PECARN Study Updates
PECARN Health Outcomes
Federal Corner
PECARN Publications
New Faces & Nodal News

“So, We Did Some Research - Now What?”
by Rachel Stanley, MD, MHSA,
PECARN Nodal Principal Investigator

CONTACT US:
PECARN Data Coordinating Center
P.O. Box 581289
Salt Lake City, UT 84158
Phone (801) 581-4027
Fax (801) 581-8686
Findings from research create evidence to drive higher quality medical practice. When evidence is incorporated into clinical practice and guidelines of care, the uptake of that evidence will be accelerated. While dissemination of results is part of the research process, the difficulty of successful transfer of research knowledge should not be underestimated. Passive uptake of evidence through publication, in traditional medical journals, can take 13-17 years. As such, we recognize the importance of early active dissemination of PECARN research findings. In Pediatric Emergency Medicine (PEM), establishing evidence-based guidelines is difficult and disseminating them to a wide audience may be even harder.

After 17 years, the Pediatric Emergency Care Applied Research Network (PECARN) has demonstrated its significant contribution to the care of acutely ill and injured children through the successful completion of over 35 research studies and over 140 publications in journals. Despite the importance the numerous publications in medical journals, the information is not easily accessible to parents, families or non-research medical providers. Reaching non-researchers and general emergency providers is particularly important as most children seek emergency care in general EDs (i.e. non-specialized pediatric ED settings). While the uptake of new knowledge is relatively good in pediatric academic centers, uptake in general EDs is more limited. Estimates are that up to 40% of children do not receive treatments for which clear evidence exists, and up to 20% may receive treatments that are of no benefit or potentially even harmful.

Has PECARN made a difference?
PECARN has demonstrated success in translating research results into practice by impacting practice guidelines. Examples include treatment for bronchiolitis and head injury for children. The first randomized controlled trial (RCT) completed in the Network evaluated the effectiveness of oral dexamethasone for acute moderate to severe bronchiolitis in children seen in the ED, both with regard to the need for hospitalization (primary outcome), and severity and duration of disease (secondary outcomes). The investigators determined that there was no reduction in hospitalizations or improvement in respiratory scores associated with the administration of oral dexamethasone. Subsequently, the AAP published guidelines for the treatment of bronchiolitis in infants citing this research. This is one way to accelerate the uptake of research results. In this example, PECARN’s first clinical trial impacted the clinical care guidelines.

To address priorities around injury and prediction rules, the Network conducted a prospective study of children with minor-to-moderate blunt head trauma. The purpose was to identify children at very low risk of clinically-important traumatic brain injuries (TBI) for whom CT might be unnecessary. The network successfully enrolled 34,000 patients for the derivation of two clinical decision rules (one for children < 2 years and one for children > 2 years), and an additional 9,000 patients to validate the decision rules. These validated prediction rules identified children at very low risk of clinically important TBIs for...
PECARN Study Updates

**ESETT**
Thank you all for your efforts in finding patients with seizures refractory to benzodiazepines. After a slow summer, enrollment kicked in again, with 3 enrollments in 2 weeks. We are now at 454 total patients. The interim analysis occurs at 450.

**Probiotics**
Follow-up for the Probiotics study completed on August 31, 2018! With enrollment and follow-up finished, we continue to work on the manuscripts for the study, four of which are in various stages of development. Meanwhile, the main manuscript has been submitted at a major medical journal. We appreciate everyone’s hard work and dedication to this study!

**FLUID**
The FLUID study successfully enrolled approximately 1,400 children with DKA and 400 non-DKA patients over five+ years at 13 PECARN centers. We previously published the Methods paper and an ancillary paper on circulating inflammatory markers in this condition. In June, we published the results of the main analysis in the New England Journal of Medicine! We are now deep into secondary analysis and manuscript writing. We have submitted an ancillary study for publication pertaining to predictors of successful enrollment. The DKA versus non-DKA manuscript is nearing completion. Two other major manuscripts underway and soon to follow: 1) Predictors of Pyuria and Kidney Injury in DKA, and 2) Hemodynamics and Neurocognitive outcomes. The manuscript analysis plans have been helpful to continue moving forward each manuscript as the previous is completed.

