Society for Birth Defects Research and Prevention 2020 Annual Meeting
Honoring Teratology’s Roots, Growing a Healthier Future
Charleston Marriott
Charleston, South Carolina
June 27–July 1, 2020

As of March 24, 2020

Only sessions designated with CME are eligible for Continuing Medical Education credit.

**Friday, June 26, 2020**

3:00 PM–6:00 PM  Registration Open  Crystal Ballroom Foyer

**Saturday, June 27, 2020**

7:30 AM–6:00 PM  Registration Open  Crystal Ballroom Foyer

8:00 AM–8:30 AM  Education Course Coffee and Pastries  Crystal Ballroom A
(Education Course Session 1 Registrants Only)

8:30 AM–12:00 Noon  Education Course Session 1  Crystal Ballroom A
Embryology and Toxicity of the Developing Immune System
(Separate Registration Required)
Organized by the Education Committee
Chairperson: Caren Villano, Bristol-Myers Squibb

8:30 AM–8:40 AM  Welcome
BDRP President, Christine Perdan Curran, Northern Kentucky University

8:40 AM–8:45 AM  Course Overview
Education Committee, Chairperson, Caren Villano, Bristol-Myers Squibb

8:45 AM–9:30 AM  Immunotoxicology Overview
Jeanine L. Bussiere, Amgen, Inc.

9:30 AM–10:15 AM  Comparative Development of the Immune System
John Krayer, Janssen

10:15 AM–10:30 AM  Break

10:30 AM–11:15 AM  Developmental Immunotoxicology
Jamie C. DeWitt, East Carolina University

11:15 AM–12:00 Noon  Clinical Diagnosis and Management of Immune Dysfunction
Mary Louise Markert, Duke University Medical Center

12:00 Noon–1:30 PM  Lunch on Your Own
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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| 1:30 PM–5:00 PM | **Education Course Session 2**  
Juvenile Toxicology  
(Separate Registration Required)  
*Organized by the Education Committee*  
*Chairperson: Caren Villano, Bristol-Myers Squibb* |
|              | 1:30 PM–1:35 PM Course Overview  
*Education Committee, Chairperson, Caren Villano, Bristol-Myers Squibb* |
|              | 1:35 PM–2:20 PM Overview of Juvenile Toxicology  
*Antonia L. Dow, US Food and Drug Administration* |
|              | 2:20 PM–3:05 PM Approaches to Juvenile Animal Testing  
*Susan Bielmeier Laffan, GlaxoSmithKline* |
|              | 3:05 PM–3:20 PM Break |
|              | 3:20 PM–4:05 PM Organ System Development in Juvenile Nonclinical Species  
*Wendy Halpern, Genentech* |
|              | 4:05 PM–4:50 PM Clinical Relevance for Pediatric Populations  
*Susan McCune, US Food and Drug Administration* |
|              | 4:50 PM–5:00 PM Discussion |
| 2:00 PM–7:00 PM | **Speaker Ready Room** Check In |
| 5:00 PM–7:00 PM | **Council 1 Meeting** Blue Topaz  
*Committee Reports*  
*(Current and Incoming Council, Committee Chairs and Vice Chairs)* |

**Sunday, June 28, 2020**

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<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>7:00 AM–6:00 PM</td>
<td><strong>Registration Open</strong> Crystal Ballroom Foyer</td>
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<tr>
<td>7:00 AM–4:00 PM</td>
<td><strong>Speaker Ready Room</strong> Check In</td>
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<tr>
<td>7:00 AM–8:00 AM</td>
<td><strong>2021 Program Committee Meeting</strong> Yellow Topaz</td>
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| 7:45 AM–8:15 AM           | **Morning Coffee** Crystal Ballroom Foyer  
*(Joint with DNTS)* |
| 8:15 AM–8:30 AM           | **President’s Welcome** Crystal Ballroom A  
*BDRP President, Christine Perdan Curran, Northern Kentucky University* |
8:30 AM–9:00 AM  
Patricia Rodier Mid-Career Award for Research and Mentoring (L1)  
Manganese Overexposure during Development: Environmental and Genetic Effects  
(Joint with DNTS)

Chairpersons: Suzanne E. Fenton, National Institute of Environmental Health Sciences and Sonia Minnes, Case Western Reserve University

Lecturer: Michael T. Williams, Cincinnati Children’s Research Foundation

9:05 AM–12:05 PM  
Graduate Student and Postdoctoral Fellow Platform Session 1  
Crystal Ballroom A

Organized by the Student Affairs Committee  
Chairperson: Ida M. Washington, West Virginia University

Presenting author is underlined.

9:05 AM–9:10 AM  
Introduction  
Ida M. Washington, West Virginia University

9:10 AM–9:30 AM  
1 Gestational Exposure to Perfluorooctanoic Acid (PFOA) or Its Replacement GenX Induces Adverse Pregnancy Outcomes and Disrupts the Placenta  
Blake BE1, Cope H1, Hall S2, Keys R1, Mahler B1, McCord J1, Scott B1, Stapleton H2, Strynar M3, Elmore S1, Fenton S1. 1NTPL/NIEHS, Research Triangle Park, NC, United States, 2Duke University, Durham, NC, United States, 3US EPA, Research Triangle Park, NC, United States

9:30 AM–9:50 AM  
2 A Secondary Mechanism by Which Ethanol Enhances Macromolecular Damage and Behavioural Deficits in Brca1 Knockout Mice  
Drake DM1, Wells PG1,2. 1Department of Pharmaceutical Sciences and the Centre for Pharmaceutical Oncology (CPO), University of Toronto, Toronto, ON, Canada, 2Department of Pharmacology and Toxicology, University of Toronto, Toronto, ON, Canada

