

2023 EIS CONFERENCE



Epidemic Intelligence Service (EIS) Conference

April 24-27, 2023 | Atlanta, Georgia




www.cdc.gov/eis



2023 Epidemic Intelligence Service (EIS) Conference

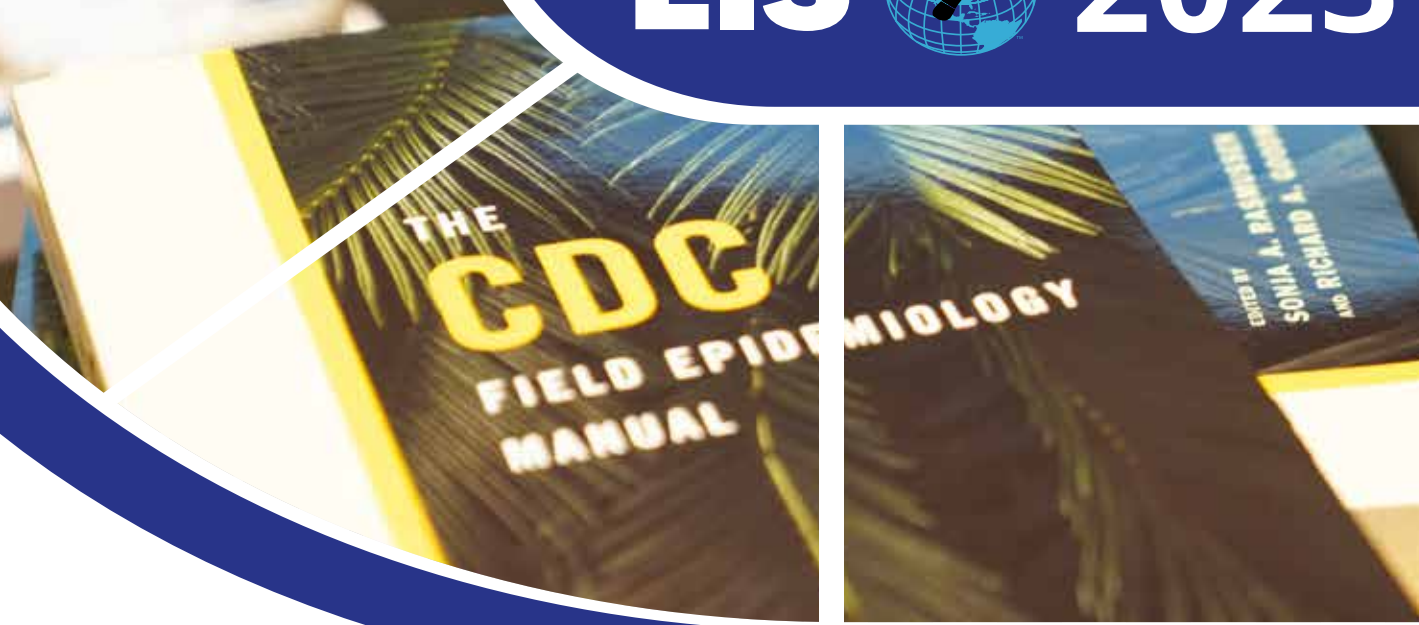
April 24–27, 2023

Agenda-at-a-Glance

MONDAY	WELCOME AND CALL TO ORDER	8:30-9:00 am
	 SESSION A: Stephen B. Thacker Opening Session.....	9:00-10:45 am
	BREAK	10:45-11:15 am
	CONCURRENT SESSION B1: Mpox	11:15 am-12:40 pm
	CONCURRENT SESSION B2: Chronic Disease and Health	11:15 am-12:40 pm
	LUNCH	12:40-1:40 pm
	SESSION C: J. Virgil Peavy Memorial Award Finalists	1:40-2:45 pm
	BREAK	2:45-3:15 pm
	CONCURRENT SESSION D1: Global Health	3:15-4:40 pm
	CONCURRENT SESSION D2: Public Health Surveillance	3:15-4:40 pm
EIS ALUMNI ASSOCIATION MEETING (private event sponsored by EISAA-All current EIS officers and Alumni are welcome).....	5:30-7:30 pm	
TUESDAY	CONCURRENT SESSION E1: HIV and Sexually Transmitted Infections.....	9:00-10:45 am
	CONCURRENT SESSION E2: Environmental Health	9:00-10:45 am
	BREAK	10:45-11:15 am
	TED-STYLE TALK SESSION 1 AND SARAH LUNA DEDICATION	11:15 am-12:20 pm
	LUNCH	12:20-1:20 pm
	CONCURRENT SESSION F1: Respiratory Diseases	1:20-2:45 pm
	CONCURRENT SESSION F2: Occupational Health and Safety.....	1:20-2:45 pm
	BREAK	2:45-3:15 pm
	SESSION G: Donald C. Mackel Memorial Award Finalists	3:15-5:00 pm
	PREDICTION RUN (Sponsored by EIS Alumni Association).....	6:00 pm
SESSION H: INTERNATIONAL NIGHT (Sponsored by EIS Alumni Association).....	6:00 pm	
WEDNESDAY	CONCURRENT SESSION I1: One Health: Connecting People, Animals, and the Environment	9:00-10:45 am
	CONCURRENT SESSION I2: Pregnancy and Infant Health	9:00-10:45 am
	BREAK	10:45-11:15 am
	CONCURRENT SESSION J1: Vaccine-Preventable Diseases.....	11:15 am-12:40 pm
	CONCURRENT SESSION J2: Homelessness and Housing Instability	11:15 am-12:40 pm
	LUNCH	12:40-1:40 pm
	 SESSION K: Alexander D. Langmuir Lecture.....	1:40-3:10 pm
	BREAK	3:10-3:40 pm
	CONCURRENT SESSION L1: Notes from the Field	3:40-5:05 pm
	CONCURRENT SESSION L2: Infectious Diseases in Healthcare Settings	3:40-5:05 pm
SESSION M: INTERNATIONAL NIGHT (Sponsored by EIS Alumni Association)	6:30 pm	
THURSDAY	CONCURRENT SESSION N1: COVID-19 Surveillance and Response	9:00-10:45 am
	CONCURRENT SESSION N2: Substance Use and Injury Prevention	9:00-10:45 am
	BREAK	10:45-11:15 am
	TED-STYLE TALK SESSION 2	11:15 am-12:20 pm
	LUNCH	12:20-1:20 pm
	CONCURRENT SESSION O1: Tuberculosis	1:20-2:45 pm
	CONCURRENT SESSION O2: Vector-Borne Diseases.....	1:20-2:45 pm
	BREAK	2:45-3:15 pm
	 PRESENTATION OF AWARDS	3:15-3:45 pm
	SESSION P: LATE-BREAKING REPORTS	3:45-4:50 pm
CLOSING REMARKS	4:50-5:00 pm	
POST-CONFERENCE EIS SATIRICAL REVIEW	7:30-9:00 pm	

 Awards presented during this session

EIS 2023



-NAME COLOR KEY-



EIS & LLS Alumni



Current EIS Officers & LLS Fellows



Incoming EIS Officers & LLS Fellows



Prospective EIS Officers & LLS Fellows



Conference Participants



Conference Staff



Recruiters



Media

SAVE *the* DATE

EIS NFERENCE

April 15-18th, 2024

MEDIA



IF YOU WOULD LIKE TO SPEAK
WITH ANY OF THE CONFERENCE
PRESENTERS CONTACT:

MELISSA BROWER

EIS Public Affairs

Call/text: (404)-903-0241

Email: gg5@cdc.gov



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EIS Conference 2023 Preface

Dear Conference Participants,

Welcome or welcome back. Four years have passed since our last in-person conference of CDC's Epidemic Intelligence Service (EIS). The COVID-19 pandemic has been hard on everyone and especially for our public health workforce. The EIS classes of 2018, 2019, and 2020 were remarkable for having completed EIS during the pandemic and while transitioning to virtual training. Thank you to our officers for your service under the most challenging of circumstances. And thank you to our EIS alumni, supervisors, and partners for your service and continued support of the EIS program. We are thankful you are back with us at the EIS conference.

The conference is a core element of EIS training. It is an opportunity for EIS officers to refine their scientific communication skills, gain experience responding to questions about their work, and share their stories. For all of us, the conference is an opportunity to learn from their analyses, investigations, and practice of consequential epidemiology.

With the return of the in-person conference, we are resuming TED-style talks and are honoring the achievements and legacy of EIS alum Dr. Sarah Luna. Sarah was a presenter in our inaugural TED-style session in 2018. In 2019, she died in a plane crash while traveling to a rural health clinic in Alaska as part of her duties as a senior epidemiologist with the Alaska Native Tribal Health Consortium. We finally get to honor Sarah by dedicating and naming a TED-style session in her memory.

We remain committed to infusing principles of diversity, equity, inclusion, and accessibility (DEIA) into all elements of our program. We have changed [our organizational practices to promote DEIA](#). Based on guidance from our EIS DEIA Council and external DEIA experts we have refined how we recruit, select, and train our EIS officers. Our 2023 Langmuir Lecturer, Dr. Donald Warne, embodies our emphasis on promoting diversity and health equity. Dr. Warne will be challenging all of us to prioritize working with indigenous communities and promote health equity.

Our Branch's programs are part of a pathway for strengthening the public health workforce. Our entry way to the path is our Science Ambassador Fellowship where we work with educators to use [NERD Academy](#) to get middle and high school kids excited about epidemiology and public health. We hope NERD Academy participants will go on to pursue training in public health. Our next contribution to the pathway is our [Epidemiology Elective Program \(EEP\)](#) for medical and veterinary students. EEP offers medical and veterinary students an opportunity to do one of their required rotations with CDC. EEP includes an orientation to CDC followed by a 6- or 8-week assignment with a CDC program or state or local public health department. The last step in our pathway are our Disease Detective training programs, including the [Laboratory Leadership Service \(LLS\)](#) and [EIS](#). Our expectation is that our multiple programs and commitment to DEIA are creating an accessible pathway to strengthening the public health workforce.

The EIS program is part of the newly formed Public Health Infrastructure Center dedicated to supporting and strengthening state, tribal, local, and territorial public health infrastructure and workforce. EIS is well positioned in CDC's first-ever Center committed to strengthening the public health workforce. EIS is working closely with our Laboratory Leadership Service, Public Health Informatics Program, Prevention Effectiveness Program, and other fellowships to promote interdisciplinary training and collaboration.

We thank you for joining us for the conference. We hope you leave energized to act on something you learn this week.

Respectfully,



CAPT Eric Pevzner
Branch Chief, EIS



Beth Lee
Deputy Chief



Dr. Wences Arvelo
Associate Chief for Science

EIS Alumni Association

The EIS Alumni Association (EISAA) represents more than 4,500 alumni leading the front lines of public health at local, state, federal, and global levels, both public and private sectors. The association was first established in the 1960s by a group of alumni interested in staying closely connected to the EIS program. The mission of EISAA is to **strengthen the public health workforce** by growing the diversity, equity, inclusion, accessibility and belonging across EISAA and all of its programs; to build and strengthen **connection** between all EIS alumni and officers; and to **support and celebrate** the work of EIS alumni and officers in public health leadership. At EIS Conference, EISAA sponsors several prestigious awards, hosts alumni networking events, and carries on treasured EIS traditions throughout conference week.

The EIS Alumni Association, in partnership with the CDC Foundation, awards the *Alexander D. Langmuir Prize*, named in honor of the beloved founder of the EIS; and the *Stephen B. Thacker Excellence in Mentoring Award* initiated in 2013 in honor of Dr. Stephen Thacker, an inspirational leader who championed the EIS program and its officers throughout his career.

In addition, the EISAA helps support the *Distinguished Friend of EIS Award* honoring an individual who has provided exceptional support to EIS Program; the *J. Virgil Peavy Memorial Award* named in honor of a distinguished CDC statistician and EIS mentor; the *Philip S. Brachman Award*, named in honor of the distinguished director of the EIS (1970-1981); and the *Outstanding Poster Presentation Award*.

Each year, EISAA also provides competitive travel scholarships for prospective applicants to attend the EIS Conference through the *David J. Sencer Scholarship Award*. EISAA also helps support EIS Conference events such as the *Prediction Run* and *Skit Night*.

EISAA is launching a BRAND NEW **user-friendly website** (www.eisalumni.org) and alumni portal during Conference that allows EIS alumni and current officers to find each other and connect based on geographic location or interest. The EISAA also **mobilizes broader recruitment support** for the EIS program by assisting with the development of new recruitment materials, sponsoring regional recruitment events, and utilizing our diverse alumni pool to speak at local residencies, academic institutions, and national conferences. In the past two years, EISAA has supported the priority within CDC to **promote diversity, equity, inclusion (DEI), accessibility, and belonging**, including working with alumni help recruit a diverse pool of qualified candidates for the EIS program.

If you haven't already made a contribution to EISAA this year, please consider doing so TODAY! Here's how you can get involved:

- **Support the EISAA Now!** You can pay your dues and make a contribution to the EIS Fund online at www.eisalumni.org. Recurring donation and planned giving options such as payments from donor-directed funds, IRAs and Employer matches are available!
- **Stay Connected!** If you are an EIS alumnus/ae and need login instructions for the NEW alumni portal, please email to eisalumni@cdcfoundation.org. This information will guide you on how to log-on to the password protected alumni portal and update your contact information and alumni profile.
- **Learn More!** Join us for our Welcome to the EIS Family Reception and Annual meeting on Monday, April 24, 2023 at 5:30 p.m. ET at the Conference hotel.

We are delighted to welcome you back to in person EIS Conference this year. And if you are among the classes who have never previously attended an in person EIS Conference: welcome to the family! We hope all EIS alumni and officers will use this conference week to join us in building our alumni community and supporting the premier public health training program in the world!

Sincerely,



Evelyn Twentyman, MD, MPH, EIS '14
President, EIS Alumni Association

Diana Robelotto Scalera
Director of Alumni Affairs/EISAA Liaison, CDC Foundation

2023 Scientific Planning Committee



Front Row: Grace Marx, Amanda Garcia-Williams, Xia Michelle Lin, Brooke Hoots, Jennifer Liang, Suzanne Beavers, Kathryn Curran, Prabasaj Paul
Back Row: Michelle Hughes, Andrea Winquist, Ethan Fechter-Leggett, Kevin Clarke, Jennifer Wright, Julia Gargano, Duong (Tony) Nguyen

2022-2023 SPC Members

Brook Hoots

Chair

National Center for Injury Prevention and Control

Jennifer Liang

Co-Chair

National Center for Surveillance, Epidemiology, and Laboratory Services; Epidemiology Workforce Branch

Kevin Clarke

Center for Global Health

Duong (Tony) Nguyen

Center for Preparedness and Response
Deputy Director for Infectious Diseases
National Center for Health Statistics

Michelle Hughes

National Center on Birth Defects and Developmental Disabilities

Sharyn Parks Brown

National Center for Chronic Disease Prevention and Health Promotion

Grace Marx and Prabasaj Paul

National Center for Emerging and Zoonotic Infectious Diseases

Andrea Winquist

National Center for Environmental Health/Agency for Toxic Substances and Disease Registry

Kathryn Curran

National Center for HIV/AIDS, Viral Hepatitis, STD and TB Prevention

Julia Gargano

National Center for Immunization and Respiratory Diseases

Amanda Garcia-Williams

National Center for Injury Prevention and Control

Ethan Fechter-Leggett

National Institute for Occupational Safety and Health

Xia Michelle Lin

National Center for Surveillance, Epidemiology, and Laboratory Services

Suzanne Beavers and Jennifer Wright

National Center for Surveillance, Epidemiology, and Laboratory Services; Epidemiology Workforce Branch – Field

Ethan Fechter-Leggett

Office of Minority Health and Health Equity

General Information

Program Production

- EIS Program
- CMI AUDIOVISUAL

Acknowledgments/Disclaimers

The EIS Program extends a special thank you to the EIS Alumni Association and the Council of State and Territorial Epidemiologists for their generous support of the 2023 Annual EIS Conference. The EIS Program gratefully acknowledges the valuable assistance and cooperation of the editorial and support staff of all CDC administrative units participating in the EIS Conference.

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 these reports are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Purpose Statement

The primary purpose of the EIS Conference is to provide a forum for EIS officers to deliver 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



TELL US ABOUT YOUR EXPERIENCE AT THE

2023 **EIS**  NFERENCE

TAKE A BRIEF

POST-CONFERENCE SURVEY

(Different from continuing Education Survey)

[TINYURL.COM/EIS2023SURVEY](https://tinyurl.com/eis2023survey)

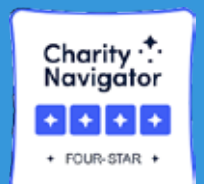
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please visit TCEO (www.cdc.gov/getCE)
and follow the “9 Simple Steps to Get CE.”

The deadline to complete CE is May 28, 2023.

CE information is available at:

www.cdc.gov/eis/conference/continuing-education.html

THERE ARE NO FEES FOR CE.

2023 Epidemic Intelligence Service (EIS) Conference

Agenda

MONDAY, APRIL 24, 2023

- 8:30 - 9:00** **Welcome and Call to Order**
- 9:00 - 10:45** **SESSION A: Stephen B. Thacker Opening Session**
- 9:05 Mpox in Transgender and Gender-Diverse Adults — United States, May–November, 2022
Dawn Blackburn, BVMS, MSc, DACVPM
- 9:25 Ongoing Physical Health Effects Associated with the Joint Base Pearl Harbor-Hickam Water System Petroleum Contamination: Follow-up Investigation — Oahu, Hawaii, November 2021
Daniel Nguyen, PhD, MSPH
- 9:45 Malaria Prevalence and Care Seeking Among School-Aged Children to Guide Community Case Management — Malawi, 2022 *Laura M. Castro, DrPH, MPH, RS*
- 10:05 Multiple Job Holding, Job Change, and Associations with Gestational Diabetes and Pregnancy-Related Hypertension — United States, October 1997–December 2011 *Amel Omari, PhD, MPH*
- 10:25 Declines in Vaccine-Type Human Papillomavirus Prevalence in Females Across Racial/Ethnic Groups — National Health and Nutrition Examination Survey, United States, 2015–2018
Ruth Stefanos, MD, MPH
- 10:45 - 11:15** **BREAK**
- 11:15–12:40** **CONCURRENT SESSION B1: Mpox**
- 11:20 Epidemiologic and Clinical Features of Mpox in Children and Adolescents — United States, May 17–September 24, 2022 *Ian Hennessee PhD, MPH*
- 11:40 Mpox Seroprevalence Among People Accessing Homeless Services and Staying in Encampments — San Francisco, CA, October – November, 2022 *Caroline Waddell, PhD, MS*
- 12:00 Racial and Ethnic Disparities in Mpox Cases and Mpox Vaccine Perception Among Males — United States, August–October 2022 *Saskia Vos, PhD, MPH*
- 12:20 Mpox Cases Among Cisgender and Pregnant Women — United States, May–November 2022
J. Danielle Sharpe, PhD, MS
- 11:15–12:40** **CONCURRENT SESSION B2: Chronic Disease and Health**
- 11:20 Prevalence and Control of Hypertension Among Women of Reproductive Age in a National Outpatient Electronic Medical Record Database *Xingran Weng, DrPH, MSW*
- 11:40 Disparities in Lung Cancer Mortality by Sex, Race, Ethnicity, and Rural vs Urban Status — United States, 1999–2020 *Christine M. Kava, PhD, MA*
- 12:00 Cardiovascular Disease Mortality Rates by County-Level Poverty and Rural Status — United States, 2020 *Ahlia Sekkarie, PhD, MPH*
- 12:20 Association Between Physical Activity and Mortality from Influenza and Pneumonia — United States, 1998–2018 *Bryant Webber, MD, MPH*
- 12:40 - 1:40** **BREAK/LUNCH**

- 1:40–2:45** **SESSION C: J. Virgil Peavy Memorial Award**
- 1:45 School District Prevention Policies and Risk for COVID-19 Among In-Person K–12 School Educators — Wisconsin, 2021 *Peter DeJonge, PhD, MPH*
- 2:05 Text Classification for Foodborne Illness Outbreak Investigations Using Deep Learning
Mohammed Khan, PhD, MSPH
- 2:25 Mpox Case Dynamics in Nonendemic Countries With and Without Vaccination Campaigns During 2022 *Andrea Stewart, PhD*
- 2:45 – 3:15** **BREAK**
- 3:15–4:40** **CONCURRENT SESSION D1: Global Health**
- 3:20 Investigation of COVID-19 Transmission During the First Community Outbreak in a Remote Island Population, Falkland Islands, April to June 2022 *Alice Wynne, MPH/FETP*
- 3:40 Nasopharyngeal Carriage of *Streptococcus pneumoniae* 5 Years After Pneumococcal Conjugate Vaccine Introduction — Southern Mozambique, October 2018–June 2019 *Rebecca Kahn PhD, MS*
- 4:00 Timing of Maternal HIV Diagnosis and Mother to Child Transmission in Harare City, Zimbabwe 2022: Implications for Pediatric HIV Elimination *Theresa Hamutyineyi MBChB/FETP*
- 4:20 COVID-19 Vaccination Coverage Among Persons Living with HIV in Zambia — Lusaka District, May 2022 *Molly Valleau, MPH, BSN, RN*
- 3:15–4:40** **CONCURRENT SESSION D2: Public Health Surveillance**
- 3:20 Racial Diversity and Social Determinants of Health Among Hispanic/Latino Heterosexually Active Adults — 23 U.S. Cities, 2019 *Valerie Madera-Garcia, PhD, MPH*
- 3:40 Encephalitis-Associated Hospitalizations — New York City, 2016–2021 *Nang Thu Thu Kyaw, PhD, MPH, MBBS*
- 4:00 SARS-CoV-2 Infection-Induced Antibody Seroprevalence in Previously Infected Persons with Immunocompromising Conditions — United States, 2020–2022 *Anna Bratcher, PhD, MSPH*
- 4:20 Characteristics of Person-to-Person Outbreaks of Nontyphoidal Salmonella Infection, National Outbreak Reporting System—United States, 2012–2019 *Isabel Griffin, PhD, MPH*
- 5:30–7:30** **EIS ALUMNI ASSOCIATION MEETING**

TUESDAY, APRIL 25, 2023

- 9:00–10:45** **CONCURRENT SESSION E1: HIV & Sexually Transmitted Infections**
- 9:05 Extended-Spectrum Beta-Lactamase *Shigella sonnei* Cluster Among Men Who Have Sex with Men — Chicago, Illinois, July–October 2022 *Emily AG Faherty, PhD, MA*
- 9:25 Self-Rated Health and HIV Outcomes Among Adults with Diagnosed HIV — Medical Monitoring Project, United States, 2019–2020 *Preetam Cholli, MD*
- 9:45 Incidence of Primary and Secondary Syphilis among American Indian and Alaska Native Persons — Oregon, 2015–2021 *Ethan Bornstein, MD*
- 10:05 Reporting Late Clinical Manifestations of Syphilis — Louisiana, 2018–2022 *Sarah Wondmeneh, MD, MPH*
- 10:25 HIV Clusters Among Hispanic or Latino Gay, Bisexual, and Other Men Who Have Sex With Men — Metropolitan Atlanta, Georgia, 2021–2022 *David Philpott, MD*

-
- 9:00–10:45** **CONCURRENT SESSION E2: Environmental Health**
- 9:05 Community Assessment for Public Health Emergency Response (CASPER) — 2022 Eastern Kentucky Floods *Oshea Johnson, PhD, MA*
- 9:25 Acute Kidney Injury Cluster of Unknown Etiology Among Children — The Gambia, June – October 2022 *Parsa Bastani PhD, MA, MPH*
- 9:45 Melioidosis Cluster Linked to Environmental *Burkholderia pseudomallei* Isolates —Gulf Coast, Mississippi, 2020 and 2022 *Julia Petras, MSPH, BSN-RN*
- 10:05 Serum Concentrations of Per- and Polyfluoroalkyl Substances and the Risk of Prostate Cancer Subtypes — United States, 1998–2015 *Alyssa Troeschel, PhD, MPH*
- 10:25 Elevated Spot Urine Thallium Levels Within a Family Associated with Kale Chip Consumption — Central California, August 2022 *Asha Choudhury, MD, MPH, MS*
- 10:45 – 11:15** **BREAK**
- 11:15–12:20** **Ted-Style Talk 1 & Sara Luna Dedication**
- 12:20 – 1:20** **BREAK/LUNCH**
- 1:20-2:45** **CONCURRENT SESSION F1: Respiratory Diseases**
- 1:25 Acute Respiratory Illness and Acute Flaccid Myelitis Associated with Enterovirus D68 Infection Among Children — United States, 2022 *Kevin Ma, PhD*
- 1:45 Highly Pathogenic Avian Influenza Enhanced Surveillance Program — Nebraska, 2022 *Lauren Jansen, MD, MPH*
- 2:05 Regional Declines in Rates of Legionnaires’ Disease Cases During the COVID-19 Pandemic — United States, January 2020–December 2021 *Lindsay Zielinski, DO*
- 2:25 Adenovirus Outbreak at a University Campus — South Carolina, 2022 *Marco Tori, MD, MSc*
- 1:20-2:45** **CONCURRENT SESSION F2: Occupational Health & Safety**
- 1:25 Tickborne Disease Perceptions and Prevention Opportunities Among Largely Foreign-Born Outdoor Workers — New Jersey, 2022 *Amy Beeson, MD*
- 1:45 Health Hazard Evaluations of Potential Occupational Cancer Clusters — United States, 2001–2020 *Dallas Shi, MD, PhD*
- 2:05 Global Rapid Response Team Deployer and Deployment Characteristics — United States, 2019–2022 *Samantha Lammie, MD, MPH*
- 2:25 Environmental Community Exposures Among Severely Injured Workers — United States, January 2015–January 2022 *Vidisha Parasram, DrPH, MPH*
- 2:45 – 3:15** **BREAK**
- 3:15-5:00** **SESSION G: Donald C. Mackel Memorial Award**
- 3:20 Mpox Virus Infection Among Persons Without Characteristic Lesions or Rash— District of Columbia, August 2022 *Yasmin Ogale, PhD, MSPH*
- 3:40 Alaskapox Virus Infections and Investigation of Zoonotic Sources — Alaska, 2020–2021 *Katherine Newell, DPhil, MPH*
- 4:00 Transmission of New Delhi Metallo- β -Lactamase Producing *Escherichia coli* Among Dogs at an Animal Rescue Facility – Wisconsin, 2022 *Kiara McNamara, DNP, BSN*

4:20 Leveraging Wastewater Surveillance to Understand Silent Spread of Poliovirus in New York State, 2022 *Nina B. Masters, PhD, MPH*

4:40 Human Trichinellosis Linked to Bear Meat from Northern Canada — Arizona, Minnesota, and South Dakota, 2022 *Shama Cash-Goldwasser, MD, MPH*

6:00 SESSION H: International Night: Special Remarks and Poster Presentations

6:00 Prediction Run

WEDNESDAY, APRIL 26, 2023

9:00–10:45 CONCURRENT SESSION I1: One Health: Connecting People, Animals & Environment

9:05 Estimating the Burden of Blastomycosis Outside of Known Endemic Region Using Insurance Claims Data — Vermont, 2011–2020 *Brian Borah, MD*

9:25 Shiga Toxin-Producing *Escherichia coli* Linked to Raw Milk Consumption Associated with a Cow Share Agreement — Tennessee 2022 *Christine Thomas, DO, MPH*

9:45 Rattlesnake Bites Characterization — Arizona, 2017–2021 *Cedar Mitchell, PhD, MSPH*

10:05 Rabies Postexposure Prophylaxis Reporting and Syndromic Surveillance Identification of Rabies Postexposure Prophylaxis Administration — Maine, 2018–2022 *Elizabeth Lamere, MPH, RN*

10:25 Highly Pathogenic Avian Influenza (HPAI) Human Symptom Monitoring System — Wyoming, 2022 *Allison Siu, DVM, MPH*

9:00–10:45 CONCURRENT SESSION I2: Pregnancy & Infant Health

9:05 Disaggregation of Breastfeeding Initiation Rates by Race, Ethnicity, and Nativity — United States, 2020–2021 *Kristin J. Marks, PhD, MPH*

9:25 Impact of Ascertaining All Pregnancy Outcomes on Birth Defects Prevalence—Massachusetts, 2012–2019 *Amy Fothergill, PhD, MPH*

9:45 Race, Place, and Infant Mortality — Infant Mortality in Chicago, Illinois, 2000–2020 *Hillary Spencer, MD, MPH*

10:05 Prescription Opioid Pain Reliever Use during Pregnancy: Data from the Washington State Pregnancy Risk Assessment (PRAMS) Opioid Supplement, 2019–2020 *Brynn Stopczynski, MPH/CSTE*

10:25 Prevalence of Viral Enteric Pathogens Causing Infection and Acute Gastroenteritis During the First Year of Life – Ohio, 2017–2022 *Julia M. Baker, PhD, MPH*

10:45 – 11:15 BREAK

11:15–12:40 CONCURRENT SESSION J1: Vaccine-Preventable Diseases

11:20 Changing Epidemiology of Bacterial Meningitis — United States, 2008–2020 *Namrata Prasad, PhD*

11:40 Invasive Pneumococcal Disease and Potential Impact of New Pneumococcal Conjugate Vaccines Among Children Aged <5 years — Alaska, 1991–2020 *Bionca Davis, MPH, RN*

12:00 Severity of Influenza-Associated Hospitalizations by Influenza Virus Subtype — United States, 2010–2019 *Kelsey Sumner, PhD, MSPH*

12:20 Novel Approaches to Polio Surveillance During an Outbreak — New York State, July–November 2022 *Haillie Meek, DVM, MPH*

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- 11:15–12:40** **CONCURRENT SESSION J2: Homelessness & Housing Instability**
- 11:20 Shigellosis Outbreak among Persons Experiencing Homelessness — San Diego County, October–December 2021 *Elizabeth Ohlsen, MD*
- 11:40 Survey of Mental Health Needs Among Displaced Families Living in Shelters — 2022 Eastern Kentucky Flood Response *Lilanthi Balasuriya MD, MHS*
- 12:00 Assessing Vector-Borne Disease Experiences and Risk of Transmission (AVERT) Survey of Homeless Service Workers — Washington and Colorado, 2022 *Shannan N. Rich, PhD, MS*
- 12:20 Experiences of Homelessness Among Sexual Minority Youth — National Youth Risk Behavior Survey, United States, 2021 *Izraelle Imani McKinnon, PhD, MPH*
- 12:40 – 1:40** **BREAK/LUNCH**
- 1:40–3:10** **SESSION K: Alexander D. Langmuir Lecture:**
Engaging Indigenous Communities to Promote Health Equity *Donald K. Warne, MD MPH, Johns Hopkins Provost Fellow for Indigenous Health Policy and Johns Hopkins Center for Indigenous Health Co-Director*
- 3:10 – 3:40** **BREAK**
- 3:40-5:05** **CONCURRENT SESSION L1: Notes from the Field**
- 3:45 Salmonellosis Incidence and Case Characteristics Before and During the COVID-19 Pandemic — Oregon, March 2017–February 2021 *Elizabeth Slocum, PhD MPH*
- 4:05 Gastrointestinal Illness Among Hikers on the Washington State Pacific Crest Trail, August–October 2022 *Arran Hamlet, PhD, MSc*
- 4:25 Correlations Between Wastewater Concentrations of SARS-CoV-2 and COVID-19 Cases Vary Over 90-Day Periods — California, February–October 2022 *Cassandra Schember, PhD, MPH*
- 4:45 Leptospirosis Outbreak After Hurricane Fiona, Puerto Rico, 2022 *Forrest Jones, PhD, MHS, MPH*
- 3:40-5:05** **CONCURRENT SESSION L2: Infectious Diseases in Healthcare Settings**
- 3:45 Investigation of The First Cluster of *Candida auris* Cases Among Pediatric Patients in The United States — Nevada, May 2022 *Sophie Jones (Allen), PhD, MSc, BSc*
- 4:05 Coronavirus Disease 2019 Pandemic Impact on Antibiotic Use Among Hospitalized Adults — Indonesia and the Philippines, March 2018–February 2021 *Amara Fazal, MD*
- 4:25 Changes in the Age Distribution of COVID-19–Associated Hospitalizations in the United States — COVID-NET, 13 States, June 2021–August 2022 *Sarah Hamid PhD, MPH*
- 4:45 Hepatitis C Virus Cluster at a Pain Clinic — Los Angeles, 2022 *Jemma Alarcón, MD, MPH*
- 6:15-9:00** **SESSION M: International Night: Special Remarks and Poster Presentations**

THURSDAY, APRIL 27, 2023

9:00–10:45 CONCURRENT SESSION N1: COVID-19 Surveillance & Response

- 9:05 Estimating Bias in COVID-19 Vaccine Coverage Under Changing Population Sizes — U.S. Virgin Islands, December 2020–September 2022 *Katie Labgold, PhD, MPH*
- 9:25 How Far We Have Come: A COVID-19 Surveillance System Evaluation
Rachel Wofford, MPH/CSTE
- 9:45 Quantitative SARS-CoV-2 Anti-Receptor Binding Domain Antibody Titer and Neutralization Capabilities in Previously Infected Persons— United States, January 2021– February 2022
Anna Bratcher, PhD, MSPH
- 10:05 Patient Characteristics Among Children in a Large Pediatric Hospital System with SARS-CoV-2 During Early Omicron and Pre-Omicron Periods — Colorado, January 2021–January 2022
Michael J. Kacka, MD, MPH
- 10:25 Racial and Ethnic Disparities in COVID-19-Associated Deaths — North Carolina, March 2020–August 2022 *Erin Ricketts, MD*

9:00–10:45 CONCURRENT SESSION N2: Substance Use & Injury Prevention

- 9:05 Every Minute Counts – Aberration Detection and Fatal Drug Overdose in Utah *Jack Pfeiffer, PhD*
- 9:25 Adolescent Experiences During the COVID-19 Pandemic and Marijuana Use — United States, January–June 2021 *Zerleen S. Quader, PhD, MPH*
- 9:45 Prevalence of Suicidality Among Sexually and Gender Diverse Youth — Washington State, 2021
Randy Stalter, PhD, MPH
- 10:05 Trends by Sex in Cannabis Use Among Students — King County, Washington, 2004–2021
Precious Esie, PhD, MPH
- 10:25 Characterization of Fatal Traumatic Brain Injuries — Alaska, 2016–2021
Katherine Newell, DPhil, MPH

10:45 – 11:15 BREAK

11:15–12:20 Ted-Style Talk 2

12:20 – 1:20 LUNCH

1:20–2:45 CONCURRENT SESSION O1: Tuberculosis

- 1:25 Tuberculosis and End-Stage Renal Disease — United States, 2010–2019
Kimberly Schildknecht, MPH, BSN
- 1:45 Tuberculosis Outbreak in Rural Arkansas, 2015–2022 *Thomas (Dan) Filardo, MD*
- 2:05 Epidemiology and Treatment Outcomes of Tuberculosis and Chronic Hepatitis B Coinfections — California, 2016–2020 *J Bradford Bertumen, MD, MPH*
- 2:25 Reduced Tuberculosis Incidence among People with HIV after Tuberculosis Preventive Treatment in a High-Burden Multidrug-Resistant Tuberculosis Setting — Ukraine, 2018–2022
Olutomi Sodeke, MD

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- 1:20-2:45** **CONCURRENT SESSION O2: Vector-Borne Diseases**
- 1:25 First Locally Acquired Dengue Virus Infection in Maricopa County — Arizona, November 2022
Kathryn Burr, DVM, MPH
- 1:45 Application of 2022 Lyme Disease Case Definition to Historical Data — Wisconsin, 2017–2021
Musheng Alishahi, PhD
- 2:05 Principal Component Analysis of the Serological Response to *Plasmodium falciparum* Using a Multiplex Bead-Based Assay to Help Guide Malaria Control Interventions — Nigeria, 2018
Jonathan Steven Schultz, MD, MPH
- 2:25 Syndromic Surveillance in Dengue Outbreak Response — Florida, 2022
Katharine Saunders, DNP, MPH, FNP-C
- 2:45 – 3:15** **BREAK**
- 3:15-3:45** 🏆 **Presentation of Awards**
- 3:45-4:50** **SESSION P: Late-Breaking Reports**
- 3:50 Measles Outbreak in Central Ohio — October 2022–February 2023 *Elizabeth Tiller MSPA, MPH*
- 4:00 Epidemiologic and Clinical Features of Deaths Among Persons with Mpox — United States, May 17–January 25, 2023 *Allison Hanley, PhD, MHS*
- 4:10 Fatal *Bacillus anthracis* Infection in a Hospitalized Patient Immigrating from Haiti
Jessica van Loben Sels, PhD, MPH
- 4:20 Salmonellosis Outbreak Linked to Alfalfa Sprouts — Nebraska, December 2022
Lauren Jansen, MD, MPH
- 4:30 Cluster Investigation of Increased Incidence of Pediatric Intracranial Abscesses in Clark County, Nevada — January–December 2022 *Jessica Penney, MD, MPHTM, MS*
- 4:40 Shingles Causing a Chickenpox Outbreak at a Child Care Center — North Carolina, December 2022–January 2023 *Erin Ricketts, MD*
- 4:50-5:00** **CLOSING REMARKS**
- 7:30-9:30** 🏆 **POST-CONFERENCE EIS SATIRICAL REVIEW**

Awards Descriptions and Committee Members

Alexander D. Langmuir Prize Manuscript Award

The Alexander D. Langmuir Prize, established in 1966 by the EIS Alumni Association and sponsored by Joanna Buffington, EIS '90 in partnership with the CDC Foundation, encourages EIS officers to publish papers based on epidemiologic work done while in the EIS. This prize recognizes a current EIS officer or recent alumnus (1 year) for excellence in a written report or an epidemiologic investigation or study.