DKA is the leading cause of death in children with Type 1 diabetes. This study and the resulting manuscripts will allow us to treat children with DKA more appropriately, and in an evidence-based fashion. This will likely lead to improved outcomes. We are also uncovering other possible causes of brain and kidney injury in children with DKA.

**ASSESS**
Currently, ASSESS investigators have 3 manuscripts under review (Predictive Validity, NIAAA Screen to Other Drug Use, Risky Behavior in Latino Youth); 1 manuscript to be resubmitted (Risky Adolescent Behavior); 1 manuscript in GAPS review (Concurrent and Predictive Validity of Newton Screen); 3 in preparation (Risky Sexual Behavior in Teens, CRAFFT screening, Racial and Ethnic Differences of NIAAA screen) and a number of manuscripts which we will begin this Fall.

**PECARN CORE DATA PROJECT**
The PECARN Core Data Project (PCDP) is an observational descriptive study to identify basic epidemiological information on all ED visits from each participating hospital in PECARN. This data has been instrumental in hypothesis generation and grant acquisition for PECARN. The PCDP database has complete data for 2002-2016. The Public Use Data Set request form can be found at [http://www.pecarn.org/studyDataSets/StudyDetails?studID=2](http://www.pecarn.org/studyDataSets/StudyDetails?studID=2).
The main goal of this study is to assess the stability of the “RNA Biosignature” to distinguish viral and bacterial infections through obtaining sequential blood samples for RNA expression analysis on febrile infants ≤60 days old. Enrollment in the Biosig II study remains on target. We have started an ancillary study exploring the gut microbiome through stool samples and correlating this bacterial growth with blood pathogens. We have also completed several manuscript analysis requests for Biosig II.

A few more Biosig I manuscripts have recently come to publication/acceptance. The Viral/SBI co-infection manuscript was accepted at the Journal of Pediatrics and the Infant Pneumonia study was accepted at Pediatric Emergency Care. Finally, the Variation in Care manuscript and the SBI Prediction Rule manuscripts are under review at other medical journals.

This study will allow us to identify young febrile infants at risk for SBI with greater accuracy and timeliness. We will be able to treat and hospitalize those at risk with greater efficiency, and avoid invasive procedures, empirical antibiotics and hospitalization for those not at risk.
The mission of the EMSC Program was defined by Congress in its authorizing legislation, establishing a federal effort to expand and improve emergency medical services for children who need treatment for trauma or critical illness. Success of the program requires accountability to a variety of national, state and local stakeholders, demonstrating how the full EMSC program portfolio works together to achieve measurable progress toward this mission. Many questions arise when working toward this accountability: How do we define success? What is an “EMS improvement”? How do we know when an improvement has been identified? What is the best way to spread an improvement, once we know what optimal systems and clinical practice looks like in the pre-hospital and hospital settings?

The EMSC Program currently has two primary points of focus to answer those questions:

1) Building and synthesizing evidence to define optimal clinical care and ED and EMS systems that leads to improved pediatric survival and health outcomes after trauma or a medical emergency. PECARN plays a critical role by studying and defining optimal clinical care. Some examples:
   - RNA biosignatures brought to the point-of-care in clinical practice, may identify young febrile infants who need early treatment and hospitalization, yet avoid unnecessary invasive testing, over-treatment with antibiotics and unnecessary hospitalizations in those who do not require such interventions.
   - Clinicians may individualize fluid hydration for children with DKA to meet the clinical needs of individual patients without fear of causing brain injury. This may prevent cognitive impairment and decrease the risk of other complications in children with diabetes and DKA.

2) Engaging systems and providers to spread uptake of these system and clinical improvements. PECARN can also play a role here by studying the best methods for translating those findings into care settings. The newly funded C-Spine study includes a knowledge translation component. Investigators will engage clinical end-users in activities that will inform the design process thus ensuring that the Pediatric Cervical Spine Injury Risk Assessment Tool will be implementation ready.

While it is clear that PECARN contributes significantly to the EMSC Program mission, the challenge can come from articulating this impact and how PECARN improves health outcomes. Each PECARN study is an opportunity to test whether a specific clinical intervention will or will not result in improved health status among the study population. Sometimes, PECARN studies establish evidence that a specific clinical management is optimal. Other times, results can show that a particular clinical intervention is not significantly associated with improved survival or health outcomes. Both results are meaningful and work to answer the question “What is an improvement in pediatric emergency medical care?”