9:50 AM–10:10 AM  
3 Ozone Exposure during Early Pregnancy Alters Energy Balance and Adipose Morphology in Female Long-Evans Rat Offspring by Six Months of Age  
Nguyen HH1, Miller CN1, Stewart EJ1, Philips PM2, O’Shaughnessy KS2, Dye JA2. 1Oak Ridge Institute for Science and Education, Research Triangle Park, NC, United States of America, 2Public Health and Integrated Toxicology Division, Center for Public Health and Environmental Assessment, US EPA, Research Triangle Park, NC, United States
<table>
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<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
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<tr>
<td>10:10 AM–10:30 AM</td>
<td>4</td>
<td>Zika-Associated Birth Defects Among Infants with Possible Congenital Zika Virus Infection, Florida Zika Pregnancy and Infant Registry, January 2016–March 2018</td>
<td>Elmore AL&lt;sup&gt;1&lt;/sup&gt;, Dixon A&lt;sup&gt;2&lt;/sup&gt;, Prieto J&lt;sup&gt;3&lt;/sup&gt;, McDermott C&lt;sup&gt;4&lt;/sup&gt;, Morrison A&lt;sup&gt;4&lt;/sup&gt;, Lowry J&lt;sup&gt;1&lt;/sup&gt;, Lake-Burger H&lt;sup&gt;1&lt;/sup&gt;, Stanek D&lt;sup&gt;4&lt;/sup&gt;. &lt;sup&gt;1&lt;/sup&gt;Florida Department of Health, Florida Birth Defects Registry, Tallahassee, FL, United States, &lt;sup&gt;2&lt;/sup&gt;University of South Florida, Birth Defects Surveillance Program, Tampa, FL, United States, &lt;sup&gt;3&lt;/sup&gt;Fulton County Board of Health, Atlanta, GA, United States, &lt;sup&gt;4&lt;/sup&gt;Florida Department of Health, Bureau of Epidemiology, Tallahassee, FL, United States</td>
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<td>10:30 AM–10:45 AM</td>
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<td>Break—Crystal Ballroom Foyer</td>
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<td>10:45 AM–11:05 AM</td>
<td>5</td>
<td>A Phenome-Wide Association Study of the Associations between Maternal Diabetes and Structural Birth Defects in Offspring in 6.5 Million Live Births</td>
<td>Schraw JM&lt;sup&gt;1&lt;/sup&gt;, Langlois PH&lt;sup&gt;2&lt;/sup&gt;, Lupo PJ&lt;sup&gt;1&lt;/sup&gt;. &lt;sup&gt;1&lt;/sup&gt;Baylor College of Medicine, Houston, TX, United States, &lt;sup&gt;2&lt;/sup&gt;Texas Department of State Health Services, Austin, TX, United States</td>
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<td>11:05 AM–11:25 AM</td>
<td>6</td>
<td>Reproductive Toxicity Studies to Evaluate Potential Neural Tube and Other Abnormalities Associated with Dolutegravir Exposure in Pregnancy</td>
<td>Mohan H&lt;sup&gt;1&lt;/sup&gt;, Guzman-Lenis M&lt;sup&gt;1&lt;/sup&gt;, Yukino Laurette E&lt;sup&gt;1&lt;/sup&gt;, Sanghvi T&lt;sup&gt;1&lt;/sup&gt;, Tejada O&lt;sup&gt;1&lt;/sup&gt;, Greene N&lt;sup&gt;2&lt;/sup&gt;, Copp A&lt;sup&gt;2&lt;/sup&gt;, Serghides L&lt;sup&gt;1&lt;/sup&gt;. &lt;sup&gt;1&lt;/sup&gt;Toronto General Hospital Research Institute, University Health Network, Toronto, ON, Canada, &lt;sup&gt;2&lt;/sup&gt;Developmental Biology and Cancer Department, UCL Great Ormond Street Institute of Child Health, University College London, London, United Kingdom</td>
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<td>11:25 AM–11:45 PM</td>
<td>7</td>
<td>Utilizing Toxicogeomics to Enhance Adverse Outcome Pathways and Testing Strategies</td>
<td>Chen H, Chidboy M, Robinson JF. Center for Reproductive Sciences and Department of Obstetrics, Gynecology &amp; Reproductive Sciences, University of California, San Francisco, San Francisco, CA, United States</td>
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</tbody>
</table>
11:45 PM–12:05 PM 8 Proof-of-Concept for a Novel Methodology to Analyze Multifactorial Pathogenesis of Developmental Defects
Fuselier KTB1, Salbaum JM2, Kappen C1.
1Department of Developmental Biology, Pennington Biomedical Research Center, Baton Rouge, LA, United States, 2Department of Regulation of Gene Expression, Pennington Biomedical Research Center, Baton Rouge, LA, United States

12:05 PM–1:30 PM Lunch on Your Own
12:05 PM –1:30 PM Past Presidents’ and Honorees’ Luncheon
(By Invitation Only)
12:30 PM –1:30 PM Membership Committee Meeting
1:30 PM–2:00 PM F. Clarke Fraser New Investigator Award
Chairperson: Suzanne E. Fenton, National Institute of Environmental Health Sciences
Lecturer: Joshua F. Robinson, University of California, San Francisco

2:00 PM–2:30 PM James G. Wilson Publication Award
The effects of alcohol and cannabinoid exposure during the brain growth spurt on behavioral development in rats
Chairperson: Brian Enright, AbbVie Inc.
Lecturer: Kristen R. Breit, San Diego State University

2:35 PM–5:30 PM The Effects of Water Fluoridation on Neurodevelopment and Other Health Outcomes Symposium
(Joint with DNTS and OTIS)
Chairpersons: Kembra Howdeshell, National Institute of Environmental Health Sciences and Kyla Taylor, National Institute of Environmental Health Sciences

2:35 PM–2:40 PM Introduction
Kembra Howdeshell, National Institute of Environmental Health Sciences

2:40 PM–3:20 PM S1 Fluoride: A Perspective from the Dental Community
E. Angeles Martinez Mier, Indiana University School of Dentistry

3:20 PM–4:00 PM S2 Prenatal and Postnatal Fluoride Exposure and Child Neurodevelopmental Outcomes
Christine Till, York University