2023 Committee Members: Gus Birkhead (Chair), Hammad Ali, Larry Cohen (EIS Program rep, non-voting), Fatima Coronado, Maria Thacker Goethe, Lisa Oakley, Pamela Mahoney

Philip S. Brachman Award

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

2023 Committee Members: Allison Siu, Anna Fagre, Dallas Smith

Distinguished Friend of EIS Award

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

2023: EIS Program Leadership

Iain C. Hardy Award

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

2023 Committee Members: Alexandre Macedo De Oliveira (Chair), Melinda Wharton, Stephanie Schrag, William Schaffner, John Modlin, Robert Linkins

J. Virgil Peavy Memorial Award

The J. Virgil Peavy Memorial Award, established in 2003 and sponsored 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.

2023 Committee Members: Duong (Tony) Nguyen (Chair), Josip Derado, Xia Michelle Lin, Yang Liu, Prbasaj Paul

Donald C. Mackel Memorial Award

The Donald C. Mackel Memorial Award, created by the EIS Alumni Association in partnership with the CDC Foundation, 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.

2023 Committee Members: Chair: Michelle Hughes (Chair), Kevin Clarke, John J. Kools, Grace Marx, Sherry (Michelle) Owen

Outstanding Poster Presentation Award

The Outstanding Poster Presentation Award is sponsored by the EIS Alumni Association and 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.

2023 Committee Members: No poster presentations for 2023 conference

Paul C. Schnitker International Health Award

Paul C. Schnitker, MD, passed away in a plane crash in Nigeria in 1969. He was en route to serve as a public health officer in the response to a 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 in partnership with the CDC Foundation, recognizes a current EIS officer who has made a significant contribution to international public health.

2023 Committee Members: Capt. Kevin Clarke (Chair), Capt. Michael Jhung, Dr. Almea Matanock, Capt. Joel Montgomery, Dr. Florina Serbanescu

James H. Steele Veterinary Public Health Award

The James H. Steele Veterinary Public Health Award, sponsored by CDC veterinarians in partnership with the CDC Foundation, 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.

2023 Committee Members: Ryan Wallace (Chair), Casey Barton Behravesh (Co-Chair), Colin Basler, Caitlin Cossaboom, Kirk Smith, Radhika Gharpure

Mitch Singal Excellence in Occupational and Environmental Health Award

The Mitch Singal Excellence in Occupational 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, was established in 2010. The Mitch Singal Award recognizes a current EIS officer for excellence in an oral presentation that best exemplifies the effective application of public health epidemiology to an investigation in the area of occupational or environmental health.

2023 Committee Members: Ethan Fechter-Leggett (chair), Andrea Winqvist (co-chair), Noemi Hall, Amy Lavery, Larry Cohen, Matt Lozier, Amy Heinzerling, R. Reid Harvey, Keisha Jenkins

Stephen B. Thacker Excellence in Mentoring Award

The Stephen B. Thacker Excellence in Mentoring Award, established in 2013 by the EIS Alumni Association and sponsored by the Thacker family in partnership with the CDC Foundation, recognizes 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.

2023 Committee Members: Gus Birkhead (Chair), Hammad Ali, Larry Cohen (EIS Program rep, non-voting), Fatima Coronado, Maria Thacker Goethe, Pamela Mahoney, Lisa Oakley

Shalon M. Irving Memorial Award

The Shalon M. Irving Health Equity Award, established by the EIS Program and sponsored by the EIS Alumni Association, was awarded for the first time in 2018. The Shalon M. Irving Award recognizes a current EIS officer or recent alumni (classes 2015–2018) for having made exemplary contributions in the areas of health equity and racial disparities research.

2023 Committee Members: Capt. Eric Pevzner (Chair), Asha Z. Ivey-Stephenson, Rashid Njai, Jennifer Lind, Francisca Abanyie, Erika Odom, Michelle Chevalier, NaTasha D. Hollis

David J. Sencer Scholarship Award

The David J. Sencer Scholarship Award fund was established by the EIS Alumni Association to provide travel scholarships to potential Epidemic Intelligence Service (EIS) applicants to attend the EIS Conference each year. For a list of scholarship recipients, contact EISAA.

2023 Committee Members: Linda Bartlett (EIS 1998), Chair, Beth Rubenstein (EIS 2019), Kristina Zierold (EIS 2001), Kathleen Gensheimer (EIS 1981), Gus Birkhead (EIS 1986), Gregory Heath (EIS 1986)

Alexander D. Langmuir Lectures, 1972–2019

The Langmuir Lecture is the preeminent public health lecture in the United States. The first lecture was given in 1972, and it has been a highlight of the annual EIS Conference each year since then. The lecture is named for Alexander D. Langmuir, MD, MPH (1910–1993), a public health visionary and leader who established the Epidemiology Program at what was then called the Communicable Disease Center in 1949; he remained as CDC's chief epidemiologist until his retirement in 1970.

Notably, Dr. Langmuir founded EIS, established national disease surveillance for the United States, and brought the Morbidity and Mortality Weekly Report to CDC. Langmuir Lecture speakers have included Abraham Lilienfeld, Sir Richard Doll, Geoffrey Rose, Jonas Salk, and many other prominent public health thinkers and researchers.

- 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. Blaser*
- 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
- 2013 The Role of EIS in Communities of Solution: Using GIS and Epidemiology to Activate Health Partnerships.
Robert Phillips
- 2014 EIS in an Era of Data, Technology, and Urban Transformations.
Martin-J. Sepulveda
- 2015 Large-Scale Machine Learning and Its Application to Public Health.
Jeff Dean
- 2016 From Antibiotic Resistance to Zika: Reflections on Working at the Intersection of Science and Public Health Politics.
Margaret Hamburg
- 2017 Moving from Epidemiology to Quantitative Population Health Science.
Sandro Galea
- 2018 Better Health through Better Partnerships.
Vice Admiral Jerome M. Adams
- 2019 Understanding of history as crucial to moving forward
Mona Hanna-Attisha

Alexander D. Langmuir Prize Manuscripts, 1972–2022

- 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
- 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 cholerae-suis*. *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.
- 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
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S.L. Solomon, E.M. Wallace, E.L. Ford-Jones, et al.
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- 1987 Oral Contraceptives and Cervical Cancer Risk in Costa Rica: Detection Bias or Causal Association? *JAMA* 1988;259:59–64.
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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.
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and
Transmission of *Plasmodium vivax* Malaria in San Diego County, California, 1986. *Am J Trop Med Hyg* 1990;42:3–9
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- 1991 An Investigation of the Cause of the Eosinophilia-Myalgia Syndrome Associated with Tryptophan Use. *N Engl J Med* 1990;323:357–65.
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- 2013 Necrotizing Cutaneous Mucormycosis after a Tornado in Joplin, Missouri, in 2011. *N Engl J Med* 2012;367;22:14–25. *R. Fanfair, K. Benedict, J. Bos, et al.*
- 2014 Raccoon Rabies Virus Variant Transmission Through Solid Organ Transplantation. *JAMA* 2013;310:398–407. *N.M. Vora, S.V. Basavaraju, KA Feldman, et al.*
- 2015 New Delhi Metallo-Beta-Lactamase-Producing Carbapenem-Resistant E. coli Associated with Exposure to Duodenoscopes. *Lauren Epstein, MD, MSc and Jennifer C. Hunter, DrPH*
- 2016 Exposure to Advertisements and Electronic Cigarette Use among U.S. Middle and High School Students. *Tushar Singh, MD, PhD, MS*
- 2017 Geospatial Analysis of Household Spread of Ebola Virus in a Quarantined Village — Sierra Leone, 2014. *Brigette L. Gleason, MD, MPH*
- 2018 Educational Disabilities Among Children Born with Neonatal Abstinence Syndrome. *Pediatrics*. 2018 Sep;142(3). *M.A. Fill, A.M. Miller, R.H. Wilkinson, et al.*
- 2019 Homelessness and Hepatitis A-- San Diego County, 2016-2018. *Corey Peak, ScD, MS*
- 2020 Factors Associated with Candida auris Colonization and Transmission in Skilled Nursing Facilities with Ventilator Units, New York, 2016-2018. *Clin Infect Dis* 2021;72(11):e753–e760. *J. Rossow, B. Ostrowsky, E. Adams, et al.*
- 2021 School District Prevention Policies and Risk of COVID-19 Among In-Person K–12 Educators, Wisconsin, 2021. *Peter DeJonge, PhD, MPH (EIS 2021)*
- 2021 Presymptomatic SARS-CoV-2 Infections and Transmission in a Skilled Nursing Facility. *N Engl J Med*. 2020;382(22):2081–2090. *M.M. Arons, K.M. Hatfield, S.C. Reddy, et al.*
- 2022 Multistate Outbreak of Spinal and Disseminated Tuberculosis Caused by Surgical Implantation of a Bone Allograft Product. *N. Schwartz, A. Hernandez-Romieu*
- 2022 Multistate Outbreak of Spinal and Disseminated Tuberculosis Caused by Surgical Implantation of a Bone Allograft Product. *N. Schwartz, A. Hernandez-Romieu, Fleming-Dutra KE, et al*

Philip S. Brachman Awards, 1983–2022

- 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
- 2013 Stephen B. Thacker
- 2014 Douglas H. Hamilton
- 2015 Julie Magri
- 2016 Diana Bensyl
- 2017 Joshua Mott and Michael King
- 2018 Anne Schuchat
- 2019 Michael Gronostaj
- 2020 Eric Pevzner and Tara Henning
- 2021 Jennifer Liang
- 2022 Kris Bisgard

Anne Schuchat Distinguished Friend of EIS Awards, 1984–2022

- 1984 Virgil Peavy
- 1985 William 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 Tauxe and Kashef Ijaz
- 2007 Dixie Snider
- 2008 Denise Koo
- 2009 Arjun Srinivasan
- 2010 Robert Quick
- 2011 Thomas Peterman
- 2012 Jeffrey P. Davis
- 2013 Douglas H. Hamilton
- 2014 William Keene
- 2015 David B. Callahan
- 2016 Sally Brown
- 2017 Marcelle “Marci” Layton and Mary Anne Duncan
- 2018 Robert “Mike” Hoekstra
- 2019 Janell A. Routh
- 2020 Jeffrey Engel
- 2021 Dr. Anne Schuchat
- 2022 Jim Curran and Michael Iademarco

Iain C. Hardy Awards, 1996–2022

- 1996 Peter Strebel
- 1997 D. Rebecca Prevots
- 1998 Beth P. Bell
- 1999 Charles 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 Parker Fiebelkorn
- 2011 Jacqueline E. Tate
- 2012 Preeta Kutty
- 2013 James L. Goodson
- 2014 Catherine Yen
- 2015 Minal K. Patel
- 2016 Eugene Lam
- 2017 Paul A. Gastañaduy
- 2018 Robert “Mike” Hoekstra
- 2019 Jose E. Hagan
- 2021 Heidi Soeters
- 2022 Sara Oliver

J. Virgil Peavy Memorial Awards, 2003–2022

- 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
- 2013 Alison Laufer
- 2014 Matthew Maenner
- 2015 Jin Qin
- 2016 Christopher Lee
- 2017 Julie Lynn Self
- 2018 Elizabeth Soda
- 2019 Heather Reese
- 2022 Peter DeJonge

Donald C. Mackel Memorial Awards, 1987–2019

- 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.
Kate 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
- 2013 Active Surveillance for Variant Influenza Among Swine, the Environment, and Employees at Live Animal Markets—Minnesota, 2012.
Mary J. Choi
- 2014 Two Cattle Herdsmen Infected With a Novel Species of Orthopoxvirus—Georgia (county), 2013.
Neil Vora
- 2015 Molecular Epidemiology of *Mycoplasma pneumoniae* (Mp) During an Outbreak of Mp-Associated Stevens-Johnson Syndrome.
Louise Francois Watkins
- 2016 Legionnaires' Disease Caused by a Cooling Tower — New York City, 2015.
Isaac Benowitz
- 2017 Unusual Pathogen Associated with Nonbiting Flies in a Person with Bacteremia — Washington State, 2016.
Jesse Bonwitt
- 2018 Use of a New Serologic Approach to Identify Avian Influenza A(H7N2) Virus Infections Among Animal Shelter Employees and Volunteers — New York City, 2016–2017.
Eugenie Poirot
- 2019 Coagulopathy Caused by Brodifacoum Rodenticide Poisoning Among Persons Who Smoke Synthetic Cannabinoids — Wisconsin, 2018. Erica Wilson
Erica Wilson

Outstanding Poster Presentation Awards, 1986–2022

- 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
- 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, Côte 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
- 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.
Stacy M. Holzbauer
- 2009 Seroprevalence of Herpes Simplex 2—National Health and Nutritional Examination Surveys, United States, 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
- 2013 A Spicy Catch: Salmonella Bareilly and Nchanga Infections Associated with Raw Scraped Tuna Product—United States, 2012.
W. Thane Hancock
- 2014 Two Fish, One Fish: Decreasing Number of Outbreaks Attributed to Fish—United States, 1998–2011.
Jolene Nakao
- 2015 Ebola Infection in a Maternity Ward—Tonkolili, Sierra Leone, 2014.
Angela Dunn
- 2016 Increased Cases of Syphilis Among Pregnant Women and Infants—United States, 2012–2014
Charnetta Williams
- 2017 Seoul Searching: Outbreak of Seoul Virus among Ratteries and Pet Owners — Illinois, 2017.
Janna Kerins
- 2018 Multiple Reports of Gastrointestinal Illness at a Hotel and Convention Center — Connecticut, 2017.
Vivian Leung
- 2019 Coccidioidomycosis in U.S. residents returning from house-building trips in Baja California, Mexico, June–July, 2018.
Mitsuru Toda

Paul C. Schnitker International Health Awards, 1995–2022

- 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 Tracy Creek
- 2005 Oleg Bilukha
- 2006 Kevin Cain
- 2007 Avid Reza
- 2008 Sapna Bamrah and David Lowrance
- 2009 Rinn Song
- 2010 Andrew Auld
- 2011 W. Roodly Archer
- 2012 Sudhir Bunga and Janell A. Routh
- 2013 Kevin R. Clarke
- 2014 Eugene Lam and Miriam Shiferaw
- 2015 Edna Moturi and Raina Phillips
- 2016 José E. Hagan
- 2017 Lawrence Purpura
- 2017 J. Lyle Conrad *Official Paul C. Schnitker Committee Historian Award*
- 2018 Rebecca Casey
- 2019 Scott Nabity and Elizabeth Swedo
- 2020 Nirma Bustamante
- 2021 Rachael Zacks
- 2022 Katrin Sadigh

James H. Steele Veterinary Public Health Awards, 1999–2022

- 1999 Fred Angulo and Jordan Tappero
- 2000 David Ashford
- 2001 Kate Glynn
- 2002 Kirk Smith
- 2003 Mike Bunning
- 2004 Jennifer McQuiston
- 2005 John Crump
- 2006 Katherine Feldman and James Kile
- 2007 Jennifer Wright
- 2008 John Dunn
- 2009 Casey Barton Behravesh and Stacy Holzbauer
- 2010 Kendra Stauffer

- 2011 Jennifer Adjemian and Adam Langer
- 2012 Barbara Knust
- 2013 Maho Imanishi and Megin Nichols
- 2014 Danielle Buttke
- 2015 Ryan Wallace
- 2016 Colin Basler and Neil Vora
- 2017 Ilana Schafer
- 2018 Laura Adams and Thomas Doker
- 2019 Caitlin Cossaboom
- 2020 Radhika Gharpure
- 2021 Jesse Bonwitt
- 2022 Kate Varela

Mitch Singal Excellence in Occupational and Environmental Health Awards, 2010–2022

- 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
- 2013 Impact of Aerial Insecticide Spraying on West Nile Virus Disease—North Texas, 2012.
Duke J. Ruktanonchai
- 2014 Workplace Secondhand Smoke Exposure Among Nonsmoking Women of Reproductive Age— United States, 2010.
Candice Johnson
- 2015 Parking Prices and Walking and Bicycling to Work in U.S. Cities.
Geoffrey Whitfield
- 2016 Cleanliness is Next to Breathlessness: Asthma and Other Health Problems Related to a New Cleaning Product Among Hospital Staff—Pennsylvania, 2015
Megan Casey
- 2017 Occupational and Take-Home Lead Exposure Associated with a Lead Oxide Manufacturing Plant — North Carolina, 2016.
Jessica L. Rinsky

-
- 2018 Occupational Exposure to Carbon Disulfide in an Artificial Casing Manufacturing Plant — United States, 2017.
Reed Grimes
- 2019 Use of an Environmental Burden Index for Health Outcome Research — United States, 2018.
Amy Lavery
- 2022 Elevated Respirable Crystalline Silica Exposure Among Engineered Stone Fabrication Workers — California, January 2019–February 2020
Krishna Surasi

Stephen B. Thacker Excellence in Mentoring Awards, 2013–2022

- 2013 Stephen B. Thacker
2014 Lyle Conrad
2015 Douglas H. Hamilton
2016 Polly Marchbanks
2017 Jennifer McQuiston
2018 James Mercy and William Schaffner
2019 Brenda Rivera-García
2020 Kristine (Kris) Bisgard
2021 John Kobayashi
2022 Matt Cartter

Shalon M. Irving Health Equity Award 2018 – 2022

- 2018 Francis Annor
2019 Sharoda Dasgupta
2020 Lisa Oakley
2021 Miriam Van Dyke
2022 Michele Bolduc

2023 EIS Conference Abstracts

MONDAY, APRIL 24, 2023

SESSION A: Stephen B. Thacker Opening

9:00-10:45 am

Moderators: Rochelle Walensky and Les Dauphin

9:05 Mpox in Transgender and Gender-Diverse Adults – United States, May–November, 2022

Authors: Dawn Blackburn, P. Dawson, N. Roth, J. Gold, L. Zilversmit Pao, N. Carnes, E. Olansky, E. Torrone, R. McClung, S. Ellington, K. Delaney

Background: As of November 4, 2022, 28,072 cases of mpox in adults were reported in the United States, primarily in cisgender men reporting recent male-to-male sexual contact. Transgender and gender-diverse persons, who constitute an estimated 0.5% of the U.S. adult population, face unique health disparities and barriers to care. We aimed to characterize the epidemiology of mpox in these populations to guide public health priorities.

Methods: We identified transgender and gender-diverse persons (based on self-reported gender and discordant gender and assigned sex at birth) with mpox reported by 54 jurisdictional health departments to CDC during May 17–November 4, 2022. We calculated the percentage of cases occurring in transgender and gender-diverse persons and described the proportion of cases by race/ethnicity, exposure characteristics and HIV status.

Results: In total, 466 mpox cases among transgender and gender-diverse adults were reported, accounting for 1.7% of reported cases in adults. Most were transgender women (43.1%) or gender-diverse (42.1%); 14.8% were transgender men. Among 374 (80.3%) cases with sexual and close intimate contact information available, 316 (84.5%) reported sexual or close intimate contact 3 weeks before symptom onset, including 276 (73.8%) who reported sexual or close intimate contact with a cisgender man. Across these populations, a total of 37.0% and 27.6% of cases with available race/ethnicity data occurred in Hispanic/Latinx persons and Black/African American persons, respectively. A total of 47.6% of the 166 cases with available data had a reported HIV positive status.

Conclusions: Transgender and gender-diverse persons, particularly those who are Hispanic/ Latinx and Black/ African American were disproportionately affected by mpox. This population frequently reported recent sexual or close intimate contact with cisgender men. Ensuring equity in approaches to mpox prevention efforts, including prioritization of eligible transgender and gender-diverse persons for vaccination and tailoring community outreach efforts, is a critical public health priority.

MONDAY

9:25 Ongoing Physical Health Effects Associated with the Joint Base Pearl Harbor-Hickam Water System Petroleum Contamination: Follow-up Investigation — Oahu, Hawaii, November 2021

Authors: Daniel Nguyen, A. Choudhury, M. Khan, S. Miko, A. Poniatowski, B. Gerhardstein, J. Rayman, N. Clemmons, D. Felton, J. Espiritu, G. Kallas, M. Jarvis, N. Mintz, J. Aponte, K. Horton, M. Orr, S. Konkle

Background: On November 20, 2021, the Red Hill Well, which provides water to ~93,000 persons on Oahu, Hawaii, was contaminated with petroleum (JP-5 jet fuel). Long-term health effects of petroleum exposure in drinking water are unclear. An initial Assessment of Chemical Exposures (ACE) investigation conducted during January–February 2022 by CDC/ATSDR and the Hawaii Department of Health (HDOH) found substantial acute health effects and recommended a follow-up investigation. In September 2022, the follow-up investigation was conducted to determine any ongoing physical health effects and guide recommendations.

Methods: A follow-up survey was designed using the ACE toolkit and the initial survey to assess water use and health since the water contamination event. The survey, available online and by telephone, was deployed during September 1–25, 2022. It asked about exposure and recent symptoms for those present in affected areas during November 20, 2021–March 18, 2022; parents or guardians completed

surveys on behalf of children. Participants were recruited using direct outreach (e.g., distributing flyers or emailing past participants) and media.

Results: Of 986 participants, which represents 8% (785/9,694) of affected households, 90% (888/986) were military-affiliated and 61% (604/986) were returning participants. In the 30 days before survey completion, 80% (785/986) reported experiencing symptoms. Most frequently reported symptoms included: headache (48%; 472/986), dry or itchy skin (39%; 380/986), dizziness (29%; 286/986), diarrhea (29%; 284/986), and skin rashes (28%; 277/986). Compared with before the incident, 55% (528/968) reported worse physical health post-incident. Since the incident, 65% (554/852) expressed “high” or “very high” confidence that symptoms were associated with water contamination. Fifty-five percent (538/986) sought medical care for their symptoms.

Conclusions: Affected community members continue experiencing physical symptoms that they attributed to this unprecedented water contamination exposure. We recommend longitudinal follow-up of affected persons and support for clinical providers and affected communities.

9:45 Malaria Prevalence and Care Seeking Among School-Aged Children to Guide Community Case Management — Malawi, 2022

Authors: Laura M. Castro, D. Sayre, T. Tizifa, L. Steinhardt, T. Volkmann, J. Gutman, P. Masache, E. Dembo, A. Malpass, M. Kayange, K. Phiri

Background: *Plasmodium falciparum* (*Pf*) malaria remains a leading cause of hospitalization in Malawi. As malaria control interventions preferentially target children aged <5 years (CU5), the burden of malaria is shifting to school-aged children (SAC; children aged 5–14 years). Malaria community case management (mCCM), whereby community health workers provide prompt malaria diagnosis and treatment, is only recommended for CU5 in Malawi. We estimated malaria infection prevalence and care-seeking among SAC compared to CU5 to inform a potential change in mCCM policy to include all children aged <15 years (CU15).

Methods: We conducted a cross-sectional household survey in 24 health facility catchment area clusters in three districts in Malawi from February to March 2022. Household heads were interviewed about recent fever (past 14 days) and care-seeking behavior for all household members. Malaria

prevalence was measured by rapid diagnostic tests for all CU15 in sampled households. We calculated 95% CI using an exact test in R.

Results: Among 2,630 children from 1,358 households, unweighted *Pf* malaria prevalence among 869 CU5 was 16.5% (95% CI: 14.0%–19.3%) compared to 31.1% (95% CI: 28.7%–33.5%) among 1,761 SAC ($P<.001$). Recent fever was reported for 24.3% (95% CI: 21.5%–27.3%) of CU5 and 18.4% (95% CI: 16.6%–20.3%) of SAC. Among children with recent fever, 73.0% (95% CI: 66.5%–78.9%) and 59.9% (95% CI: 54.3%–65.3%) of CU5 and SAC, respectively, sought care ($P<.001$) and 63.0% (95% CI: 56.1%–69.6%) and 48.5% (95% CI: 42.9%–54.0%) received a malaria diagnostic test ($P<.001$).

Conclusions: SAC had a higher malaria infection prevalence and were less likely to have sought care for fever and to have received a diagnostic test than CU5. Expanding mCCM to include SAC could improve access to prompt diagnosis and treatment and lead to declines in malaria prevalence among SAC in Malawi.

10:05 Multiple Job Holding, Job Change, and Associations with Gestational Diabetes and Pregnancy-Related Hypertension — United States, October 1997–December 2011

Authors: Amel Omari, M.R. Siegel, C.M. Rocheleau, K. Fujishiro, K. Van Buren, D. Shi, A.J. Agopian, S.M. Gilboa, P.A. Romitti, National Birth Defects Prevention Study

Background: Gestational diabetes and pregnancy-related hypertension are serious maternal health conditions which could be influenced by social determinants of health, including occupation. Many health surveys ask only about participants' main job, limiting the study of detailed working patterns in relation to maternal morbidities. We used National Birth Defects Prevention Study (NBDPS) data to investigate associations between multiple job holding and job change shortly before and throughout pregnancy and gestational diabetes and pregnancy-related hypertension.

Methods: We analyzed three maternal self-reported working patterns (multiple job holders, job changers, single job holders) during the three months before and throughout pregnancy of 8,140 NBDPS participants who delivered a live-born child without a birth defect. "Multiple job holders" worked >1 job simultaneously during at least part of this time, "job changers" worked >1 job with no overlap in timing, and "single job holders" (referent) worked 1 job. We used multivariable logistic regression to estimate

associations between working pattern and self-reported gestational diabetes and pregnancy-related hypertension, adjusting for maternal age and education. We explored effect modification by household income, peak weekly working hours, and maternal race/ethnicity.

Results: Multiple job holders had higher odds of gestational diabetes (adjusted odds ratio [aOR]: 1.5; 95% CI: 1.1–2.1) and pregnancy-related hypertension (aOR: 1.5; 95% CI: 1.0–2.2) compared with single job holders. Multiple job holders with a household income of <\$30,000 per year, 32–44 peak weekly working hours, and Hispanic and/or non-White race/ethnicity had higher odds of gestational diabetes compared with single job holders in respective categories. We observed no associations between job change and outcomes.

Conclusions: Detailed occupational information is important for exploring relationships between occupation and maternal health. Non-standard work arrangements and instability related to working multiple jobs could drive observed associations with maternal morbidities. Further research is warranted to replicate findings.

10:25 Declines in Vaccine-Type Human Papillomavirus Prevalence in Females Across Racial and Ethnic Groups — National Health and Nutrition Examination Survey, United States, 2015–2018

Authors: Ruth Stefanos, L. Markowitz, R. Lewis, J. Gargano, T. Querec, E. Unger

Background: Racial/ethnic disparities persist in incidence of and mortality from cervical cancer, a cancer caused by human papillomavirus (HPV) infection. Cervical cancer prevention through HPV vaccination has been recommended in the United States since 2006. Quadrivalent vaccine (4vHPV), targeting HPV6/11/16/18, was predominantly used from 2006–2015; 9-valent vaccine (9vHPV), additionally targeting HPV31/33/45/52/58, has been used since 2016. We evaluated equity of vaccine impact by comparing HPV prevalence in 2015–2018 to 2003–2006 (prevaccine era) among non-Hispanic White (NHW), non-Hispanic Black (NHB), and Mexican American (MA) females.

Methods: In the nationally representative National Health and Nutrition Examination Survey, self-collected cervicovaginal samples were tested for 37 HPV types. We analyzed HPV DNA prevalence, demographics, and self-reported vaccination among 1,709 sexually experienced females aged 14–24 years; analyses were weighted and accounted for the complex survey design. We compared

4vHPV-type and nonvaccine-type (28 types not targeted by either vaccine) prevalences in 2015–2018 to the prevaccine era, using prevalence ratios (PR) and 95% CIs, overall and by race/ethnicity.

Results: In 2015–2018, 59% of females reported receipt of ≥1 HPV vaccine dose; vaccination coverage was similar for all racial/ethnic groups. Compared to prevaccine era, 4vHPV-type prevalence declined 85% overall (PR: 0.15; 95% CI: 0.08–0.28), 82% in NHW (PR: 0.18; 95% CI: 0.08–0.40), 86% in NHB (PR: 0.14; 95% CI: 0.05–0.36) and declined 100% (from 11.5% to 0%) in MA. Nonvaccine-type prevalence was similar in both eras for all groups.

Conclusions: HPV6/11/16/18-type prevalence declined by ≥80% between the prevaccine era and 2015–2018 in all racial/ethnic groups analyzed. Stable nonvaccine-type prevalence indicates similar exposure in both eras and supports interpretation that vaccination led to 4vHPV-type prevalence declines. By reducing transmission of oncogenic HPV types across racial/ethnic groups, HPV vaccination has the potential to reduce cervical cancer disparities in future decades.

CONCURRENT SESSION B1: Mpox

11:15 am - 12:40 pm

Moderators: Jennifer McQuiston and Grace Marx

11:20 Epidemiologic and Clinical Features of Mpox in Children and Adolescents — United States, May 17–September 24, 2022

Authors: Ian P. Hennessee, V. Shelus, C. McArdle, M. Wolf, S. Schatzman, A. Carpenter, F. Minhaj, J. Petras, S. Cash-Goldwasser, K. Saunders, M. Cahill, J. Alarcón, E. Ricketts, M. Roskosky, D. McCormick, A. McCollum, J. Salzer, A. Kimball, J. Gold

Background: During previous mpox (monkeypox) outbreaks, severe disease and deaths were reported among children. However, little is known about the burden, exposure routes, and severity of mpox in children and adolescents during the 2022 mpox outbreak. This information is essential for understanding risk and guiding prevention measures and treatment. We investigated epidemiologic and clinical characteristics of mpox cases in children and adolescents in the United States.

Methods: We identified persons aged <18 years who received a laboratory diagnosis of mpox during May 17–September 24, 2022, through national surveillance and CDC clinical consultations. When data were available, persons whose cycle threshold values on polymerase chain reaction testing were ≥ 34 and who had atypical clinical features or no known epidemiologic risk factors were excluded. We collected data on demographics, exposures, and clinical features. We stratified data by age group (0–12, and 13–17 years).

Results: Among 109 persons aged <18 years with a positive mpox test, 83 met inclusion criteria, accounting for 0.3% of all U.S. cases during the reporting period. Most children and adolescents with mpox were Black (47%) or Hispanic (35%). Among 28 children aged 0–12 years with mpox, 64% were male, and 85% had known direct skin-to-skin contact with an adult caregiver with mpox. Among 55 adolescents aged 13–17 years, most were male (89%), and male-to-male sexual contact was the most common reported exposure route (66%). Overall, most (89%) were not hospitalized, none required critical care, and none died.

Conclusions: Mpox was rare in children and adolescents, and most cases were not severe. Black and Hispanic children and adolescents were disproportionately affected. Ensuring equitable access to vaccination and sexual health education for eligible adolescents and providing prevention information for persons with mpox caring for children should be public health priorities.

11:40 Mpox Seroprevalence Among People Accessing Homeless Services and Staying in Encampments — San Francisco, CA, October – November 2022

Authors: Caroline J. Waddell, T.D. Filardo, N. Prasad, G.J. Pellegrini Jr., N. Persad, M. Townsend, P.S. Satheskumar, D. Lowe, D. Borne, J. Janssen, N. Okoye, A. Bejarano, G.E. Marx, E. Mosites

Background: People experiencing homelessness are disproportionately represented among hospitalized patients with severe mpox. However, the extent and pathways of mpox transmission among people experiencing homelessness are not clear. We sought to determine the seroprevalence of mpox among people experiencing homelessness in San Francisco, California, and to understand the circumstances of possible exposure.

Methods: During October–November 2022, we obtained surveys and blood samples using convenience sampling of people in encampments or at homeless service sites. Specimens were tested by enzyme-linked immunosorbent assay for anti-Orthopoxvirus immunoglobulin IgG; IgG-positive specimens and specimens from people with prior smallpox vaccination were tested for IgM to distinguish recent versus historical vaccination or infection. Possible mpox infection was defined as IgG or IgM positivity without reported vaccination history. We analyzed data descriptively.

Results: We collected survey data from 284 participants. Of these, 209 (73.6%) had a successful blood draw. There were 167 participants who reported a history of mpox or smallpox vaccination and 109 who reported mpox vaccination alone. Among 209 samples tested for IgG, 49 were positive (23%). Of these, 39 participants had history of mpox or smallpox vaccination, and 2 were unsure, yielding 8 positive test results of 117 participants (6.8%) without reported vaccination. Among 70 samples tested for IgM, 6 (8.6%) were positive. Of these, 5 participants reported mpox vaccination, yielding 1 positive test result of 175 (0.6%) participants without reported mpox vaccination. Among 9 participants with evidence of possible mpox infection, 3 (33%) reported sexual contact in the prior month, and none reported spending time around someone with mpox.

Conclusions: Almost one-quarter of samples demonstrated antibody positivity to mpox and up to 7% of those were from participants who did not report vaccination, suggesting possible undetected infection. These instances of possible mpox infection occurred without known contact with someone with mpox.

12:00 Racial and Ethnic Disparities in Mpox Cases and Mpox Vaccine Perception Among Males — United States, August–October 2022

Authors: Saskia R. Vos, C. Prue, C. Nestor

Background: The 2022 mpox outbreak has disproportionately affected gay, bisexual, and same-gender loving men across the United States (U.S.). As the outbreak continues, racial/ethnic disparities have widened. Black and Hispanic males have disproportionately higher mpox infection rates and lower mpox vaccination rates when compared to White males. Perceptions of disease risk and severity can affect prevention behaviors. We assessed perceptions of mpox and mpox vaccines among U.S. male adults (aged > 18 years) by race/ethnicity. **Methods:** We conducted a cross-sectional household survey in 24 health facility catchment area clusters in three districts in Malawi from February to March 2022. Household heads were interviewed about recent fever (past 14 days) and care-seeking behavior for all household members. Malaria prevalence was measured by rapid diagnostic tests for all CU15 in sampled households. We calculated 95% CI using an exact test in R.

Methods: We analyzed data on U.S. males (N=923) from an online panel survey conducted three times during fall 2022. We examined differences among racial/ethnic groups (White n=680, Black n=118, Hispanic n=56, and of another race [American Indian/Asian/Multiracial] n=69). We assessed differences in

mpox information sufficiency, i.e., how to prevent/treat mpox, perceived risk, perceived severity, on a 0–100 scale using linear regression and perceptions about mpox vaccines (e.g., who needs vaccination) using ordinal logistic regression controlling for survey administration month, urbanicity, region, marital status, income, education, and LGBTQ+ self-identification.