PECARN’s critical role can be maximized when the network’s power is used to explore research questions that reveal clear insights on optimal pediatric emergency medicine, as well as demonstrate successful paths for spreading the delivery of that optimal care.

- Erin Reiney, Acting Division Director, Division of Child, Adolescent and Family Health, Maternal & Child Health Bureau (MCHB), Health Resources & Services Administration (HRSA)
- Diane Pilkey, Nurse Consultant in MCHB and HRSA Project Officer for PECARN
Federal Corner

New Guidelines for Care of Children in the ED

The 2009 Joint Policy Statement “Guidelines for Care of Children in the Emergency Department” has been revised with an anticipated simultaneous publication in early November 2018 by the American Academy of Pediatrics (AAP), the American College of Emergency Physicians (ACEP) and the Emergency Nurses Association (ENA). The National Pediatric Readiness Toolkit, assessment portal, and other pediatric readiness activities (e.g. the Pediatric Readiness Quality Collaborative) remain available to support and encourage pediatric readiness efforts. In collaboration with AAP, ACEP, and ENA, the EMS for Children Program is planning a national pediatric readiness reassessment of emergency departments in late 2019. It is expected that the National Pediatric Readiness Assessment Portal, hosted by the National EMS for Children Data Analysis Resource Center (NEDARC), will close at the end of 2018 in preparation for this national reassessment.

Pediatric Readiness Quality Collaborative (PRQC)

All 146 emergency departments participating in the EMSC PRQC are preparing to launch local quality improvement efforts to improve pediatric readiness in each participating ED. Working with 17 teams consisting of 19 training sites and 127 affiliate sites across 17 states, the collaborative team has provided participants with resources, tools, quality improvement education, strategies, and metrics to help support local efforts. The collaborative teams are geographically spread across the United States and include hospitals in each of the following states: AK, CA, CT, GA, IL, IN, MO, KS, NJ, NY, OR, RI, TN, TX, VT, WA, and WI. The participating sites will be working on any of four interventions based on gaps identified during the 2013 National Pediatric Readiness Assessment:

1. Weighing and recording pediatric weights in kilograms;
2. Identification of abnormal vital signs;
3. Optimizing pediatric inter-facility transfers; and
4. Ensuring pediatric-specific needs are integrated into the hospital disaster plan.

NIH National Institutes of Health Turning Discovery Into Health

Trans-NIH Pediatric Research Consortium:

In June, the National Institutes of Health (NIH) announced the formation of a consortium among 27 institutes and centers to fund child health research, termed the Trans-NIH Pediatric Research Consortium. The lead NIH institute for the consortium will be the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) under the directorship of Diana Bianchi, MD. (https://www.nih.gov/news-events/news-releases/new-trans-nih-consortium-aims-advance-pediatric-research-global-level)

Opioid Misuse & Abuse:

The National Highway Traffic Safety Administration (NHTSA) Office of EMS has awarded a Cooperative Agreement to the National Association of State EMS Officials (NASEMSO), in partnership with the ACEP and the National Association of EMS Physicians. The goal of this agreement is to develop an evidence-based guideline for prehospital treatment of suspected opioid overdose. This guideline will include recommendations for both patient care and provider safety and will focus upon the optimal routes of administration, titration of doses to clinical effect, and triage protocols for destination hospitals. The project has an actively involved Technical Expert Panel that is providing guidance on developing recommendations in response to the project’s key questions. The project is scheduled for completion in March of 2019. This reflects NHTSA’s involvement in a number of public health initiatives that impact prehospital and hospital-based care. Numerous webinars hosted by NHTSA are available online. (https://www.ems.gov/emsdata.html)

Field Triage Guidelines:

NHTSA’s Office of EMS is planning a revision of the Field Triage Guidelines. In support of this, two literature syntheses have been conducted by the Agency for Healthcare Research and Quality’s (AHRQ) Evidence-based Practice Center Program. The first of these reviews, examining level of consciousness as a predictor of the need for tertiary trauma care has been completed and posted on the AHRQ website (https://effectivehealthcare.ahrq.gov/sites/default/files/related_files/field-triage-glasgow_executive.pdf). This document reviews the advantages and disadvantages of different measures to assess mental status, including the Glasgow Coma Scale, the modified GCS, and the Simplified Motor Score. The second review on vital sign parameters to identify children at high risk of serious injury and guide triage destination decisions respiratory and circulatory system predictors was published in April (https://effectivehealthcare.ahrq.gov/sites/default/files/pdf/predictors-trauma-care_cer-
The authors concluded that a combination of physiologic measures with assessments of mental status likely performs better than use of either parameter in isolation. In addition, NHTSA’s Office of EMS has awarded a Task Order to procure and analyze linked state EMS-trauma databases to identify other predictors of severe injury in the absence of physiologic derangement. That project is expected to be completed in September.