4:00 PM–4:15 PM Break—Crystal Ballroom Foyer
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<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Chairpersons</th>
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<tr>
<td>4:15 PM–4:55 PM</td>
<td>S3</td>
<td>Systematic Review of Fluoride Exposure and Neurodevelopmental and Cognitive Health Effects</td>
<td>Kyla Taylor, National Institute of Environmental Health Sciences</td>
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<tr>
<td>4:55 PM–5:30 PM</td>
<td>S4</td>
<td>Fluoride Exposure and Neurodevelopmental and Neuroendocrine Outcomes among Youth in the United States</td>
<td>Ashley Malin, Mount Sinai School of Medicine</td>
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<td>2:35 PM–5:30 PM</td>
<td>S5</td>
<td>Can Experimental Animal Studies Be Used in Counseling Symposium</td>
<td>Chairpersons: Anthony R. Scialli, Scialli Consulting LLC and Sarah Gloria Običan, University of South Florida</td>
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<tr>
<td>Introduction</td>
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<td>2:40 PM–3:20 PM</td>
<td>S5</td>
<td>Experimental Animal Testing Paradigms and Endpoints Used to Evaluate the Developmental Toxicity of Drugs and Other Chemicals</td>
<td>Lori A. Dostal, Lori Dostal Consulting, LLC</td>
</tr>
<tr>
<td>3:20 PM–4:00 PM</td>
<td>S6</td>
<td>How Are Experimental Animal Test Results Used to Inform Product Approval and Labeling?</td>
<td>Melissa Tassinari</td>
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<td>4:00 PM–4:15 PM</td>
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<td>Break—Crystal Ballroom Foyer</td>
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<tr>
<td>4:15 PM–5:15 PM</td>
<td>S7</td>
<td>Can Experimental Animal Results Be Used in Counseling Patients?</td>
<td>NO</td>
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<td>NO</td>
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<td></td>
<td>Sarah Gloria Običan, University of South Florida</td>
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<tr>
<td>YES</td>
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<td></td>
<td>Anthony R. Scialli, Scialli Consulting LLC (Member)</td>
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<td>5:15 PM–5:30 PM</td>
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<td>Discussion</td>
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<td>5:35 PM–6:15 PM</td>
<td>S7</td>
<td>Josef Warkany Lecture POPs: A Plethora of Developmental Effects (L2) (Joint with DNTS and OTIS)</td>
<td>Chairperson: Christine Perdan Curran, Northern Kentucky University</td>
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<tr>
<td>Lecturer: Linda S. Birnbaum, Scientist Emeritus and Former Director, National Institute of Environmental Health Sciences and National Toxicology Program</td>
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<td>6:15 PM–7:45 PM</td>
<td>S7</td>
<td>Welcome Reception, Poster Session 1, and Exhibits Attended (Joint with DNTS)</td>
<td>Crystal Ballroom D</td>
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<tr>
<td>BDRP Posters P1–P20</td>
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Monday, June 29, 2020

7:00 AM–6:00 PM  Registration Open  Crystal Ballroom Foyer
7:00 AM–4:00 PM  Speaker Ready Room  Check In
7:00 AM–8:00 AM  Publications Committee Meeting  Blue Topaz
7:00 AM–8:00 AM  Student Affairs Committee Meeting  Yellow Topaz
7:30 AM–8:00 AM  Morning Coffee  Crystal Ballroom Foyer
(Joint with DNTS)
8:00 AM–9:00 AM  Keynote Lecture  Crystal Ballroom A
Prenatal Genomic Medicine: Transforming Obstetric Practice and Delivering New Biological Insights (L3)
(Joint with DNTS and OTIS)
Chairperson: Elise M. Lewis, Charles River
Speaker: Diana W. Bianchi, Eunice Kennedy Shriver National Institute of Child Health and Human Development

9:05 AM–12:00 Noon  Developmental Neurotoxicity of Methylmercury Symposium  Crystal Ballroom A
(Joint with DNTS)
Chairpersons: Michael Garry, Exponent and Deborah Segal, US Environmental Protection Agency

9:05 AM–9:45 AM  S8  Methylmercury and Developmental Neurotoxicity: Historical Context and Current Exposure
Michael Garry, Exponent

9:45 AM–10:25 AM  S9  Methylmercury Neurotoxicity: What Can We Learn from Worms?
Michael Aschner, Albert Einstein College of Medicine

10:25 AM–10:40 AM  Break—Crystal Ballroom Foyer

10:40 AM–11:20 AM  S10  Cognitive and Neurobehavioral Impacts of Prenatal and Early Life Methylmercury Exposure
Susan A. Korrick, Harvard Medical School and Harvard T.H. Chan School of Public Health

11:20 AM–12:00 Noon  S11  Updating the US EPA IRIS Assessment of Methylmercury
Deborah Segal, US Environmental Protection Agency
9:05 AM–12:00 Noon Investigation of a Potential Outbreak of Birth Defects Symposium

Chairpersons: Sonja A. Rasmussen, University of Florida and Cheryl S. Broussard, Centers for Disease Control and Prevention

9:05 AM–9:40 AM S12 Ten Steps to a Field Investigation of an Increased Rate of Birth Defects
Sonja A. Rasmussen, University of Florida

9:40 AM–10:15 AM S13 Using Birth Defects Surveillance to Address a Possible Increased Rate of Birth Defects
Peter H. Langlois, Texas Department of State Health Services

10:15 AM–10:30 AM Break—Crystal Ballroom Foyer

10:30 AM–11:05 AM S14 Developing Interventions in Response to an Increase
Cheryl S. Broussard, Centers for Disease Control and Prevention

11:05 AM–11:40 AM S15 Communicating with the Public during a Public Health Emergency Response
TBA

11:40 AM–12:00 Noon Discussion

12:00 Noon–1:00 PM Lunch on Your Own

12:00 Noon–1:30 PM BDR Editorial Board Meeting Blue Topaz

12:00 Noon–1:45 PM Professional Development Workshop Career Options and Challenges
(Separate Registration Required, Boxed Lunch Provided)

Organized by the Membership Committee and Student Affairs Committee

Chairpersons: Terry C. Hrubec, E. Via Virginia College of Osteopathic Medicine and Ida M. Washington, West Virginia University

12:00 Noon–12:10 PM Boxed Lunch Pick-Up

12:10 PM–12:15 PM Introduction
Ida M. Washington, West Virginia University

12:15 PM–12:35 PM Career Options for Trainees
Tacey E.K. White, Aclairo Pharmaceutical Development Group, Inc

12:35 PM–12:50 PM Changing Professional Paths Mid-Career
Christine Perdan Curran, Northern Kentucky University