Results: Black males (β : -10.19; 95% CI: -16.2--4.2; $P < .001$) and males of another race (β : -8.23; 95% CI: -15.6---.8; $P = .029$) had lower information sufficiency when compared to White males. Black males also had higher perceived risk (β : 5.88; 95% CI: 0.7–11.1; $P = .026$) and severity (β : 8.49; 95% CI: 2.8–14.1; $P = .003$) compared to White males. Black males (aOR=1.65, 95% CI: 1.23–1.77) were also more likely to agree that vaccines are only for people exposed to mpox compared to White males.

Conclusions: Black males in the sample had higher perceptions of risk and severity than White males, in addition to higher odds of agreement that the mpox vaccine was only for exposed individuals. Tailored mpox education using community champions among Black and American Indian/Asian/Multiracial communities may be needed to decrease mpox-related disparities.

12:20 Mpox Cases Among Cisgender and Pregnant Women – United States, May–November 2022

Authors: J. Danielle Sharpe, L.P. Oakley, K. Hufstetler, J. O’Shea, C. McArdle, V. Neelam, M. Wolf, L. Zilversmit Pao, M. Davis, E. Ricketts, M. Roskosky, R. Galang, K. Perkins, M. Taylor, M. Choi, P. Weidle, P. Dawson, S. Ellington

Background: During the 2022 U.S. mpox outbreak, cases occurred among cisgender and pregnant women but were not well characterized. Understanding the epidemiology of mpox among these populations is critical for mpox prevention.

Methods: We analyzed data on confirmed and probable mpox cases among cisgender women aged ≥ 15 years and pregnant women during May 11–November 7, 2022 based on case report data electronically reported to CDC by jurisdictional health departments. Additionally, we analyzed data on mpox cases among pregnant women reported to CDC through clinical consultations. We calculated descriptive statistics to characterize epidemiologic factors of mpox among cisgender and pregnant women.

Results: In total, 769 mpox cases were reported among cisgender women, representing 2.7% of reported U.S. cases. The median age was 32 years (range: 15–89 years). Among 717 cisgender women with available data, 313 (44%) were non-Hispanic Black, 182 (25%) were non-Hispanic White, and 167 (23%) were Hispanic/Latina. Of 73 cisgender women with complete data, 53 (73%) reported sexual contact as the likely exposure route. The most frequently reported symptom was rash (93%), most often reported on the legs (48%), arms (47%), and genitals (36%). Of the 769 cases among cisgender women, 23 were among pregnant women. Among 12 pregnant women with complete data, nine reported sexual contact as the likely exposure route. Rash was present in all pregnant women; four required hospitalization for pain or infection associated with rash, and all recovered.

Conclusions: Although cisgender women constituted $<3\%$ of reported cases, Black women may be disproportionately affected by mpox. Despite limited exposure data, reports of sexual activity and rash on the limbs and genital areas suggest a likely sexual route of transmission. Equitable mpox prevention efforts and messaging should include more emphasis on cisgender women and women of reproductive age who are at increased risk for mpox.

CONCURRENT SESSION B2: Chronic Disease and Health

11:15 am - 12:40 pm

Moderators: Karen Hacker and Sharyn Parks Brown

11:20 Prevalence and Control of Hypertension Among Women of Reproductive Age in a National Outpatient Electronic Medical Record Database

Authors: Xingran Weng, S. Park, R. Woodruff, S. He, A. Thompson-Paul, D. Hayes, E. Kuklina, N. Therrien, S. Jackson

Background: Hypertension, a key modifiable risk factor for cardiovascular disease, is a leading cause of death among women of reproductive age (WRA). However, hypertension is inadequately monitored among WRA. We addressed this surveillance gap by estimating national and state hypertension prevalence and control by using electronic medical record (EMR) data.

Methods: Hypertension, a key modifiable risk factor for cardiovascular disease, is a leading cause of death among women of reproductive age (WRA). However, hypertension is inadequately monitored among WRA. We addressed this surveillance gap by estimating national and state hypertension prevalence and control by using electronic medical record (EMR) data.

Results: Among 2,125,804 WRA (62.1% White, 8.8% Black, and 29.1% other races) with a mean age of 32, hypertension prevalence was 14.5%. Of those with hypertension, 71.9% had controlled BP. Black WRA had a higher overall prevalence (22.3% vs 14.4%; $P < .05$) but lower hypertension control (60.6% vs 74.0%; $P < .05$) versus White WRA. WRA from the South had the highest overall prevalence (17.5%; $P < .05$) but the lowest hypertension control (69.8%; $P < .05$) compared to other regions. State-level hypertension prevalence ranged from 13.7% in Massachusetts to 36.0% in Alabama, and hypertension control ranged from 59.2% in the District of Columbia to 82.9% in Kansas.

Conclusions: This study provides the first state-level estimates of hypertension control among WRA. The comprehensive clinical indicators in EMR data enable researchers to measure hypertension and control, and can help evaluate and guide efforts to prevent and manage hypertension among WRA.

MONDAY

11:40 Disparities in Lung Cancer Mortality by Sex, Race, Ethnicity, and Rural vs Urban Status — United States, 1999–2020

Authors: Christine M. Kava, D. Siegel, S. Sabatino, J. Henley

Background: Lung cancer is the leading cause of cancer deaths in the United States, but rural vs urban disparities have not been recently evaluated. We describe 2020 age-adjusted lung cancer mortality rates and examine sociodemographic trends.

Methods: We used 1999–2020 data from the National Vital Statistics System to describe age-adjusted lung cancer death rates in 2020 per 100,000 persons by sex, race, ethnicity, and rural vs urban status. We calculated the proportion of the overall 2020 lung cancer rural vs urban death rate difference and calculated average annual percent change (AAPC) in cancer death rates during 1999–2020 by rural vs urban status.

Results: Lung cancer accounted for 23% of all cancer deaths in 2020. The age-adjusted death rate for lung cancer was higher among males (38.05; 95% CI: 37.77–38.33) than females (26.93;

95% CI: 26.72–27.14). Lung cancer death rates by race and ethnicity were highest among Black, non-Hispanic males (45.57; 95% CI: 44.52–46.62). Lung cancer death rates were higher in rural vs urban settings among females (33.55; 95% CI: 32.94–34.15 vs 25.74; 95% CI: 25.51–25.96) and males (49.04; 95% CI: 48.26–49.82 vs 35.89; 95% CI: 35.59–36.19). When comparing all cancer deaths by setting, 44% of the rural vs urban difference in 2020 was from lung cancer. During 1999–2020, urban death rates declined more than rural rates for all cancers combined (AAPC: -1.7 vs -1.1), lung cancer (AAPC: -2.8 vs -1.7), and all cancers excluding lung (AAPC: -1.3 vs -0.9).

Conclusions: In 2020, lung cancer death rates were highest among males and in rural settings. Nearly half of the rural vs urban difference in death rates for all cancers combined was from lung cancer. Improvements in prevention, screening, and treatment among rural communities may reduce disparities in lung cancer mortality.

12:00 Cardiovascular Disease Mortality Rates by County-Level Poverty and Rural Status — United States, 2020

Authors: Ahlia Sekkarie, R. Woodruff, M. Casper, L. Schieb, A. Thompson-Paul, A. Vaughan

Background: Rural counties with high poverty, especially in the South, have the highest all-cause mortality rates, but it's unknown if disparities exist at the intersection of poverty and rurality for cardiovascular disease (CVD).

Methods: Age-standardized CVD mortality rates and rate ratios (RR) were calculated for adults 35–64 years in 2020 by rurality and poverty classification both nationally and by U.S. census region (Northeast, Midwest, South, West). We obtained county populations and CVD death counts (underlying cause of death ICD-10 codes I00–I99) from the National Center for Health Statistics. We classified counties by rural or urban status by using the U.S. Department of Agriculture Rural-Urban Continuum Codes (rural: codes 4–9; urban: codes 1–3), and by poverty level by using U.S. Census Small Area Income and Poverty Estimates (low: <15% population below poverty; high: ≥15%) to create 4 categories: high-poverty rural, high-poverty urban, low-poverty rural, and low-poverty urban (referent).

Results: Nationally, the CVD mortality rate was highest among high-poverty rural counties (183 deaths/100,000 population; 95% CI: 176–189), with a rate 1.64 (95% CI: 1.62–1.67) times that of low-poverty urban counties (111 deaths/100,000; 95% CI: 110–112). Low-poverty rural (RR: 1.22; 95% CI: 1.20–1.24) and high-poverty urban counties (RR: 1.48; 95% CI: 1.46–1.50) also had higher CVD mortality rates relative to low-poverty urban counties. Regionally, the largest disparity between high-poverty rural and low-poverty urban counties was in the South (RR: 1.91; 95% CI: 1.87–1.95), though this disparity also existed in the Midwest (RR: 1.68; 95% CI: 1.61–1.76), West (RR: 1.54; 95% CI: 1.45–1.63), and Northeast (RR: 1.36; 95% CI: 1.15–1.60).

Conclusions: CVD mortality is highest among high-poverty rural counties, with the largest disparity in the South. Documenting CVD mortality by poverty and rurality can guide geographically focused efforts to address these disparities.

12:20 Association Between Physical Activity and Mortality from Influenza and Pneumonia – United States, 1998–2018

Authors: Bryant J. Webber, G. Whitfield

Background: Current physical activity guidelines do not mention communicable disease prevention as a benefit of physical activity. We assessed associations of aerobic and muscle-strengthening physical activity with mortality from influenza and pneumonia, the ninth leading cause of death.

Methods: We conducted a longitudinal analysis of a nationally representative sample of U.S. adults from the National Health Interview Survey, 1998–2018. We classified participants as meeting the aerobic guideline only (≥ 150 minutes/week of moderate-intensity equivalent aerobic physical activity), the strength guideline only (≥ 2 episodes/week of muscle-strengthening activity), both guidelines, or neither guideline. From reported activity volume, we also grouped participants into five categories of aerobic and muscle-strengthening activity. Participants were followed for influenza and pneumonia mortality through 2019 via the National Death Index public-use linked mortality files. By using Cox proportional hazards regression and adjusting for sociodemographic and lifestyle factors, health conditions, and influenza and pneumococcal vaccination statuses, we calculated mortality hazard ratios (HR) with 95% confidence intervals (CI).

Results: Among 577,909 linkage-eligible participants followed for a median of 9.2 years, 1,516 influenza and pneumonia deaths occurred. Compared to participants who met neither physical activity guideline, those who met both guidelines had 48% lower adjusted risk of influenza and pneumonia mortality (HR: 0.52; 95% CI: 0.39–0.68). Relative to no aerobic activity and adjusting for muscle-strengthening activity, 10–149, 150–300, 301–600, and >600 minutes/week were associated with lower adjusted risk. Relative to <2 episodes/week of muscle-strengthening activity and adjusting for aerobic activity, 2, 3, and 4–6 episodes/week were associated with lower adjusted risk, whereas ≥ 7 episodes/week with higher adjusted risk.

Conclusions: Physical activity was associated with lower risk of influenza and pneumonia mortality among U.S. adults. This finding amplifies emerging data of the effects of physical activity on communicable diseases, which may warrant consideration in guideline updates.

SESSION C: J. Virgil Peavy Memorial Award

1:40 - 2:45 pm

Moderators: Chad Heilig and Anna Blackstock

1:45 School District Prevention Policies and Risk for COVID-19 Among In-Person K–12 School Educators — Wisconsin, 2021

Authors: Peter M. DeJonge, I.W. Pray, R. Gangnon, K. McCoy, C. Tomasallo, J. Meiman

Background: During Wisconsin’s 2021–2022 school year, K–12 schools had largely returned to in-person learning and implementation of COVID-19 mitigation policies differed across school districts. Health benefits of mitigation policies for adult K-12 educators, with an inherent occupational risk for COVID-19, are not well established. We compared COVID-19 risk among K-12 educators working in different school districts to assess protection against COVID-19 illness afforded by different mitigation policies.

Methods: We matched in-person K–12 educators (Wisconsin Department of Public Instruction) by name and birthday to COVID-19 cases occurring during September 2–November 24, 2021 (Wisconsin Electronic Disease Surveillance System) and COVID-19 vaccination status (Wisconsin Immunization Registry). Masking, physical distancing, and quarantine policies were ascertained using a national school district questionnaire distributed before the 2021–22 school year. A mixed-effects Cox proportional hazard model, adjusted for pertinent educator- and district-level covariates based on *a priori* assumptions, compared rates of COVID-19 among educators in districts with and without each mitigation policy.

Results: Among 51,997 educators, we linked 2,838 (5.5%) to a COVID-19 case (cumulative incidence of 5,458 cases/100,000 educators). In total, 40,526 (77.9%) educators had completed a full primary series of a COVID-19 vaccination by the start of school. Educators in school districts requiring masking for students and staff experienced a 19% lower hazard of COVID-19 than those in districts not requiring masking (hazard rate ratio: 0.81; 95% CI: .72–.92); this reduced hazard remained statistically significant after stratifying by elementary, middle, and high school educators. Physical distancing and quarantine policies were not significantly associated with reduced COVID-19 hazard.

Conclusions: Districtwide masking policies were associated with a significantly reduced risk for COVID-19 among in-person K-12 educators, a highly vaccinated group. Masking policies—a relatively simple, nonpharmaceutical intervention—should be considered an effective prevention tool during periods of high COVID-19 community transmission.

2:05 Text Classification for Foodborne Illness Outbreak Investigations Using Deep Learning

Authors: Mohammed A. Khan, K. Wong, L. Bottichio, M. Wise

Background: Annually, CDC investigates over 100 multistate foodborne outbreaks to rapidly identify a source and take actions to prevent illness. Collecting free-text food consumption information from jurisdictions allows CDC to receive data flexibly and quickly but is challenging to analyze systematically. We trained a model to automatically categorize food exposures from free text during multistate foodborne outbreaks.

Methods: We analyzed free-text data on food exposures provided to CDC by state and local jurisdictions during multistate outbreaks of *Salmonella*, Shiga toxin-producing *Escherichia coli*, and *Listeria* infections between January 2016 and May 2022. We manually categorized text observations into ≥ 1 of 47 food categories chosen for being: 1) a major source of foodborne illness in the United States and 2) included in standard foodborne outbreak hypothesis-generating questionnaires. Using cluster computing, we trained DistilBERT, a deep neural network language model, to predict food categories for each

free-text observation. Eighty percent of the data were used for model training and 20% were used to test performance of the trained model. Performance was measured using sensitivity, positive predictive value (PPV), and F1 score (a combination of sensitivity and PPV).

Results: We included 13,954 observations in training data and 3,488 in test data. Free-text observations in the training data had a median of 3 food categories (interquartile range: 1–8); chicken was the most common (45% of observations). The weighted average of sensitivity, PPV, and F1 across all food categories were 0.89, 0.90, and 0.89, respectively. Model performance varied by food category and ranged from near perfect for carrots (F1: 0.99) to poor for hot chili peppers (F1: 0.50).

Conclusions: Deep learning with neural network language models successfully categorized unstructured free-text food exposures. This could allow investigators to focus multistate outbreak investigations more rapidly on suspected foods.

2:25 Mpox Case Dynamics in Nonendemic Countries With and Without Vaccination Campaigns During 2022

Authors: Andrea Stewart, I. Spicknall, M. St. Louis, S. Bennett, J. Mermin, L.O. Durand

Background: During 2022, mpox was reported in multiple nonendemic countries in Europe and the Americas. We describe the trajectory of mpox outbreaks in these countries relative to the implementation and timing of vaccination campaigns.

Methods: Outbreak peak dates were derived from spline curves fit to data reported to the World Health Organization from countries with 80 or more cases and cumulative incidence greater than 1 per million population. The effective reproduction number (R_t) was estimated using the EpiEstim package in R. Post-peak transmission was defined as the average R_t value in the 8 weeks after the outbreak peak. The Wilcoxon rank-sum test was used to compare average post-peak R_t values between vaccine-implementing and non-implementing countries.

Results: We analyzed 76,022 mpox cases reported as of December 13, 2022, from 14 countries in Europe, Israel, the United States, Canada, and 7 countries in Latin America. The median average post-peak R_t value was 0.87 [inter-quartile range: 0.85–0.87] in 9 countries that implemented vaccines in late May–July 2022 before their peak, and 0.93 [inter-quartile range: 0.88–0.99] in the 12 countries that never vaccinated, a statistically significant difference. In 3 countries that implemented vaccines after their outbreak peak, the average R_t values after the peak were 0.71, 0.88, and 0.88, within the range of the values of early vaccinating countries.

Conclusions: Vaccination is a key strategy for reducing mpox morbidity for individuals at risk; there is currently limited information on its population-level effect. This is the first analysis of the population-level effect of mpox vaccine. Post-peak mpox transmission was modestly lower in countries that implemented vaccination in May–July than in countries that did not vaccinate. Other factors, including population behavior dynamics, case detection and reporting, or strength of other public health response measures, may have contributed to the observed difference.

CONCURRENT SESSION D1: Global Health

3:15 - 4:40 pm

Moderators: Carl Reddy and Kevin Clarke

3:20 Investigation of Covid-19 Transmission During the First Community Outbreak in a Remote Island Population – Falkland Islands, April–June 2022

Authors: Alice Wynne, P. Manley, N. Wright, R. Edwards, T. Bale

Background: After 2 years of zero Covid-19 transmission, the Falkland Islands (FI) reported their first community Covid-19 case in April 2022. Because of high vaccine coverage (88% of entire population), no specific control measures were instigated, and cases spread rapidly. We undertook a retrospective cohort study to determine the extent of transmission and the effectiveness of Covid-19 vaccine in an infection-naive population.

Methods: We extracted data on age, sex, and vulnerability for the FI registered population from a patient information system and linked to Covid-19 case line list and vaccination datasets. Cases were individuals with positive SARS-CoV-2 PCRs or lateral flow tests (LFDs) from 26 April to 30 June 2022. Univariable analyses compared case risk factors to non-cases. Relative vaccine effectiveness was calculated using Poisson regression with robust error variance, comparing against individuals without vaccination in the 20 weeks prior to the outbreak. Models were adjusted for age, sex, extreme vulnerability, and previous infection.

Results: Of the 3,343 registered population, 44% ($n = 1,467$) were cases, with no Covid-19 hospitalizations or deaths. In univariable analysis, being female (RR 1.12, $P = 0.004$) and under 18 years (RR 1.70, $P < 0.001$) were associated with increased Covid-19 risk. Relative vaccine effectiveness was 39.0% (95% CI, 1.03 to 62.5) and 33.0% (95% CI, 8.3 to 51.0) 2 to 9 weeks after receiving 2nd and 1st boosters, respectively.

Conclusions: We showed widespread transmission, disproportionately affecting children and women, indicative of transmission in educational and household settings. Despite limited natural immunity, our findings suggested that vaccination was effective protecting against severe disease, and booster doses provided additional short-term protection against infection. We would recommend optimizing coverage with boosters of vaccine in remote island populations such as FI. Follow-up would be needed to assess duration of protection after booster vaccination.

3:40 Nasopharyngeal Carriage of *Streptococcus pneumoniae* 5 Years After Pneumococcal Conjugate Vaccine Introduction — Southern Mozambique, October 2018–June 2019

Authors: Rebecca Kahn, B. Moiane, F. Lessa, S. Massora, V. Mabombo, A. Chauque, N. Tembe, H. Mucavele, C. Whitney, C. Sacoor, G. Matsinhe, F. Pimenta, M. Carvalho, B. Sigauque, J. Verani

Background: *Streptococcus pneumoniae* is an important cause of pneumonia, sepsis, and meningitis, which are leading causes of child mortality. Pneumococcal conjugate vaccines (PCVs) protect against disease and nasopharyngeal colonization with vaccine serotypes, reducing transmission among unvaccinated individuals (indirect effects). Mozambique introduced 10-valent PCV (PCV10) in 2013. In 2018–2019, 13-valent PCV (PCV13) replaced PCV10, and in September 2019, the schedule changed from three primary doses to two primary doses and a booster; the booster-containing schedule may increase indirect effects. We examined pneumococcal carriage in Mozambique to estimate the long-term impact of PCV10 in children aged <5 years and establish a baseline for estimating the impact of policy changes.

Methods: We calculated prevalence of carriage of PCV10-serotypes and the 3 additional PCV13 serotypes (‘PCV13-unique’) among a random sample of HIV-uninfected children aged <5 years and their household members in Manhiça, Mozambique, between October 2018 and June 2019.

Nasopharyngeal swabs were cultured, and isolates underwent Quellung serotyping. For children, we compared these “long-term post-PCV10” data with prior surveys (“pre-PCV” [2012–2013] and “post-PCV10” [2015–2016]) that used the same methods.

Results: Among 316, 348, and 646 children enrolled in the pre-PCV, post-PCV10, and long-term post-PCV10 studies, respectively, the prevalence of PCV10-type carriage was 36%, 13%, and 10%; prevalence of PCV13-unique carriage was 12%, 17%, and 17%. Among enrolled household members aged ≥5 years in the long-term post-PCV10 study, prevalence of PCV10-type and PCV13-unique carriage was 8% and 12% in children 5–17 years (n = 614), and 3% and 5% in adults ≥18 years (n = 804). 19A (98/1248, 8%) and 6A (65/1248, 5%), PCV13-unique serotypes, were the most common long-term post-PCV10 serotypes.

Conclusions: Despite substantial declines in PCV10-type carriage initially following vaccine introduction, the continued circulation of PCV10 serotypes and relative high prevalence of PCV13-unique serotypes underscore the need to understand the impact of policy changes on pneumococcus transmission.

4:00 Timing of Maternal HIV Diagnosis and Mother-to-Child Transmission in Harare City, Zimbabwe 2022: Implications for Pediatric HIV Elimination

Authors: Theresa Hamutyinei, C. Madembo, M. Mungati, P. Chonzi, T. Juru, A. Chadambuka, N. Gombe, G. Shambira, M. Tshimanga

Background: Zimbabwe has made significant progress towards elimination of Mother to Child Transmission (MTCT) of HIV from 30% transmission rate in 2005 to 6.9% in 2016. However, in 2020 Harare province had a MTCT rate of 11.4% which was highest among all 10 provinces and was above the 5% national target. We determined the factors associated with vertical transmission of HIV in Harare City.

Methods: We conducted a 1:2 unmatched case-control study where a case was defined as an HIV-positive mother whose child was infected by 18 months of age. We interviewed 62 cases and 124 health facility controls. We collected data on prepartum, intrapartum, postpartum, and service delivery factors using questionnaires and health facility and patient records. Multivariate logistic regression analysis was performed to identify independent factors for MTCT.

Results: The median age was 27 (IQR 24–34) years for cases and 30.5 (IQR 25–36) years for controls. More controls (71.8%) had their maternal HIV diagnosis prepartum compared to cases (45.2%). Sixteen percent of cases had their diagnosis postdelivery compared to 0.8% of controls. Thirty-two (51.6%) baby cases had acquired HIV by 6 weeks postpartum. Prepartum maternal HIV diagnosis was protective (OR = 0.32; 95% CI 0.17–0.61). Independent factors associated with MTCT were non-adherence to ART (aOR 14.57; [2.18–97.44]), non-availability of infant ARV prophylaxis (aOR 14.91; [2.83–78.83]), and having a treatment partner (aOR 0.27; [0.11 – 0.68]).

Conclusions: MTCT was associated with late maternal HIV diagnosis and non-adherence to ART, and interruptions to pediatric ART. Vertical transmission was high among babies whose mothers were diagnosed of HIV after conception and low among babies whose mothers had a treatment partner. This study highlights key intervention points in the acceleration of pediatric HIV elimination. We, therefore, recommend intensifying health promotion on prepartum testing for HIV, strengthening treatment support groups, and adequate stocking of pediatric ARVs.

4:20 COVID-19 Vaccination Coverage Among Persons Living With HIV in Zambia – Lusaka District, May 2022

Authors: Molly M. Valteau, M. Kalima, P. Minchella, J. Sampungwe, M. Hast, C. Toledo, N. Flowers, C. Mwale, F. Mwape, P. Phiri, S. Mwansa, M. Ndhlovu, J. Hines

Background: Achieving high COVID-19 vaccine coverage among persons living with HIV (PLHIV) is a priority due to increased risk of severe COVID-19. In May 2022, Zambia's national vaccine registry estimated that 8% of eligible PLHIV had received ≥ 1 vaccine dose compared to 31% in the general population; this may be underestimated as HIV status was self-reported. Our study aimed to determine vaccine coverage among PLHIV in Zambia.

Methods: We conducted a survey in 10 HIV clinics in Lusaka from April 12–May 10, 2022. A systematic random sample of PLHIV was selected proportional to clinic enrollment. For each PLHIV, we collected vaccination and demographic information from their electronic health record (EHR) or, if not available in their EHR, contacted them by phone to administer a standardized questionnaire (which also asked about reasons for not being vaccinated). We reported overall vaccine coverage and disaggregated by age and sex.

Results: Of 2,946 sampled PLHIV, we verified vaccination status for 1,512 (51.3%) (729 [24.7%] by registry and 783 [26.6%] by phone). Overall, 745 (25.3%) were fully vaccinated, and 224 (7.6%) were partially vaccinated; only 10 (1.3%) fully vaccinated persons had been boosted. There were no significant differences in coverage by sex. PLHIV aged 60+ years had the highest vaccination rate (≥ 1 dose) (46%). Among unvaccinated PLHIV, 32% planned to get vaccinated, 17% wanted additional information, and 51% refused vaccination. Fear of death was the most common reason for refusing. Only 28% of PLHIV with a matching vaccine record were correctly identified as HIV-positive in the registry.

Conclusions: In May 2022, most PLHIV in Lusaka were unvaccinated against COVID-19, although coverage was higher than the general population. Given ongoing epidemics of HIV and COVID-19 in Zambia, additional efforts to offer vaccination (including boosters) during routine HIV care could increase protection in this high-risk group.

CONCURRENT SESSION D2: Public Health Surveillance

3:15 - 4:40 pm

Moderators: Carolyn Greene and Tony Nguyen

3:20 Racial Diversity and Social Determinants of Health Among Hispanic/Latino Heterosexually Active Adults – 23 U.S. Cities, 2019

Authors: Valerie Madera-Garcia, L. Trujillo, A. Baugher, E. Respress, E. German, Y. Salabarría-Peña, S. Cha; National HIV Behavioral Surveillance Study Group

Background: The Office of Management and Budget (OMB) federal race/ethnicity data standard defines Hispanic/Latino ethnicity without accounting for racial identity. This standard treats Hispanic/Latino persons as a monolith and fails to account for heterogeneous racial identities. Social determinants of health (SDOH) can illuminate differences in health risks and outcomes, including HIV. This analysis compares SDOH among Hispanic/Latino and non-Hispanic/Latino heterosexually active adults (heterosexual adults) by racial identity.

Methods: We analyzed interview data from heterosexual adults participating in CDC's National HIV Behavioral Surveillance in 2019 from 23 U.S. cities. We used log-linked Poisson regression models to estimate adjusted prevalence ratios (aPRs; adjusted for city and recruitment chains) and 95% CIs to assess whether SDOH (education, employment, insurance status) differed between Hispanic/Latino and non-Hispanic/Latino heterosexual adults by racial identity (American Indian or Alaska Native [AI/AN], Black/African American [Black], White, and no racial identity selected [no race]). Participants reporting multiple races were excluded.

Results: Overall, 1,973 Hispanic/Latino adults (45% White, 31% Black, 9% AI/AN, 13% no race) and 7,553 non-Hispanic/Latino adults (7% White, 91% Black, <1% AI/AN, <1% no race) were included in this analysis. AI/AN Hispanic/Latino adults were less likely to be unemployed (aPR: 0.62; 95% CI: 0.40–0.97) than AI/AN non-Hispanic/Latino adults. Black Hispanic/Latino adults were more likely to have education beyond high school (aPR: 1.26; 95% CI: 1.10–1.44) than Black non-Hispanic/Latino adults. White Hispanic/Latino adults were less likely to have education beyond high school (aPR: 0.79; 95% CI: 0.65–0.96) and more likely to be uninsured (aPR: 1.43; 95% CI: 1.10–1.85) than White non-Hispanic/Latino adults.

Conclusions: We found significant differences in SDOH between Hispanic/Latino and non-Hispanic/Latino adults by racial identity. Revising the federal data standards to denote the racial diversity of Hispanic/Latino heterosexual adults might improve understanding of HIV epidemiology and racial disparities for targeted preventive interventions.

MONDAY

3:40 Encephalitis-Associated Hospitalizations — New York City, 2016–2021

Authors: Nang Thu Thu Kyaw, S. Slavinski, A. Abdool, H. Jordan, S. Ahuja

Background: Encephalitis is an inflammation of brain tissue that can cause life-threatening illness with substantial healthcare system burden. Encephalitis has multiple causes, and certain causes are preventable. Although encephalitis is reportable to the New York City (NYC) health department, only 58 cases were reported during 2016–2021. We used an alternate data source to investigate the burden, etiologies, and patient characteristics of encephalitis-associated hospitalizations in NYC during 2016–2021.

Methods: We extracted data concerning patient characteristics, diagnoses, and hospital stay from New York State’s Statewide Planning and Research Cooperative System, an all-payer healthcare claims reporting system. Hospitalized NYC residents with any encephalitis *International Classification of Disease-10, Tenth Revision* (ICD-10) codes were included. Data were summarized using counts, proportions, rates, medians, and interquartile range (IQR).

Results: We identified 6,023 encephalitis-associated hospitalizations among 4,813 NYC residents. Of these, 1,795 (30%) hospitalizations were coded as viral encephalitis, 317 (5%) as other infectious etiologies, 141 (2%) as postinfectious, and 3,761 (62%) as unspecified etiologies. For viral encephalitis hospitalization, 591 (33%) were attributable to herpes simplex virus, 196 (11%) herpes zoster, 58 (3%) varicella zoster, and 50 (3%) West Nile virus. Median length of hospital stay was 11 days (IQR: 6–23 days). Rates of encephalitis increased from 705 cases (8/100,000 persons) in 2016 to 999 cases (12/100,000 persons) in 2021, with the increase driven by unspecified etiologies. Among all patients, 2,472 (51%) were male, 1,604 (33%) were aged ≥ 65 years, 171 (3%) were aged < 1 year, and 477 (10%) had HIV.

Conclusions: Encephalitis was vastly underreported to the NYC health department during 2016–2021. Encephalitis disproportionately affected persons aged ≥ 65 years and most cases were of unknown etiology. ICD-10 code data can establish a baseline of encephalitis-associated hospitalizations.

4:00 SARS-CoV-2 Infection-Induced Antibody Seroprevalence in Previously Infected Persons with Immunocompromising Conditions — United States, 2020–2022

Authors: Anna Bratcher, J. Jones, A. Harris, K. Clarke

Background: People with immunocompromising conditions (IC) are at increased risk of severe COVID-19 and death. These individuals show weaker immunogenicity following vaccination than individuals without IC, yet immunogenicity after SARS-CoV-2 infection is poorly understood. To address this gap, the presence of infection-induced antibodies in sera following a positive COVID-19 test result was compared between people with and without IC.

Methods: Data were from CDC’s national commercial laboratory seroprevalence study, a repeated, cross-sectional survey that includes associated diagnostic codes and previous COVID-19 viral test results. Infection-induced antibody seroprevalence in sera from people with a positive COVID-19 test result was compared by IC status for three post-infection periods: 14–90 (early), 91–180 (mid), and > 180 (late) days. A logistic regression produced adjusted odds ratios (aOR) comparing infection-induced antibody prevalence among specimens with and without associated IC adjusted for age, sex, and infection-induced antibody assay used (Abbott Architect, Ortho VITROS, or Roche Elecsys).

Results: The analytic sample consisted of 15,554 specimens across the three periods (4,571 early, 4,465 mid, and 6,518 late). Of these, 188, 157, and 283 specimens had one or more associated, recorded IC, respectively. During the early period, 22.3% of specimens with IC lacked infection-induced antibodies compared with 6.8% of those without IC. After adjustment, specimens with IC were more likely to lack infection-induced antibodies in the early (aOR: 4.85; 95% CI: 3.20–7.38), mid (aOR: 2.53; 95% CI: 1.57–4.09), and late (aOR: 1.62; 95% CI: 1.12–2.36) periods compared to specimens without IC.

Conclusions: Sera from people with IC is less likely to contain infection-induced antibodies following SARS-CoV-2 infection compared to sera from those without IC within the studied periods. These findings stress the importance of prevention measures for people with IC, such as pre-exposure prophylaxis, additional vaccination doses, and consistent mask use before and after a documented infection.

4:20 Characteristics of Person-to-Person Outbreaks of Nontyphoidal *Salmonella* Infection, National Outbreak Reporting System – United States, 2012–2019

Authors: I. Griffin, B.B. Bruce, T. Eisenstein, M.E. Wikswo, E.B. Rose

Background: Nontyphoidal *Salmonella* is the most common cause of bacterial foodborne illness in the United States. We described characteristics of U.S. nontyphoidal *Salmonella* outbreaks associated with person-to-person (P2P) transmission compared with other routes.

Methods: We analyzed nontyphoidal *Salmonella* outbreaks reported to the National Outbreak Reporting System from 2012–2019. A confirmed outbreak was defined as ≥ 2 laboratory-confirmed cases of nontyphoidal *Salmonella* with a common exposure. We summarized characteristics of confirmed outbreaks by transmission route (P2P, foodborne, animal, environmental, and waterborne). We used univariable and multivariable logistic regression to estimate the odds of an outbreak being P2P compared with other modes of transmission for settings (restaurants, schools, long-term care facilities [LTCFs], private homes, and other settings), outbreak size, the proportion of illnesses in children (defined as persons aged <20 years), and proportion of illnesses with fever, bloody stools, and vomiting.

Results: Among 1,053 reported nontyphoidal *Salmonella* outbreaks, 116 (11.0%) were P2P, 819 (77.8%) foodborne, 116 (11.0%) animal contact, 2 (0.2%) environmental, and none waterborne. The estimated odds ratio of an outbreak being P2P compared with a different transmission mode was 1.3 (95% CI: 1.2–1.4) per 10% increase in the proportion of illnesses that occurred among children. In multivariable analyses, the estimated odds ratio of an outbreak being P2P compared with other modes was 7.5 (95% CI: 2.3–24.2) for schools and 3.9 (95% CI: 1.1–12.9) for LTCFs both compared with private homes adjusted for outbreak size, and proportion of illnesses with fever, bloody stools, and vomiting.

Conclusions: Among nontyphoidal *Salmonella* outbreaks, P2P transmission was associated with group settings and a high proportion of illnesses in children. Describing characteristics associated with P2P outbreaks may help efficiently identify and control them.

CONCURRENT SESSION E1: HIV and Sexually Transmitted Infections

9:00 - 10:45 am

Moderators: Leandro Mena and Katie Curran

9:05 Extended-Spectrum Beta-Lactamase *Shigella sonnei* Cluster Among Men Who Have Sex with Men – Chicago, Illinois, July–October 2022

Authors: Emily A.G. Faherty, K. Kling, C. Qi, S. Altman, V.K. Dhiman, R. Teran, K. Anderson, S. Smith, M. Richardson, K. Vogelzang, I. Ghinai, J. Kerins, P. Ruestow, L.F.K. Watkins, N. Logan, M. Pacilli, S. Black

Background: In August 2022, Chicago Department of Public Health (CDPH) was notified of 3 cases of multidrug-resistant *Shigella sonnei*. Men who have sex with men (MSM) face increased risk of sexually transmitted multidrug-resistant shigellosis. We investigated and characterized extended-spectrum beta-lactamase (ESBL) *Shigella* cases in Chicago and among Chicago travelers to understand transmission and potential prevention.

