Welcome to our second issue of the Research Quarterly!

In this issue, we are pleased to be updating you on:

- **SUDEP biomarker challenge:** Looking for solvers. Through our targeted research program in the SUDEP Institute, we support the Biomarker Challenge. The goal of the challenge is to identify biomarkers that will predict who is at highest risk of SUDEP (sudden unexpected death in epilepsy) or life-threatening seizures. To learn more about this research initiative, please turn to page 2. #AimforZero.

- **3** different grants were awarded through our Shark Tank Awards. Awardees were focused on seizure detection and prediction – from developing improved algorithms for seizure prediction to better seizure detection mobile applications. To learn more about our awardees, please turn to page 3.

- **4** different grants were awarded through our Next Generation Scientists Program, a partnership with the American Epilepsy Society. Awardees’ research focus spans a wide range of areas from genetics to inflammation to assessing healthcare outcomes in epilepsy. To learn more about our awardees, please turn to page 5.

- **Clinical Trial Portal Launched** – Our clinical trials portal has gone live! In this issue, we highlight the FAIRE program of clinical trials for Dravet syndrome. To learn more, please turn to page 4.

Sincerely,

Brandy Fureman, PhD
VP of Research & New Therapies

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**SAVE THE DATE**

Epilepsy Foundation Pipeline Conference
San Francisco, CA
February 22-24, 2018

More Details Coming Soon

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Sudden unexpected death in epilepsy (SUDEP) is the leading cause of death in young adults with uncontrolled seizures. Each year, more than 1 out of 1,000 people with epilepsy die from SUDEP. If seizures are uncontrolled, the risk of SUDEP increases to more than 1 out of 150.

Can we prevent SUDEP from happening?

One theory for why SUDEP occurs is that there is compromised cardiac or respiratory function occurring before, during, or after the seizure. However, it is difficult to predict what a specific person’s risk level might be for SUDEP.

The Epilepsy Foundation SUDEP Institute has issued a challenge to find predictive biomarkers to identify people at risk for SUDEP or seizures that compromise cardiac or respiratory function.

A biomarker is a measurable biological substance in the body. For example, blood sugar can be a biomarker for diabetes risk or cholesterol for heart disease.

If we can identify who is at high risk, then we can try different interventions to prevent SUDEP from happening.

This challenge has been broken down into three components (or milestones). Anyone can submit solutions at any time before the deadline for an open challenge milestone, and you do not need to participate in previous milestones to be considered.

Milestone One (CLOSED):
Creating a Plan of Action.
Applicants were asked to submit detailed proposals on how they would validate potential biomarkers that could predict SUDEP.
Submission Deadline: Closed.
Award: $10,000 to up to four different solvers/solving teams from around the world. Information on the Milestone One winners can be found here.

The SUDEP Institute is looking for applicants to solve the remaining milestones!

Milestone Two (OPEN):
Production of Proof-of-Concept Data
Applicants must demonstrate that their proposed biomarker that indicates risk of SUDEP has the potential for real-world application. These could be pilot studies that are done in preclinical models or in human populations.
Submission Deadline: October 10, 2017
Award: $25,000 each to up to four different solvers/solving teams from around the world

Milestone Three:
Experimental Confirmation of Results (OPENING ON 10-10-2017)
Solvers must demonstrate that their selected biomarker(s) have predictive efficacy and value in the human population.
Submission Deadline: Race to the Finish, with solutions accepted between October 17 and October 20, 2020. Submissions will be reviewed as they are received and at the discretion of the SUDEP Institute. The first submission that meets all the challenge criteria will be awarded the prize.
Award: $800,000 for successful completion

Great minds think alike, but we challenge you to think differently!

Learn more about the $1,000,000 prizes available for development of a SUDEP biomarker and register here.

The SUDEP Institute is looking for a new Director.

Learn more at: www.epilepsy.com/dare-defy-seizures/careers/director-sudep-institute

Interested candidates should submit a cover letter and resume to: recruitment@efa.org.
Innovation Programs: Epilepsy Therapy Project
Shark Tank Awards

In May, the annual Shark Tank competitions were held in Miami, Florida, at the Antiepileptic Drug and Device Trial Conference.

Inspired by the TV show Shark Tank, finalists can give a 5-minute pitch to our judges about why the Foundation should invest in their idea to solve challenges that people living with epilepsy face every day. The audience also gets to vote on their favorite project to fund.

Listed below are the three winners of the 2017 Shark Tank Competition.