12:50 PM–1:10 PM Balancing Career and Family
Terry C. Hrubec, E. Via Virginia College of Osteopathic Medicine
1:00 PM–1:55 PM  PRGLAC and ConcePTION Initiatives: Update and Discussion (Joint with OTIS)  
Moderators: Elizabeth A. Conover, University of Nebraska Medical Center  
Panel: Janet R. Hardy, ECC Population Health Group LLC; Melissa Sherman Tassinari; Leyla Sahin, US Food and Drug Administration; and Hedvig Marie Egeland Nordeng, University of Oslo

2:00 PM–2:30 PM  Agnish Fellowship Lecture  
Educating Future Birth Defects Researchers: Opportunities in the Era of Personalized Medicine, Systems Biology, and CRISPER Technologies  
Chairperson, Caren Villano, Bristol-Myers Squibb  
Speaker: Elaine M. Faustman, University of Washington

2:35 PM–5:35 PM  Gene Therapy: CRISPR/Cas9 Technology, Breakthroughs, and Ethical Challenges Symposium  
Organized by the Public Affairs Committee  
Chairpersons: Gloria D. Jahnke, National Institute of Environmental Health Sciences and Evi Struble, US Food and Drug Administration

2:35 PM–2:45 PM  Introduction  
Jennifer Mason, Clemson University

2:35 PM–3:20 PM  S16  Introduction to CRISPR-Cas9 Gene Editing  
Jennifer Mason, Clemson University

3:20 PM–4:00 PM  S17  The Use of CRISPR/Cas9 Technology to Study Congenital Malformations Caused by NAD Deficiency  
Paul R. Mark, Spectrum Health Medical Group

4:00 PM–4:15 PM  Break—Crystal Ballroom Foyer

4:15 PM–4:55 PM  S18  Gene Therapy Products Using CRISPR/CAS9: Applications and Regulatory Considerations  
Shana D. Hardy, US Food and Drug Administration

4:55 PM–5:35 PM  S19  Ethical and Governance Considerations of Germline Gene Editing  
Eric T. Juengst, University of North Carolina, Chapel Hill

2:35 PM–5:30 PM  Platform Session 2  
Chairpersons: Linda G. Roberts, NapaTox Consulting LLC and Deirdre K. Tucker, Charles River Laboratories

2:35 PM–2:45 PM  Introduction
2:45 PM–3:00 PM  9  Pathogenic Copy Number Variants Associated with Neurodevelopmental Impairment Detected in Chromosomal Microarray Analysis in Neonates with Congenital Heart Defects
Findley TO1, Crain AK2, Mahajan S2, Solis Zavala A2, Davis J6, Rodriguez-Buritica DF3. 1Division of Neonatal-Perinatal Medicine, Department of Pediatrics, McGovern Medical School, University of Texas Health Science Center at Houston, Houston, TX, United States, 2McGovern Medical School, University of Texas Health Science Center at Houston, Houston, TX, United States, 3Division of Medical Genetics, Department of Pediatrics, McGovern Medical School, University of Texas Health Science Center at Houston, Houston, TX, United States

3:00 PM–3:15 PM  10  Altered Mechanisms of Genital Development Identified Through Integration of DNA Methylation and Genomic Measures in Hypospadias
Richard MA1, Sok P1, Canon S2,3, Nembhard WN4, Brown AL1, Peckham-Gregory EC1, Ehli EA5, Kallsen NA5, Davies GE5, Patel A2,3, Zamilpa I2,3, Hobbs CA2, Scheurer ME1, Lupo PJ1. 1Department of Pediatrics, Baylor College of Medicine, Houston, TX, United States, 2Arkansas Children's Hospital, Little Rock, AR, United States, 3Department of Urology, University of Arkansas for Medical Sciences, Little Rock, AR, United States, 4Department of Epidemiology and Arkansas Center for Birth Defects Research and Prevention, Fay W. Boozman College of Public Health, University of Arkansas for Medical Sciences, Little Rock, AR, United States, 5Avera Institute for Human Genetics, Sioux Falls, SD, United States, 6Department of Pediatrics, College of Medicine, University of Arkansas for Medical Sciences, Little Rock, AR, United States

3:15 PM–3:30 PM  11  Gene-Environment Interactions in Epithelial Morphogenesis
Wang J, Mongan M, Puga A, Xia Y. University of Cincinnati, Cincinnati, OH, United States

3:30 PM–3:45 PM  12  Differences in Cell Proliferation and Inflammation Pathways Regulate Prenatal Alcohol Sensitivity in Mice
Boschen KE1, Mendoza-Romero HN1, Fish EW1, Peterson RL1, Eberhart JK2, Parnell SE1,3. 1Bowles Center for Alcohol Studies, University of North Carolina, Chapel Hill, NC, United States, 2Molecular Biosciences and Waggoner Center for Alcohol and Addiction Research, University of Texas, Austin, TX, United States, 3Department of Cell Biology and Physiology, University of North Carolina, Chapel Hill, NC, United States.
3:45 PM–4:00 PM  13  Increased Body Mass Index and Birth Defects Prevalence Across South Carolina, 2016–2018
Humphries B, Leedom VO. South Carolina Department of Health and Environmental Control, Columbia, SC, United States