Methods: Using state surveillance data, we identified shigellosis cases in Chicago residents during July 1–October 31, 2022. We identified *Shigella sonnei* isolates with reported cephalosporin resistance with antimicrobial susceptibility testing (AST) and identified ESBL genes in whole genome sequencing (WGS) at the state laboratory. Patients were interviewed about demographics and exposures; clinical outcomes were confirmed in state surveillance data. We identified related out-of-state ESBL cases with epidemiologic links to Chicago by WGS data in the System for Enteric Disease Response, Investigation, and Coordination (SEDRIC).

Results: Among 84 *Shigella* infections identified in Chicago, 27 (32%) had AST and 40 (48%) had WGS results. We identified 5 ESBL cases. Patients were males aged 24–38 years. Four (80%) were non-Hispanic White MSM. Of these, 3 attended a LGBTQ festival before symptom onset in August 2022; all 3 patients' isolates contained identical resistance genes, were cephalosporin and macrolide resistant on AST, and were part of a multistate cluster in SEDRIC. This cluster included 4 additional patients who traveled to Chicago before symptom onset; 3 attended the same LGBTQ event, and 2 were hospitalized.

Conclusions: We identified the first cluster of ESBL shigellosis among MSM in Chicago after a LGBTQ festival, including 6 local and out-of-state patients. Increased awareness of sexual transmission risk and shigellosis prevention among MSM is important, particularly before events with transmission potential. We found limited AST use, suggesting need for greater provider awareness of ESBL *Shigella* incidence and importance of AST to guide treatment.

9:25 Self-Rated Health and HIV Outcomes Among Adults with Diagnosed HIV – Medical Monitoring Project, United States, 2019–2020

Authors: Preetam A. Cholli, K. Buchacz, N. Harris, Y. Tie, S. Crim, L. Koenig, L. Beer

Background: The National HIV/AIDS Strategy (NHAS) outlines national priorities for ending the U.S. HIV epidemic. Recently, NHAS added self-rated health (SRH) as an indicator of progress towards national quality of life (QoL) goals for people with HIV (PWH). Because little is known about how SRH relates to outcomes among PWH, we evaluated associations between SRH and key HIV care outcomes using representative data on U.S. adults with diagnosed HIV.

Methods: We analyzed interview and medical record data collected during June 2019–May 2020 from the Medical Monitoring Project, a complex, nationally representative sample of 4,081 PWH. Participants were asked to rate their health (SRH) on a 5-point Likert scale (poor to excellent), which we dichotomized into 2 categories (“good to excellent,” “poor or fair”). We computed weighted percentages and unadjusted prevalence ratios (PRs) to investigate associations between SRH and outcomes, including missed HIV clinic appointments (past

12 months), 100% antiretroviral therapy (ART) adherence in the last 30 days, and sustained viral suppression (all HIV viral loads in last 12 months <200 copies/mL or undetectable).

Results: Nationally, 29.4% of PWH reported “poor or fair” SRH. Persons with “poor or fair” SRH were more likely to miss HIV clinic appointments (PR: 1.49; 95% CI: 1.33–1.66) than PWH with “good to excellent” SRH and were less likely to be 100% ART-adherent (PR: 0.89; 95% CI: 0.83–0.96) and have sustained viral suppression (PR: 0.85; 95% CI: 0.80–0.91).

Conclusions: PWH with “poor or fair” SRH were more likely to have poorer HIV care outcomes, underscoring the importance of holistically assessing and addressing factors affecting health during HIV medical visits to improve the health and QoL of PWH. PWH with “poor or fair” SRH might face unique challenges that should be considered when designing strategies to advance NHAS objectives and improve HIV outcomes.

9:45 Incidence of Primary and Secondary Syphilis Among American Indian and Alaska Native Persons – Oregon, 2015–2021

Authors: Ethan Bornstein, A. Hoover, S. Joshi, T. Martin, L. Drach, L. Bush, R. Leman, T. Weiser

Background: Acquired primary and secondary (P&S) syphilis, which are the most infectious stages, and congenital syphilis (CS) diagnoses are increasing in Oregon. Disease burden among American Indian and Alaska Native (AI/AN) persons is frequently underestimated because of racial misclassification. The Northwest Tribal Epidemiology Center used Oregon Health Authority (OHA) sexually transmitted infection (STI) data and Northwest Tribal Registry (NTR) data to characterize incidence of syphilis more accurately among AI/AN and non-AI/AN in Oregon.

Methods: Using probabilistic record linkage (by name, birthdate, and sex) between NTR and OHA STI datasets, we reclassified AI/AN race for state records of P&S syphilis, during 2016–2021 to include AI/AN persons listed in the NTR, who previously self-identified as non-Hispanic AI/AN alone or AI/AN in any combination. Cumulative incidence rates and 3-year average annual incidences were calculated to examine P&S syphilis incidence by race, age, and sex. U.S. Census Bureau bridged race population estimates from 2020 were used as denominators to calculate AI/AN- and non-AI/AN-specific rates.

Results: During 2015–2021, we identified 91 P&S cases among AI/AN. Race reclassification identified 22 cases, which increased ascertainment by 24%. AI/AN P&S syphilis incidence increased from 12.2/100,000 persons to 22.8/100,000 persons, compared with 8.6/100,000 persons to 9.9/100,000 persons among non-AI/AN. Among females of all ages, during 2019–2021, 3-year rolling average P&S syphilis incidence among AI/AN (19.1/100,000 persons) was ~3.5-fold higher than among non-AI/AN (4.5/100,000 persons). The highest 6-year cumulative P&S syphilis incidences were among AI/AN aged 25–34 years (58.9/100,000 persons) and 35–44 years (47.7/100,000 persons).

Conclusions: We demonstrated wide disparities in incidence of P&S syphilis diagnoses among AI/AN persons, including females and persons of reproductive age. To prevent further syphilis transmission, increased screening, diagnosis, treatment, and culturally guided prevention efforts should be considered, particularly for females of childbearing age in Oregon AI/AN communities.

10:05 Reporting Late Clinical Manifestations of Syphilis — Louisiana, 2018–2022

Authors: Sarah B. Wondmeneh, K. Hufstetler, J. Fridge, M. Rahman, S. Euraque, E. Torrone, D. Jackson

Background: Late clinical manifestations of syphilis (LCM) develop in ~25%–40% of persons with prolonged untreated infection and can result in disability or death. In 2018, CDC began collecting LCM case data using an updated case definition that requires a revised combination of clinical and laboratory information to identify LCM. To inform LCM surveillance, we evaluated Louisiana’s use of the revised case definition in LCM reporting.

Methods: We reviewed all LCM cases reported during January 2018–June 2022 in Louisiana’s surveillance information system (PRISM) and selected a purposeful sample: 1) LCM cases with any supporting clinical and laboratory evidence of meeting the revised case definition, and 2) a random sample of LCM cases without supporting evidence. We verified whether sampled cases met the revised case definition by abstracting clinical and laboratory information from medical records using a structured tool. To understand reporting challenges, we conducted structured interviews with surveillance staff.

Results: PRISM records review demonstrated that supporting evidence can only be identified in optional notes fields or the laboratory section and was infrequently documented. Of 132 LCM cases in PRISM, 8 (6%) had enough supporting evidence to meet the case definition, 32 (24%) had some supporting evidence, and 92 (70%) had no supporting evidence. Among sampled cases with available medical records, 44% (12/27) of cases with any supporting evidence in PRISM met the case definition, compared with none (0% [0/5]) of those without supporting evidence. Difficulties accessing medical records and limited staffing to conduct case investigations were identified as reporting challenges.

Conclusions: Based on medical record review, many LCM cases reported to CDC did not meet the revised case definition, potentially biasing burden estimates and limiting LCM case data utility. Capturing supporting evidence in structured fields in PRISM and improving medical record access might improve data quality and reporting accuracy.

10:25 HIV Clusters Among Hispanic or Latino Gay, Bisexual, and Other Men Who Have Sex with Men — Metropolitan Atlanta, Georgia, 2021–2022

Authors: David C. Philpott, C. Saldana, D. Mauck, R. Hershow, E. Garlow, J. Gettings, D. Freeman, A. France, K. Reed, A. Ajmal, R. McClung, V. Cantos, A. Sulka, A. Arona, D. Holland, J. Scott, A. Oster, K. Curran, R. Hassan, P. Wortley

Background: Between February 2021–June 2022, the Georgia Department of Public Health (GDPH) detected multiple HIV clusters centered among Hispanic or Latino gay, bisexual, and other men who have sex with men (HLMSM) in metropolitan Atlanta. In spring 2022, after continued cluster growth, GDPH, local health districts, and CDC investigated these clusters and assessed barriers to accessing HIV care and prevention to inform response activities.

Methods: By analyzing HIV-1 nucleotide sequences obtained through routine surveillance, GDPH routinely identifies clusters of highly similar HIV sequences, consistent with rapid HIV transmission in a sexual or social network. We analyzed HIV surveillance data for persons in clusters with at least 40% HLMSM and conducted qualitative interviews with a purposeful sample of 65 service providers and 29 HLMSM community members.

Results: By June 2022, these 5 clusters included 75 persons with HIV (cluster size: 4–45 persons); 56% of persons identified as Hispanic or Latino, 96% were male sex at birth, 81% reported male-to-male sexual contact, and 84% resided in Atlanta. Eighty-five percent of persons had HIV viral load <200 copies/mL in the previous 12 months, indicating viral suppression through HIV antiretroviral therapy. Interview participants identified the following barriers to accessing services: few Spanish-speaking staff, limited Spanish-language materials, immigration-related concerns, HIV- and sexuality-related stigma, low awareness of HIV prevention and treatment, limited HIV services in primary and urgent care settings, and limited HLMSM-focused community outreach and marketing.

Conclusions: HLMSM in metropolitan Atlanta faced barriers to accessing HIV services that might have led to missed opportunities for HIV prevention, testing, and linkage to care and contributed to rapid transmission. Based on investigation findings and recommendations, GDPH and the health districts initiated culturally concordant HIV prevention marketing and education, developed partnerships with organizations serving Hispanic or Latino communities, and created a bilingual patient navigation program.

CONCURRENT SESSION E2: Environmental Health

9:00 - 10:45 am

Moderators: Robin Ikeda and Andrea Winquist

9:05 Community Assessment for Public Health Emergency Response (CASPER) – 2022 Eastern Kentucky Floods

Authors: Oshea Johnson, D. Thoroughman

Background: On July 28, 2022, eastern Kentucky experienced devastating floods, leaving 40 people dead and >600 persons displaced. Given the flood's large geographical distribution, we conducted 2 Community Assessment for Public Health Emergency Response (CASPER) surveys to assess health and wellbeing of affected communities, support recovery efforts, and guide preparedness for future disasters in Kentucky.

Methods: During September 6–9, we conducted 2 CASPER surveys, each involving 4 counties. Households were randomly selected using published multistage sampling methodology. The questionnaire assessed community preparedness, recovery efforts, and health effects from the flood. Weighted cluster analyses were conducted to provide survey-wide estimates of household variables.

Results: We interviewed 193 households in the first survey and 194 in the second for a completion rate of approximately 90% each. In each CASPER survey, among households that evacuated, 60% and 69% evacuated during the flood. Approximately 42% and 57% of households in each CASPER survey learned about the flood by seeing the water rising around them. Social media and online news were main sources for health or clean-up communications, but 10% and 15% of households reported no internet and cellular service since the flood. Approximately 31% and 41% of households across each CASPER survey reported experiencing 1 or more mental health issue since the flood, and 69% and 62% of households in each CASPER survey preferred to receive mental health services in-person and locally.

Conclusions: Approximately half of households became aware of the flood only as the water started rising, suggesting they were unprepared to evacuate. Although social media and online news were main information sources, up to 15% of households lacked internet and cellular service. Increasing internet and cellular service in these affected regions could reach more affected households before and after a natural disaster. Mental health services should be deployed in-person and locally.

9:25 Acute Kidney Injury Cluster of Unknown Etiology Among Children – The Gambia, June–October 2022

Authors: Parsa Bastani, A. Jammeh, F. Lamar, J. Malenfant, P. Adewuyi, A. Cavanaugh, K. Calloway, C. Crisp, N. Fofana, T. P. Hallet, A. Jallow, M. Nyassi, J. Thomas, A. Troeschel, E. Yard, M. Yeh, M. Bittaye

Background: In July 2022, a pediatric nephrologist from the country's sole teaching hospital notified The Gambia Ministry of Health (MoH) of a cluster of acute kidney injury (AKI) cases among young children. The baseline AKI rate is unknown. Shiga toxin-producing *E. coli* (STEC) and drug toxicity were suspected. We investigated to enumerate cases, characterize symptoms, and identify exposures.

Methods: Cases were defined as acute onset anuria of unknown etiology that persisted ≥ 24 hours in children ≤ 8 years with onset between June 21 and October 7, 2022. The MoH line list was reviewed to determine if the case definition was met. We reviewed medical records and interviewed patients' caregivers to characterize symptoms and identify exposures.

Results: Seventy-five AKI cases in 6 of 7 health regions of The Gambia met the case definition (85% case-fatality rate). Most patients were < 2 years of age (75%) and male (63%). Among 52 (69%) patients with medical records available, predominant documented symptoms were fever (100%), vomiting (95%), diarrhea (73%), and difficulty breathing (34%); bloody diarrhea (2%) was uncommon. Most patients had mild or moderate anemia (68%) and elevated platelet counts (68%). Among the 26 patients with a completed caregiver interview, 12% had contacts with other household children who also fell ill. All 26 (100%) patients consumed a syrup-based children's medication before experiencing anuria.

Conclusions: The geographic spread of AKI and common medication use among patients are more consistent with a toxic etiology, potentially through contaminated medications. It is unlikely that the AKI cases were STEC-related, given the elevated platelet counts and low proportion of severe anemia, bloody diarrhea, and intrahousehold spread among cases. Enhanced AKI surveillance, active case-finding, and a pharmaceutical quality investigation would be helpful to further evaluate the trend and etiology of the outbreak.

9:45 Melioidosis Cluster Linked to Environmental *Burkholderia pseudomallei* Isolates – Gulf Coast, Mississippi, 2020 and 2022*

Authors: Julia K. Petras, M. Ty, M. Elrod, J. Gee, C. Kolton, E. Saile, R. Tiller, R. Stoddard, P. Dawson, K. O'Laughlin, J. Hanson, C. Boutwell, G. Ainsworth, D. Ware, T. Sokol, G. Balsamo, K. Taylor, J. Salzer, W. Bower, Z. Weiner, M. Negron, A. Hoffmaster, P. Byers

Background: Melioidosis is caused by the environmental bacterium *Burkholderia pseudomallei*, endemic to tropical and subtropical regions, but has previously never been isolated in continental US soil or water. From 2020 through 2022, the CDC and Mississippi State Department of Health (MSDH) were notified of 2 melioidosis patients from the same Gulf Coast Mississippi county. The patient isolates were clonal, indicating a shared exposure. From May–July 2022, CDC and MSDH conducted a joint investigation to identify the source of melioidosis.

Results: Both patients denied travel history to a known melioidosis-endemic region, however, some potential common exposures were identified, such as freshwater fishing. *B. pseudomallei* was isolated from 2 soil samples and 1 surface water sample from the property of patient 1. Whole genome sequencing revealed that the environmental isolates and clinical isolates from both patients were identical and were a novel western hemisphere *B. pseudomallei* strain. Serology was negative for all household members except for the spouse of patient 2.

Conclusions: Both patients most likely acquired melioidosis through exposure to their local environment in Mississippi. This is the first environmental isolation of *B. pseudomallei* in the continental U.S. Melioidosis is now considered locally endemic to the Mississippi Gulf Coast region and is likely endemic in other Gulf Coast states where environmental conditions are predicted to be suitable for *B. pseudomallei*.

* Singal Finalist

10:05 Serum Concentrations of Per- and Polyfluoroalkyl Substances and the Risk of Prostate Cancer Subtypes — United States, 1998–2015 *

Authors: Alyssa N. Troeschel, J. Hodge, L. Teras, WR. Diver, J. Rodriguez, J. Daniel, A. Winquist

Background: Per- and polyfluoroalkyl substances (PFAS) are ubiquitous, environmentally persistent chemicals with evidence of carcinogenicity. Previous studies investigating PFAS and prostate cancer yielded mixed findings but did not consider potential heterogeneity by tumor grade. We investigated associations between PFAS exposure and incident prostate cancer, considering tumor grade, in a cohort of U.S. men.

Methods: We conducted a case-cohort study among Cancer Prevention Study-II LifeLink Cohort participants who, at baseline (1998–2001), had serum specimens collected and no prior cancer diagnosis. The study included all men diagnosed with prostate cancer ($n = 1610$) during follow-up (baseline–June 30, 2015) and a random sub-cohort of 500 men. Prostate cancers were classified, using Gleason's scores (GS) as low-grade ($GS < 7, n = 772$), intermediate-grade ($GS = 7, n = 488$), and high-grade ($GS > 7, n = 240$). PFAS concentrations [perfluorohexane sulfonic acid (PFHxS), perfluorooctane sulfonate (PFOS), perfluorononanoic acid (PFNA), and perfluorooctanoic acid (PFOA)] were measured in stored serum specimens. We used

multivariable Cox proportional hazards models to estimate associations between PFAS concentration and prostate cancer, overall and by grade category, using hazard ratios (HR) and 95% CIs, adjusting for age, blood draw year, race/ethnicity, education, alcohol consumption, and smoking status.

Results: HRs comparing prostate cancer incidence in men with concentrations in the highest vs. lowest quartiles (Q4 vs. Q1) were as follows: PFHxS: 1.18, 95% CI: 0.88–1.59; PFNA: 1.05, 95% CI: 0.77–1.41; PFOA: 0.93, 95% CI: 0.69–1.25; and PFOS: 1.18, 95% CI: 0.89–1.58. The Q4 vs. Q1 HRs for PFHxS and PFOS were slightly higher for low- and high-grade than for overall prostate cancer. No associations were observed for intermediate-grade prostate cancer.

Conclusions: Findings do not provide clear support for an association between PFAS and prostate cancer, overall or when considered by grade category, in this cohort.

*Singal Finalist

10:25 Elevated Spot Urine Thallium Levels Within a Family Associated with Kale Chip Consumption — Central California, August 2022 (Singal Finalist)

Authors: Asha Choudhury, J. Fowles, T. Barreau, R. Bartlett

Background: Thallium is a toxic, tasteless, odorless metal. Exposure can occur through skin contact, inhalation, or ingestion. Studies guiding threshold intake associated with adverse health outcomes are limited; the U.S. Environmental Protection Agency (EPA) reference dose of 0.05 $\mu\text{g}/\text{kg}/\text{day}$ was withdrawn in 2009. The Food and Drug Administration (FDA) has no established action levels for thallium in food. In August 2022, the California Department of Public Health (CDPH) was alerted to elevated spot urine thallium levels within a family. The mother was tested in February 2022 after reporting hallmark symptoms of peripheral neuropathy, gastrointestinal irritation, and hair loss. Urine thallium was measured at 0.8 $\mu\text{g}/\text{g}$ creatinine; reference concentrations per NHANES are ≤ 0.4 $\mu\text{g}/\text{g}$ creatinine (adults) and ≤ 0.8 $\mu\text{g}/\text{g}$ creatinine (children aged 3–5 years). In July, her level had risen to 5.6 $\mu\text{g}/\text{g}$ creatinine, and her 3 children had levels between 1.5–9.7 $\mu\text{g}/\text{g}$ creatinine. The father's urine thallium remained normal throughout. We conducted an investigation to identify the source of exposure.

Methods: We interviewed the family about possible sources of thallium exposure. EPA staff joined the home visit and sampled indoor air and surface dust, soil, well water, and imported bottled water. CDPH tested potential dietary sources using mass spectrometry. We monitored repeat urine testing of the family.

Results: Environmental testing was unremarkable. Interviews revealed that mother and children regularly consumed kale chips, whereas the father avoided this snack. Two separately sourced samples of commercially available kale chips contained thallium at ~ 2 ppm; consumption of one 28-gram serving/day of these chips would result in a dose of ~ 3 $\mu\text{g}/\text{kg}/\text{day}$. After the family stopped consuming the kale chips, their urine levels normalized, and symptoms improved.

Conclusions: Thallium from the kale chips might explain the family's elevated urine levels and symptoms. FDA is investigating the source of kale chip contamination.

CONCURRENT SESSION F1: Respiratory Diseases

1:20 - 2:45 pm

Moderators: Sam Posner and Jennifer Liang

1:25 Acute Respiratory Illness and Acute Flaccid Myelitis Associated with Enterovirus D68 Infection Among Children – United States, 2022

Authors: Kevin C. Ma, A. Winn, H. Moline, H. Scobie, C. Midgley, H. Kirking, J. Adjemian, K. Hartnett, D. Johns, J. Jones, A. Lopez, X. Lu, A. Perez, C. Perrine, A. Rzucidlo, M. McMorrow, B. Silk, Z. Stein, E. Vega, New Vaccine Surveillance Network Collaborators, A. Hall

Background: Enterovirus D68 (EV-D68) infections can lead to acute respiratory illness (ARI), severe asthma exacerbations, and acute flaccid myelitis (AFM), a serious paralytic illness. EV-D68 circulation and AFM peaked in 2014, 2016, and 2018, but not 2020. Enterovirus subtyping and reporting are not routine, hindering EV-D68 surveillance. Following reports of pediatric ARI hospitalizations in summer 2022, we analyzed data from three surveillance systems to evaluate trends in EV-D68 infection and disease, including asthma exacerbations and AFM.

Methods: We analyzed (a) positive EV-D68 tests among children aged <18 years during 2017–2022 in the New Vaccine Surveillance Network, a pediatric ARI sentinel system; (b) emergency department (ED) visits associated with asthma/reactive airway disease (RAD) among children aged <5 years during 2018–2022 in the National Syndromic Surveillance Program, comprising data from 71% of U.S. EDs; and (c) AFM cases reported to CDC during 2014–2022. Trends were assessed using Mann-Kendall tests and increases relative to historical baselines were assessed using *t*-tests.

Results: In 2022, the percentage of children with EV-D68 positive ARI increased through summer from 0% (0/191) in week 19 to 16% (33/201) in week 33 ($P < .001$); in 2018, the percentage peaked at 28% (57/205) by week 37. Concurrently, in 2022 the percentage of ED visits by young children with asthma/RAD was higher weeks 29–37 compared with the corresponding weeks in 2018–2021 ($P < .01$). By week 37, the percentage reached the highest level observed since 2018 (4.7%; 4,231/90,657). The number of AFM cases in 2022 (30) was consistent with non-peak years (22–38) versus peak years (120–238).

Conclusions: Analysis of data from multiple systems identified increases in pediatric EV-D68 infections and asthma exacerbations, without concomitant AFM increases, during late summer 2022. This study highlights the value of integrated, multi-platform approaches for detecting circulation of emerging pathogens.

1:45 Highly Pathogenic Avian Influenza Enhanced Surveillance Program — Nebraska, 2022

Authors: Lauren Jansen, B. Loeck, N. Smith, S. Koirala, J. Frederick, C. Wetzel, H. Giambrone, T. Litz, L. Dayne, J. Sison, D. Bumgardner, K. Schultis, A. Carlson, C. Wolinski, M. Donahue, B. Buss

Background: Salmonellosis is an illness caused by infection with the bacteria *Salmonella*; common symptoms include diarrhea, fever, and abdominal cramping. On December 19, 2022, the Nebraska Department of Health and Human Services (NDHHS) received a report of a salmonellosis cluster from the Douglas County Health Department (DCHD). We initiated a collaborative, multijurisdictional investigation to identify the infection source and prevent additional illnesses.

Methods: We reviewed laboratory-confirmed salmonellosis cases occurring during December 2022 in Nebraska. We interviewed ill persons to elicit possible sources of exposure and medical records were reviewed. *Salmonella* isolates underwent whole genome sequencing (WGS), performed by Nebraska Public Health Laboratory. Preliminary traceback was conducted by NDHHS and DCHD.

Results: Twenty-two cases were identified, with illness onset dates during December 5–28. Patients had a median age of 41 years (range: 1–78 years); 15 (68%) were female. Five (23%) were hospitalized; no deaths were reported. Alfalfa sprout consumption was reported by 17 (77%) patients. The outbreak serotype was found to be *Salmonella* Typhimurium. Isolates from 21 cases had WGS matching within 0–2 alleles, suggesting a common exposure source. Preliminary traceback of alfalfa sprouts from patient-reported grocery stores and restaurants revealed the sprouts were produced by 1 Nebraska grower. Two restaurants known to have served affected sprouts were advised to discontinue their use on December 20. An NDHHS press release was distributed on December 23, warning state residents of the outbreak and to avoid sprout consumption. Four lots of alfalfa sprouts were recalled by the single Nebraska grower on December 29.

Conclusions: We confirmed an outbreak of *Salmonella* Typhimurium associated with alfalfa sprouts grown in Nebraska. Rapid epidemiologic investigation enabled timely identification of the outbreak source and implementation of control measures.

2:05 Regional Declines in Rates of Legionnaires' Disease Cases During the COVID-19 Pandemic — United States, January 2020–December 2021

Authors: Lindsay Zielinski, G. Derado, C. Edens

Background: Since 2003, Legionnaires' disease (LD) cases have increased, reaching 8,871 cases in 2019; with burden highest in the Northeast and lowest in the West. In 2020, during the COVID-19 pandemic, reported cases declined precipitously. To describe this trend, we compared modeled expected case rates for 2020 and 2021 with observed values.

Methods: Utilizing National Notifiable Diseases Surveillance System data, LD incidence rates for 2020 and 2021 were predicted using a negative binomial regression model based on trends from 2011–2019. Census data were used to determine population counts. Relative differences in observed and predicted incidence rates were calculated nationally and by census region. Data for 2020 and 2021 were provisional.

Results: In 2020, there were 1.91 cases per 100,000 population nationally, 40% lower than the predicted rate of 3.18 (CI 2.81,3.61). This decline was greatest in the Northeast, which observed 2.73 cases per 100,000, 43% lower than predicted (4.79 [CI 3.81,6.02]). In the West, the rate was 35% lower than predicted (0.98 from 1.51 [CI 1.22,1.86]). In 2021, cases were 29% lower than predicted for the year (2.50 cases per 100,000, 3.54 predicted [CI 3.06,4.10]). The greatest difference occurred in the South, with 1.76 cases per 100,000, which was 41% fewer cases than predicted (3.00 [CI 2.59,3.48]). The 2021 rate in the Northeast was only 23% lower than predicted (3.95 from 5.14 [CI 3.94,6.70]).

Conclusions: In 2020, there was a steep drop in rates of LD cases that differed by census region. The Northeast experienced the greatest difference in observed case rates compared to predicted values for 2020, followed by the lowest difference in 2021. Case rates rebounded in 2021 but were still lower than predicted. Further analysis is ongoing to determine if decreased surveillance, mask mandates, and widespread movement restrictions may have contributed to the drop in cases.

2:25 Adenovirus Outbreak at a University Campus — South Carolina, 2022

Authors: Marco E. Tori, J. Chontos-Komorowski, D. Lamson, K. St. George, H. L. Kirking, C. H. Hsu

Background: Adenoviruses can cause flu-like illnesses that mimic other respiratory viruses. We investigated a respiratory disease outbreak on a university campus during January 2022–May 2022 (as COVID-19 mitigation was being lifted) to understand transmission and implement mitigation measures.

Methods: We included students positive for adenovirus by multiplex testing at the student health center. We collected demographic and clinical information through medical chart review and interviews. We compared symptoms and infection severity between students infected by adenovirus-only and those with respiratory coinfections. Adenoviruses were typed by sequence analysis of partial hexon gene. Campus SARS-CoV-2 case numbers were compared with those of adenovirus.

Results: We identified 195 students with adenovirus infections; 30 of 30 typed specimens were adenovirus type 4, suggesting a single viral strain. Most students were underclassmen (n = 134; 69%) residing in campus dormitories (n = 115; 59%). Most common symptoms included sore throat (n = 166; 85%), cough (n = 149; 76%), and fever (n = 146, 75%). Through interviews (n = 96), 19 (20%) reported attending social events; 27 (28%) reported contact with someone with adenovirus infection or similar illness. We detected respiratory viral coinfections in 43 (22%) students; clinical severity was similar to adenovirus-only infections (P = .07). During the outbreak, 588 student cases of SARS-CoV-2 were identified. Eight (4%) students experienced adenovirus and SARS-CoV-2 coinfection. No hospitalizations or deaths occurred.

Conclusions: This investigation demonstrates that other respiratory viruses, including adenovirus, cause significant illness and outbreaks in university settings during SARS-CoV-2 circulation. Use of multiplex respiratory testing differentiated this outbreak from other circulating viruses, prompting more specific infection prevention measures for the campus community. Most infections occurred among those living in dense quarters, highlighting challenges of outbreak mitigation on campus when respiratory and social precautions enacted during the COVID-19 pandemic were lifted.

CONCURRENT SESSION F2: Occupational Health & Safety

1:20 - 2:45 pm

Moderators: Casey Chosewood and Ethan Fechter-Leggett

1:25 Tickborne Disease Perceptions and Prevention Opportunities Among Largely Foreign-Born Outdoor Workers – New Jersey, 2022*

Authors: Amy M. Beeson, N. Mandujano, S. Prager, M. Towle, B. Alcauter, J. Ruiz, K. Cervantes, G. Keefer, E. Price, A. Rodriguez Lainz, C. Seman, A. Hinckley, G. Marx

Background: Occupational risk for tickborne diseases (TBDs) is poorly described for foreign-born outdoor workers (OWs) in the United States. We assessed workers' tick and TBD knowledge and experiences in New Jersey, where Lyme disease is endemic.

Methods: We partnered with local organizations to recruit workers from community, work, and housing sites in 3 counties during October–November 2022. We conducted surveys in Spanish, English, and Mam regarding work history, tick encounters, tick and TBD knowledge, prevention behaviors, and attitudes toward Lyme disease vaccination. We compared responses by work site (outdoor versus indoor) and outdoor industry using chi-square tests and computing odds ratios (ORs).

Results: We surveyed 259 workers; 93% reported birthplace outside the United States. OWs comprised 75% of participants, including construction ($n = 74$), landscaping ($n = 74$), and agricultural workers ($n = 37$). Seven participants, all OWs, reported prior TBD diagnoses. Among OWs, 26% recalled tick encounters in 2022, compared with 12% of non-OWs (OR: 2.5; 95% CI: 1.1–5.7). Compared with other OWs, landscapers reported more tick encounters (34%) (OR: 1.8; 95% CI: 0.96–3.5); landscapers also perceived higher likelihood of tick encounters at work ($P = .003$). While most OWs (80%) knew ticks spread disease, only 18% had heard of Lyme disease, and 15% recalled ever receiving tick bite prevention information from employers. Most (55%) were “somewhat” or “very” concerned about TBDs; 46% reported regular use of repellent, 43% performed tick checks, and 10% wore insecticide-treated clothing. Most OWs (67%) “probably” or “definitely” would get a Lyme disease vaccine if available; acceptance was lower for agricultural workers (49%) compared to other OWs (72%) ($P = .008$).

Conclusions: Foreign-born OWs, particularly landscapers, are at increased risk of TBDs and would benefit from focused prevention efforts, including tailored risk communication, education from employers, and future Lyme disease vaccination.

* Singal Finalist

1:45 Health Hazard Evaluations of Potential Occupational Cancer Clusters — United States, 2001–2020

Authors: Dallas S. Shi, S. Chiu, J. Rinsky, G. Grimes

Background: Cancer clusters, defined as a greater-than-expected number of cancer cases occurring within a group of people in a geographic area over a defined period, can be distressing for those affected. The National Institute for Occupational Safety and Health (NIOSH) Health Hazard Evaluation (HHE) Program routinely evaluates suspected workplace cancer concerns but rarely identifies unusual or excessive patterns of cancer or a cause. Our objective was to summarize workplace cancer concern HHEs over time to inform investigative approaches and provide context for communication with concerned parties.

Methods: We identified cancer concern HHEs (overall and by year) completed during January 1, 2001–December 31, 2020. We abstracted information on cancer sites, procedures, and investigator determinations about clusters (i.e., presence of excess cases, unusual distribution of cases, and exposures). We calculated frequencies and proportions for each characteristic.

Results: Of 5,754 HHEs, 175 included cancer concerns, comprising 1–5% of HHEs per year. Multiple cancer sites were reported in 124 (71%) HHEs. Investigation procedures varied but included record review (n = 63, 36%), interviews/questionnaire (n = 25, 14%), rate calculations (n = 14, 8%), and site visits (n = 22, 13%). Of 156 (89%) HHEs with a final determination, 150 (96%) did not meet the definition of a cluster. In 6 (4%) HHEs, investigators found evidence of a cluster but occupational exposure to a carcinogen was unknown or unclear.

Conclusions: The proportion of HHEs focused on workplace cancer cluster concerns has remained steady over time; most did not meet the definition of a cluster or uncover an occupational cause. Public health practitioners can use this information to refine investigative approaches, set expectations about the frequency of detecting occupational cancer clusters, and improve communication about the investigation process.

2:05 Global Rapid Response Team Deployer and Deployment Characteristics — United States, 2019–2022

Authors: Samantha L. Lammie, M. Habib, D. Bugli, J. Neatherlin, C. Watson, C. Dubray

Background: CDC's Global Rapid Response Team (GRRT) deploys agency staff to address public health threats worldwide. GRRT was created in response to the 2014–2016 Ebola outbreak and was intended to support field deployments addressing public health issues overseas. Prior reports document that 74% of GRRT person-days deployed took place outside the domestic United States from 2018–2019. The COVID-19 pandemic reinforced the need for effective emergency response surge capacity both abroad and domestically. We described deployer and deployment characteristics to assess GRRT's contribution to agency emergency response.

Methods: We analyzed attributes of rostered responders and deployments between April 1, 2019, and March 31, 2022. We included deployments of at least one day and assessed deployment trends by function, context (remote versus in-person), and location. Total person-days deployed and median deployment duration were calculated. Responder languages spoken and self-reported responder roles were also assessed.

Results: There were 1,808 deployments during the study period, 79% COVID-19-related, 17% related to other outbreaks, and 4% related to other emergencies, including conflicts and natural disasters. Domestic deployments accounted for 83% overall, and 50% of all deployments were remote. The total person-days deployed was 89,459, and the median deployment duration was 32 days. Among 884 rostered responders, epidemiology was the most common self-reported skillset (25%), and the most prevalent non-English language proficiency was Spanish (20%).

Conclusions: During the COVID-19 pandemic, GRRT supported CDC public health emergency response with skilled individuals for approximately 90,000 person-days, many deploying a month or more per deployment. Although GRRT was developed to support international deployments, responses shifted to virtual domestic deployments during the study period. This demonstrates how GRRT was able to meet evolving CDC-wide response needs. GRRT provides a nimble and adaptable model for large-scale mobilizations of skilled public health staff, something essential to mitigate emerging global health threats.

2:25 Environmental Community Exposures Among Severely Injured Workers – United States, January 2015–January 2022

Authors: Vidisha D. Parasram, C. Socias-Morales, L. Freeland, C. Owusu

Background: Environmental justice research illustrates communities with lower-income workers and communities of color are more often located near hazardous facilities or highways, landfills, agricultural chemical applications, and other industries, and are at higher risk for asthma, cancer, and other illnesses. Work-related injuries and illness disproportionately affect workers without job security and health insurance coverage. We examined associations between work-related severe injuries and environmental and social disparities to explore their role in severe worker injury.

Methods: Two datasets (Environmental Justice [EJSCREEN, US EPA]) from 2021, and Social Vulnerability (ATSDR/CDC Social Vulnerability Index, SVI) from 2018 were spatially joined by census block group and census tract, respectively, to the OSHA Severe Injuries Report (SIR) data from 2015–2022. We used a linear multivariable regression model to examine associations between severe work-related injuries and environmental covariates, including air toxic cancer risk, lead paint, and proximity to traffic, as well as social

disparities measures such as disability, unemployment, and per capita income. We calculated beta coefficients (β) with 95% confidence intervals to assess direction and magnitude of associations.