24/7 Portable, Ultra-long term EEG Recording
Jonas Duun-Henriksen, PhD Senior Scientific Researcher UNEEG medical A/S $75,000 Audience Choice award

Description: 24/7 EEG™SubQ is a portable EEG recording system that provides a robust and easy way of monitoring epilepsy patients for weeks, months, or years without the need for an inconvenient and costly stay at the hospital wearing uncomfortable wires and electrodes. The system comprises an implantable monitor and a small external recorder.

Device for Epileptic Seizure Prediction
Paula Gomez, PhD CEO, Epistemic Hilda A. Cerdeira, PhD Fellow of the American Physical Society $50,000 award

Description: A wearable device that sends an SOS message in advance of a seizure to an application in the smartphone of the care-partner. The algorithm to create this seizure-predicting device was created using approximately 1,000 EEGs from people with epilepsy. Awardees will update us on their progress in February 2018 at the Epilepsy Foundation Pipeline Conference. Click here to learn more about the Shark Tank Competition and read the 2017 press release.

Stay Tuned: The Epilepsy Foundation will be accepting new Shark Tank Letter of Intent Submissions in Late July: http://www.epilepsy.com/accelerating-new-therapies/shark-tank-competition

Post-Award 2016 Shark Tank Awardee Update

Improving the EEG Experience

Since 1924, getting an EEG reading in the hospital has not changed much. A trained technician measures the head, sorts through hair, marks electrode locations, and applies paste and electrodes to the scalp, eventually tethering the patient to a box with wires. The procedure requires about an hour, and one leaves with goo stuck in the hair.

At the 2016 Shark Tank, a new company called Zeto was awarded $150,000 to develop a comfortable, wireless, dry-electrode headset that could be used to perform a routine or urgent EEG anywhere without the need for a technician.

Since their award, Zeto has altered the prototype design, expanding recording capabilities from 6 to 19 channels to improve the quality of EEG recordings. Moreover, the headset design has been modified from a video gaming head band to look more like a bike helmet. This is to ensure that the electrodes doing the recording are secured in the correct locations. The device can also stream EEG records to a secure cloud platform, enabling remote interpretation. The goal is to wear, share and diagnose someone without needing to go to the hospital.

“Epilepsy Foundation funding set the ball rolling for us. The validation helped position Zeto as a disruptive startup, gain credibility, raise investor funding, and expedite our overall progress.”

-Aswin Gunasekar
Founder, Zeto, Inc.
This past April, the Epilepsy Foundation launched the Clinical Trials Portal, where you’ll find information about ongoing clinical trials and observational studies in epilepsy. This tool will help connect you to studies that match the type of epilepsy you or your loved one has.

You will also find tools to help you learn about trials and other clinical research studies, and to help you consider whether joining a study is right for your situation.

This month, a new program has been posted on the Clinical Portal. The Fenfluramine Assessment in Rare Epilepsy “FAiRE” program is exploring whether an investigational drug (ZX008) can improve seizure control in children and young adults with Dravet syndrome.

Go to our portal to learn more!

**Clinical Trials Portal**

www.epilepsy.com/clinical_trials

Several large epilepsy trials funded by the National Institutes of Health had to be terminated due to insufficient enrollment.

80% of people living with epilepsy say they would participate in a clinical trial.

But fewer than 20% ever do.

84% of volunteers for epilepsy clinical trials would be willing to participate again.

**Why are Clinical Trials Important?**

- Clinical trials are the only way new treatments can be approved and made available to people with epilepsy.
- Clinical trials can help determine if a treatment is safe and effective.

**Did you know?**

- Change in number of convulsive (for example, tonic-clonic) seizures or non-convulsive (for example absence or focal) seizures compared to before the study medication was started.
- Number of days without convulsive seizures.
- Use of rescue medication.
- Number of hospitalizations to treat seizures.

**Clinical Trial Open for Recruitment**

**GOAL OF ZX008-1501/1504 TRIALS:**

Test if ZX008 is a safe and effective treatment for children and adolescents with Dravet syndrome, when added on to their other seizure medications.

**OUTCOMES TO BE LOOKED AT:**

- Age 2-18 years (inclusive).
- Documented medical history that supports a clinical diagnosis of Dravet syndrome.
- First seizure happened in the person’s first year of life.
- Uncontrolled seizures despite current medication.

*Study 1011 does not allow patients taking stiripentol to participate. *Study 1504 requires patients to be taking stiripentol as part of their current treatment regimen.

**PARTICIPATION ENTAILS:**

- Continuation of person’s normal background anti-seizure medication(s).
- Treatment with either placebo or study medication.
- Use of a seizure diary to record seizure activity and medication details.
- Regular health checks include electrocardiograms (ECG) (test of heart rhythms), echocardiograms (an ultrasound of the heart), physical examination (including blood pressure and heart rate), and nervous system assessments.