4:00 PM–4:15 PM  Break—Crystal Ballroom Foyer

4:15 PM–4:30 PM  14  Patterns of Congenital Malformations Co-occurring with Nonsyndromic Gastroschisis and Omphalocele
Oluwafemi OO1, Benjamin RH1, Navarro Sanchez ML1, Scheuerle AE2, Schaaf CP3,4,5, Mitchell LE1, Langlois PH6, Canfield MA6, Swartz MD7, Scott DA8, Northrup H8, Ray JW9, McLean SD10, Ludorf KL1, Chen H1,11, Lupo PJ12, Agopian A1.
1Department of Epidemiology, Human Genetics and Environmental Sciences, UTHealth School of Public Health, Houston, TX, United States,  
2Department of Pediatrics, Division of Genetics and Metabolism, University of Texas Southwestern Medical Center, Dallas, TX, United States,  
3Jan and Dan Duncan Neurological Research Institute, TX Children’s Hospital, Houston, TX, United States,  
4Heidelberg University, Institute of Human Genetics, Heidelberg, Heidelberg, Germany,  
5Department of Molecular and Human Genetics, Baylor College of Medicine, Houston, TX, United States,  
6Birth Defects Epidemiology and Surveillance Branch, TX Department of State Health Services, Austin, TX, United States,  
7Department of Biostatistics and Data Science, UTHealth School of Public Health, Houston, TX, United States,  
8Department of Pediatrics, Division of Medical Genetics, McGovern Medical School, University of Texas Health Science Center at Houston, Houston, TX, United States,  
9Department of Pediatrics, Division of Medical Genetics and Metabolism, University of Texas Medical Branch, Galveston, TX, United States,  
10Clinical Genetics Section, Children’s Hospital of San Antonio, San Antonio, TX, United States,  
11Center for Precision Health, UTHealth School of Public Health and UTHealth School of Biomedical Informatics, Houston, TX, United States,  
12Department of Pediatrics, Section of Hematology-Oncology, Baylor College of Medicine, Houston, TX, United States
5:15 PM–5:30 PM 18 Use of Cluster Analysis to Better Define a Distinct Clinical Phenotype Associated with Possible Congenital Zika Virus Infection

Zambrano LD¹, Delaney A¹, Gilboa SM¹, Tong V¹, Cragan JD¹, Valencia M², Roth NM¹, Moore J¹, Staples JE³, Honein MA¹, Moore CA¹. ¹National Center on Birth Defects and Developmental Disabilities, Centers for Disease Control and Prevention, Atlanta, GA, United States, ²Departamento de Salud de Puerto Rico, San Juan, PR, United States, ³National Center for Emerging and Zoonotic Infectious Diseases, Centers for Disease Control and Prevention, Atlanta, GA, United States

5:35 PM–7:00 PM Poster Session 2 and Exhibits Attended Crystal Ballroom D

(BJoint with DNTS and OTIS)

BDRP Posters P21–P37

Tuesday, June 30, 2020

7:00 AM–5:00 PM Registration Open Crystal Ballroom Foyer

7:00 AM–4:00 PM Speaker Ready Room Check in

7:00 AM–8:00 AM Communications Coordination Committee Meeting Blue Topaz

7:30 AM–8:00 AM Morning Coffee Crystal Ballroom Foyer

(Joint with DNTS)

8:00 AM–9:00 AM Robert L. Brent Lecture—Teratogen Update Crystal Ballroom A

From Dysmorphology to Next-Generation Phenotyping

(Joint with OTIS)

Chairperson: Christine Perdan Curran, Northern Kentucky University

Lecturer: Karen W. Gripp, A.I. duPont Hospital for Children/Nemours

9:05 AM–12:00 Noon Opioid Use in Pregnancy: Translational Perspectives Crystal Ballroom A

Symposium

(Joint with DNTS)

Chairpersons: Christina D. Chambers, University of California–San Diego and Rina Eiden, Pennsylvania State University

9:05 AM–9:40 AM S20 Outcomes among Children of Opiate Using Mothers Elisabeth Conradt, University of Utah


10:15 AM–10:30 AM Break—Crystal Ballroom Foyer
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<th>Speaker(s)</th>
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<tr>
<td>10:30 AM–11:05 AM</td>
<td>S22</td>
<td>Prenatal Exposure to Opioids and Other Substances: What Do We Know about Later Development Outcomes?</td>
<td>Hendrée Jones, UNC Department of Obstetrics &amp; Gynecology</td>
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<tr>
<td>11:05 AM–11:40 AM</td>
<td>S23</td>
<td>Modifying an Evidence-Based Home Visiting Intervention for Mothers with Opioid Dependence</td>
<td>Mary Dozier, University of Delaware</td>
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<td>11:40 AM–12:00 Noon</td>
<td>Discussion</td>
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<td>9:05 AM–12:00 Noon</td>
<td>Single-Cell Revolution: Embryogenesis at High-Resolution Symposium</td>
<td>Organized by the BDRP Science Committee</td>
<td>Chairpersons: Thomas B. Knudsen, National Center for Computational Toxicology, US EPA and Elaine M. Faustman, University of Washington</td>
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<td>9:40 AM–10:15 AM</td>
<td>S25</td>
<td>Development and Disease at Single Cell Resolution Development and Disease at Single Cell Resolution</td>
<td>Malte Spielmann, Max Planck Institute for Molecular Genetics</td>
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<td>10:15 AM–10:30 AM</td>
<td>Break—Crystal Ballroom Foyer</td>
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<td>10:30 AM–11:05 AM</td>
<td>S26</td>
<td>What scRNAseq Is Now Telling Us about Embryology</td>
<td>Sean Megason, Harvard Medical School</td>
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<tr>
<td>11:40 AM–12:00 Noon</td>
<td>Panel Discussion</td>
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<td>12:00 Noon–1:30 PM</td>
<td>Lunch on Your Own</td>
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<td>12:00 Noon–1:15 PM</td>
<td>Lunch and Learn Mini Course</td>
<td>Assessment of Ovarian Toxicity (Separate Registration Required)</td>
<td>Organized by the Education Committee</td>
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<td>Chairperson: Caren Villano, Bristol-Myers Squibb</td>
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<tr>
<td>12:00 Noon–12:05 PM</td>
<td>Boxed Lunch Pick-Up</td>
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<td>12:05 PM–12:40 PM</td>
<td>Detecting Ovarian Follicles by Deep Learning and Not In Vivo Ovarian Models</td>
<td>Heike Antje Marxfeld, BASF</td>
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12:40 PM–1:15 PM  
In Vitro Ovarian Models  
Shuo Xiao, University of South Carolina

1:30 PM–4:30 PM  
Assessing and Modeling Perinatal and Postnatal Exposures to Environmental Chemicals in Support of Human Health Risk Assessment Symposium  
Crystal Ballroom A  
Chairpersons: Laura Carlson, US Environmental Protection Agency and Geniece Lehmann, US Environmental Protection Agency

1:30 PM–2:00 PM  
S28 Environmental Chemicals in Breast Milk and Formula: Exposure and Risk Assessment Implications  
Judy S. LaKind, LaKind Associates

2:00 PM–2:30 PM  
S29 Level of Detail for Pharmacokinetic Modeling During Development: Time or Tissues, But Not Both  
Paul M. Schlosser, US Environmental Protection Agency