Results: Work-related severe injuries were associated with EJSCREEN measures: working in communities with <high school education (β : 4.17E-5, 95% CI: 3.8E-06–8E-05), linguistic isolation (β : 1.67E-4, 95% CI: 3.5E-05–2.99E-4), air toxics cancer risk (β : 2.33E-4, 95% CI: 1.42E-4–3.25E-4), and wastewater discharge (β : 1.09E-4, 95% CI: 1.86E-5–2.0E-4); and SVI measures of unemployed persons (β : 5.15E-5, 95% CI: 3.06E-5–7.24E-5) and disabled persons (β : 1.70E-5, 95% CI: -2.44E-05–9.55E-06).

Conclusions: Work-related severe injuries were associated with environmental justice and social disparities indicators. Although weak, the associations indicate environmental and social disparities may impact the occurrence of severe workplace injury. This novel, exploratory study challenges the occupational and environmental fields to examine the impact of community exposure on workplace safety and injury prevention policies.

SESSION G: Donald C. Mackel Memorial Award

3:15 - 5:00 pm

Moderators: Victoria Olson and Tara Henning

3:20 Mpox Virus Infection Among Persons Without Characteristic Lesions or Rash — District of Columbia, August 2022

Authors: Yasmin P. Ogale, N. Baird, M. Townsend, I. Berry, I. Griffin, A. Mangla, M. Lee, C. Willut, P. Ashley, T. Rhodes, T. Notigan, N. Wynn, C. Kling, T. Smith, L. Priyamvada, W. Carson, T. Navarra, N. Wiley, R. Flowers, P. Dawson, P. Weidle, P. Satheskumar, C. Hutson, D. Jackson, M. Waltenburg

Background: Recent evidence suggests that mpox virus might be transmitted prior to rash onset. However, the utility of mpox testing in persons without rash and the burden of undiagnosed mpox virus infection are unestablished. We assessed the prevalence of mpox virus and undiagnosed infection among persons without rash who engaged in behaviors that might have increased their risk for mpox virus infection.

Methods: We enrolled individuals without characteristic mpox rash or history of mpox infection at 2 DC Health mpox vaccine clinics between 8/11/2022–8/31/2022. Participants completed a questionnaire that captured demographic, exposure, and clinical information and provided pharyngeal, rectal, and/or blood specimens. Specimens underwent real-time polymerase chain reaction (PCR) testing for mpox virus DNA; PCR-positive specimens were evaluated by culture. Serum specimens were tested for anti-orthopoxvirus Immunoglobulin G (IgG) antibodies; a subset underwent Immunoglobulin M (IgM) testing.

Results: Among 810 participants, we collected 1,009 specimens—522 (64%) pharyngeal, 164 (20%) rectal, and 323 (40%) blood—for molecular testing. Of these, 1 pharyngeal and 2 rectal specimens from 3 participants were mpox virus PCR-positive. All 3 participants were cisgender men with HIV, 1 reported symptoms (headache, fever), and none had a known mpox exposure in the past 14 days. The 2 rectal specimens were mpox virus culture positive, suggesting possible viable virus shedding. Among participants without PCR-positive specimens who provided serum specimens, 15% (47/321) were IgG-positive, of which 13% (6/47) were also IgM-positive, suggesting likely recent mpox infection.

Conclusions: Serologic testing identified minimal undetected recent infection. Less than 1% (3/1,009) of molecular specimens had detectable mpox virus DNA. While early detection of mpox prior to rash onset could help reduce transmission, the low prevalence of detectable infection indicates that the utility of risk-based testing for mpox in persons without rash via pharyngeal, rectal, and/or blood specimens is likely limited.

3:40 Alaskapox Virus Infections and Investigation of Zoonotic Sources — Alaska, 2020–2021

Authors: Katherine G. Newell, E.Q. Mooring, F.M. Whitehill, E.S. Minhaj, C.N. Morgan, A. Matheny, Z. Hui, Z.R. Werle, L.E. Olson, Y. Li, A.M. McCollum, J.B. Doty, L. Castrodale, J. McLaughlin

Background: *Alaskapox virus* (AKPV), a novel zoonotic orthopoxvirus (OPXV), was first identified in 2015 in an Alaskan patient. Four additional cases have been detected in Alaska since 2020. Infection is primarily characterized by a localized, self-limited pustular rash. We performed an investigation to understand which animals might serve as vectors for transmission of AKPV to humans.

Methods: Skin lesions from 3 patients with AKPV detected since 2020 underwent testing by OPXV-generic polymerase chain reaction (PCR), virus isolation, and whole genome sequencing (WGS). All 3 patients were interviewed about potential exposures. Tissue and sera samples from wild, small mammals near the 3 patients' homes were collected. Tissue was tested by AKPV-specific PCR, viral isolation, and WGS. Sera were tested for anti-OPXV IgG antibodies by enzyme-linked immunosorbent assay (ELISA). Sera from a patient's 5 domestic pets were tested by ELISA.

Results: All lesions had OPXV DNA and yielded viable virus; viral genomes were >99% identical to the 2015 human AKPV isolate. Patients were not epidemiologically linked and did not report regular, small-mammal contact; all lived with domestic pets that encountered small mammals. Eight species of small mammals (385 animals) were collected; 62 (16%) animals from 4 species had anti-OPXV IgG antibodies, and 5% (20/385) of animals across 2 species were positive for AKPV by PCR. Viable AKPV virus was isolated from 1 red-backed vole and 1 shrew; the viral genome was identical between both species. Anti-OPXV IgG antibodies were detected in a domestic dog known to roll in small mammal carcasses.

Conclusions: Samples collected from animals demonstrated both past OPXV and current AKPV infections, indicating they might be reservoirs for AKPV transmission to humans. Our findings have led to streamlined case investigation protocols and are being used in messaging to generate awareness about AKPV among clinicians, veterinarians, and the public.

4:00 Transmission of New Delhi Metallo- β -Lactamase Producing *Escherichia coli* Among Dogs at an Animal Rescue Facility — Wisconsin, 2022

Authors: Kiara X. McNamara, C. Habrun, W. Wilson, N. Mueller, L. Kollmann, G. Stapleton, R. Stanton, K. Benedict, A. Beaudoin, P. Snippes Vagnone, M. Anacker, M. Nichols, M. Walters, J. Mason

Background: New Delhi Metallo- β -lactamase (NDM)-producing *Escherichia coli* are highly resistant organisms that spread quickly. Organisms with NDM are rare and associated with healthcare settings in the United States but can be more common and found in the community in other countries. State partners detected NDM-*E. coli* in a dog from Iran living at an animal rescue facility (ARF). We investigated to determine spread among dog and human contacts and prevent further transmission.

Methods: We screened dogs and humans for NDM at the ARF, local veterinary clinic (Clinic-A), and ARF staff homes (Home-A, Home-B). We performed a case-control analysis to identify risk factors for NDM acquisition among dogs and evaluated ARF infection control practices. Analysis of short and long-read whole-genome sequencing data examined isolate relatedness. NDM-*E. coli* sequences from dogs and humans were compared in Wisconsin and surrounding states.

Results: Screening identified NDM in 37% (27/73) of ARF dogs and 57% (4/7) of Home-A dogs, but not in ARF or Clinic-A staff. Among ARF dogs with NDM, 74% (20/27) had international origins and 81% (22/27) had ≥ 1 medical condition. Dogs sharing the same space were associated with NDM acquisition (OR 5.1; 95% CI 1.8-14.7). We observed high animal density, soiled environments, insufficient hand hygiene, and workwear worn offsite. Sequencing analysis identified three multilocus sequence types (ST): ST361, ST167, and ST1163, each harboring a ST-specific NDM-carrying plasmid. Within STs, isolates varied by <13 high-quality single-nucleotide variants. No NDM-*E. coli* sequences from humans appeared related.

Conclusions: Investigation of a single isolate identified widespread NDM-*E. coli* transmission at an ARF. There were multiple NDM-*E. coli* introductions to the ARF, likely by dogs of international origin; poor hygiene contributed to transmission among ARF dogs and to dogs outside the ARF. Unrecognized sources of NDM-*E. coli* can result in dissemination and undetected spread in community settings.

4:20 Leveraging Wastewater Surveillance to Understand Silent Spread of Poliovirus in New York State, 2022

Authors: Nina B. Masters, N. Gerloff, J. Jorba, D. Lang, M. Alazawi, K. St. George, S. Rulli, C. Punjabi, K. McKay, M. Souto, P. Ruppert, E. Omoregie, A. Kirby, J. Routh, E. Rosenberg, M. Oberste

Background: In July 2022, the New York State Department of Health reported a case of paralytic polio resulting from infection with vaccine-derived poliovirus type 2 (VDPV2) in an unvaccinated adult in Rockland County, New York. Because approximately 1 in 1,900 VDPV2 infections results in paralysis, at least hundreds of inapparent infections might be present for every paralytic case. We used wastewater surveillance for poliovirus to help define the scope of transmission and track circulation throughout southern New York state.

Methods: Wastewater samples, some originally collected for SARS-CoV-2 surveillance, were collected from 48 sewersheds from March 9 through November 16, 2022. Nucleic acids were extracted from sewage concentrates and screened for the presence of poliovirus using the pan-poliovirus real-time RT-PCR assay; positive samples were sequenced. Static and interactive maps visualizing the spatiotemporal scope of polio

transmission and corresponding vaccination coverage were generated in R version 4.0.3.

Results: Eighty-seven (6.5%) of 1,344 wastewater samples tested positive for polioviruses genetically related to the case-patient's virus, with the last positive sample collected on November 1, 2022. Overall, 7/48 (14.6%) sewersheds tested positive for poliovirus in 6 of 13 counties tested, including Brooklyn and Queens boroughs in New York City. Poliovirus was identified in Rockland and Orange Counties, where 3-dose polio vaccination coverage was low (with zipcode-level coverage as low as 37.3% and 31.3%, respectively), highlighting increased transmission risk. Ongoing transmission of virus in New York met the WHO criteria for a circulating VDPV2, with related viruses found in the UK and Israel.

Conclusions: The proportion of HHEs focused on workplace cancer cluster concerns has remained steady over time; most did not meet the definition of a cluster or uncover an occupational cause. Public health practitioners can use this information to refine investigative approaches, set expectations about the frequency of detecting occupational cancer clusters, and improve communication about the investigation process.

4:40 Human Trichinellosis Linked to Bear Meat from Northern Canada – Arizona, Minnesota, and South Dakota, 2022

Authors: Shama Cash-Goldwasser, D. Ortbahn, M. Narayan, C. Fitzgerald, K. Maldonado, A. Straily, S. Sapp, H. Bishop, M. Neja, Y. Qvarnstrom, S. Park, D. Berman, K. Smith, S. Holzbauer

Background: In July 2022, the Minnesota Department of Health was notified of a patient hospitalized with myalgias, periorbital edema, and eosinophilia; providers suspected trichinellosis. Human trichinellosis is rare in the United States and usually acquired from wild game meat. To prevent future outbreaks, we investigated to confirm the diagnosis, ascertain additional cases, and identify the source of infection.

Methods: We interviewed persons potentially exposed to the suspected *Trichinella* source. We defined trichinellosis as compatible symptoms in a person who consumed an epidemiologically implicated meal (probable) or had *Trichinella* antibodies (confirmed). We tested acute blood samples for antibodies and conducted next-generation sequencing to detect microbial DNA. We performed microscopy and polymerase chain reaction for *Trichinella* on suspected source samples.

Results: One week before symptom onset, the patient and 8 relatives from 3 states shared a meal, including meat from a bear harvested in Saskatchewan, Canada. The hunting outfitter advised that freezing meat kills parasites. The meat was frozen for 5 weeks until being grilled with vegetables and served rare. Among 8 interviewed persons, 5 ate the meat, and all ate the vegetables. Six persons, including 4 who ate the meat, met trichinellosis case criteria (4 probable, 2 confirmed; attack rate = 75%). Two of 5 patients tested for *Trichinella* antibodies were positive. The two antibody-positive patients were tested by sequencing; both were positive for *Trichinella* DNA. Motile *T. nativa* larvae (>800 larvae/g) were identified in bear meat kept frozen for 4 months.

Conclusions: We used multimodal diagnostic testing to detect an outbreak of *T. nativa* infections and confirm bear meat as the source. Freezing kills *Trichinella* species commonly implicated in pork-associated outbreaks, but *T. nativa* is freeze-resistant. Consumers of wild game meat should be informed that meat can cross-contaminate other foods, and adequate cooking is required to kill *Trichinella* parasites.

CONCURRENT SESSION 11: One Health: Connecting People, Animals, and the Environment

9:00 - 10:45 am

Moderator: Chris Braden and Jennifer Wright

9:05 Estimating the Burden of Blastomycosis Outside of Known Endemic Region Using Insurance Claims Data — Vermont, 2011–2020

Authors: Brian F. Borah, P. Meddaugh, V. Fialkowski, N. Kwit

Background: Blastomycosis, a rare but potentially fatal fungal disease caused by inhalation of *Blastomyces* spp., has historically not been considered endemic to Vermont. A 2019 surveillance summary estimated incidences of 0.2–1.7 cases/100,000 population in reporting states; Vermont's disease burden is unknown. We used insurance claims data to describe epidemiology, understand clinical outcomes, and estimate annual incidence of blastomycosis in Vermont

Methods: Vermont Health Care Uniform Reporting and Evaluation System is an all-payer claims database containing medical claims for all Vermonters covered by Medicare and Medicaid and approximately 75% of those covered by commercial insurers. Patients who received a diagnosis of blastomycosis during 2011–2020 were identified on claims with *International Classification of Disease Clinical Modification, Ninth Edition* or *International Classification of Disease Clinical Modification, Tenth Edition* diagnosis codes for blastomycosis (116.0 and B40.X, respectively). Blastomycosis-attributable deaths were identified from vital records. Incidence/100,000 population was estimated using state- and county-level census estimates and year of patient's first recorded claim with a blastomycosis diagnosis code.

Results: We identified 114 unique patients with blastomycosis; 67 (59%) were male, median age was 55 years (range: 0–89 years), and 34 (30%) were hospitalized. Of hospitalized patients, 20 (59%) were male; median age was 56 years (range: 3–89 years). Four deaths were identified (mean annual death rate: 0.06/100,000 population). Mean annual incidence was 1.8/100,000 population (range: 1.0–3.0). Most patients (65; 57%) resided in 1 of 4 contiguous counties in North-central Vermont. The county with the highest mean incidence (7.5/100,000 population; range: 0–15.8) surrounds the Lamoille River Valley.

Conclusions: Vermont has a high incidence of blastomycosis compared with endemic states that mandate reporting. Clinicians should consider blastomycosis in patients with compatible signs and symptoms, particularly in north-central Vermont. Routine surveillance might help improve understanding of exposures, risk factors, and clinical outcomes.

9:25 Shiga Toxin-Producing *Escherichia coli* Linked to Raw Milk Consumption Associated with a Cow Share Agreement — Tennessee 2022

Authors: Christine M. Thomas, J. H. Marr, L. M. Durso, M. Golwalkar, D. J. Irving, K. Orejuela, R. Rasnic, D. Ripley, B. Rue, L. S. Thomas, J. Viruez, M. M. Fill, MD, K. N. Garman, J. Dunn

Background: On August 9, 2022, the Tennessee Department of Health (TDH) identified 2 cases of Shiga toxin-producing *Escherichia coli* (STEC) infections in 2 infants, each aged 10 months. One infant developed hemolytic uremic syndrome (HUS). Both lived in households that consumed raw milk from the same cow-share program. To determine STEC source and prevent additional illnesses, TDH initiated epidemiologic and environmental investigations of the cow-share dairy farm.

Methods: We attempted to contact listed cow-share participants and did an environmental assessment of the cow-share dairy farm. We defined a case as diarrheal illness in a person with access to raw milk from the cow-share. If laboratory-confirmed STEC infection was identified, we considered the case confirmed, otherwise considered it probable. We tested available human stool samples for STEC O157:H7 using selective media culture and polymerase chain reaction, and environmental samples from the dairy farm using brilliant green agar, anti-O157 immunomagnetic beads, and CHROMagar 0157.

Results: Of 125 listed cow-share participants, we reached 50 households with a total of 112 persons and identified 3 additional probable cases. In total, 5 cases were identified with 2 confirmed in hospitalized infants; no deaths were reported. The environmental assessment found possible routes of fecal contamination during milking and that temperature abuse might occur during milk storage. Laboratory testing identified 1 isolate of STEC O157:H7 from a human stool sample and 2 isolates from a cow manure sample taken from the milking barn. These isolates were highly related, with zero allele differences by whole genome sequencing. We provided education to the dairy farm and cow-share participants about reducing raw milk health risks.

Conclusions: This outbreak highlights the risk for significant illness associated with cow-share arrangements, especially among young children at increased risk for HUS. Policies increasing awareness of raw milk product health risks could prevent further morbidity.

9:45 Rattlesnake Bites Characterization — Arizona, 2017–2021

Authors: Cedar Mitchell, G. Smelski, K. Schmid, M. Roland, M. Christenberry, K. Ellingson, D. Brooks, K. Komatsu, S. Dudley, T. Cullen

Background: Envenoming after a rattlesnake bite (*Crotalus* spp.) is associated with substantial morbidity. Arizona reports the highest number of rattlesnake envenomings (RSEs) annually within the United States. Because reporting of RSEs is not required, gaps exist in understanding the epidemiology and clinical effects. Two regional Arizona Poison and Drug Information Centers (APDICs) receive calls about RSEs and collect data to help improve clinical outcomes and conserve resources. We sought to characterize Arizona RSE patients using hospitalization data and evaluate APDIC data utility to address epidemiologic and clinical knowledge gaps.

Methods: We screened dogs and humans for NDM at the ARE. We identified patients in Arizona's hospital and emergency department discharge database (HDD) using diagnostic codes for snake envenoming, and APDIC RSE-associated calls during 2017–2021. Patients were matched using name, birthdate, and zip code. Sensitivity of APDICs for detecting RSEs was compared with HDD data and patient characteristics were described. APDIC records with clinical and treatment data were available for non-Maricopa County patients and were analyzed.

Results: In total, 1,313 patients with snake envenoming were identified using Arizona's HDD; 992 were reported to APDICs yielding 76% sensitivity. Among all patients, median age was 48 years (range: <1–93 years); 1,162 (88%) were White; 1,071 (82%) were non-Hispanic; and 867 (66%) were male. Median hospital charges were \$82,000 (interquartile range: \$13,600–\$165,100). Among 523 RSE-associated APDIC calls, 60% of RSEs occurred near the home; 59% experienced coagulopathy and 23% experienced swelling of the entire affected extremity. RSE-associated calls also showed median of 14 antivenom vials (range: 4–48 vials) were administered per patient; median hospitalization was 2 days (range: <1–23 days). No deaths were reported.

Conclusions: RSEs can evoke life-threatening coagulopathy and require multiday hospitalizations with expensive medical care. APDICs were moderately sensitive in detecting RSE and provided additional contextual and clinical information to improve understanding of RSE in Arizona.

10:05 Rabies Postexposure Prophylaxis Reporting and Syndromic Surveillance Identification of Rabies Postexposure Prophylaxis Administration — Maine, 2018–2022

Authors: Liz Lamere, H. Sohail, S. Robinson

Background: Rabies virus infects the central nervous system and is nearly always fatal but preventable with prompt use of postexposure prophylaxis (PEP) after a potential exposure. Rabies PEP administration is reportable in Maine, yet likely underreported. We compared rabies PEP administrations from Maine's reportable disease database with syndromic surveillance records during January 2018–June 2022 to assess completeness of Maine's PEP reporting and to evaluate feasibility of using syndromic surveillance for improving surveillance of PEP administrations in Maine.

Methods: We identified rabies PEP administrations from reports entered in Maine's reportable disease database. Additionally, Maine's syndromic surveillance data were queried for *International Classification of Disease Clinical Modification, Tenth Edition* diagnosis codes for Z20.3 contact with and (suspected) exposure to rabies, or Z29.14 encounter for prophylactic rabies immune globulin. Syndromic surveillance data were restricted to likely first dose by selecting the earliest dose in a series of patient visits and by text processing to remove

records that indicated second, third, fourth, or other follow-up doses. We deduplicated records by patient identification number. We identified number of first rabies PEP administrations in both sources and number of administrations in one source but not the other.

Results: Overall, we identified 1,408 rabies PEP first dose administrations. Maine's reportable disease database identified 536 (38%) rabies PEP administrations, including 220 not found in syndromic surveillance. Syndromic surveillance identified 1,192 (85%) rabies PEP administrations, including 876 not in Maine's reportable disease database.

Conclusions: Rabies PEP administration is underreported in Maine. Although rabies PEP administrations from Maine's reportable disease database and from syndromic surveillance both captured rabies PEP events, each system identified events missing in the other. Efforts to increase provider reporting of PEP administrations into Maine's reportable disease database and incorporating PEP administration data from syndromic surveillance could increase reporting completeness of administered rabies PEP in Maine.

10:25 Highly Pathogenic Avian Influenza (HPAI) Human Symptom Monitoring System — Wyoming, 2022

Authors: Allison W. Siu, E. Curren, C. Van Houten, R. McClinton, A. Harrist

Background: Highly pathogenic avian influenza (HPAI) virus primarily affects birds and has zoonotic potential. An HPAI outbreak was detected among domestic and wild birds in Wyoming during the 2022 spring migration. The Wyoming Department of Health (WDH) coordinated with local, state, and federal partners to develop an HPAI symptom monitoring system for humans exposed to HPAI-infected birds. We conducted a real-time system evaluation and incorporated results into the fall migration response.

Methods: During March–September 2022, birds found ill or deceased birds were tested for HPAI. HPAI-infected birds and persons who had contact with them were reported to WDH. WDH interviewed these persons to assess type, extent, and length of bird exposure, and monitored them for 10 days for influenza-like symptoms. We measured system timeliness as time from last HPAI-infected bird exposure to interview. System cost was determined by personnel time, total individuals monitored, and resulting human HPAI diagnoses.

Results: Of 64 persons exposed and monitored during March–September 2022 (36 wildlife officials and 28 public), 9 reported influenza-like symptoms; 5 were wildlife officials, and 4 from the public. None tested positive for HPAI. Postexposure interviews were conducted an average of 5 days (range: 0–17 days) into the 10-day postexposure monitoring period. System cost required 8 employees and involved 3,120 person-hours over 6 months of response.

Conclusions: This symptom monitoring system found no zoonotic HPAI transmission, was labor-intensive, but relatively timely. Based on these findings, the HPAI symptom monitoring system was scaled down in October 2022 to self-monitoring for wildlife officials. Although implementing symptom monitoring systems is necessary for applicable public health responses, balancing available resources is also necessary. Our investigation illustrates importance of real-time evaluation during an outbreak response to assess and maximize limited public health resources, particularly when zoonotic transmission risk is found to be low.

CONCURRENT SESSION I2: Pregnancy and Infant Health

9:00 - 10:45 am

Moderators: Amanda Cohn and Michelle Hughes

9:05 Disaggregation of Breastfeeding Initiation Rates by Race, Ethnicity, and Nativity – United States, 2020–2021

Authors: Kristin J. Marks, J. Nakayama, K. Chiang, M. Grap, E. Anstey, E. Boundy, H. Hamner, R. Li

Background: Breastfeeding is the ideal source of nutrition for most infants, but there are racial or ethnic disparities in breastfeeding initiation. Breastfeeding surveillance rates have historically included estimates for few racial or ethnic groups. Aggregated data can challenge the understanding and monitoring of effective, culturally appropriate interventions among specific racial or ethnic groups. We examined differences in breastfeeding initiation rates within racial or ethnic groups by disaggregation to finer subgroups of race, ethnicity, and nativity.

Methods: This study analyzed births during 2020–2021 in 48 states and DC by using the National Vital Statistics System's birth certificate data. Data indicate whether an infant received any breast milk during birth hospitalization and include self-reported maternal race (15 categories), ethnicity (8 categories), and nativity (2 categories). Cross-tabulations of race, ethnicity, and nativity by breastfeeding initiation were calculated and compared across aggregated and disaggregated categories.

Results: Among 6,099,484 infants, the overall prevalence of breastfeeding initiation was 83.9%, ranging from 74.6% (mothers who identify as Black) to 93.8% (mothers who identify as Japanese). The aggregated prevalence of breastfeeding initiation among Hispanic mothers was 86.7%; disaggregated estimates by Hispanic origin ranged from 82.2% (mothers who identify as Puerto Rican) to 90.9% (mothers who identify as Cuban). Mothers who identify as Black, who were born outside of the United States, were more likely to initiate breastfeeding than those born in the United States (89.4% vs. 70.9%).

Conclusions: There is substantial variation in the prevalence of breastfeeding initiation across disaggregated racial or ethnic categories, and stratification by nativity highlights additional differences. Disaggregation of racial or ethnic data unmask differences that may suggest variations in cultural practices or systemic barriers to breastfeeding, which could guide public health practitioners' efforts to improve and tailor breastfeeding support. These efforts could result in reduced racial or ethnic disparities in breastfeeding.

9:25 Impact of Ascertaining All Pregnancy Outcomes on Birth Defects Prevalence — Massachusetts, 2012–2019

Authors: Amy Fothergill, R. Liberman, E. Nestoridi, C. Mai, L. Yeung, C. Higgins, M. Yazdy

Background: Birth defects affect 1 in 33 infants in the United States and are a leading cause of infant mortality. Ongoing, systematic birth defects surveillance is crucial for informing public health action. In 2011, an update to regulations allowed the Massachusetts Birth Defects Monitoring Program (BDMP) to ascertain birth defects in other pregnancy losses (OPLs), including miscarriage (<20 weeks gestational age [GA]) or elective terminations (any GA), available through prenatal reporting. We assessed the impact of these additional cases on prevalence estimates within the BDMP.

Methods: Using population-based statewide data on pregnancy outcomes with a birth defect from 2012 to 2019, we calculated counts and prevalence estimates per 10,000 live births (95% CIs using Poisson distribution) with and without OPLs overall and by specific birth defect groups and maternal demographics.

Results: Including OPLs resulted in an additional 4,206 cases. The overall prevalence (per 10,000 live births) increased from 254.9 (95% CI: 250.8, 259.0) to 329.0 (95% CI: 324.4, 333.7); neural tube defects overall and specifically anencephaly prevalence increased from 3.2 (95% CI: 2.7–3.7) to 8.4 (95% CI: 7.6–9.1) and from 0.4 (95% CI: 0.3–0.6) to 2.9 (95% CI: 2.5–3.4), respectively. Increased prevalence estimates were observed across maternal race/ethnicity (American Indian/Alaska Native: 264.0 vs. 336.4, Asian/Pacific Islander: 205.6 vs. 287.1, Black, non-Hispanic: 263.1 vs. 309.2, Hispanic: 270.0 vs. 308.1, White, non-Hispanic: 255.8 vs. 334.8) and age groups (<20 years: 265.9 vs. 296.6, 20–24 years: 247.1 vs. 275.8, 25–29 years: 238.4 vs. 282.5, 30–34 years: 244.0 vs. 307.2, ≥35 years: 289.5 vs. 437.4).

Conclusions: The inclusion of OPLs with birth defects resulted in more complete case ascertainment, particularly for severe birth defects such as anencephaly. This information is essential for etiologic research and raising awareness for needed public and health care resources within disproportionately affected populations.

9:45 Race, Place, and Infant Mortality — Infant Mortality in Chicago, Illinois, 2000–2020

Authors: Hillary Spencer, D. Harper, N. Prachand, J. Seo, C. Robinson

Background: As a marker of infant and societal health, infant mortality (IM) has decreased in Chicago over the past 2 decades. Still, IM was among the top drivers of the 8.8-year gap in life expectancy between Black and White Chicagoans in 2017. We sought to describe racial disparity in IM in Chicago to guide interventions.

Methods: Birth and infant death data were from vital statistics records (2000–2020). We calculated overall IM rate (IMR) as deaths occurring <12 months after birth/1,000 live births, IMR and risk ratios by race for 2000 and 2020, and excess Black infant deaths ($[\text{Black IMR} - \text{White IMR}] \times \text{Black births}/1,000$) in 2020. We calculated proportion of deaths attributable to disparity by dividing excess Black infant deaths by total Black infant deaths. We evaluated IMR by community area (CA, 77 administrative units of Chicago).

Results: In 2000, IMR was 10.5 overall, 15.8 for Black, and 5.4 for White infants. In 2020, IMR was 5.2 overall, 10.5 for Black and 2.0 for White infants. The risk ratio for Black infant death

relative to White infant death grew from 2.9 in 2000 to 5.3 in 2020. In 2020, 95 Black infant deaths in Chicago were reported, 77 (81%) of which were estimated as excess deaths. The 40 CAs with an IMR above the citywide median in 2016–2020 had a median Black population of 82%, compared to 4.4% in CAs below the median.

Conclusions: The disparity between Black and White Chicago IMR has nearly doubled over the past two decades. CAs with predominantly Black populations tended to also have higher than expected IMRs. This analysis suggests that targeted community-level interventions are needed to reduce infant mortality racial disparities. Future analyses will incorporate the impact of economic deprivation, the role of geographic racial segregation, and their interaction.

10:05 Prescription Opioid Pain Reliever Use During Pregnancy: Data from the Washington State Pregnancy Risk Assessment (PRAMS) Opioid Supplement, 2019–2020

Authors: Brynn Stopczynski

Background: Prescription opioid pain relievers (PPRs) can be used to treat moderate-to-severe pain but are associated with negative health effects for the pregnant person and their baby. The Centers for Disease Control and Prevention (CDC) notes 7% of women in the US self-report use of opioids during pregnancy, and 20% of those report misuse (not obtained from a provider or not used for pain). Washington State adopted the Pregnancy Risk Assessment Monitoring System (PRAMS) Opioid Supplement in 2019 to monitor opioid use during pregnancy. Data from the Opioid Supplement was analyzed to inform surveillance efforts in the state.

Methods: Weighted data from the 2019 and 2020 PRAMS Opioid Supplements for Washington State were analyzed using descriptive statistics to estimate the overall percentage of PPR use in WA state, the distribution of use across age and race/ethnicity groups, the location of PPR obtainment, and reasons for PPR use during pregnancy. Chi-square tests were conducted to examine the relationship between PPR use and experiences related to discrimination and stress before birth.

Results: A total of 2,424 PRAMS Opioid Supplements were completed between 2019 and 2020; 152 (6.3%) participants identified PPR use during pregnancy. The weighted proportion of participants using PPRs during pregnancy included 6.8% of Non-Hispanic (NH) White, 9.5% of NH Black, 9.5% of NH American Indian/Alaska Native, and 5.2% of Hispanic individuals (of any race). PPR use was highest amongst participants between 20–24 years old, with 11% of participants in this age group indicating PPR use. Prescription opioids were often obtained from the participant's prenatal care provider (48%) or an emergency department (25%). The most common reason for PPR use was for pain relief (92%). Misuse (PPR not obtained from a provider or not used for pain) was indicated by 11% of individuals. The association of discrimination before birth and PPR use during pregnancy was not statistically significant ($p = 0.45$); however, stress during pregnancy was associated with PPR use ($p = 0.01$).

Conclusions: Findings indicate that, although the proportion of PPR use during pregnancy in Washington State is comparable to the CDC's national estimate, some subpopulations may be at higher risk. Further examination of the relationships between opioid use and stress, discrimination, and race and ethnicity are necessary as additional years of PRAMS Opioid Supplement data become available. Current and future findings can be used to inform Washington State opioid policy and programs.

10:25 Prevalence of Viral Enteric Pathogens Causing Infection and Acute Gastroenteritis During the First Year of Life — Ohio, 2017–2022

Authors: Julia M. Baker, H. Browne, R.M. Burke, J.L. Cannon, C.P. Mattison, K. Nguyen, S.C. Conrey, A.R. Burrell, A.L. Morrow, M. Allen Staat, U.D. Parashar, D.C. Payne, J.E. Tate, J. Vinjé

Background: Birth cohort studies conducted in low- to middle-income countries have shown that noroviruses and sapoviruses are high-exposure pathogens associated with infection and acute gastroenteritis (AGE) in young children; However, similar data are lacking in high-income countries. PREVAIL (Pediatric Respiratory and Enteric Virus Acquisition and Immunogenesis Longitudinal study) is a birth cohort study conducted in Cincinnati, Ohio investigating the natural history and immunity to common viral enteropathogens. Here, we present PREVAIL data on the prevalence of viral enteropathogens in the first year of life.

Methods: Stool specimens and symptom status questionnaires were collected at birth, weekly, and during AGE events between 2017–2020 for enrolled infants ($n = 245$). All stools were screened for 19 viral, bacterial, and parasitic pathogens by the xTAG® Gastrointestinal Pathogen Panel and/or reverse transcription-polymerase chain reaction. Those positive for

norovirus were genotyped. AGE was defined as ≥ 3 loose stools and/or ≥ 1 vomiting episodes within 24 hours. Asymptomatic stools were defined as those collected >28 days after or >4 days before an AGE episode. Pathogen prevalence was compared using the chi-square test.

Results: During the first year of life, 755 symptomatic and 5,946 asymptomatic stools were collected. Prevalence was highest for norovirus GII (13.1% of symptomatic and 4.1% of asymptomatic stools, $P < .01$) and sapovirus (6.1% of symptomatic and 1.8% of asymptomatic stools, $P < .01$). Astrovirus, rotavirus, adenovirus 40/41, and norovirus GI, together, were present in 7.8% of symptomatic and 3.3% of asymptomatic stools. GII.4 Sydney (13.9%), GII.3 (13.2%), and GII.6 (12.6%) norovirus genotypes were most often detected regardless of symptom status.

Conclusions: Norovirus GII was the most prevalent viral enteropathogen detected in stools during the first year of life and was more commonly detected in symptomatic versus asymptomatic children. Further work is needed to examine repeat infections to improve our understanding of infection, disease, and immunity.

CONCURRENT SESSION J1: Vaccine-Preventable Diseases

11:15 am - 12:40 pm

Moderators: Georgina Peacock and Julia Gargano

11:20 Changing Epidemiology of Bacterial Meningitis — United States, 2008–2020

Authors: Namrata Prasad, M. Kobayashi, A. Rubis, J. Collins, M. Delahoy, H. Shah, D. C. Payne, A. Reingold, M. Barnes, S. Petit, M. Farley, L. Harrison, R. Lynfield, J. Houston, B. J. Anderson, A. Thomas, W. Schaffner, S. Schrag, M. Arvay

Background: In the United States, the incidence of bacterial meningitis declined following introduction of vaccines against some causative pathogens; however, analyses of recent epidemiologic trends are lacking. We describe recent bacterial meningitis etiology and assessed changes in incidence following introduction of a 13-valent pneumococcal conjugate vaccine (PCV13) against a common pathogen, *Streptococcus pneumoniae*, and during the COVID-19 pandemic.

Methods: We analyzed active, population-based surveillance data on bacterial meningitis due to common pathogens (group B *streptococcus* [GBS], *Haemophilus influenzae*, *Listeria monocytogenes*, *Neisseria meningitidis*, and *Streptococcus pneumoniae*) across 10 states during 2008–2020. Average annual incidence (per 100,000 population), overall and by age group, and hospitalized case fatality were calculated during 2008–2009 (pre-PCV13), 2010–2019 (post-PCV13), and 2020 (COVID-19 pandemic), with changes assessed using Poisson regression and Chi-square tests, respectively.

Results: The overall incidence of bacterial meningitis was 1.8 during 2008–2009, 1.3 during 2010–2019 (24.0% [95% CI: 18.0–29.5%] decline from 2008–2009), and 0.6 during 2020 (38.6% [95% CI: 30.9–45.6%] decline from 2010–2019). Among 5,001 bacterial meningitis cases, *S. pneumoniae* was the predominant pathogen (51.0%), followed by GBS (23.6%), *H. influenzae* (11.8%), *N. meningitidis* (9.5%), and *L. monocytogenes* (4.2%). Median age (range) of patients was 41 years (0–106); 26.8% were infants aged <1 year. Case fatality did not change between 2008–2009 (11.4%) and 2010–2019 (10.5%) ($P=.39$) but increased in 2020 (14.0%) ($P <.001$, compared with 2010–2019). Incidence was highest among infants (29.4 during 2008–2009, 26.7 during 2010–2019, 22.1 during 2020) with GBS accounting for the majority (64.7%) of cases.