**ELIGIBILITY CRITERIA INCLUDE:**

- Age 2-18 years (inclusive).
- Documented medical history that supports a clinical diagnosis of Dravet syndrome.
- First seizure happened in the person’s first year of life.
- Uncontrolled seizures despite current medication.

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For more information on Dravet syndrome and FAiRE or to enroll, visit www.FAiREDS.com
The Epilepsy Foundation, in partnership with the American Epilepsy Society (AES), supports young investigators.

For 2017, we are pleased to be supporting:

1. Junior Investigator Research Award
3. Clinical Research Fellowship Awards
1. Clinical Apprenticeship Award

More information on 2017 awardees and what they will be studying is to the right and below.

AES/EF Junior Investigator Research Award

Gemma Carvill, PhD
Assistant Professor of Neurology, Northwestern University
Research Topic: Expanding Epilepsy Genetics beyond the Exome

The overall mission of Dr. Gemma Carvill’s lab is to define the genetic basis of epilepsy, understand disease mechanisms, and develop new therapeutics. Current medications only treat the outward symptoms of a seizure but not the underlying cause. Genetics provide a clue to the potential mechanisms for why the epilepsy begins. Over the past few years, there has been tremendous progress in identifying novel genetic causes for pediatric epilepsy subtypes. This research will focus on the role that newly uncovered mutations in the sodium channels SCN1, SCN2, and SCN8A have on the brain network. Dr. Carvill will study how these variants impact neuronal networks and assess how common these genetic variations are in pediatric populations with severe cases of epilepsy.

AES/EF Clinical Research & Training Fellowship

Luca Bartolini, MD
Children’s National Health System and National Institute of Neurological Diseases and Stroke (NINDS)
Research Topic: Research Study on Viral and Inflammatory Causes of Epilepsy

Inflammation is one of the many causes attributed to having seizures. An earlier study suggested that the herpes virus HHV-6B was present in the brains of children with febrile status epilepticus and temporal lobe epilepsy. However, the actual association between herpes virus infection and acute seizures is unknown. Dr. Luca Bartolini will examine whether herpes virus’s infection may contribute to the onset of acute-seizures in children. Specifically, he will test whether children who come to the clinic with high fevers and acute seizures are more likely to be infected with the herpes virus versus those who appear in the clinic without high fevers. He has previously demonstrated that such a test can be easily performed with a saliva swab sample. These studies may lay the foundation for whether anti-inflammatory therapies.

AES/EF Clinical Research & Training Fellowship

Adam Numis, MD
UCSF Benioff Children’s Hospital
Research Topic: An inflammatory molecular profile in treatment response of infantile spasms

Infantile spasms (IS) are a severe type of epilepsy, frequently resulting in ongoing seizures and cognitive delay. Poor cognitive outcomes correlate to how long the symptoms can be resolved. Therefore, efficient and effective therapy is critical. Unfortunately, many patients do not respond to initial therapies and predictors of response to treatment are lacking. Medications that can alter inflammation, including prednisolone and adrenocorticotropic hormone, are frequently used in the treatment of IS. Their effectiveness suggests that inflammation plays a role in the development of this disorder. Here, Dr. Numis will study whether inflammatory markers in the blood change during treatment and whether these markers could predict who responds better to treatment.

Want to Support Next Gen Fellows?
Donate Today.
Epilepsy Foundation Clinical Research Apprenticeship
Administered by the American Epilepsy Society
Lu Li, MD
Brigham and Women’s Hospital: Boston Hospital & Medical Center
Research Topic: Assessing Efficacy and Adverse Events of New AEDs in Hospitalized Patients

Dr. Lin is developing a standardized assessment tool to collect prospective information on patients to better report antiepileptic drug (AED) dosing and indications, adverse effects, and efficacy. Once the tool is developed, Dr. Lin will use it to assess the patterns of use, safety, and effectiveness of three new AEDs (brivaracetam, perampanel, and clobazam) in hospitalized patients with seizures. The prospective observational trial will be performed at three sites of the Critical Care EEG Monitoring Research Consortium (CCEMRC). This information will be critical to comparing the drug’s effectiveness and safety and to ensuring evidence based practices for optimal standard of care.

Susan Spencer Clinical Research Fellowship
Co-sponsored by the American Academy of Neurology, the American Brain Foundation, the American Epilepsy Society, and the Epilepsy Foundation

Alice Lam, MD, PhD
Massachusetts General Hospital
Research Topic: Developing a Neurophysiologic Toolbox for Diagnosing Epilepsy in Alzheimer’s Disease

Studies suggest that epilepsy is a common but often under-recognized in patients with Alzheimer’s Disease (AD). The abnormal brain electrical activity reported in AD patients occurs in the temporal lobe. Recent studies suggest that electrodermal activity (sweat response) can be an indicator of seizures in the temporal brain region. Therefore, Dr. Lam will study the following questions:

1) What is the actual prevalence of epilepsy in the AD population?
2) Can the abnormal electrical activity be detected through non-invasive EEG wearables?
3) Is the brain electrical activity associated with changes in electrodermal activity?