2:30 PM–3:00 PM  
S30 Pharmacokinetic Modeling As a Tool to Bridge In Vitro, In Vivo, and Epidemiological Data in Risk Assessment of Developmental Exposures  
Marc-Andre Verner, University of Montréal

3:00 PM–3:15 PM  
Break—Crystal Ballroom Foyer

3:15 PM–3:45 PM  
S31 Children’s Nondietary Exposures to Environmental Chemicals  
Paloma I. Beamer, University of Arizona

3:45 PM–4:15 PM  
S32 A Review of Factors Influencing Children’s Exposure Assessment  
Geniece Lehmann, US Environmental Protection Agency

4:15 PM–4:30 PM  
Discussion

1:30 PM–4:30 PM  
Current Topics and Updates for Pregnancy Registries Workshop  
Emerald 1  
(Joint with OTIS)  
Chairpersons: Lewis B. Holmes, MassGeneral Hospital for Children and Keele Elise Wurst, GlaxoSmithKline

1:30 PM–2:00 PM  
W1 Criteria Used for Classifying Abnormalities Identified in the Antiretroviral Pregnancy Registry  
Angela Scheuerle, UT Southwestern Medical Center

2:00 PM–2:30 PM  
W2 The Inclusion/Exclusion Criteria Used by the North American Antiepileptic Drug (AED) Pregnancy Registry  
Lewis B. Holmes, MassGeneral Hospital for Children
2:30 PM–3:00 PM  W3  An Update on the Use of Social Media to Recruit Enrollees in Pregnancy Registries  
*Nicole Chavez, Nicole Chavez Public Relations*

3:00 PM–3:15 PM  Break—Crystal Ballroom Foyer

3:15 PM–3:35 PM  W4  Pregnancy Registries and Beyond: US FDA Update on Efforts to Advance Data Collection in Pregnant and Lactating Women  
*Sahin L, US Food and Drug Administration, Silver Spring, MD, United States*

3:35 PM–3:55 PM  W5  Comparison Groups for Pregnancy Drug Registries: Implications for Interpretation of Results  
*Chambers CD¹, del Campo M¹, Cragan JD², Johnson D¹, Lyons Jones K¹. ¹University of California, San Diego, La Jolla, CA, United States, ²National Center on Birth Defects and Developmental Disabilities, Centers for Disease Control and Prevention, Atlanta, GA, United States*

3:55 PM–4:15 PM  W6  Prenatal Acetaminophen Use and Adverse Pregnancy Outcomes in Women with Autoimmune Conditions  
*Killon J¹, Chambers CD¹,², Bandoli G¹,². ¹Department of Family Medicine and Public Health, University of California San Diego, San Diego, CA, United States, ²Department of Pediatrics, University of California San Diego, La Jolla, CA, United States*

4:15 PM–4:30 PM  Discussion

**4:35 PM–6:00 PM**  
**Multidisciplinary Research Needs Workshop**  
**Crystal Ballroom A**  
*Chairpersons: Dana L. Shuey, Incyte and William Slikker, Jr., National Center for Toxicological Research, US FDA*

4:35 PM–4:50 PM  Overview of Workshop Goals and Progress from 2019

4:50 PM–5:30 PM  Concurrent Breakout Sessions

5:30 PM–6:00 PM  Reassemble to Discuss Progress from Breakout Sessions
<table>
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<th>Time</th>
<th>Session</th>
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| 4:35 PM–6:00 PM | **Platform Session 3**<br>Chairpersons: Kimberly C. Brannen, Merck and Mark Herberth, Charles River<br><br>4:35 PM–4:45 PM Introduction<br>4:45 PM–5:00 PM 19 The Role of *In Utero* Exposure to Drugs Beyond Opioids in the Development and Severity of Neonatal Opioid Withdrawal Syndrome (NOWS) Bailey BA¹, Wood DL², Shah DS². ¹Central Michigan University, Mt Pleasant, Michigan, United States, ²East Tennessee State University, Johnson City, TN, United States<br>5:00 PM–5:15 PM 20 Multi-Modal Assessment of Stress-Reactivity and Self-regulation in the Newborn Period in a Prospective Cohort Study of Moderate Alcohol Exposure Bakhireva LN¹, Ruyak S¹, Roberts M¹, Rodriguez DE¹, Leeman L¹, Stephen J², Maxwell JR¹. ¹University of New Mexico Health Sciences Center, Albuquerque, NM, United States, ²The Mind Research Network, Albuquerque, NM, United States<br>5:15 PM–5:30 PM 21 A Tale of Two Livers: The Impact of Sex on Hepatic Gene Expression in the Adolescent Rat Exposed to Ozone During Implantation Miller CN¹, Stewart EJ², Schladweiler MC³, Ren H³, Valdez MC¹, Fisher A³, Kodavanti UP³, Dye JA³. ¹Oak Ridge Institute for Science and Education, Research Triangle Park, NC, United States, ²Oak Ridge Institute for Science and Education, Research Triangle Park, NC, United States, ³Public Health and Integrated Toxicology Division, Center for Public Health and Environmental Assessment, US Environmental Protection Agency, Research Triangle Park, NC, United States<br>5:30 PM–5:45 PM 22 Adverse Outcome Pathways for Developmental Toxicity Gleaned from the Embryological Literature: A Rich and Rutted Road Rogers JM. US Environmental Protection Agency, Research Triangle Park, NC, United States<br>5:45 PM–6:00 PM 23 Automated Applications of Ontologies to Standardize Developmental Toxicology Study Extraction Foster C¹, Wignall J¹, Kovach S¹, Trgovcich J¹, Varghese A¹, Rochester J¹, Stout M², Kleinstreuer NC³. ¹ICF International Inc, Durham, NC, United States, ²NIHES/NTP, Durham, NC, United States<br>6:00 PM–7:30 PM | **Poster Session 3 and Exhibits Attended**<br>BDRP Posters P38–P61 | **Crystal Ballroom D**
Wednesday, July 1, 2020

6:30 AM–7:30 AM  BDRP 39th Annual Volleyball Game  

7:30 AM–2:30 PM  Registration Open  
Crystal Ballroom Foyer

7:30 AM–2:00 PM  Speaker Ready Room  
Check In

7:30 AM–8:00 AM  Morning Coffee  
(Joint with DNTS)  
Crystal Ballroom Foyer

8:00 AM–9:00 AM  BDRP and European Teratology Society  
Exchange Lecture  
Early Principles of Teratology: Does Karnofsky’s Law Still Apply  

Chairpersons: Paul C. Barrow, F. Hoffmann-La Roche Ltd. and  
Susan L. Makris, US Environmental Protection Agency

European Teratology Society  
Paul C. Barrow, F. Hoffmann-La Roche Ltd.