Conclusions: While the incidence of bacterial meningitis has declined since 2008, especially during the COVID-19 pandemic, case fatality remains high. *S. pneumoniae* was the predominant pathogen despite PCV13 introduction. Preventative measures against infant bacterial meningitis caused by GBS should be prioritized.

11:40 Invasive Pneumococcal Disease and Potential Impact of New Pneumococcal Conjugate Vaccines Among Children Aged <5 Years – Alaska, 1991–2020

Authors: Bionca M. Davis, J. Steinberg, S. Bressler, M. Harker-Jones, B. Simons-Petrusa, G. Thompson, A. Kretz, L. Orell, S. Massay, J. McLaughlin, D. Bruden, R. Singleton, M. Fischer

Background: Invasive pneumococcal disease (IPD) occurs when *Streptococcus pneumoniae* infects a normally sterile site, such as blood or cerebrospinal fluid. Historically, IPD has disproportionately impacted Alaska Native children. In Alaska, 7-valent and 13-valent pneumococcal conjugate vaccines (PCV7 and PCV13) were introduced in 2001 and 2010, respectively. A 15-valent pneumococcal conjugate vaccine (PCV15) was approved for pediatric use in 2022, and 20-valent pneumococcal conjugate vaccine (PCV20) is being evaluated in clinical trials in children. We assessed IPD trends among Alaska children before and after pneumococcal conjugate vaccine (PCV) introduction.

Methods: Using statewide, laboratory-based surveillance data, we calculated IPD rates per 100,000 children aged <5 years, 95% CI, and percent change for 3 decades: 1991–2000 (pre-PCV7), 2001–2010 (post-PCV7), and 2011–2020 (post-PCV13). We estimated the proportion of IPD cases during 2011–2020 caused by PCV serotypes.

Results: During 1991–2020, 912 IPD cases were reported among all Alaska children aged <5 years for an incidence of 59 (95% CI: 55–62) cases per 100,000 per year. Annual IPD incidence declined 82% from 108 (95% CI: 99–117) per 100,000 pre-PCV7 to 20 (95% CI: 16–24) per 100,000 post-PCV13. Annual IPD incidence among Alaska Native children declined 80% from 247 (95% CI: 221–277) per 100,000 pre-PCV7 to 49 (95% CI: 39–61) per 100,000 post-PCV13; however, rates remained higher compared to non-Alaska Native children during all 3 decades. During 2011–2020, of 103 IPD cases among Alaska children, 20 (19%) were caused by PCV13 serotypes, 41 (40%) by PCV15 serotypes, and 57 (55%) by PCV20 serotypes.

Conclusions: IPD incidence among Alaska children declined after PCV introduction and a substantial proportion of cases during 2011–2020 were caused by PCV15 and PCV20 serotypes. To further reduce IPD incidence and remaining disparities, clinicians should consider using new PCV as they become available.

12:00 Severity of Influenza-Associated Hospitalizations by Influenza Virus Subtype – United States, 2010–2019

Authors: Kelsey M. Sumner, S. Garg, S. Masalovich, A. O'Halloran, R. Holstein, A. Reingold, N. Alden, K. Yousey-Hindes, E. Anderson, M. Monroe, L. Leegwater, R. Lynfield, M. Bleeker, N. Spina, C. Felsen, K. Lung, A. Thomas, K. Talbot, E. Roberts, M. Rolfes, C. Reed

Background: In the U.S., influenza infection causes up to 710,000 hospitalizations and 52,000 deaths each season, depending partly on the circulating influenza A virus subtype. Using the multi-state U.S. Influenza Hospitalization Surveillance Network, we assessed the severity of influenza-associated outcomes among individuals hospitalized with influenza A(H3N2) and A(H1N1)pdm09 viruses during the 2010–2011 through 2018–2019 influenza seasons.

Methods: To evaluate the association between influenza virus subtype and severe in-hospital outcomes (intensive care unit [ICU] admission, mechanical ventilation [MV] or extracorporeal membrane oxygenation [ECMO] use, and death) overall and by age group, we used logistic regression adjusted for influenza season, influenza vaccination, age, and site. When missing, influenza A subtypes were imputed using chained equations of known subtypes by season.

Results: Among 86,408 hospitalized individuals with laboratory-confirmed influenza A, 16.8% required ICU admission, 6.6% received MV/ECMO, and 3.0% died. After imputing 52.4% of subtypes, a mean of 70.1% of individuals had A(H3N2) and 29.9% had A(H1N1)pdm09 infections. Individuals hospitalized with A(H1N1)pdm09 versus A(H3N2) had higher adjusted odds of ICU admission (adjusted odds ratio [aOR]: 1.42, 95% CI: 1.32–1.52), MV/ECMO (aOR: 1.79, 95% CI: 1.60–2.00), and death (aOR: 1.25, 95% CI: 1.07–1.46). Associations were similar across age groups for ICU admission and MV/ECMO; however, increased odds of death with A(H1N1)pdm09 were only observed among adults aged 18–64 years.

Conclusions: Over one in six individuals hospitalized with influenza experienced an in-hospital severe outcome. While more hospitalized individuals had A(H3N2) infections across nine seasons, individuals with A(H1N1)pdm09 experienced greater odds of ICU admission and MV/ECMO use across all ages; this indicates that A(H1N1)pdm09 infection can result in substantial morbidity despite the misperception that it is clinically milder than A(H3N2) infection. Annual influenza vaccination is important to prevent severe outcomes across all ages, regardless of the season's predominant circulating subtype.

12:20 Novel Approaches to Polio Surveillance During an Outbreak – New York State, July–November 2022

Authors: Haillie C. Meek, BJ. Anderson, M. McClenaghan, E. Rosenberg, M. Fuschino, K. St. George, C. Weng, NK. Mita-Mendoza, D. Gowie, D. Hoefler, B. Backenson, E. Lutterloh

Background: Poliovirus is an enterovirus; ~70% of infections are asymptomatic, but 25% cause nonspecific symptoms, 1%–5% cause meningitis, and <1% cause paralysis. In July 2022, identification of paralytic polio in a patient and subsequent sustained wastewater detections of poliovirus in multiple New York State counties indicated the second community transmission of poliovirus in the United States since 1979. We describe New York State Department of Health (NYSDOH) expanded surveillance and monitoring for additional cases using wastewater and syndromic surveillance, clinician reporting, enterovirus testing for patients with nonparalytic polio symptoms, and stool convenience sampling.

Methods: Wastewater was tested in 13 counties geographically proximate to the index patient; non-New York City (NYC) counties with >1 poliovirus detection were considered affected. We identified hospitalized patients with meningitis and paralysis through syndromic surveillance of emergency department chief complaint and diagnosis data using 16 *International Classification of Diseases, Tenth Revision* codes, and 11 free-text terms; patients were prioritized for follow-up investigation,

and specimen testing using age, county of residence, and polio vaccination status. A health alert requested clinicians to report patients with acute flaccid weakness and clinicians in affected counties to test unvaccinated patients with nonparalytic polio symptoms for enterovirus. NYSDOH Wadsworth Center subtyped enterovirus-positive specimens forwarded from laboratories and tested a convenience sample of patient stool from 4 pediatricians' offices in affected counties.

Results: Wastewater surveillance identified 4 non-NYC counties with >1 poliovirus detections. Specimens were tested from 77 patients; 37 (48%) were from convenience sampling, 22 (28%) from clinician reporting, 12 (16%) from laboratory surveillance, and 6 (8%) from syndromic surveillance. No additional poliovirus infections were identified.

Conclusions: Although no additional human specimens tested positive for poliovirus, wastewater surveillance indicated ongoing community transmission. A multifaceted polio surveillance system could be considered by localities responding to poliovirus detection in environmental or clinical testing.

CONCURRENT SESSION J2: Homelessness & Housing Instability

11:15 am - 12:40 pm

Moderators: Emily Mosites and Brooke Hoots

11:20 Shigellosis Outbreak Among Persons Experiencing Homelessness – San Diego County, October–December 2021

Authors: Elizabeth C. Ohlsen, K. Angel, A. Maroufi, A. Kao, M. Victorio, L. Cua, A. Kimura, K. Vanden Esschert, N. Logan, T. M. McMichael, M. Beatty, S. Shah

Background: During October 2021, San Diego County identified 5 cases of shigellosis among persons experiencing homelessness (PEH). Shigellosis is a highly contagious enteric disease commonly infecting young children, travelers, and men who have sex with men. We conducted an outbreak investigation and developed interventions to respond to shigellosis outbreaks among PEH.

Methods: Confirmed cases occurred among PEH with stool-cultured *Shigella sonnei* after August 15, 2021; probable cases were among PEH with *Shigella*-positive culture-independent diagnostic testing. Patients were interviewed to determine possible infectious sources, commonalities, and other infection risk factors. Whole genome sequencing (WGS) was attempted for all isolates; genetic relatedness was examined.

Results: Forty-seven confirmed and 6 probable cases were identified; 34 (64%) of 53 patients were hospitalized. Twenty-one (91%) of 23 persons providing a sexual history reported

opposite-sex partners; 2 (9%) reported same-sex partners. Epidemiologic investigation found no distinct point source. However, patients reported geographically similar eating and living areas, including homeless encampments and shelters. Among 43 samples with sufficient isolate for WGS, 2 *S. sonnei* strains were identified; 1 locally endemic, and 1 associated with a multistate cluster involving San Diego County. Patients reported inadequate access to sanitation and hygiene facilities, including public restrooms closed because of the COVID-19 pandemic and limited clean water access. After interventions were implemented, including portable handwashing stations near commonly reported living areas, frequent cleaning and stocking of public restrooms, distribution of sanitation kits, and isolation housing for ill persons, *S. sonnei* cases decreased to preoutbreak frequencies.

Conclusions: PEH often lack access to adequate sanitation and hygiene measures crucial to prevent *Shigella* spread. This outbreak of locally endemic *Shigella* strains was not associated with sexual practices. Improving public access to sanitation and hygiene may have helped end the outbreak and should be considered to prevent other outbreaks among PEH.

11:40 Survey of Mental Health Needs Among Displaced Families Living in Shelters – 2022, Eastern Kentucky Flood Response

Authors: Lily Balasuriya, O. Johnson, D. Thoroughman

Background: Sudden, unexpected displacement from one's home can cause profound mental health impacts. On July 28, 2022, floods in eastern Kentucky displaced >600 individuals. To understand the mental health needs of affected families, we surveyed households living in flood evacuation shelters after the 2022 Kentucky floods.

Methods: Families experiencing displacement from the 2022 Kentucky floods living in three different shelter locations (including travel trailers, campers, rooms, and campgrounds) were surveyed via convenience sampling. A rapid community needs assessment involving in-person interviews was conducted between September 6–9, 2022. Teams interviewed one person to answer household-level questions. The last three individual-level mental health questions were asked to the same person answering the household-level questions.

Results: Teams conducted 61 household interviews (out of 150 shelter families). Since the flood, 27% reported their household received behavioral health services, and 20% received grief counseling. Agitation (37%), difficulty concentrating (48%),

nightmares (62%), or suicidal thoughts/self-harm (7%) were reported by households surveyed. Over one-fourth (27%) of individuals surveyed ($n = 61$) reported being depressed nearly every day, and another 36% reported this >half the days, or several days, in the last 2 weeks. Over 20% reported anhedonia nearly every day; 26% reported this >half the days or several days in the last two weeks. Over 75% of individuals surveyed reported being anxious several days or more over the last 2 weeks. Over one-third of individuals (34%) reported being unable to stop worrying nearly every day; another 41% reported this several days or >half the days. Households surveyed reported barriers to mental health services (36.1%), including transportation (11.5%) and being unaware of resources (8.2%).

Conclusions: Symptoms of depressed mood, anhedonia, anxiety, and nightmares were prevalent in displaced families 6 weeks after the 2022 Kentucky floods. Providing and encouraging access to mental health services are important priorities during disaster recovery.

12:00 Assessing Vector-Borne Disease Experiences and Risk of Transmission (AVERT) Survey of Homeless Service Workers – Washington and Colorado, 2022

Authors: Shannan N. Rich, R. Henderson, B. Dell, C. Grano, B. Sprague, T. Bostic, E. Mosites, J.S. Salzer, A. Hinckley, D. McCormick, G. Marx

Background: In the United States, cases of louse-borne *Bartonella quintana* infection and flea-borne typhus disproportionately impact people experiencing homelessness (PEH). These diseases can spread rapidly under conditions of crowding and poor hygiene. Little is known about louse- and flea-borne disease awareness among workers who provide direct services to PEH. We surveyed workers at centers serving high numbers of PEH to assess knowledge and prevention of these diseases.

Methods: We partnered with public health agencies in Colorado and Washington to identify homeless service sites and street/encampment outreach teams for recruitment. We administered in-person surveys to staff working with PEH to identify knowledge gaps, barriers to implementing control measures, and preferred education modalities.

Results: We administered surveys to 63 service center staff and 37 outreach staff across 27 sites ($N = 13$ in CO; $N = 14$ in WA). Most participants thought that body lice and fleas are a public health problem for PEH (73% and 62%, respectively). However, few were aware that body lice can transmit *B. quintana* (11%) or that fleas can transmit *Rickettsia typhi* (2%). Most staff were unaware of how to manage body lice infestations or flea bites appropriately (76% and 94%, respectively). In outreach settings, lack of access to hygiene services for people living in encampments or on the streets was cited as a key barrier to louse- and flea-borne disease prevention. When asked about modes of learning, in-person trainings and online modules were preferred.

Conclusions: This study identified several gaps in knowledge of louse- and flea-borne diseases among workers providing services to PEH. Guidance on the appropriate management of persons with lice infestation or flea bites is needed. These results will be used to guide development of educational trainings and online educational modules to reduce vector-borne disease risk among PEH.

12:20 Experiences of Homelessness Among Sexual Minority Youth — National Youth Risk Behavior Survey, United States, 2021

Authors: Izraelle I. McKinnon, K. Krause, L. Robin, J. Smith-Grant, M. Underwood

Background: Sexual minority youth (lesbian, gay, bisexual, questioning, or a sexual identity other than heterosexual [LGBQ+]) are more likely to face child abuse and neglect, discrimination, and other factors that might increase their risk for experiencing homelessness. A new item on the 2021 national Youth Risk Behavior Survey (YRBS) allows the first nationally representative estimates of homelessness among high school students in the United States. We sought to estimate the prevalence of LGBQ+ students experiencing homelessness and examine disparities in substance use, violence victimization, and suicide risk by sexual identity among students experiencing homelessness.

Methods: We used data from the 2021 YRBS, a cross-sectional, school-based survey of 9th–12th grade students in the 50 U.S. states and the District of Columbia (N = 17,232). We calculated prevalence estimates of homelessness by dichotomized sexual identity groups (LGBQ+ versus heterosexual). We calculated prevalence estimates of substance use, violence victimization, and suicide risk among students experiencing homelessness

by sexual identity groups and performed chi-square statistics comparing groups.

Results: The prevalence of homelessness was twice as high among LGBQ+ students (3.9%; 95% CI: 2.8%–5.4%) compared with heterosexual students (2.0%; 95% CI: 1.6%–2.5%). Among students experiencing homelessness (n = 419), LGBQ+ students were more likely than heterosexual students to have used illicit drugs (cocaine, inhalants, heroin, methamphetamines, ecstasy, or hallucinogens) (58% versus 33%; $P < .001$), experienced sexual violence (55% versus 14%; $P < .001$), and attempted suicide (56% versus 26%; $P = .001$).

Conclusions: LGBQ+ students were more likely to experience homelessness compared with heterosexual students. Among students experiencing homelessness, LGBQ+ students had a higher prevalence of health risk behaviors and experiences and might have unique needs compared with heterosexual students. Programs and policies for youth experiencing homelessness should seek to address the disproportionate burden of homelessness among LGBQ+ youth.

SESSION K: Alexander D. Langmuir Lecture

1:40 - 3:10 pm

Moderator: Julianna Reece, Musheng Alishah, Pattie Simone



Donald K. Warne, MD MPH

*Johns Hopkins Provost Fellow
for Indigenous Health Policy and
Johns Hopkins Center for
Indigenous Health Co-Director*

Engaging Indigenous Communities to Promote Health Equity

Donald Warne, MD, MPH, joined the Johns Hopkins Center for Indigenous Health as Co-Director on September 1, 2022. He is an acclaimed physician, one of the world's preeminent scholars in Indigenous health, health education, policy and equity as well as a member of the Oglala Lakota tribe from Pine Ridge, South Dakota. Dr. Warne will also serve as Johns Hopkins University's new Provost Fellow for Indigenous Health Policy.

Warne comes from a long line of traditional healers and medicine men, and is a celebrated researcher of chronic health inequities. He is also an educational leader who created the first Indigenous health-focused Master of Public Health and PhD programs in the U.S. or Canada at the North Dakota State University and the University of North Dakota, respectively. Warne previously served at the University of North Dakota as professor of Family and Community Medicine and associate dean of diversity, equity, and inclusion, as well as director of the Indians Into Medicine and Public Health programs at the University of North Dakota School of Medicine and Health Sciences.

Warne's career is informed by rich work and life experiences. He served the Pima Indian population in Arizona as a primary care physician and later worked as a staff clinician with the NIH. He has also served as Health Policy Research director for the Inter-Tribal Council of Arizona, executive director of the Great Plains Tribal Chairmen's Health Board, and faculty member at the Indian Legal Program of the Sandra Day O'Connor College of Law at Arizona State University.

Warne has received many awards recognizing his research accomplishments, educational leadership, and service work, including the American Public Health Association's Helen Rodríguez-Trías Award for Social Justice and the Explorer's Club 50 People Changing the World. Warne received a Bachelor of Science degree from Arizona State University, Doctor of Medicine degree from Stanford University's School of Medicine, and a Master of Public Health degree from the Harvard T.H. Chan School of Public Health.

CONCURRENT SESSION L1: Notes from the Field

3:40 - 5:05 pm

Moderators: Janet Hamilton and Suzanne Beavers

3:45 Salmonellosis Incidence and Case Characteristics Before and During the COVID-19 Pandemic — Oregon, March 2017–February 2021

Authors: Elizabeth Slocum, R. Trevejo, J. Hatch, R. Leman, E. DeBess, P. Cieslak

Background: Salmonellosis is the second-most reported bacterial enteric illness in the United States. National incidence of reported enteric illnesses, including salmonellosis, declined during the COVID-19 pandemic, but whether this reduction was an artifact of reduced care-seeking and testing is unknown. We evaluated pandemic-associated changes in reported incidence of salmonellosis, case characteristics, and exposures in Oregon.

Methods: We examined *Salmonella* cases reported to the Oregon Health Authority with polymerase chain reaction or culture-confirmation during March 2017–February 2021 (n = 1,855). We collected data on hospitalizations, demographic characteristics (age and sex), and reported exposures (restaurants, international travel, and gatherings). We examined differences between pre-pandemic (March 2017–February 2020) and pandemic (March 2020–February 2021) periods.

Results: Compared with pre-pandemic, during the pandemic reported salmonellosis cases decreased (11.7/100,000 and 9.0/100,000 persons, respectively) and *Salmonella*-related hospitalizations decreased (2.6/100,000 and 2.2/100,000 persons, respectively). Percentage of salmonellosis patients hospitalized did not change significantly when comparing pre-pandemic to pandemic (22.0% [95% CI: 19.9%–24.2%], 24.4% [20.2%–29.0%], respectively). Pre-pandemic median age was 38 years (interquartile range [IQR]: 22–57 years) and 45.3% were male. During the pandemic, median age was 41 years (IQR: 23–61 years) and 42.7% were male. Compared with pre-pandemic, during the pandemic decreases in exposures to restaurants (72.2% [95% CI: 69.5%–74.7%], 59.5% [95% CI: 53.7%–65.0%], respectively), international travels (18.6% [95% CI: 16.5%–20.8%], 4.7% [95% CI: 2.7%–7.6%], respectively), and gatherings (20.8% [95% CI: 18.5%–23.2%], 8.9% [95% CI: 6.0%–12.6%], respectively) were reported.

Conclusions: Reported salmonellosis incidence decreased, and its epidemiologic characteristics changed during the pandemic. Decreases in both overall incidence and hospitalized cases suggest reduced acquisition of salmonellosis rather than decreased sensitivity of surveillance. Decreases in frequency of travel, restaurant, and gatherings exposures indicate that lifestyle changes during the pandemic contributed to reductions in salmonellosis.

4:05 Gastrointestinal Illness Among Hikers on the Washington State Pacific Crest Trail, August–October 2022

Authors: Arran Hamlet, K. Begley, S. Miko, L. Stewart, M. Tellier, J. Gonzalez De Leon, H. Booth, S. Lippman, A. Hatada, S. Lindquist, B. Melius, M. Goldoft, M. Mattioli, M. Holshue

Background: The Pacific Crest Trail (PCT) stretches ~2,650 miles from California to Washington State. Annually, thousands of hikers attempt this over 4–6 months. In August 2022, the Washington State Department of Health received informal reports of persons experiencing gastrointestinal illness (GI) symptoms hiking the PCT. We investigated the outbreak to identify potential sources and prevent further infections.

Methods: We searched social media platforms popular with PCT hikers and identified reports of GI symptoms. We developed a REDCap survey assessing symptoms, onset dates, and exposures. Requests to complete the online survey were distributed on social media and through flyers posted at PCT trailheads where illnesses had been reported. Respondents who provided contact details were symptomatic during previous 14 days, and still traveling in WA were contacted to obtain stool samples for testing and genotyping. We used locations and onset dates from the survey and pathogen diagnosis to identify sites for environmental sampling; testing for fecal indicators (qPCR) and norovirus (RT-qPCR) were done.

Results: In total, 27 ill hikers completed the survey; 17 provided symptom onset locations, all within a 73-mile section of the PCT in Washington. Two hikers' fecal samples were tested; both had norovirus GII.10[P16]. Water and surface sampling was conducted from a drinking water stream and lake and in 1 cabin, 2 pit latrines, and 4 latrines at a road crossing. Human-specific fecal surface contamination was detected on cabin and all latrine surfaces; norovirus was not identified in any environmental samples.

Conclusions: This GI outbreak among hikers on a national trail was likely caused by norovirus. Despite norovirus not being detected in environmental samples, evidence of human feces on potential exposure surfaces indicates poor hygiene and/or sanitation could have facilitated person-to-person transmission. To prevent future outbreaks along trails, we recommend improved hygiene and regular sanitation of shared facilities.

4:25 Correlations Between Wastewater Concentrations of SARS-CoV-2 and COVID-19 Cases Vary over 90-Day Periods — California, February–October 2022

Authors: Cassandra O. Schember, A. Yu, T. León, A. Abram, E. Burnor, M. Rane, S. Ravuri, K. Wong, D. Vugia, S. Jain

Background: Early in the COVID-19 pandemic, wastewater SARS-CoV-2 virus concentrations positively correlated with COVID-19 case counts, but this correlation pattern has likely changed. The pandemic has evolved with increased vaccine coverage and decreased confirmatory testing, and we have limited data regarding how changes in variants, immune status, testing behaviors, and fecal shedding might affect these correlations. To determine the stability of the association between wastewater SARS-CoV-2 concentrations and COVID-19 case counts throughout the pandemic, we examined 90-day rolling correlations between wastewater concentrations and case counts in California after the winter 2021–2022 Omicron variant BA.1 surge.

Methods: We extracted California Department of Public Health COVID-19 wastewater and case surveillance data during February–October 2022 for 11 sewersheds in 3 California regions. We assessed 90-day, rolling Pearson's correlations between raw wastewater SARS-CoV-2 concentrations with and without a 5- and 10-day lag, compared with polymerase chain reaction-confirmed COVID-19 cases from corresponding sewersheds.

Results: Analyzed sewersheds covered ~36% of California's population. After assessing rolling correlations in individual sewersheds, the median 90-day rolling correlation during February–June was 0.57 (interquartile range [IQR]: 0.47–0.77), decreased to 0.35 (IQR: 0.29–0.50) during June–August, and increased to 0.62 (IQR: 0.55–0.74) during September–October 2022. The decrease in strength of correlations during June–August corresponded to a peak then decline in confirmed cases, whereas wastewater concentrations increased; this was also observed when lagging wastewater concentrations by 5- and 10-days.

Conclusions: Discordance between wastewater concentrations and confirmed cases observed in summer 2022 was likely due to COVID-19 burden increasing while confirmatory testing was decreasing. Groups conducting wastewater surveillance should account for amount of confirmatory testing occurring and other potential factors when interpreting correlations between wastewater SARS-CoV-2 concentrations and confirmed COVID-19 cases, particularly during peaks in COVID-19 burden.

4:45 Leptospirosis Outbreak After Hurricane Fiona, Puerto Rico, 2022

Authors: Forrest K. Jones, A.G. Medina, K.R. Ryff, J. Irizarry-Ramos, J.M. Wong, E. O'Neill, I.A. Rodríguez, A.C. Hernandez-Romieu, M.T. Phillips, M.A. Johansson, T. Bayleyegn, C. Atherstone, K. Roguski DeBord, M.E. Negron, R. Galloway, L.E. Adams, M. Marzán-Rodríguez

Background: Leptospirosis is a bacterial disease endemic to Puerto Rico, which reported 51% of all cases nationally during 2016–2019 and historically reported increased cases after hurricanes. On September 18, 2022, Hurricane Fiona hit Puerto Rico, leading to major flooding. In response, we investigated leptospirosis cases and characterized temporal and spatial patterns.

Methods: The Puerto Rico Department of Health expanded leptospirosis laboratory testing, increased messaging to providers, and used existing surveillance to investigate cases reported with clinical suspicion for leptospirosis. Confirmed cases had a positive PCR result for pathogenic *Leptospira*, probable cases only had a positive IgM result, and suspected cases had negative or no laboratory results. We compared cases in the 37 weeks before Hurricane Fiona (January 2–September 17, 2022) and during the 11 weeks after Hurricane Fiona (September 18–December 3, 2022).

Results: Before Hurricane Fiona, 173 leptospirosis cases were reported, including 16 (10%) confirmed, 90 (52%) probable, and 67 (38%) suspected cases. After Hurricane Fiona, 743 cases were reported, including 31 (4%) confirmed, 84 (12%) probable, and 628 (84%) suspected cases; median age was 41 (interquartile range: 25–59) years, 486 (65%) were male, 375 (50%) were hospitalized, and 6 (1%) died. After Hurricane Fiona, the mean weekly number of confirmed or probable cases was 10.5, 3.6 (95% CI: 2.5–5.3) times higher than before (2.9 cases). Confirmed and probable cases were identified in 42/78 (54%) municipalities before Hurricane Fiona versus 47/78 (60%) municipalities after; 32 municipalities reported cases in both periods. For both periods, the four municipalities with the highest attack rates were western inland municipalities.

Conclusions: We identified an outbreak of leptospirosis that lasted >2 months after Hurricane Fiona, using existing surveillance built after previous hurricanes. In endemic areas, health departments should reinforce leptospirosis surveillance and increase clinician awareness, particularly during hurricane season.

CONCURRENT SESSION L2: Infectious Diseases in Healthcare Settings

3:40 - 5:05 pm

Moderators: Mike Bell and Prabasaj Paul

3:45 Investigation of the First Cluster of *Candida auris* Cases Among Pediatric Patients in The United States – Nevada, May 2022

Authors: Sophie Jones, K. Wu, D. Smith, K. Forsberg, J. Ruff, E. Misas, C. Prestel, D.J. Sexton, B. Min, P. Gable, F. Osman, T. Lynn, C. Lewis, J. Glowicz, H. Jones, C. Njoku, E. Archer, M. Walters, K. Causey, M. Lyman

Background: *Candida auris* is a frequently drug-resistant yeast that can cause invasive disease and is easily transmitted in healthcare settings. Pediatric cases are rare in the United States, with <10 reported before 2022. In August 2021, the first *C. auris* case in Las Vegas was identified in an adult. By May 2022, there were 117 cases identified across 16 healthcare facilities, including three pediatric cases at an acute care hospital (ACH) with adult cases, representing the first pediatric cluster in the U.S. CDC and Nevada Division of Public and Behavioral Health (NVDPBH) sought to describe these cases and risk factors for *C. auris* acquisition.

Methods: We defined a case as a patient's first positive *C. auris* specimen. We reviewed medical records and infection prevention and control (IPC) practices. Isolate relatedness was assessed using whole genome sequencing (WGS).

Results: All three pediatric patients were born at the facility and had congenital heart defects. All were <6 months old when they developed *C. auris* bloodstream infections; two developed *C. auris* endocarditis. One patient died. Patients overlapped in the pediatric cardiac intensive care unit, and two did not leave between birth and *C. auris* infection. Mobile medical equipment was shared between adult and pediatric patients; lapses in equipment cleaning and disinfection were observed, presenting opportunities for transmission. WGS showed pediatric cases were highly related and clustered with adult cases.

Conclusions: *C. auris* was likely introduced to the pediatric population from adults via improperly cleaned and disinfected mobile medical equipment. Recommendations were made to ensure adequate cleaning and disinfection and implement cleaning audits, no pediatric cases have been identified since. This investigation demonstrates transmission can occur between unrelated units and populations and that robust IPC practice throughout the facility is critical to limiting *C. auris* transmission, including to previously unaffected vulnerable populations, like children.

4:05 Coronavirus Disease 2019 Pandemic Impact on Antibiotic Use Among Hospitalized Adults – Indonesia and the Philippines, March 2018–February 2021

Authors: Amara Z. Fazal, O. McGovern, F. Lessa, G. Mahon, M. Gler, J. Garcia, M. Festin, K. Kuntaman, C. Siregar, J. Muere, G. De Guzman Betito, A. De Leon, M. Montemayor, E. Borillo, M. Llanes, R. Berba, L. Widyatmoko, B. Andriyoko, D. Turbawaty, I. Parwati, A. Sugianli, I. Ranita, F. Ginting, F. Rizky, M. Rusli, M. Qibtiah, B. Semedi, R. Sarassari, M. Krisna, R. Joesoef, T.S. Patel

Background: Antimicrobial resistance kills at least 1.27 million people annually and disproportionately affects low- and middle-income countries. Overuse of antibiotics is a major risk factor for antimicrobial resistance, and multiple countries reported increases in antibiotic overuse during the coronavirus disease 2019 (COVID-19) pandemic. COVID-19 severely affected hospitals in Southeast Asia, with over 35 million cases. We assessed the impact of COVID-19 on the use of antibiotics commonly used to treat respiratory infections in Southeast Asia.

Methods: We evaluated intravenous antibiotic use (AU) among hospitalized adults in acute care wards in three hospitals in Indonesia and three in the Philippines. AU rate for the 25 included antibiotics was calculated as monthly defined daily dose per 1000 patient-days (or discharges where patient-day information was unavailable) collected from pharmacy

dispensing records and administrative records, respectively. Median AU rates for the pre-pandemic (3/2018–2/2020) and pandemic (3/2020–2/2021) periods were compared with percent change calculated for: all 25 antibiotics combined; ceftriaxone; vancomycin and linezolid combined; and broad-spectrum antibiotics with activity against *Pseudomonas aeruginosa* (anti-PSA antibiotics). Statistical significance was determined by the Wilcoxon rank-sum test and defined as two-tailed *P* value <0.05.

Results: When compared to the pre-pandemic period, statistically significant increases in AU were observed during the pandemic for all 25 antibiotics combined in 4 of 6 hospitals (range: 6.9%–63.6%), ceftriaxone in 3 hospitals (range: 37.1%–55.4%), vancomycin and linezolid in 3 hospitals (range: 59.8%–212.6%), and anti-PSA antibiotics in 4 hospitals (range: 16.1%–161.5%). Ceftriaxone use decreased significantly in 3 hospitals (range: 15.9%–31.9%).

Conclusions: We observed substantial increases in antibiotic use among hospitalized adults in Indonesia and the Philippines during the COVID-19 pandemic, raising concerns about worsening antibiotic resistance. Robust diagnostic support from microbiology labs can help guide antibiotic use, especially during infectious disease pandemics.

4:25 Changes in the Age Distribution of COVID-19–Associated Hospitalizations in the United States – COVID-NET, 13 States, June 2021 – August 2022

Authors: Sarah Hamid, K. Woodworth, H. Pham, J. Milucky, S.J. Chai, B. Kawasaki, K. Yousey-Hindes, E.J. Anderson, J. Henderson, R. Lynfield, F. Pacheco, G. Barney, N. M. Bennett, E. Shiltz, M. Sutton, H. K. Talbot, A. Price, F. P. Havers, C. A. Taylor

Background: As SARS-CoV-2 becomes endemic, understanding changes in age groups most at risk is important to target interventions. We described changes in COVID-19–associated hospitalization rates in the Omicron BA.2/BA.5 variant–predominant period compared to the prior Delta variant–predominant period with a focus on infants aged <6 months.

Methods: We describe weekly COVID-19–associated hospitalization rates since June 20, 2021, using data from the Coronavirus Disease 2019–Associated Hospitalization Surveillance Network in 13 states and the National Center for Health Statistics’ 2020 postcensal population estimates. We compared age-group-stratified mean weekly hospitalization rates and, among young infants (aged <6 months), disease severity indicators (including intensive care unit [ICU] admission) between variant-predominant periods.

Results: During the Omicron BA.2/BA.5 period, the mean weekly hospitalization rate per 100,000 young infants was 1.6 (95% CI: 1.4–1.8) times higher than that during the Delta period. The proportion of hospitalized young infants with indicators of severe disease such as ICU admission did not increase between the Delta (22%; 95% CI: 18–28) and the Omicron BA.2/BA.5 (18%; 95% CI:14–22) periods. During the Delta period, mean weekly hospitalization rates were highest among adults aged ≥75 years (27.9) followed by adults aged 65–74 years (17.0); rates among young infants (8.3) and adults aged 18–64 years (8.1) were similar. During the Omicron BA.2/BA.5 period, mean weekly hospitalization rates were highest among adults aged ≥75 years (39.4), followed by adults aged 65–74 years (13.8) and young infants (13.7).

Conclusions: Although COVID-19 severity among hospitalized infants did not increase, COVID-19-associated hospitalization rates among young infants were higher during Omicron-predominant periods compared to the Delta-predominant period and were higher than those of all other age groups except adults aged ≥65 years. As young infants are ineligible for vaccination, maternal vaccination and nonpharmaceutical measures are important interventions.

4:45 Hepatitis C Virus Cluster at a Pain Clinic – Los Angeles, 2022

Authors: Jemma Alarcón, B. Dao, M. Jewell, M. Santos, C. Donabedian, A. Stanley, P. Gounder

Background: During October 2022, the Los Angeles County Department of Public Health (LACDPH) was notified of a patient with acute hepatitis C virus (HCV) infection with no known risk factors that had been treated previously at a local pain clinic. We investigated to determine a source and prevent further infections.

Methods: We reviewed medical records to confirm the patient's illness met the Council of State and Territorial Epidemiologists' case definition for acute HCV infection. We interviewed the patient regarding HCV risk factors during 6 months before symptom onset and conducted an assessment of the pain clinic. We matched names of patients who received procedures at the pain clinic ≤ 28 days before the index patient to the LACDPH HCV registry. We reviewed medical records for patients with HCV who had procedures the same day as the index patient and collected blood for whole-genome sequencing.

Results: Of 127 pain clinic patients, 1 with chronic and 1 with acute HCV infection matched with the HCV registry. All 3 patients had HCV genotype 1b infections and had procedures requiring anesthesia performed on the same day. Propofol and lidocaine were used for anesthesia; only lidocaine was in a multidose vial and was found inside the procedure room. The chronic HCV patient had the first procedure of the day, followed by the 2 acute HCV patients.

