AAP ZIKA ECHO
(EXTENSION FOR COMMUNITY HEALTHCARE OUTCOMES)
Zika in Infants and Pregnancy (ZIP) Study and Community Engagement in Puerto Rico

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**Research Projects**

- **Puerto Rico Testsite to Explore Contamination Threats (PROTECT)**
  - Seeks to identify environmental factors associated with preterm births

- **Center for Research on Early Childhood Exposure and Development in Puerto Rico (CRECE)**
  - Examines neurodevelopmental effects in infants and children from prenatal exposures, including mixtures of agents

- **Zika in Infants and Pregnancy (ZIP)**
  - Examines the risk of maternal Zika infection and its effects to the developing fetus and infants

- **Environmental Influences in Children’s Health (ECHO)**
  - Expansion of PROTECT and CRECE activities
Why Puerto Rico?

• Preterm birth rate 11.4% (data 2016)
• Extent of hazardous waste contamination
  • More than 200 contaminated sites with 16 active Superfund sites
  • Many unlined landfills overlying the karst aquifers
• Aquifer is primarily limestone with highly permeable karst aquifers from which most of the wells draw water
• Our projects’ target population is pregnant women and their children living in the Northern Karst area
POTENTIAL CONTRIBUTION OF ENVIRONMENTAL CONTAMINATION, PUERTO RICO

All have been found in groundwater in Puerto Rico

- Phthalates
- Chlorinated solvents (e.g. TCE)
- Pesticides
- Heavy Metals

1ATSDR, 2007; CERHR, 2006; Latini et al., 2003; Ha and Cho 2002; Khattak, 1999; Lipscomb and Fenster, 19991
KARST REGION OF NORTHERN PUERTO RICO

Extensive area (~1000 mi²) of great socio-economical diversity
Requires strong community engagement component
**Zika Epidemic in Puerto Rico**

First confirmed case of Zika virus infection reported in PR in December 2015

PR declares Public Health Emergency on February 5, 2016

According to PR DOH (last weekly report) confirmed cases accumulated 2017-2018:

- 1,150 confirmed pregnant women
  - 15% symptomatic
  - 85% asymptomatic
- 49 cases of congenital defects

(cdc.gov, 2017)
ZIKA EPIDEMIC IN PUERTO RICO: OUR RESEARCH PROGRAM RESPONSE

- Contact pregnant women for support and orientation on prevention of mosquito bite and reduction of mosquito breeding sites
- Distributed mosquito nets for mothers and children
- Personal orientation at the PROTECT and CRECE follow-up visits
- Education of health care professionals and the public through health forums
- Community education on Integrated Pest Management and mosquito control
RESEARCH QUESTIONS

What is the risk of:

– Zika infection in pregnancy?
– Infection to the fetus (vertical transmission)?
– Malformations & other adverse outcomes by gestational age?
– Malformations & other adverse outcomes in fetus/infants of mothers with Zika infection who become symptomatic vs. those who don’t
– Neurodevelopmental conditions in infancy?
– Infection and adverse outcomes with co-infections and other co-factors (social, environmental)?
PARTICIPANTS’ FOLLOW-UP

• 500 pregnant women < 18 weeks gestation and 15 years old or older
  – Weekly and monthly sampling (blood, urine, saliva, vaginal swab) and placenta at time of delivery
  – Monthly visits
  – Questionnaires

• All infants born to ZIP participants
  – Evaluation at birth, 3m, 6m, 12m of age
  – Audiological, ophthalmological evaluations
  – Targeted physical examination and anthropometric measurements
  – Developmental screening: ASQ3/SE screening and Bayley Scales
  – Biological sampling
SEPTEMBER 20, 2017...
THE BEGINNING OF A NEW REALITY

- Strongest hurricane to hit land in the Atlantic
- Ten hour path of destruction
- All 78 municipalities affected
- Collapse of the electric grid, water systems, telecommunications, and roads
- Many homes destroyed
- Five months after the catastrophe: 30% of island without electricity
- Tremendous health risks from environmental exposures
Hurricane María...
ENVIRONMENTAL CHALLENGES

• Potable water quality: treatment plants running on emergency generators
• Effects of prolonged use of electricity generators
• Reports of public briefly accessing water from EPA-designated Superfund site in Dorado
• Lack of access to health care and increased potential for epidemics
• Decreased public safety
• Deteriorated mental health

(Morovis, PR)
ENSURING SAFE WATER IN OUR COMMUNITIES

• Collaboration with the Society of Jesus, San Ignacio de Loyola High School, Rotary Club of Houston and One at a Time Organization to make potable water accessible to all our participants
• Purification systems donated by the company Vestergaard Frandsen and distributed to clinics
• Distribution of Agua Munda Condor filters donated by the Kumpi Mayu Foundation
• Educating the families on the importance of clean water use and consumption, the proper use and maintenance of the filter
COMMUNITY EDUCATION POST-DISASTER

- Development of public health fact sheets
- Focused on most common issues after a storm and continued emphasis on prevention of mosquito bites
- Close and personal communication with participants and our community partners and collaborators
  - Community Health Centers
  - Community pediatricians
RESTORING RESEARCH ACTIVITIES DURING CHALLENGING TIMES

Shortly after hurricane:
- Staff coming to work every day in spite personal and family challenges
- Participants eager to return follow-up and recruitment re-started
- Project office became a center for connection, counseling and support

Overcoming daily challenges
- Successful restructuring of office flow
- Working with logistics challenges and other limitations as they appear

(Manatí, PR)
ZIP and Community Engagement

Reaching out to partners and participants
- Needs assessment in our communities
- Primary contacts with community health center staff, hospital staff and others
- Recognized need for integrated community education on post-disaster issues

Coordinating donations with local needs
- Water filters for participants and clinics
- Personal care items needs
- Batteries, flashlights, and other needs

Our office became a Community Center of support
ZIP AND COMMUNITY ENGAGEMENT

• Link families who may have special needs with health care providers, Early Intervention Services, Departments of Health and Education
• Any participant with neurodevelopmental findings is being offered an assessment and follow-up by a pediatric neurologist in our offices
  – Otherwise unavailable service to most of our participants
  – Education and orientation about findings and communication with primary care providers
• Support and empowerment: parent as leader in their child’s healthcare team
  – Very high study participant retention rate
  – Families get much needed information and assistance navigating a complicated system
In Summary …

- In spite of the daily adversities after Hurricane Maria, there is a spirit and sense of hope that Puerto Rico will rise from the ashes, and become a better place to live for all.
- Community engagement has enabled our research program to contribute to our community’s well-being and strength.