BDRP  
Alan M. Hoberman, Charles River

9:05 AM–12:00 Noon  Wiley Symposium  
Pregnancy, Environment, and Child Health: A Focus on  
Obesity and Metabolic Disorders  

Chairpersons: Suzanne E. Fenton, National Institute of Environmental Health  
Sciences and Jerrold J. Heindel, Commonweal

9:05 AM–9:30 AM  S33  Endocrinological and Environmental Control of Obesity  
Jerrold J. Heindel, Commonweal

9:30 AM–10:00 AM  S34  Environmental Influences on the Childhood Obesity Epidemic  
Leonardo Trasande, NYU School of Medicine

10:00 AM–10:30 AM  S35  Effects of Developmental Exposure to Genx on Mouse Offspring: Pubertal and Metabolic Targets  
Suzanne E. Fenton, National Institute of Environmental Health Sciences

10:30 AM–11:00 AM  Warkany Tea—Crystal Ballroom Foyer

11:00 AM–11:30 AM  S36  How Does Prenatal Obesogen Exposure Lead to a Transgenerational Predisposition to Obesity?  
Bruce Blumberg, University of California, Irvine

11:30 AM–12:00 Noon  S37  The Role of Maternal Obesity and Pregnancy Weight Gain Patterns in Pregnancy and Birth, and Longer-Term Health Outcomes  
Elizabeth Widen, University of Texas at Austin
9:05 AM–10:30 AM Hot Topics Symposium  
Chairpersons: Vinita Leedom, SC Department of Health and Environmental Control and Elise Madison Lewis, Charles River Laboratories

9:05 AM–9:30 AM S38 The Impact of Vaping on Pregnancy
Eugene Y. Chang, Medical University of South Carolina

9:30 AM–9:55 AM S39 An Update on Coronavirus Disease 2019 (COVID-19) and Pregnancy
Sonja A. Rasmussen, University of Florida

9:55 AM–10:20 AM S40 S5(R3): What’s New and Different?
Mary Ellen McNerney, Bristol Meyers Squibb

10:20 AM–10:30 AM Discussion

10:30 AM–11:00 AM Warkany Tea (Joint with DNTS)

11:00 AM–12:00 Noon Innovator Award Finalists Platform Session 4
Chairperson: Suzanne E. Fenton, National Institute of Environmental Health Sciences

11:00 AM–11:20 AM 24 Studying Gene-Environmental Interactions in Autism with iPSC-derived BrainSpheres: microRNA and Metabolic Biomarkers of the Synergy
Smirnova L, Zhong X, Modafferi S, Fagiani F, Kleensang A, Murata Y, Hartung T. Johns Hopkins University, Baltimore, MD, United States

Kappen C¹, Kruger C¹, Jones S², Salbaum JM².
¹Department of Developmental Biology, Pennington Biomedical Research Center, Louisiana State University System, Baton Rouge, LA, United States, ²Regulation of Gene Expression Laboratory, Pennington Biomedical Research Center, Louisiana State University System, Baton Rouge, LA, United States

11:40 AM–12:00 Noon 26 ReproTracker: A Human Stem Cell-Based Biomarker Assay for In Vitro assessment of Developmental Toxicity

12:00 Noon–1:30 PM Lunch on Your Own

12:30 PM–1:30 PM Awards Committee Meeting
12:30 PM–1:30 PM  Education Committee Meeting  
   Opal 2
12:30 PM–1:30 PM  Public Affairs Committee Meeting  
   Blue Topaz
12:30 PM–1:30 PM  Science Committee Meeting  
   Yellow Topaz
1:30 PM–4:30 PM  HESI Symposium  
   Crystal Ballroom A
Assessing Pregnancy Risk of Immunomodulators

Chairpersons: Caren Villano, Bristol-Myers Squibb and
Dinesh J. Stanislaus, GlaxoSmithKline

1:35 PM–2:10 PM  S41  
   Immune Mechanisms and Immunoregulation: Role in Fertility, Gestation, and Parturition
   Joanne Kwak-Kim, Rosalind Franklin University of Medicine and Science

2:10 PM–2:45 PM  S42  
   Current Methods to Assess Pregnancy Risk for Immunomodulators
   Caren Villano, Bristol-Myers Squibb

2:45 PM–3:00 PM  
   Break—Crystal Ballroom Foyer

3:00 PM–3:35 PM  S43  
   Case Studies: Gestational Exposures to Immunomodulators in Nonclinical Species
   Aimee Hillegas, GlaxoSmithKline

3:35 PM–4:10 PM  S44  
   Gaps in Evaluation of Immune Function during Pregnancy: Workshop Summary
   Christopher J. Bowman, Pfizer Inc.

4:10 PM–4:30 PM  
   Panel Discussion

1:30 PM–4:30 PM  Platform Session 5  
   Emerald 1

Chairpersons: Philip Lupo, Baylor College of Medicine and Kristina York, Charles River Laboratories

1:30 PM–1:45 PM  
   Introduction

1:45 PM–2:00 PM  27  
   Mouse Model of Dolutegravir-Induced Neural Tube Defects
   University, Omaha, NE, United States

2:00 PM–2:15 PM  28  
   Alterations in the Mouse Placenta After Preconception and Prenatal Arsenic Exposure
   Rychlik KA, Kashiwagi C, Liao J, Sillé FC. Johns Hopkins University Bloomberg School of Public
   Health, Baltimore, MD, United States
2:15 PM–2:30 PM  29  Quantitative Proteomic Analyses of Perfluorooctanoic Acid with Primary Human Villous Trophoblasts