Conclusions: Identification of an uncommon HCV genotype (1b) and the temporal association of 2 acute cases in patients with similar procedures performed immediately after a patient with chronic HCV infection provided substantial evidence for HCV transmission from the medical procedures. A multidose vial used in the procedure room might have been inadvertently contaminated. Our investigation reinforces the importance of keeping multidose vials in the central medication area and taking only the needed dose to the procedure room.

CONCURRENT SESSION N1: COVID-19 Surveillance and Response

9:00 -10:45 am

Moderators: Priti Patel and Wences Arvelo

9:05 Estimating Bias in COVID-19 Vaccine Coverage Under Changing Population Sizes – U.S. Virgin Islands, December 2020–September 2022

Authors: Katie Labgold, H. Cranford, L. Ekpo, V. Mac, J. Roth, M. Stout, E. Ellis

Background: COVID-19 vaccine coverage estimates are necessary for guiding vaccination outreach. Precise vaccine coverage estimates rely on accurate counts of both individuals vaccinated and total population. Unlike U.S. states, the U.S. Virgin Islands (USVI) only receive updated population estimates every 10 years. 2020 U.S. Census Bureau data was unavailable until October 2021. Thus, USVI's COVID-19 vaccine coverage was calculated using 2010 population data. We compared COVID-19 vaccine coverage estimates using 2010 and 2020 population data to identify differences that could lead to gaps in COVID-19 vaccination outreach planning.

Methods: We estimated percentage of USVI residents with a completed primary COVID-19 vaccination series (1 dose of J&J/Janssen or 2 doses of Pfizer-BioNTech or Moderna) during December 16, 2020–September 20, 2022. We used USVI's vaccine database for the vaccine coverage numerator, whereas 2010 and 2020 U.S. Census Bureau total population estimates were used as denominators. Vaccine coverage was calculated overall and by island.

Results: In total, 54,739 persons completed a vaccination series. USVI population estimates were 106,405 (2010) and 87,146 (2020). Overall, COVID-19 vaccine coverage using 2020 population data was 11.4% higher than coverage using 2010 data (2010: 51.5%; 2020: 62.9%). Using 2020 data, vaccine coverage estimates were 11.4% higher for St. Croix and St. Thomas, and 6.1% higher for St. John than with 2010 data. The difference in vaccine coverage across islands using 2020 population data was smaller yet remained disparate.

Conclusions: Using outdated population data underestimated USVI COVID-19 vaccine coverage, potentially miscalculating vaccination outreach and other prevention program effectiveness. This underestimation misrepresented coverage differences within USVI, hindering USVI's ability to validly compare vaccination progress overall and across islands. More frequent population estimates are essential for accurately guiding USVI public health decision-making. Consequently, the U.S. Census Bureau and USVI might consider collaborating to generate intercensal estimates within territorial resource constraints.

9:25 How Far We Have Come: A COVID-19 Surveillance System Evaluation

Author: Rachel Wofford

Background: The COVID-19 pandemic introduced stress on the public health system and the need to be innovative to adequately track the rapidly increasing cases. In Tennessee, the first case of COVID-19 was reported on March 1st, 2020, with over two million cases reported since then. This study evaluated Tennessee's COVID-19 surveillance system for five system attributes: simplicity, data quality, timeliness, flexibility, and stability.

Methods: Stakeholder interviews were conducted with key users. Additionally, a statewide survey was deployed to assess the state office and local/regional public health staff's perception of the system on a Likert Scale with optional open-ended comment fields.

Results: Lower average scores were seen from local/regional office staff than state staff, with simplicity scoring the lowest overall (average score of 3.13/5). Lab reporting methods and flow during the initial stages of the surveillance system were prioritized in this evaluation. Throughout the pandemic, there were four major ways lab results were reported to the Tennessee Department of Health: electronic lab reporting (ELR), emergency use template/spreadsheet reporting, Point of Care REDCap survey, and manual entry. ELRs were responsible for the majority of lab reports submitted to the public health system. However, during the early months of the pandemic, when an influx of laboratories requested to participate in ELR, separate protocols had to be initiated to speed up the onboarding process. Where ELRs lacked simplicity, they allowed for greater timeliness which is essential during a pandemic with unprecedented case counts.

Conclusions: Throughout the pandemic, the surveillance system has adapted to the changing landscape of COVID-19 in Tennessee, including evolving case definitions, testing expansion, and variant waves. Overall, the Tennessee COVID-19 surveillance system has continued to adapt throughout the COVID-19 pandemic resulting in a more flexible, stable, timely, and simple system.

9:45 Quantitative SARS-CoV-2 Anti-Receptor Binding Domain Antibody Titer and Neutralization Capabilities in Previously Infected Persons – United States, January 2021 – February 2022

Authors: Anna Bratcher, J. Jones, A. Harris, K. Clarke

Background: People with immunocompromising conditions (IC) are at increased risk of severe COVID-19 and death. These individuals show weaker immunogenicity following vaccination than individuals without IC, yet immunogenicity after SARS-CoV-2 infection is poorly understood. To address this gap, the presence of infection-induced antibodies in sera following a positive COVID-19 test result was compared between people with and without IC.

Methods: Data were from CDC's national commercial laboratory seroprevalence study, a repeated, cross-sectional survey that includes associated diagnostic codes and previous COVID-19 viral test results. Infection-induced antibody seroprevalence in sera from people with a positive COVID-19 test result was compared by IC status for three post-infection periods: 14–90 (early), 91–180 (mid), and >180 (late) days. A logistic regression produced adjusted odds ratios (aOR) comparing infection-induced antibody prevalence among specimens with and without associated IC, adjusted for age, sex, and infection-induced antibody assay used (Abbott Architect, Ortho VITROS, or Roche Elecsys).

Results: The analytic sample consisted of 15,554 specimens across the three periods (4,571 early, 4,465 mid, and 6,518 late). Of these, 188, 157, and 283 specimens had one or more associated, recorded IC, respectively. During the early period, 22.3% of specimens with IC lacked infection-induced antibodies compared with 6.8% of those without IC. After adjustment, specimens with IC were more likely to lack infection-induced antibodies in the early (aOR: 4.85; 95% CI: 3.20–7.38), mid (aOR: 2.53; 95% CI: 1.57–4.09), and late (aOR: 1.62; 95% CI: 1.12–2.36) periods compared to specimens without IC.

Conclusions: Sera from people with IC is less likely to contain infection-induced antibodies following SARS-CoV-2 infection compared to sera from those without IC within the studied periods. These findings stress the importance of prevention measures for people with IC, such as pre-exposure prophylaxis, additional vaccination doses, and consistent mask use before and after a documented infection.

10:05 Patient Characteristics Among Children in a Large Pediatric Hospital System with SARS-CoV-2 During Early Omicron and Pre-Omicron Periods — Colorado, January 2021–January 2022

Authors: Michael J. Kacka, A. Burakoff, S. O'Brien, D. Tapay, S. Dominguez

Background: By January 2022, Omicron variants became the predominant SARS-CoV-2 infection in Colorado. We reviewed records of patients hospitalized in the largest pediatric hospital system in Colorado to better understand how infection during the Omicron period compared with the prior period.

Methods: We reviewed records of patients with admission diagnosis of SARS-CoV-2 during January 1, 2021–January 31, 2022. We compared the Omicron period (Omicron; December 25, 2021–January 31, 2022) with a pre-Omicron period (pre-Omicron; January 1–December 24, 2021) for patient age, croup or bronchiolitis diagnosis, presence of underlying medical conditions, death, and prior receipt of any COVID-19 vaccine based on eligibility.

Results: During Omicron, 204 cases were identified (no deaths), compared with 179 cases during pre-Omicron (5 deaths). Median patient age during Omicron was 0.8 years (range: 0–17.6 years) whereas, during pre-Omicron, median age was 5.2 years (range: 0–17.9 years) ($P < 0.001$). Six (3.4%) patients had croup and 32 (17.9%) had bronchiolitis during pre-Omicron, and 40 (19.6%) had croup and 74 (36.3%) had bronchiolitis during Omicron. Odds of croup (odds ratio [OR] = 7.0; 95% CI: 3.0–18.6) and bronchiolitis (OR = 2.6; 95% CI: 1.6–4.2) were significantly increased during Omicron compared with pre-Omicron. During Omicron, 103 (48.8%) patients had underlying medical conditions compared with 107 (57.5%) during pre-Omicron; odds of an underlying condition were increased in pre-Omicron (OR = 1.5; 95% CI: 0.97–2.2).

Conclusions: Patients during Omicron were younger, had more croup or bronchiolitis diagnoses, and had fewer death outcomes compared with pre-Omicron. The changing characteristics of SARS-CoV-2 variant infections requires rapid evaluation of their effects on patients to meet patient needs and support hospital systems' preparedness and response to COVID-19 trends.

10:25 Racial and Ethnic Disparities in COVID-19-Associated Deaths — North Carolina, March 2020–August 2022

Authors: Erin K. Ricketts, J. Alim, E. Wilson, A. Fleischauer, J. MacFarquhar, Z. Moore

Background: The COVID-19 pandemic has accounted for ~26,000 deaths in North Carolina to date, most occurring during 3 major pandemic waves. Consistent with national data, published unadjusted North Carolina data show these deaths were unevenly distributed by race and ethnicity. We assessed age-adjusted COVID-19 mortality in North Carolina by race and ethnicity to examine death distribution and guide outbreak response efforts throughout the pandemic.

Methods: COVID-19 associated deaths were collected from mandatory reports using North Carolina's Electronic Disease Surveillance System and from death certificates submitted to North Carolina's State Center for Health Statistics. Mortality rates were age-adjusted using U.S. Census Bureau data to describe distributions by race and ethnicity overall and throughout each of the 3 major pandemic waves during March 2020–August 2022.

Results: In total, 26,846 COVID-19-associated deaths were reported. Disparities were not constant throughout the pandemic. Hispanic persons experienced a 200% higher age-adjusted mortality than non-Hispanic persons during the first wave, and American Indian or Alaska Native persons experienced a 170% higher mortality than White persons during the second wave. Black persons did not have significantly higher adjusted mortality than White persons in any wave. Asian or Pacific Islander persons had 37% to 53% of the adjusted mortality of White persons throughout the pandemic.

Conclusions: Significant differences in age-adjusted mortality rates among Hispanic, American Indian or Alaska Native, and Asian or Pacific Islander persons were observed during 3 distinct pandemic waves. Changes in the characterization of disparities over the pandemic waves indicate acutely modifiable risks among different races and ethnicities exist in North Carolina. These data support North Carolina's equity team outbreak response goals (e.g. increasing vaccinations, and providing culturally competent resources) to acutely decrease disparities in COVID-19 outcomes.

CONCURRENT SESSION N2: Substance Use and Injury Prevention

9:00 - 10:45 am

Moderators: Chris Jones and Amanda Garcia-Williams

9:05 Every Minute Counts – Aberration Detection and Fatal Drug Overdose in Utah

Authors: Jack Pfeiffer, M. Broekemeier, M. Balough, J. Valdez, K. Regan, E. Vasquez Gomez, N. Idaikkadar, M. Friedrichs

Background: Drug overdoses are the leading cause of injury-related deaths in Utah. To improve Utah's suspected overdose surveillance response system timeliness and capacity to detect increases or aberrations in suspected overdose fatalities, we incorporated the exponentially weighted moving average (EWMA). EWMA monitors the moving average of daily overdose fatalities over time with diminishing weight effects over time as determined by a smoothing factor. We evaluated EWMA's capacity to timely detect aberrations to reduce overdose fatalities.

Methods: We developed a dashboard-embedded system for statewide and local health district (LHD)-level data. It used suspected fatal overdose data from Utah's Office of the Medical Examiner (OME) to calculate EWMA control charts to detect aberrations. A smoothing parameter (λ) of 0.55 was selected by finding the λ value that most accurately detected known aberrations in historic OME data. Aberrations were detected when EWMA exceeded upper detection limits from the 28-day period mean; 3 standard deviations were used as the cutoff for aberration detection, warranting immediate assessment and possible community intervention. A preliminary linear regression analysis of timeliness was conducted. The predictor variable was date of alert notification; the outcome of interest was alert delay (days from aberration occurrence to alert notification). Model data were available for July 3, 2022–November 12, 2022.

Results: Among all 13 LHDs, 10 LHDs experienced aberrations during the period, and 26 aberrations were detected in total. Alert delay range was 2–19 days (mean: 8 days). For every day since model implementation, alert delay was reduced by 2 hours ($P \leq 0.01$).

Conclusions: We found a reduction in alert delay post-implementation of EWMA for detection of fatal overdose aberrations, indicating improved timeliness for response efforts. EWMA can potentially result in more timely detection of aberrations in fatal overdoses and similar public health events allowing implementation of community interventions.

9:25 Adolescent Experiences During the COVID-19 Pandemic and Marijuana Use — United States, January–June 2021

Authors: Zerleen S. Quader, B. Hoots

Background: During the COVID-19 pandemic, adolescents reported experiencing poor mental health and additional stressors. These factors can contribute to increases in substance use, including marijuana; however, little is known about adolescent marijuana use patterns during the pandemic. We examined the association between adolescents' experiences during the pandemic and the prevalence of current and frequent marijuana use to inform adolescent marijuana use prevention strategies.

Methods: The Adolescent Behaviors and Experiences Survey (ABES) was a one-time cross-sectional, nationally representative survey of 9th through 12th grade students in the United States conducted by CDC during January–June 2021. Adjusted prevalence ratios (aPRs) and 95% confidence intervals (CIs) were used to assess the association between ten COVID-19-related experiences and behaviors (e.g., poor mental health, job loss, food insecurity, schoolwork difficulty, physical abuse, alcohol drinking) and current (past 30 days) and frequent (≥ 20 times in the past 30 days) marijuana use. Models were adjusted for sex, race/ethnicity, grade, and sexual identity. Analyses were weighted to account for sampling design.

Results: From January–June 2021, 13% of high school students reported current marijuana use; among those, 27% reported frequent use. All experiences/behaviors except virtual connectedness during the pandemic were associated with current marijuana use. Self-reported increased alcohol consumption during the pandemic had the strongest association (aPR: 3.6; 95% CI: 3.1, 4.3). Students experiencing parental emotional abuse, parental physical abuse, or poor mental health had over two times greater prevalence of current marijuana use. Factors associated with frequent marijuana use were parental job loss and student job loss during the pandemic.

Conclusions: Adolescents who reported stressful experiences during the pandemic were more likely to report current marijuana use. Job loss was also associated with frequent marijuana use. Characterizing adolescents' experiences during the pandemic that are associated with marijuana use can inform future prevention and intervention strategies.

9:45 Prevalence of Suicidality Among Sexually and Gender-Diverse Youth — Washington State, 2021

Authors: Randy M. Stalter, A. Shah, H. Gorman, J. Marcinkevage, M. Simckes, C. Wasserman

Background: Suicide is the second leading cause of death among those aged 10–24 years in Washington State. Sexually and gender-diverse (SGD) youth, including those who identify as gay or lesbian, bisexual, transgender, or questioning, have higher risk for suicidality. However, few population-based data regarding SGD youth are available. To inform prevention efforts, we assessed suicidality indicators using the Washington Healthy Youth Survey (HYS), a statewide, cross-sectional survey of health and risk behaviors among 8th-, 10th-, and 12th-graders, and compared suicidality prevalence among SGD youth relative to heterosexual and cisgender youth.

Methods: We used data from the 2021 Washington HYS that included questions about sexual orientation and gender identity (SOGI) and suicidal ideation, planning, and attempts in the past year. We included all 10th-graders who answered SOGI questions and calculated suicidality prevalence. Prevalence ratios (PR) were estimated using log-binomial models.

Results: Of 50,288 10th-grade participants, 43,695 (86.9%) were included; 9.7% identified as gender diverse (2.7% transgender, 4.5% questioning, and 4.4% something else fits better [categories non-mutually exclusive]) and 27.4% as sexually diverse (3.8% gay or lesbian, 12.9% bisexual, 5.4% questioning, and 5.2% something else fits better). Among SGD youth, 42.3% reported suicidal ideation, 33.9% reported suicide planning, and 17.8% reported attempting suicide in the past year, from 3.4 to 4.0 times higher than heterosexual, cisgender respondents (suicidal ideation PR: 3.4 [95% CI: 3.2–3.5]; suicide planning PR: 3.6 [3.4–3.8]; suicide attempt PR: 4.0 [3.7–4.4]). Among SGD youth, suicidality prevalence was highest among transgender youth; 25.3% reported attempting suicide, 4 times higher than cisgender youth (PR: 4.0 [3.4–4.6]).

Conclusions: SGD youth among Washington 10th-graders are numerous and varied, and experience high suicidality, particularly those identifying as transgender. This reinforces needs for tailored prevention programs for SGD youth that address suicidality risk factors and strengthen resiliency and well-being.

10:05 Trends by Sex in Cannabis Use Among Students – King County, Washington, 2004–2021

Authors: Precious Esie, M. Ta, S. Ross-Viles

Background: Frequent cannabis use among youth is linked to poor school performance and cognitive deficits. Legalization of nonmedical adult cannabis use in 2012 and the COVID-19 pandemic might have affected trends among King County, Washington youth. Data during 2004–2016 suggest that although cannabis use among King County youth declined, declines since legalization might have been faster among male vs. female youth. Analyses with data accounting for the pandemic have not been conducted. We used data during 2004–2021 to describe how sex differences in cannabis use among King County students might have changed and to better guide youth cannabis use reduction strategies.

Methods: The Washington State Healthy Youth Survey is a representative biennial cross-sectional survey of health and health-related behaviors administered to students in 6th, 8th, 10th, and 12th grades. We used data from 9 surveys conducted during 2004–2021 and restricted analyses to King County students. We generated survey-weighted prevalence estimates of frequent cannabis use (≥ 6 days during the past 30 days) by sex at birth. We evaluated prevalence differences (PDs) and 95%

CI by sex using survey-weighted generalized linear regression models including an interaction between sex and survey year.

Results: During 2004–2018, frequent cannabis use was markedly higher among male vs. female youth, with the largest difference in 2010 (7.5% vs. 3.9%; PD: 3.6% [95% CI: 3.5%, 5.1%]). In 2021, frequent use was not appreciably different between male and female youth (2.9% vs. 2.8%; PD: 0.1% [95% CI: -0.3%, 0.5%]).

Conclusions: Although previous years showed a gap in frequent cannabis use among youth in King County by sex, this gap was not present in 2021 and attributable to larger declines among male youth. To inform reduction strategies, more research is needed to better understand why declines were larger among male youth.

10:25 Characterization of Fatal Traumatic Brain Injuries – Alaska, 2016–2021

Authors: Katherine G. Newell, L. Castrodale, J. McLaughlin

Background: States with large proportions of residents in rural areas have higher rates of traumatic brain injury (TBI)-associated mortality. We characterized epidemiology of TBI-related mortality in Alaska to develop specific prevention strategies.

Methods: We reviewed death certificates from the Alaska Vital Statistics system collected during 2016–2021. We defined TBI-associated deaths as those with an injury-related *International Classification of Diseases, Tenth Revision* (ICD-10) code as the underlying cause of death, and a TBI-related ICD-10 code in ≥ 1 cause of death field. Mean annual rates of TBI-associated mortality were calculated as fatalities/100,000 population. Age-adjusted rates were calculated to enable comparison among population groups. Fatality characteristics were analyzed.

Results: We identified 1,527 TBI-related deaths. Alaska's age-adjusted TBI-related mortality rate was double the national average (36.2; 95% CI: 31.8–40.6 vs. 18.0; 95% CI: 17.8–18.1). Rates by sex and race were highest among males and American Indian (AI) and Alaska Native (AN) persons (55.1; 95% CI: 51.9–58.3/100,000 population, and 67.3; 95% CI: 61.0–73.6/100,000 population, respectively). Rates were highest in persons aged >85 years (147.7/100,000 population). Approximately 43% (649/1,527) of TBI-associated deaths in Alaska were attributable to suicide; 98% (635/649) involved a firearm. Among persons aged 25–34 years rate of TBI-associated mortality attributable to suicide was >3 times higher in Alaska than national average (22.4/100,000 population vs. 7.2/100,000 population, respectively). Age-adjusted rates of TBI-associated mortality attributable to suicide within Alaska were highest among AI and AN persons (23.6; 95% CI: 20.0–27.2).

Conclusions: Alaska's rate of TBI-associated mortality is double the national average. Suicide is the most common attributable mechanism of TBI-associated mortality among Alaskans, and AI and AN persons are disproportionately affected. These findings underscore the need for suicide prevention programs in Alaska, particularly in AI and AN communities.

CONCURRENT SESSION 01: Tuberculosis

1:20 - 2:45 pm

Moderators: Phil LoBue and Michelle Lin

1:25 Tuberculosis and End-Stage Renal Disease — United States, 2010–2019

Authors: Kimberly R. Schildknecht, M. Deutsch-Feldman, D. Forbes, J. Cummins, M. Haddad, J. Wortham

Background: Approximately 800,000 persons nationwide are on dialysis for end-stage renal disease (ESRD), resulting in >\$36 billion in annual Medicare expenditures. ESRD causes immunosuppression and increased risk for progression to tuberculosis disease following *Mycobacterium tuberculosis* infection. To describe the burden and assess the effects of testing persons with ESRD for *M. tuberculosis* infection, we produced the first nationwide estimates of ESRD-associated tuberculosis incidence and mortality.

Methods: We conducted a cross-sectional analysis of tuberculosis cases and deaths reported to the National Tuberculosis Surveillance System during 2010–2019. We examined *M. tuberculosis* infection test results for cases, stratified by reported ESRD status, and used U.S. Renal Data System denominators to estimate annual tuberculosis incidence rates among persons with ESRD. Among persons with tuberculosis, we calculated prevalence odds ratios to estimate associations between ESRD and all-cause death or *M. tuberculosis* infection test results.

Results: Among 96,168 tuberculosis cases reported during 2010–2019, 2,457 (2.6%) occurred among persons with ESRD. Compared with 2.0–3.0 tuberculosis cases/100,000 persons in the overall U.S. population each year, annual tuberculosis rates were 32.0–43.8 cases/100,000 persons with ESRD. Compared with persons with tuberculosis but not ESRD, persons with tuberculosis and ESRD had nearly 7 times the odds of death (910 [37.0%] persons with both conditions; 7,424 [7.9%] with only tuberculosis; 95% CI: 6.3–7.4) and lower odds (0.77) of a positive blood or skin test for *M. tuberculosis* infection (946 [46.7%] versus 44,576 [61.5%]; 95% CI: 0.74–0.80).

Conclusions: Estimated annual tuberculosis incidence among persons with ESRD was 10 times higher than overall U.S. tuberculosis incidence; over 1 in 3 died. However, persons with tuberculosis and ESRD were more likely to have false-negative *M. tuberculosis* infection test results. Therefore, clinicians should not exclude tuberculosis as a diagnostic possibility in a person with ESRD even if testing is negative.

1:45 Tuberculosis Outbreak in Rural Arkansas, 2015–2022

Authors: Thomas D. Filardo, M. Deutsch-Feldman, V. Maturino, L. Marzano, T. Dulski, S. Cooley, A. James, J. Wortham, S. Chai, R. Stewart, L. Mukasa

Background: Despite decreasing incidence of tuberculosis in the United States, tuberculosis outbreaks continue to occur. During March 2015–March 2022, the Arkansas Department of Health (ADH) identified 21 tuberculosis cases sharing a unique genotype or with known epidemiologic linkage. ADH and CDC investigated the extent of transmission and identified barriers to tuberculosis control during March–April 2022.

Methods: We defined outbreak-associated cases as those with a matching genotype or epidemiologic linkage to another outbreak-associated case during 2015–2022. We reviewed public health and medical records for outbreak-associated cases and estimated infectious periods, during which patients were considered contagious. We interviewed patients and medical providers and reviewed public health and medical records to characterize transmission and identify tuberculosis control barriers.

Results: We identified 23 outbreak-associated cases among Arkansas residents, including 2 previously unrecognized as outbreak cases. Seventeen cases were reported in or epidemiologically linked to cases in Howard County, Arkansas (population <15,000). Of 68 identified contacts in Arkansas, 22 (32%) were diagnosed with latent tuberculosis infection. Tuberculosis cases were epidemiologically linked within households or close social networks. Among 18 patients aged ≥15 years with pulmonary tuberculosis, the median infectious period was 6 months (range: 2–11 months). Eleven patients had 20 healthcare encounters during their infectious periods where no tuberculosis diagnostics were performed. Medical providers reported prolonged turnaround time for sputum smear testing and low tuberculosis incidence as barriers to timely diagnosis. Patients reported lack of tuberculosis outbreak awareness and limited knowledge of tuberculosis symptoms as barriers to seeking tuberculosis evaluation.

Conclusions: This large tuberculosis outbreak was characterized by transmission within close social networks and households in a rural community, diagnostic delays, and lack of tuberculosis awareness. When community tuberculosis transmission is detected, we recommend early engagement with medical providers and community members to raise awareness and facilitate prompt diagnosis.

2:05 Epidemiology and Treatment Outcomes of Tuberculosis and Chronic Hepatitis B Coinfections – California, 2016–2020

Authors: J. Bradford H. Bertumen, L. Pascopella, E. Han, R. Glenn-Finer, L. Stockman, R. Wong, A. Chitnis, D. Jaganath, M. Jewell, P. Gounder, S. McElroy, P. Barry

Background: Tuberculosis (TB) disease and chronic hepatitis B (CHB) are serious, preventable conditions. Data regarding effects of CHB in those with TB are limited, including TB treatment outcomes possibly worsened by chronic liver disease and TB medication hepatotoxicity. We compared the characteristics and TB treatment outcomes of persons with coinfection, and those with TB only, in California.

Methods: We matched California Department of Public Health TB and CHB registries for 2016–2020 using a probabilistic algorithm to identify persons with coinfection. We used Chi-square analysis to compare demographic, risk factor, and clinical information among those with TB and CHB coinfection and those with TB only. We compared death during TB treatment and documented TB treatment completion between these groups using Poisson regression models adjusted for confounders.

Results: We identified 324 persons with TB and CHB coinfection and 8,119 with TB only. Among persons with coinfection, 264 (81.5%) were non-U.S.-born Asian vs. 4,186 (51.6%) with TB only ($P < 0.0001$). Persons aged ≥45 years represented a larger proportion of coinfections, vs. those with TB only (266 [82.1%] vs. 5,520 [68.0%]; $P < 0.001$), as did those with end-stage renal disease (26 [8.0%] vs. 322 [4.0%]; $P < 0.001$), HIV (21 [6.5%] vs. 247 [3.0%]; $P = 0.03$), and other immunosuppressive conditions (38 [11.7%] vs. 637 [7.9%]; $P = 0.01$). Adjusted relative risk ratios for death during TB treatment and incomplete TB treatment for those with coinfection vs. TB only were 1.33 (95% CI: 1.01, 1.74) and 1.23 (95% CI: 1.01, 1.50), respectively.

Conclusions: TB and CHB coinfection was associated with increased risk of poor TB treatment outcomes. Persons with coinfection were disproportionately non-U.S.-born Asian, ≥45 years of age, and affected by chronic medical conditions. Screening TB or CHB patients in these groups for the other condition could be considered to improve linkage to care.

2:25 Reduced Tuberculosis Incidence Among People with HIV After Tuberculosis Preventive Treatment in a High-Burden Multidrug-Resistant Tuberculosis Setting — Ukraine, 2018–2022

Authors: Olutomi Sodeke, J. Da Silva, S. Vallabhaneni, S. Pals, F. Mishara, N Podolchak, I. Doan, E. Barzilay, R. Kulchynska, S. Shah

Background: Tuberculosis (TB) is the leading cause of morbidity and mortality among people with HIV (PWH) worldwide. The World Health Organization recommends six months of isoniazid to prevent TB disease among PWH. However, it is unclear how effective isoniazid TB preventive treatment (TPT) is in settings with high incidence of multidrug-resistant (MDR) TB — defined as TB that is resistant to at least isoniazid and rifampin. We assessed the relationship between isoniazid TPT and TB incidence among PWH in Ukraine, a high-burden (31.0%) MDR TB setting, from 2018–2022.

Methods: We conducted a retrospective (January 2018–February 2022) cohort analysis of the Ukraine national HIV and TB electronic case-based surveillance database, where all PWH are enrolled. TPT was categorized as complete if documentation confirmed adherence to ≥ 146 days of isoniazid, partial if 28–146 days, and none if < 28 days. TB incidence rates (cases per 100 person-years) and incidence rate ratios (IRRs) were calculated

for each of the TPT completion categories using a Poisson model, adjusting for demographic and clinical variables.

Results: Of the 166,365 PWH, 123,884 (74.5%) included complete data on TPT duration and TB diagnosis. Overall, 24.7% completed TPT, 9.6% had partial completion, and 65.7% had no TPT. Adjusted TB incidence rate was 1.9, 2.8, and 5.0 among those that completed, partially completed (IRR 1.45), and had no TPT (IRR 2.58), respectively. Among PWH with newly diagnosed TB, drug resistance occurred in 21.9%, 20.4%, and 21.6% of those that completed, partially completed, and had no TPT, respectively.

Conclusions: In Ukraine, TB incidence showed a dose-response relationship to TPT duration and was lowest in PWH who completed TPT. Multidrug resistance was commonly observed in this setting and comparable across TPT groups. These findings suggest TPT may benefit PWH in high-burden MDR-TB settings.

CONCURRENT SESSION O2: Vector-Borne Diseases

1:20 -2:45 pm

Moderators: Monica Parise and Larry Cohen

1:25 First Locally Acquired Dengue Virus Infection in Maricopa County — Arizona, November 2022

Authors: Kathryn Burr, M. Kretschmer, J. Collins, A.P. Dale, F.K. Jones, J. Townsend, I. Ruberto, B. Garrett, N. Busser, G. Adame, A. Panella, L. Koski, K. Fitzpatrick, G.A. Santiago, K. Zabel, R. Turner, J. White, K. Turnbow, L. Adams, N. Staab, R. Sunenshine, Dengue Response Field Team

Background: Dengue, a mosquito-borne disease, is not endemic in the continental United States. On November 8, 2022, Maricopa County Department of Public Health reported a dengue patient with <4 hours travel to Mexico on October 12 and dengue-consistent symptoms starting October 19. In response, Maricopa County Environmental Services Department (MCESD) tested for dengue virus (DENV) in mosquitoes collected on October 5 near the patient's residence. Testing from mosquitoes and patient identified closely related DENV-3 strains not known to be in the travel region, suggesting local transmission. We investigated to identify possible locally transmitted cases and stop spread.

Methods: On November 17–19, we interviewed residents within 150 meters surrounding the DENV-positive mosquito pool and patient's residence. DENV blood testing and environmental assessments for mosquito breeding areas were offered. Arizona Department of Health Services (ADHS) tested human samples using DENV serum enzyme immune-assay for IgM antibodies; CDC confirmed IgM-positive samples by plaque reduction neutralization. ADHS performed DENV polymerase chain reaction (PCR) for residents with dengue-like illness within previous 14 days. PCR-positive samples were whole genome sequenced by CDC. MCESD conducted countywide DENV PCR testing of mosquito pools.

Results: Of 241 households we interviewed, 59 (24.5%) and 72 (29.9%) had environmental assessments. Seventy-three persons were interviewed, and 53 (72.6%) consented for DENV blood testing. Thirteen (24.5%) symptomatic persons were PCR-negative. One (1.9%) person had confirmed DENV-3. Environmental assessment of this person's residence found evidence of *Aedes aegypti* mosquitoes. This person reported symptom onset August 8 with no travel; a concurrently symptomatic household member declined testing. PCR yielded 4,320 negative mosquito pools countywide during September 18–November 19.

Conclusions: Rapid response was crucial to identify 2 likely autochthonous DENV infections in Maricopa County. Although residents were provided education and breeding sites mitigated, continued vigilance for locally transmitted DENV is needed.

1:45 Application of 2022 Lyme Disease Case Definition to Historical Data – Wisconsin, 2017–2021

Authors: Musheng L. Alishahi, R. Osborn, R. Klos

Background: Lyme disease, a tickborne disease, is the most common vectorborne disease in Wisconsin. In January 2022, the Wisconsin Department of Health Services began using the 2022 Council of State and Territorial Epidemiologists and CDC's Lyme disease case definition for high-incidence states. Notably changed from the previous definition is dependence on confirmatory laboratory evidence, without consideration of clinical criteria. Local public health investigations to gather clinical criteria were time intensive and resulted in missing data and underreporting. To improve interpretation of Lyme surveillance data, we quantified change in case counts by applying the 2022 case definition to historical data.

Methods: We applied the 2022 laboratory-only case definition for Lyme disease reports during January 2017–December 2021 and calculated percentage change in cases between the 2 case definitions for all Wisconsin counties, and assessed differences by age and sex.

Results: We identified 39,726 suspected Lyme disease reports. Applying the 2017 case definition resulted in 10,953 (27.6%) Lyme disease cases. Applying the 2022 case definition resulted in 22,472 (56.6%) Lyme disease cases, a 105.2% increase. Of 72 counties, 67 (93%) had increased cases, 10 increased by >75%, 5 counties in southwestern and northeastern Wisconsin had fewer cases. Mean age was 47.2 years (range: 0–93 years), and 58.4% were male among patients who met the 2022 case definition, and 45.7 years (range: 0–103 years) with 56.5% male among those who met the 2017 case definition.

Conclusions: The 2022 case definition resulted in a substantial increase in Lyme disease case counts in Wisconsin based on historical data. In most counties, the 2022 laboratory-only Lyme disease case definition will likely capture more cases and require fewer public health resources, which could be used to support other efforts, including prevention. Interpretation of historical data with new case definitions is necessary to understand trends prospectively.

2:05 Principal Component Analysis of the Serological Response to *Plasmodium falciparum* Using a Multiplex Bead-Based Assay To Help Guide Malaria Control Interventions – Nigeria, 2018

Authors: Jonathan S. Schultz, C. Leonard, D. Sayre, S. Lee, C. Heilig, B. Ogunniyi, P. Uhomobhi, A. Abubakar, N. Iriemenam, M. Okoye, M. Plucinski, L. Steinhardt, E. Rogier

Background: Nigeria accounted for 27% of global malaria cases reported in 2021, more than any other country. Public health interventions for malaria control traditionally target cross-sectional measurement of malaria parasite antigen carriage using rapid diagnostic tests; however, these estimates are not stable measures of malaria burden in a community. Quantifying malaria antibody responses could provide a robust measure to reflect the disease burden more accurately over space and time. We assessed whether multiple serological responses to *Plasmodium falciparum* (Pf) could be combined into accurate composite measures of exposure and frequency of infections to better target resources.

Methods: Previously collected dried blood spot samples (N = 32,494) from participants under 15 years of age from a 2018 nationally representative Nigeria HIV/AIDS household survey were analyzed using a multiplex bead-based assay to measure immunoglobulin G (IgG) levels to five Pf-specific antigens and

histidine-rich protein 2 (HRP2) as a marker of acute infection. We used a principal component analysis (PCA) to simplify these five IgG levels into principal component (PC) scores and compared them to traditional Pf exposure risk factors (e.g., age), HRP2 level by geographic location, and mapped them by state.

Results: The first two PC scores explained 75% of the variance in IgG levels. PC1, a weighted average of the five IgGs, indicated Pf seroprevalence. PC1 scores increased logarithmically with age and were significantly higher for rural participants (P < 0.001). PC2 contrasted IgG levels acquired after multiple infections over time to those that persist after a single infection, implicating PC2 as a measure of repeated infections. Mean state PC2 score correlated with mean state HRP2 level (P = 0.04).

Conclusions: PCA of cross-sectional serological data can simplify multiple antibody responses to indicate Pf seroprevalence and overall disease burden to enable improved targeting of resources to areas at greatest need of malaria interventions.