Overall, her work will generate new tools and knowledge that would enhance our understanding of epilepsy in AD. It is possible that the underlying epilepsy contributes to the cognitive decline associated with AD. Therefore, this work may also indicate that anti-seizure medications may be useful in treating the AD population.

Upcoming Conferences for 2017

Tuberous Sclerosis Complex Patient Focused Drug Development Meeting
June 21st, Washington, D.C.
http://www.tsalliance.org/individuals-families/patient-focused-drug-development/

2017 International Research Conference on TSC and LAM: Innovation through Partnerships
June 22-24th, Washington, D.C.

Duq15 Alliance 2017 Science Symposium
July 27-28th, Los Angeles, CA
http://www.dup15q.org/events/scientific-conferences/2017-dup15q-alliance-scientific-symposium/

International Conference for Technology and AnaLysis of Seizures (ICTALS2017)
August 20-24th, Minneapolis, MN
http://ictals2017.umn.edu/

32nd International Epilepsy Congress
September 1-6th, Barcelona, Spain
http://epilepsybarcelona2017.org/

3rd International Conference on Functional (Psychogenic) Neurological Disorders
September 6-8th, Edinburgh, Scotland
http://www.fnd2017.org/

American Epilepsy Society Annual Meeting 2017
December 1-5th, Washington, D.C.
https://www.aesnet.org/annual_meeting/about

Hope for Hypothalamic Hamartomas Family Forum
December 2-3rd, Washington, D.C.
http://www.hopedorhh.org/?s=family+forum

Have a conference that you want to share?
Email ahansell@efa.org
Currently, there is a transformation underway in the research ecosystem.

The roles of patients and caregivers are changing from research “subjects” to research partners. This paradigm shift provides increased leverage and impact of the stakeholder group that has the most at stake in developing new treatments for diseases.

The culture change is apparent in several recent pieces of legislation, now law, including the Affordable Care Act’s creation of the Patient Centered Outcomes Research Institute (PCORI), the Food and Drug Administration Safety and Innovation Act’s section 1137: Patient participation in medical product discussions and in the 21st Century Cures Act’s emphasis on putting patient perspectives first.

Embracing Community Engagement

In the epilepsy community, we are embracing patient engagement principles in several large consortia and research projects underway. The Rare Epilepsy Network, funded by PCORI, is a patient-powered research network that brings together over thirty different organizations representing people living with rare epilepsies and their caregivers.

Enrollment in REN is currently at 1300 individuals and growing, and the survey data collected thus far is available by request for researchers interested in analyzing their own questions about one or more of the rare epilepsies.

The most recently funded NINDS Center Without Walls (CWOW), the Epilepsy Bioinformatics Study For Antiepileptogenic Therapy (EpiBioS4Rx; Grant identifier U54NS100064) has a Public Engagement Core that will actively involve voluntary organizations with the EpiBioS4Rx CWOW in public outreach to successfully design and complete clinical research studies, including future trials of prevention therapy in epilepsy.

Many of the patient-led organizations on the Epilepsy Leadership Council are hosting, or in the process of building, their own research initiatives (registries, biorepositories, priority-setting conferences and grant funding programs) that embed the patient perspective into the research being conducted on their disorder.

The Epilepsy Foundation has also taken these principles to heart. Our newest research program, the Epilepsy Innovation Institute, solicits input from people impacted by epilepsy to guide the selection of topics for the institute to tackle.

The emphasis on community engagement is changing the epilepsy research ecosystem for the better.

A culture of connection between patient partners and clinical investigators from academia and industry can ensure that the perspectives and needs of the study population are included in the conceptualization and design of clinical research studies.

Interested in getting involved in advocacy & research efforts at the Epilepsy Foundation?
Email: ContactUs@efa.org
2016 COMMUNITY SURVEY: YOU SPOKE, WE LISTENED

Last fall, we asked the community to help set the research priorities. We published our results in February in a community report online.

Some of the results are summarized below, but we encourage you to go to our research page to learn more about the survey results and how the Epilepsy Foundation is responding to your input. http://www.epilepsy.com/accelerating-new-therapies/our-research-program

When individuals were asked to describe what aspects of epilepsy impacted them the most, these were the most common words used: