1–17 years from 10 U.S. geographic areas participating in the Emerging Infections Program during 2010–2011. A case was defined as *C. difficile*-positive stool without a positive test in the prior 8 weeks. Community-associated (CA) cases had stool collected as an outpatient or ≤3 days after hospital admission and no overnight healthcare facility stay in the prior 12 weeks. Demographic, exposure, and clinical data were collected. A convenience sample of CA cases was interviewed. Age-stratified incidence was calculated using U.S. census. Chi-square test was used for comparisons.

**RESULTS:** Of 944 CDI cases identified, 71% were CA. Incidences per 100,000 were 70.6 (age 1 year), 34.2 (2–3 years), 15.4 (4–9 years), and 16.6 (10–17 years). Older cases (10–17 years) more frequently had underlying medical conditions ( $P=0.003$ ) but the proportion of cases with diarrhea (72%), severe disease (8%), or co-infection with another enteric pathogen (4%) was similar across age groups; none died. Among the 95 CA cases interviewed, 83% reported a doctor's office visit and 72% used antibiotics during the prior 12 weeks.

**CONCLUSIONS:** Similar clinical severity across age groups suggests an etiologic role for *C. difficile* in the high rates observed in younger children. Targeting prevention efforts to reduce antimicrobial use among young children in outpatient settings should be prioritized for prevention.

**KEYWORDS:** *Clostridium difficile*, pediatrics, surveillance

## 2:55 Invasive Group A *Streptococcus* Infections Associated with Outpatient Liposuction – Multiple States, August–September 2012

**AUTHORS:** Amanda L. Beaudoin, L. Torso, M.A. Said, K. Richards, L. Wilson, K.L. Dooling, J.M. Wendt, M. Wise, A. Longenberger, M. Moll, P. Eggers, S. Ostroff

**BACKGROUND:** Group A *Streptococcus* (GAS) causes 10,700–12,500 invasive infections annually among U.S. residents. In September 2012, the Maryland Department of Health and Mental Hygiene was notified of invasive GAS infections in three persons who had undergone liposuction at an unregulated outpatient cosmetic surgery “medspa” (Facility A). Health care personnel (HCP) at Facility A also performed liposuction in Pennsylvania (Facility B). State health departments investigated both facilities to identify additional cases and potential GAS sources.

**METHODS:** We contacted 53 liposuction patients from Facilities A and B during July 1–September 15, 2012. Confirmed cases had GAS isolated from a normally sterile site or wound after liposuction. We reviewed infection control practices at both facilities. HCP were interviewed and screened for GAS carriage. GAS isolates were *emm*-typed.

**RESULTS:** We identified four confirmed invasive GAS cases, including one death. All patients (Maryland=3, Delaware=1) had been hospitalized in intensive care. Three cases were

linked to Facility A and one to Facility B. An additional GAS infection was identified in a household contact of a patient. GAS was isolated from two HCP who performed all four liposuction procedures; *emm* type (*emm28*) matched all three available case isolates. HCP received antimicrobial treatment to eradicate GAS carriage. Both facilities lacked infection control policies and equipment sterilization records. State health departments closed Facility A and suspended liposuction at Facility B.

**CONCLUSIONS:** GAS was likely transmitted by HCP during liposuction performed at facilities with deficient infection control practices and policies. These outpatient facilities typically are not regulated as ambulatory surgical centers. This investigation highlights the need for oversight of such outpatient facilities to reduce the incidence of life-threatening health care-associated infections.

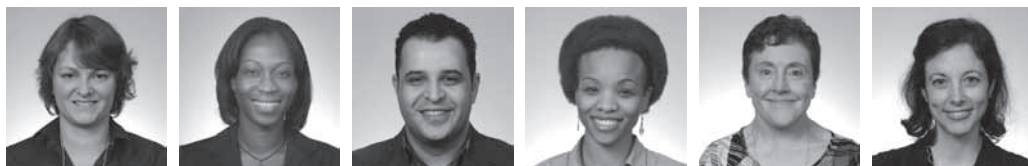
**KEYWORDS:** *Streptococcus*; lipectomy; infection control; ambulatory surgical procedures; quality assurance, health care



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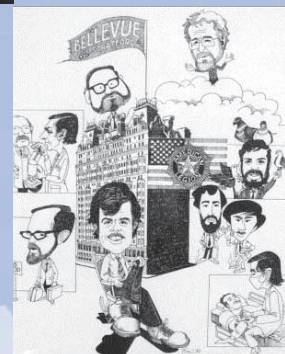
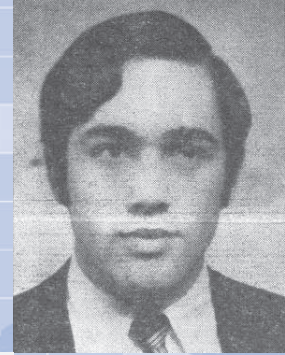
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