2:25 Syndromic Surveillance in Dengue Outbreak Response – Florida, 2022

Authors: Katharine E. Saunders, A. Morrison, R. Zimler, D. Atrubin, A. Mejia-Echeverry, S. Baudin, E. Rico, S. Barajas, E. Crandall, L. Franks, K. Edwards-Taylor, S. Patelsky, B. Benton, H. Leon, S. Grubbs

Background: In 2022, Florida reported a dengue outbreak and the most cases on record. Because dengue is not endemic to Florida, viral transmission from imported cases to the local mosquito population is a concern. Providers are required to report any suspected dengue cases directly to county health departments (CHDs), but historically, most cases are identified through electronic laboratory results (ELR) from commercial laboratories after test results are available. Additionally, enhanced syndromic surveillance queries are used during outbreak periods to identify emergency department and urgent care visits suspicious for dengue. We assessed data sources for dengue surveillance in Florida to improve timely case identification.

Methods: Suspected dengue cases are reported to CHDs by ELR, provider reports, or through enhanced syndromic surveillance. Records of interest are forwarded to CHDs to investigate and determine if national case definition is met. We reviewed case investigation data for confirmed and probable dengue cases reported during June 27–November 7, 2022, to determine how cases were first reported to CHDs. We also analyzed the time from symptom onset to mosquito control notification for each reporting category.

Results: We identified 608 confirmed and 57 probable dengue cases. Overall, 312 (47%) cases were first reported by ELR, 290 (44%) through syndromic surveillance, and 63 (9%) by providers. Mean time between symptom onset and notification of mosquito control services was 15.73 days (range: 5–72 days) for ELR, 11.94 days (range: 1–41 days) for syndromic surveillance, and 9.54 days (range: 1–33 days) for provider-reported cases.

Conclusions: ELR and syndromic surveillance provided most reports of dengue cases during the outbreak. Although case reporting from providers in Florida was low, identification of cases from provider reports or syndromic surveillance allowed for earlier public health interventions, such as mosquito spraying, to reduce potential local transmission.

LATE-BREAKING REPORTS

3:45 - 5:00 pm

Moderator: Nirav Shah and Eric Pevzner

3:50 Measles Outbreak in Central Ohio – October 2022–February 2023

Authors: Elizabeth Tiller, N. Masters, K. Raines, A. Mathis, S. Crooke, G. French, R. Zwickl, E. Alexy, E. Koch, N. Tucker, E. Wilson, T. Krauss, J. Budd, E. Leasure, L. Billing, C. Dewart, K. Tarter, K. Dickerson, R. Iyer, A. Jones, K. Halabi, M. Washam, D. Sugerman, M. Roberts

Background: During June–October 2022, 4 internationally imported cases of measles were confirmed in residents of Franklin County, Ohio. All case patients traveled to East Africa; none had evidence of measles, mumps, and rubella (MMR) vaccination. On November 5, 2022, a local hospital reported 2 children with suspected measles; neither had received MMR vaccine or traveled internationally. Each subsequently tested positive for measles. On November 9, a measles outbreak was declared. We investigated to assess outbreak magnitude, morbidity, and chains of transmission.

Methods: We conducted enhanced case finding for patients with clinically suspected measles following dissemination of public health advisories and collected specimens for real-time reverse transcription-polymerase chain reaction, genotyping, and serology testing. We defined a case as febrile rash illness and laboratory-confirmed measles or an epidemiological link to a laboratory-confirmed case in an Ohio resident or visitor during October 11, 2022–February 4, 2023. We used case investigation information from the Ohio Disease Reporting System to describe demographics, clinical characteristics, and reported exposure settings.

Results: We identified 85 measles cases in Ohio with rash onset during October 22–December 24, 2022. Seventy-four were laboratory-confirmed; all genotyped specimens were B3. Median case-patient age was 1 year (range: 6 months–15 years). Eighty (94%) were unvaccinated; 56 (70%) were age-eligible for routine MMR vaccination. Forty-four (52%) developed measles complications, including otitis media (33; [39%]), diarrhea (22; [26%]), and pneumonia (7; [8%]). Thirty-six (42%) required hospitalization; median hospital stay was 3 days (range: 1–7 days). Reported exposure settings included child care centers (22; [26%]) and healthcare facilities (32; [38%]).

Conclusions: This outbreak highlights the ongoing threat of measles resurgence, associated morbidity among mostly unvaccinated children, and potential transmission risk in child care centers and healthcare facilities. Healthcare facilities, medical providers, and child care centers serving under-vaccinated populations should maintain vigilance for measles.

4:00 Epidemiologic and Clinical Features of Deaths Among Persons with Mpox — United States, May 17–January 25, 2023

Author: Allison Hanley, A. Riser, L. Salmon-Trejo, S. Kindilien, R. Velazquez-Kronen, J. Alarcón, R. Anderson, K. Byrd, J. Gold, C. Hughes, J. Lee, S. O'Connor, J. O'Shea, K. Wong, C. Zelaya, E. Belay, W. Bower, S. Ellington, A. Gundlapalli, A. McCollum, L. Zilversmit Pao, A. Rao, S. Guagliardo

Background: During May 2022–January 2023, >30,000 mpox cases were reported in the United States (US), and 26 deaths occurred. We sought to understand the epidemiologic and clinical characteristics of mpox-associated deaths and how they differed from mpox cases overall, which can be used to inform prevention of morbidity and mortality.

Methods: Deaths associated with mpox were reported via the Data Collation and Integration for Public Health Event Response (DCIPHER) platform and/or the National Notifiable Diseases Surveillance System (NNDSS) per jurisdiction-specific procedures. Deaths were 'attributed to mpox' when mpox was the underlying cause of death or a contributing factor leading to death. Cause of death was determined by the treating healthcare provider and reported on the death certificate. Jurisdictional health departments obtained and shared death certificate data with the CDC. Descriptive statistics on demographics and clinical features were calculated for all cases of mpox and all deaths attributed to mpox.

Results: Preliminary results indicate that among decedents, the median age was 37.5 years (range: 25-55), 88.5% were Black, 69.2% were cis-gender men, 61.5% were HIV+, 73.0% were hospitalized for mpox, and median duration from symptom onset to death was 70 days (range: 1-146). This differed from surviving persons with mpox, in which the median age was 34 years (range: 0-89), 32.3% were Black, 81.8% were cis-gender men, 13.9% were HIV+, and 5.5% were hospitalized for mpox.

Conclusions: While mpox deaths were rare (0.09%), racial disparity was observed. Ensuring equitable access to education on mpox, available prevention measures (e.g., safer sex practices, vaccine), and early appropriate treatment may reduce mpox-related mortality. The high prevalence of co-occurring HIV in deaths attributed to mpox warrants further study to better understand mpox illness among immunocompromised persons and improve timely HIV and mpox treatment accessibility in the US.

4:10 Fatal *Bacillus anthracis* Infection in a Hospitalized Patient Immigrating from Haiti

Author: Jessica van Loben Sels, V. Mac, J. Bernadel, A. Gumbs, B. Lettsome, L. Harrigan, B. Pinney, D. Cole, D. Grell, P. Lee, C. Marston, C. Gulvik, Z. Weiner, M. Lawrence, B. Ellis, E. Ellis

Background: Human anthrax infection is rare in the United States, with <1 case reported a year. Human anthrax infection can be deadly without treatment and occurs through cutaneous exposure, injection, ingestion, or inhalation of *Bacillus anthracis* (BA) spores. Typically, these spores originate from natural reservoirs (e.g., soil or animals). Areas without effective livestock vaccination programs, including parts of the Caribbean, report higher incidences of human anthrax infection. In December 2022, a U.S. Virgin Islands (USVI) hospital notified the local Department of Health (VIDOH) of blood cultures with suspected BA growth that were obtained from a Haitian immigrant hospitalized with neck cellulitis. The patient died from disseminated intravascular coagulopathy the same day as this notification. VIDOH investigated to confirm the causative agent and prevent an outbreak.

Methods: The territorial public health laboratory handled, packaged, and shipped specimens to Laboratory Response Network partners in Florida for confirmatory polymerase chain reaction (PCR) testing. CDC performed whole genome sequencing (WGS) and compared the sequence with other BA isolates. VIDOH identified close contacts (i.e., clinicians and family who provided direct care or handled patient specimens) through case interviews and medical record reviews and monitored them for symptoms.

Results: Five days after notification, PCR testing confirmed BA was the causative agent of the cutaneous lesions. VIDOH identified 19 hospital employees and 4 family members as close contacts and provided post-exposure antibiotics; none developed illness. WGS data revealed the isolate likely originated in Haiti, with no direct link to known BA isolates.

Conclusions: We confirmed a human case of cutaneous anthrax in USVI. Rapid confirmation allowed prompt identification, treatment, and monitoring of close contacts. This investigation demonstrates how collaborative partnerships can support effective emergency response in laboratory capacity-limited settings. VIDOH used associations with local and mainland partners to respond to a public health threat quickly and successfully.

4:20 Salmonellosis Outbreak Linked to Alfalfa Sprouts – Nebraska, December 2022

Author: Lauren Jansen, B. Loeck, N. Smith, S. Koirala, J. Frederick, C. Wetzell, H. Giambone, T. Litz, L. Dayne, J. Sison, D. Bumgardner, K. Schultis, A. Carlson, C. Wolinski, M. Donahue, B. Buss

Background: Salmonellosis is an illness caused by infection with the bacteria *Salmonella*; common symptoms include diarrhea, fever, and abdominal cramping. On December 19, 2022, the Nebraska Department of Health and Human Services (NDHHS) received a report of a salmonellosis cluster from the Douglas County Health Department (DCHD). We initiated a collaborative, multijurisdictional investigation to identify the infection source and prevent additional illnesses.

Methods: We reviewed laboratory-confirmed salmonellosis cases occurring during December 2022 in Nebraska. We interviewed ill persons to elicit possible sources of exposure, and medical records were reviewed. *Salmonella* isolates underwent whole genome sequencing (WGS) performed by Nebraska Public Health Laboratory. Preliminary traceback was conducted by NDHHS and DCHD.

Results: Twenty-two cases were identified, with illness onset dates during December 5–28. Patients had a median age of 41 years (range: 1–78 years); 15 (68%) were female. Five (23%) were hospitalized; no deaths were reported. Alfalfa sprout consumption was reported by 17 (77%) patients. The outbreak serotype was found to be *Salmonella* Typhimurium. Isolates from 21 cases had WGS matching within 0–2 alleles, suggesting a common exposure source. Preliminary traceback of alfalfa sprouts from patient-reported grocery stores and restaurants revealed the sprouts were produced by 1 Nebraska grower. Two restaurants known to have served affected sprouts were advised to discontinue their use on December 20. An NDHHS press release was distributed on December 23, warning state residents of the outbreak and to avoid sprout consumption. Four lots of alfalfa sprouts were recalled by the single Nebraska grower on December 29.

Conclusions: We confirmed an outbreak of *Salmonella* Typhimurium associated with alfalfa sprouts grown in Nebraska. Rapid epidemiologic investigation enabled timely identification of the outbreak source and implementation of control measures.

4:30 Cluster Investigation of Increased Incidence of Pediatric Intracranial Abscesses in Clark County, Nevada – January–December 2022

Author: Jessica A. Penney, Y. Zhang, R. Bryant, C. Lockett

Background: In October 2022, the Southern Nevada Health District (SNHD) received reports of higher-than-expected pediatric patients in Clark County with intracranial abscess in 2022. This followed a CDC-led national investigation into this topic, which concluded in May 2022. SNHD investigated to confirm if this was above expected, identify common risk factors for infection, and report findings to the community.

Methods: Hospital discharge data were used to identify 2022 cases and evaluate trends during 2015–2021. Cases were diagnosis of intraparenchymal abscess, subdural abscess or empyema, epidural abscess or empyema, or evidence of intracranial extension on imaging in a patient aged ≤ 18 years without a previous neurosurgical procedure or head trauma. For cases that occurred during January 1, 2022–December 31, 2022, hospital course and microbiologic findings were assessed through data abstraction, and telephone interviews were conducted using a semistructured survey with parents or guardians.

Results: During 2015–2021, the annual median incidence of intracranial abscess was 4 cases/year in Clark County. During the COVID-19 pandemic (2020–2021), the median incidence was 7 cases/year. In 2022, 18 cases were identified with no associated deaths. Median age was 12 years, and most were male ($n = 14$; 78%). Fifteen patients (83%) required craniotomy. The most common bacterial pathogen isolated was *Streptococcus intermedius* ($n = 6$; 33%). Among 14 (78%) parents or guardians interviewed, 9 (64%) caregivers reported their child had cold symptoms, but none reported a COVID-19 diagnosis. Three (21%) reported their child was diagnosed with otitis media and 1 (7%) with sinus infection. Eleven (79%) children had sought care before hospitalization.

Conclusions: The number of pediatric intracranial abscesses in Clark County, Nevada, was higher in 2022 than previous years. More research is needed to identify specific risk factors and causes of this rare condition, and surveillance should continue to understand future trends.

4:40 Shingles Causing a Chickenpox Outbreak at a Child Care Center – North Carolina, December 2022–January 2023

Author: Erin K. Ricketts, M. DeFranco, E. Pettigrew, S. Sullivan, J. MacFarquhar, A. Fleischauer, Z. Moore, E. Wilson

Background: Varicella zoster virus causes chickenpox and can reactivate as shingles. Chickenpox cases decreased sharply postvaccination and became reportable in North Carolina in 2020. Although children aged <12 months usually have maternal antibody protection, breakthrough infections can occur, ranging from mild (e.g., <50 lesions) to severe (e.g., >300 lesions, complications). On December 22, 2022, the North Carolina Division of Public Health received notification of a suspected chickenpox outbreak in a child care center. We investigated to control the outbreak and determine cause and scope.

Methods: We defined cases as clinically consistent rash illness in children who had been at the child care center 10–21 days before illness onset. We reviewed case reports and interviewed caregivers, birthing parents, and staff for symptoms, clinical care, and contacts. We offered lesion polymerase chain reaction testing and provided infection control guidance.

Results: During December 2, 2022–February 1, 2023, a total of 12 (50%) of 24 child care attendees (median age 11 months, range: 7 months–3 years) developed chickenpox. Caregivers reported receiving alternative diagnoses; the first 9 cases were not reported by clinicians. Clinical information was available for 8 children; 3 had >100 lesions and 5 had <50. Both children eligible for varicella vaccine had received their first dose. Six of 10 birthing parents were contacted; 5 had evidence of prior immunity. One of 3 children tested had a positive varicella result. A staff member reported having shingles 2 weeks before the outbreak. The child care center separated exposed children and staff to prevent further transmission.

Conclusions: We describe an outbreak of 12 chickenpox cases at a child care facility, predominantly among children too young for vaccination. This outbreak occurred after exposure to shingles and continued, in part, because of low recognition and delayed reporting of mild chickenpox cases by community clinicians.

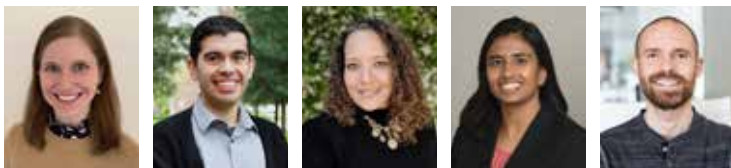
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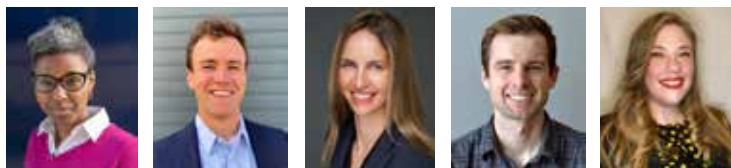
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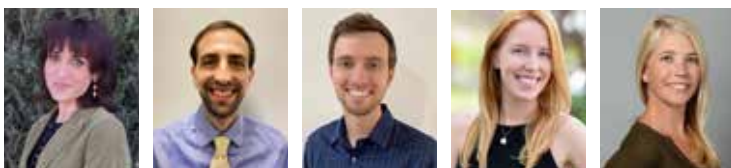
Battle, Shanice, PhD, MPH, BS – CDC OMHHE
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 Bertumen, J Bradford, MD, MPH – California DPH
 Borah, Brian, MD, MA, BA – Vermont DOH
 Bornstein, Ethan, MD, BA – Northwest Portland Area IHB



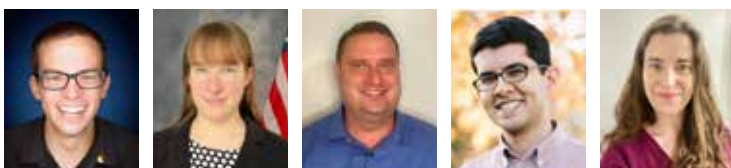
Cahill, Megan, PhD, MPhil, BS – Idaho DPH
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 Choudhary, Rewa, MD, MPH, BSE – CDC CGH
 Cornforth, Daniel, PhD, MS, BS – CDC CSELS



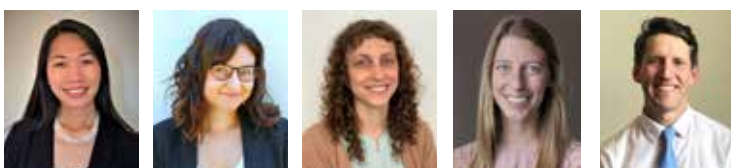
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 Kreuze, Molly, DVM, MPH, BA – Maryland DOH

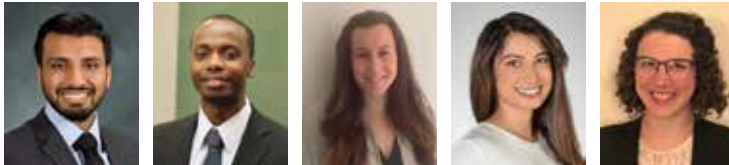


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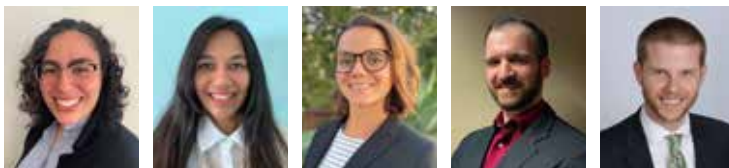
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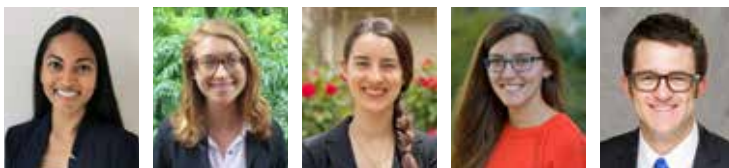
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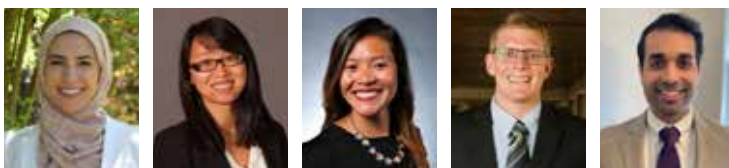
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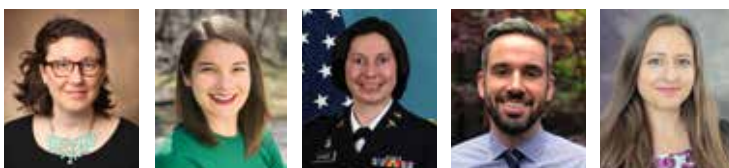
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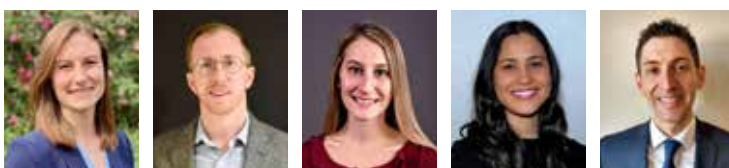
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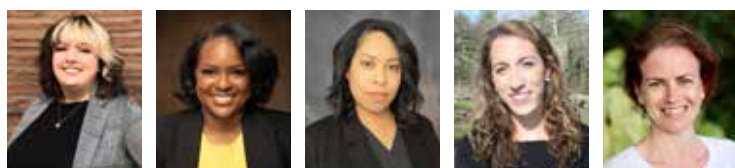
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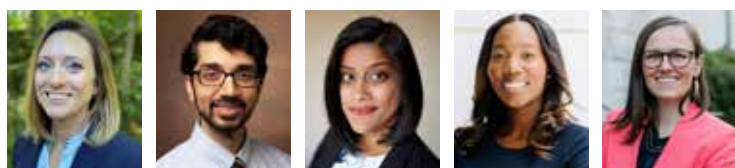
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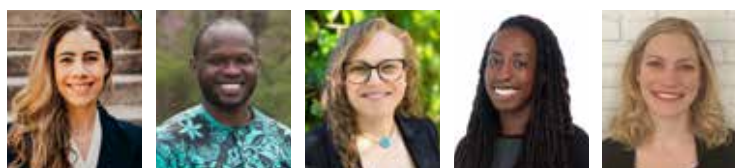
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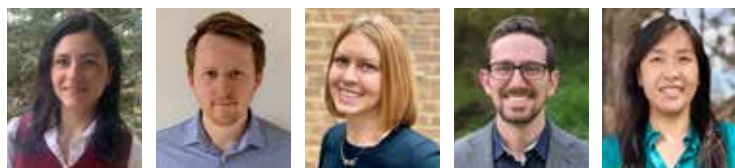
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 Esie, Precious, PhD, MPH, BS - Washington Public Health -
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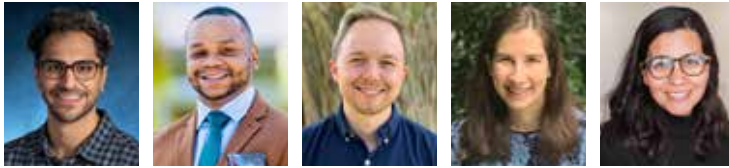


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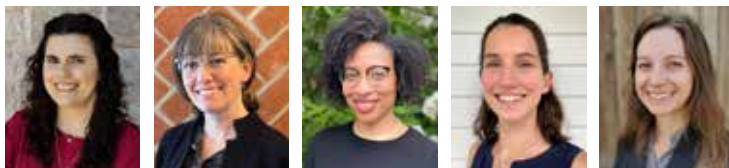
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 Kahn, Rebecca, PhD, SM, BA - CDC NCIRD
 Kaur, Gurpreet, MD, MPH, BA - CDC CGH



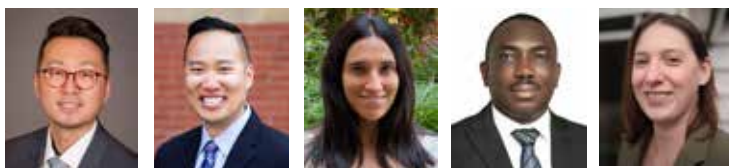
Kava, Christine (Marie), PhD, MA, BA - CDC NCCDPHP
 Keino, Barbara, PhD, MS, BS - CDC NCHHSTP
 Kojima, Noah, MD, BS - CDC NCIRD
 Labgold, Catherine, PhD, MPH, BA - U.S. Virgin Islands DOH
 Lamar, Frederica, PhD, MSPH, BS - CDC CGH



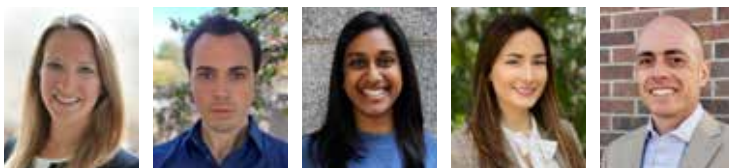
Lamb, Gabriella, MD, MPH, BA - CDC NCEZID
 Lamere, Elizabeth, MPH, BSN - Maine CDC
 Lee, Scarlett, DVM, PhD, BS - CDC CGH
 Lindsay, Keisha, PhD, MA, BS - CDC NCIPC
 Ma, Kevin, PhD, BA - CDC NCIRD



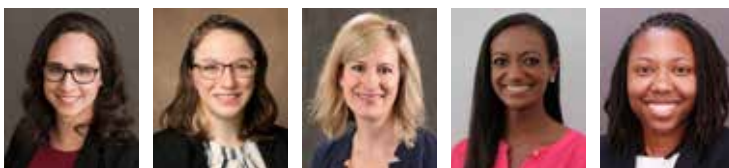
Madera, Valerie Garcia, PhD, MPH, BS - CDC NCHHSTP
 McArdle, Cristin, PhD, MPH, BA - CDC NCEH
 McKinnon, Izraelle, PhD, MPH, BA - CDC NCHHSTP
 Meek, Haillie, DVM, MPH, BA - New York State DOH
 Mitchell, Cedar, PhD, MSPH, BS - Pima CHD



Nam, Yoon-Sung, PhD, MPH, BS - New York City DOH
 Nguyen, Daniel, PhD, MScPH, BS - Hawaii State DOH
 Noiman, Adi, PhD, MHS, AB - CDC NCCDPHP
 Odafe, Solomon, MBBS, MSc, MPH - CDC NCIRD
 Penney, Jessica, MD, MS, MPHTM, BS/BA - Southern Nevada Health District



Price, Emma, VMD, MS, BS - New Jersey DOH
 Proctor, Dylan, PhD, MS, MA, BA - Georgia DPH
 Quader, Zerleen, PhD, MPH, BS - CDC NCIPC
 Rich, Shannan, PhD, MS, BS - CDC NCEZID
 Rowh, Adam, MD, ScB - CDC NCIPC

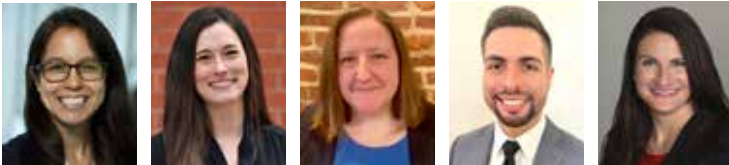


Saunders, Katharine, DNP, MPH, BSN, BS - Florida DOH
 Schember, Cassandra, PhD, MPH, BA - California DPH
 Schildknecht, Kimberly, MPH, BSN - CDC NCHHSTP
 Seifu, Leah, MD, MPH, AB - New York City DOH
 Sharpe, Joyce (Danielle), PhD, MS, BS - CDC CGH

EIS Officers – Class of 2022



Shelus, Victoria, PhD, MEM, BS - CDC NCEZID
 Slocum, Elizabeth, PhD, MPH, BS - Oregon Health Authority
 Sodeke, Olutomi, MD, BA - CDC CGH
 Stefanos, Ruth, MD, MPH, BA - CDC NCIRD
 Stephenson, Caroline, PhD, MS, BS - CDC DDID



Tan, Marissa, PhD, MPH, AB - Philadelphia DPH
 Thomas, Christine, DO, MPH, BA - Tennessee DOH
 Tiller, Elizabeth, MPH, MS, BS - Columbus Public Health
 Axel A Vazquez Deida, PharmD, MPH, BS - CDC NCEZID
 Vos, Saskia, PhD, MPH, BA - CDC NCIPC



Wallender, Erika, MD, BA - CDC CGH
 Weng, Xingran, DrPH, MSW, LLB - CDC NCCDPHP
 White, Elizabeth, PhD, AB - CDC NCIRD
 Wolf, Maren E, MPH, BSN, BA - CDC NCCDPHP
 Wondmeh Sarah, MD, MPH, BS - CDC NCHHSTP

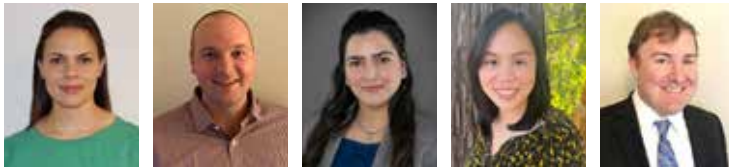


Zielinski Lindsay, DO, BA - CDC NCIRD

Acronyms

CDC	<i>Centers for Disease Control and Prevention</i>	DSHS	<i>Department of State Health Services</i>
CGH	<i>Center for Global Health</i>	IHB	<i>Indian Health Board</i>
CHD	<i>County Health Department</i>	NCEH	<i>National Center for Environmental Health</i>
CHHS	<i>County Health and Human Services</i>	NCEZID	<i>National Center for Immunization and Respiratory Diseases</i>
DFSPHL	<i>Department of Forensic Sciences Public Health Laboratory</i>	NCHHSTP	<i>National Center for HIV, Viral Hepatitis, STD, and TB Prevention</i>
DOH	<i>Department of Health</i>	NCHS	<i>National Center for Health Statistics</i>
DOHS	<i>Department of Health Services</i>	NCIPCDVP	<i>National Center for Immunization and Respiratory Diseases and Control Division of Violence Prevention</i>
DOHEC	<i>Department of Health and Environmental Control</i>	OMHHE	<i>Office of Minority Health and Health Equity</i>
DOHMH	<i>Department of Health and Mental Hygiene</i>	PHD	<i>Public Health Department</i>
DOHS	<i>Department of Health and Social Services</i>		
DPH	<i>Department of Public Health</i>		
DPHED	<i>Department of Public Health and Environment</i>		

LLS Fellows – Class of 2021



Baird, Nicolle, PhD - CDC NCEZID
 Kopping, Erik, PhD - New York City DOHMH
 Mustafa, Gul (Mehnaz), PhD, MSc - CDC NCIRD
 Ty, Maureen Michelle Caracena, PhD - Dallas CHHS
 Wakeman, Brian, PhD, MSc, BS - CDC NCEZID

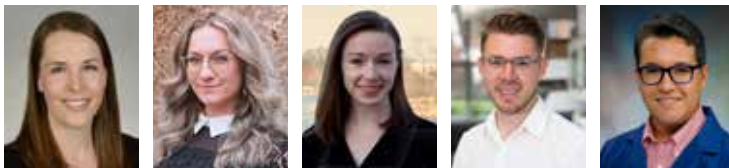
LLS Fellows – Class of 2022



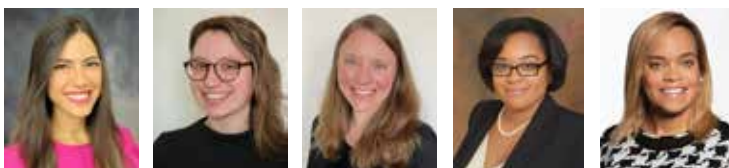
Bell, Courtnee' PhD, MS, BS - Virginia Division of Consolidated Laboratory
 Bouda, Emilie, PhD, BA, AS - CDC NCIRD
 Burg, Noah, PhD, BA, AA - CDC NCHHSTP
 Callaway, Perri, PhD, BA - CDC NIOSH
 Darby, Trevor, PhD, MSc, BSc - CDC NCEZID



Dumoulin, Peter, PhD, BSc - Bureau of Public Health - Tampa
 Gianetti, Brittany, PhD, MPH, BS - CDC NCIRD
 Leachman, Jacqueline, PhD, BS - CDC NCHS
 Margulieux, Katie, PhD, PGD, MS, BS - Michigan DOH
 Martin, Matthew, PhD, MS, BS - Wisconsin State Laboratory of Hygiene



Mickum, Megan, PhD, BS - CDC NCEZID
 Miller, Katherine, PhD, MPH, BS - Washington State Public Health
 Moran, Eileen, PhD, AB - University of Iowa
 Murphy, Robert, PhD, BS - Milwaukee City MHD
 Rodriguez, Sergio, PhD, MSc, MPH, BSc - CDC NCEZID



Rodriguez Stewart, Roxana M, PhD, BS - CDC NCEZID
 Sabin, Susanna, PhD, MSc, BA - CDC NCEZID
 Schatzman, Sabrina, PhD, BS - CDC NCEZID
 Scott, Ninecia, PhD, BS - CDC NCEZID
 Thomas, Jeronay, PhD, MS, BS - CDC NCHHSTP



Van Loben Sels, Jessica, PhD, MPH, BS - Virgin Islands DOH
 Vantucci, Casey, PhD, BS - CDC NCEZID
 Watts, Elizabeth, PhD, BS - NYC DOHMH CSELS
 Wong-Sam, Andres, PhD, MS, BS - CDC NCEZID
 Yarosz, Emily, PhD, BS - Minnesota DOH

Incoming EIS Officers – Class of 2023

Ahson, Minal, MPH
Alade, Rachel, DM, BS
Ali, Mohsin, MD, WES Cred Eval
Anand, Priyanka, MD
Askari, Melanie, PhD
Ayangunna, Elizabeth, MPH, BS
Balta, Victoria, PhD, MPH, BA
Barger, Alexandra, DM
Barrall, Angelica
Beard, Cynthia, BS, BA
Boland, Samuel, PhD, BA
Braunfeld, Jordan, DM
Brown, Andrea, MPH
Canepa, Hannah, DO, MS, BA
Drehoff, Cara Costanza, DVM, MPH
DeVita, Timothy, DM, MPH, BS
Dorris, Megan, MPH
Emmerich, Samuel, DM, BS
Eugene, DaJuandra, PhD
Frutos, Aaron
Geiger, Karen, BS
Gowler, Camden, PhD, BS
Green, Adelaide, BS
Gressick, Kimberly, MD/MPH
Havor, Essi, MSN, BSN
Johnson, Amelia, PhD
Jones, Camille, VMD, MPH
Jose, Rini, BS
Kache, Pallavi
Kennar, Audrey, MSPH
Khan, Sana
Kiplagat, Sandra, PhD
Lambert, Matthew, DM, BS
Langerman, Steven, MD, BA
Le, John, PharmD, BA
Ledford, Savanna, MS
Leonard, Jerome, DM, MPH, BS
Louis, Souci, MPH, BS
Ludmer, Sarah, MSN, MPH
Lundstrom, Eric, MPH, BS
Lutz, Chelsea, MPH, BA
McElroy, Roisin, MD, MPH
McKinney, Kimberly, MPH
Molinari, Alexander, DO, MPH, BA
Moore, Tori, MPH, BS, AS

Moran, Mary, PhD(non-conferred), MPH, MS, BA
Mouhanna, Farah, PhD, WES Eval
Murugappan, Meena, PhD, MPH
Naraharisetti, Ramya, MS, BS
Nham, Amy, PharmD, MPH
Nyika, Ponesai
Padda, Hannah, VMD, MPH
Patrick, Rudy, MPH, BS
Polter, Elizabeth
Ramachandran, Veena, DM, MPH, BS
Rogers, Courtney, MPH, BA
Rogers, Julia Hendon, MPH
Rumph, Jelonia, BS
Saif, Nadia, MD/MPH, MS
Sajewski, Elizabeth, PhD, BSE
Salvesen von Essen Lopez, Beatriz
Schappert, Alexa, DVM, MPH, BS
Sherman, Jessica, MSN, BSN
Singichetti, Bhavna, MPH, BS
Singleton, Jordan
Smith, Kami, BS
Staley, Brooke, PhD
Stein, Sydney, VMD, MPH
Strelau, Katherine, PhD
Sutter, Rebekah, MPH
Swift, Bethan, MS, BS, (WES Cred Eval)
Swisher, Samantha, BA
Tangney, Sylvia
Thomas, Shawn
Thompson, Julie, VMD, MPH, BS
Vachon, Madhura
Valenzuela Lara, Marisol, DM, MS, WES EVAL
Walker, Heather, VMD
Walton, Madison
Wang, Dennis, MD
Waranius, Brittney, MPH
Ware-Gilmore, Fhallon
Wendt, Elizabeth
Williams, Paula, DrPh, MPH, BS
Xie, Amy, BS
Yomogida, Kyle, BS
Zecca, Italo, PhD, BS
Zeno, Erica, MPH, BA
Zhao, Sifang, PhD, BS
Zhu, Sophie, BS

Incoming LLS Fellows – Class of 2023

Aoued, Hadj
Bertrand, Blake, BS
Bowen, Nicole, PhDc, BS
Desale, Hans, MPH, BS
Ende, Zachary, PhD
Grossman, Nina, PhD, BA
Haddock, Luis, PhDc, MS, BS
Hein, Lindsay (Dahora), PhD, BS

Knight, Frances, PhD
Miller, Sonni-Ali, PhD
Nyhoff, Lindsay, PhD, BS
Prah, Jordan, PhD
Sanchez, Annie, PhDc, BS
Sousa, Gregory, PhD
Tsai, Meng Hsien, PhD, BA
Wickline, Jessica, PhD, MPH, BA