2:30 PM–2:45 PM  30  The Epidermal Growth Factor Receptor Mediating the Crosstalk of Genetic Risks and Environmental Toxicants in Epithelial Morphogenesis
Wang J. University of Cincinnati, Cincinnati, OH, United States

2:45 PM–3:00 PM  Break—TBA

3:00 PM–3:15 PM  31  Quantification of the Uncertainties in Extrapolating from In Vitro Androgen Receptor (AR) Antagonism to In Vivo Hershberger Assay Endpoints and Adverse Reproductive Development in Male Rats
Gray EE. US EPA, ORD, CPHEA, PHITD, RDTB, Durham, NC, United States

3:15 PM–3:30 PM  32  Evaluation of Bisphenol Analogue Exposure on Mouse Adipose Gene Expression In Vivo and In Vitro Using 3T3-L1 Cells
Chappell VA, Tucker DK, Fenton S. NTPL/NIEHS, Research Triangle Park, NC, United States

Tinker SC¹, Gilboa SM¹, Moore CA¹, Waller DK², Simeone RM¹, Kim SY¹, Jamieson DJ¹, Botto LD¹, Fisher S⁵, Reefhuis J¹. ¹Centers for Disease Control and Prevention, Atlanta, GA, United States, ²University of Texas Health Science Center at Houston, Houston, TX, United States, ³Emory University School of Medicine, Atlanta, GA, United States, ⁴University of Utah School of Medicine, Salt Lake City, UT, United States, ⁵New York State Department of Health, Albany, NY, United States

3:45 PM–4:00 PM  34  Modeling Shows High Potential for Preventing Major Neural Tube Defects with Folic Acid Fortification of Iodized Salt
Manandhar M¹, Tsang B², Kan cherla V¹, Dixon MA¹, Oakley G¹. ¹Emory University Rollins School of Public Health, Atlanta, GA, United States, ²Food Fortification Initiative, Atlanta, GA, United States
Spina Bifida Lesion Level Changes Before and After Mandatory Folic Acid Fortification in the United States

Mai C¹, Adisa O¹,², Evans J³, Arnold K¹, Flood T⁴, Frohnert B⁵, Alverson C¹, Denson L⁶, Nestoridi E⁷, Nance A⁸, Leedom V⁹, Shan X¹⁰, Ethen M¹¹, Eckert V¹², Kirby R¹³. ¹National Center on Birth Defects and Developmental Disabilities, CDC, Atlanta, GA, United States, ²P3S Corporation, Atlanta, GA, United States, ³University of Manitoba, Winnipeg, MB, Canada, ⁴Arizona Department of Health Services, Phoenix, AZ, United States, ⁵Minnesota Department of Health, St. Paul, MN, United States, ⁶Oklahoma State Department of Health, Oklahoma City, OK, United States, ⁷Massachusetts Department of Public Health, Boston, MA, United States, ⁸Utah Department of Health, Salt Lake City, UT, United States, ⁹South Carolina Dept. of Health & Environmental Control, Columbia, SC, United States, ¹⁰Arkansas Children’s Hospital, Little Rock, AR, United States, ¹¹Texas Department of State Health Services, Austin, TX, United States, ¹²California Department of Public Health, Richmond, CA, United States, ¹³University of South Florida, Tampa, FL, United States
Prevalence of Select Brain and Eye Defects Potentially Related to Zika Virus in Pregnancy

Delaney AM, Olson SE, Roth NM, Cragan J, Godfred-Cato S, Fornoff J, Nestoridi E, Forkner A, Stolz A, Cho SJ, Knapp M, Crawford K, Breidenbach R, Nance A, Elmore AL, Denson L, Forestieri N, Leedom V, Tran T, Romitti PA, Valencia M, Barton J, St. John K, Kimura J, Orantes L, Ellis EM, Tong VT, Gilboa SM, Moore CA, Honein MA. 1Eagle Global Scientific, LLC, Atlanta, GA, United States, 2G2S Corporation, San Antonio, TX, United States, 3National Center on Birth Defects and Developmental Disabilities, CDC, Atlanta, GA, United States, 4Illinois Department of Public Health, Springfield, IL, United States, 5Massachusetts Department of Public Health, Boston, MA, United States, 6Indiana State Health Department, Indianapolis, IN, United States, 7New York State Department of Health, Bureau of Environmental & Occupational Epidemiology, Albany, NY, United States, 8Minnesota Department of Health, St. Paul, MN, United States, 9New Jersey Department of Health, Trenton, NJ, United States, 10Virginia Department of Health, Richmond, VA, United States, 11Birth Defects Epidemiology and Surveillance Branch, TX Department of State Health Services, Austin, TX, United States, 12Utah Department of Health, Salt Lake City, UT, United States, 13Florida Department of Health, Tallahassee, FL, United States, 14Oklahoma State Department of Health, Oklahoma City, OK, United States, 15North Carolina Department of Health and Human Services, Raleigh, NC, United States, 16South Carolina Dept. of Health & Environmental Control, Columbia, SC, United States, 17Louisiana Department of Health, New Orleans, LA, United States, 18University of Iowa, Iowa, IA, United States, 19Puerto Rico Department of Health, San Juan, PR, United States, 20Georgia Department of Public Health, Atlanta, GA, United States, 21Rhode Island Department of Health, Providence, RI, United States, 22Hawaii Department of Health, Honolulu, HI, United States, 23Vermont Department of Health, Burlington, VT, United States, 24US Virgin Islands Department of Health, Christiansted, US Virgin Islands, United States
4:35 PM–6:30 PM  Annual Meeting Awards Presentation and Business Meeting  Crystal Ballroom A
Graduate Student and Postdoctoral Fellow Travel Awards
Wilson Presentation Awards
Marie Taubeneck Award
James C. Bradford Memorial Student Poster Awards
Edward W. Carney Trainee Awards
BDRP Innovator Award
*Birth Defects Research* Distinguished Scholar Award
Edward W. Carney Distinguished Service Award
Recognition of Other Awards Presented throughout the Week
Annual Business Meeting

7:00 PM–9:00 PM  Closing Celebration  Courtyard

**Thursday, July 2, 2020**

7:00 AM–9:30 AM  Council 2 Meeting  Emerald 3
*(2020–2021 Council Members Only)*