Critical Crossroads Dissemination Meeting
As part of the HHS/HRSA commitment to address the urgent mental health concerns and serious mental illness, HRSA launched an agency-wide effort to identify innovative and collaborative strategies to address this public health issue in new, impactful ways. This prompted a collaboration led by the HRSA EMSC Program, in partnership with the Federal Office of Rural Health Policy (FORHP). Together, EMSC and FORHP examined the rising number of children seen in EDs experiencing a mental health crisis, the gaps in hospital preparedness to provide continuity of care for these patients, and the impact on children and their families. This resulted in the launch of the Critical Crossroads: Improving Emergency Care for Children in Mental Health Crisis project in late 2017.

To date, EMSC has led a cross-governmental approach that has fostered federal partnerships and stakeholder engagement dedicated to the mission of improving emergency care for children in mental health crisis, resulting in the centralization of resources into a Critical Crossroads Care Pathway Toolkit. The toolkit is intended to help improve the coordination and continuity of care of children in emergency mental health crisis. It is intended to provide helpful resources to support customized care pathways, and serve as a piece in the larger web of addressing an aspect of care for children’s mental health needs. There will be a November 13th, 2018 meeting in Rockville to plan dissemination of the toolkit and a national launch is projected in early 2019.

Databases & Data Sharing:
The Office of the National Coordinator for Health Information Technology is working on how to more seamlessly integrate EMS data into hospital-based electronic health records to facilitate care. This project evaluates data integration in five communities in California using a model termed the EMS Search, Alert, File and Reconcile (SAFR) model. (https://www.healthit.gov/sites/default/files/emr_safer_knowledge_product_final.pdf)

The 2016 National EMS Information System (NEMSIS) public release research dataset is now available and includes almost 30 million EMS activations submitted by approximately 10,000 EMS agencies. (https://nemsis.org/using-ems-data/request-research-data/)

Upcoming Events
• American College of Emergency Physicians: October 1-4, 2018, San Diego, CA
• National EMSC Data Analysis Resource Center (NEDARC) Workshop on Using Performance Measure Data to Make Impactful Change: October 16-18, 2018, Philadelphia, PA
• American Academy of Pediatrics: November 26, 2018, Orlando, FL
• National EMSC Data Analysis Resource Center (NEDARC) Workshop on Using Pediatric NEMSIS Data to Drive Quality Improvement: February 26-28, 2019, San Diego, CA
• Pediatric Academic Societies: April 24-May 1, 2019, Baltimore, MD
• National Association of State EMS Officials: May 13-16, 2019, Salt Lake City, UT
• Society for Academic Emergency Medicine: May 14-17, 2019, Las Vegas, NV
SUMMARY
The Pediatric Emergency Care Applied Research Network (PECARN) Registry, representing four hospital systems and seven emergency departments (EDs), demonstrates that ED data from disparate health systems and EHR vendors can be harmonized for use in a single registry with a common data model. The current PECARN Registry represents data from 2,019,461 pediatric ED visits, 894,503 distinct patients, more than 12.5 million narrative reports, and 12,469,754 laboratory tests and continues to accrue data monthly. The Registry is a robust harmonized clinical registry that includes data from diverse patients, sites, and EHR vendors derived via data extraction, de-identification, and secure submission to a central data coordinating center. The data provided may be used for benchmarking, clinical quality improvement, and comparative effectiveness research.


SUMMARY
This multi-center, randomized, controlled trial evaluated the effects of rehydration rate and fluid sodium content on neurocognitive outcomes in children with diabetic ketoacidosis (DKA). The study examined 1,389 episodes of DKA in 1,255 children enrolled from 13 PECARN EDs. Participants were randomized using a 2 x 2 factorial design to one of four treatment regimens, consisting of slow or fast rates of rehydration using 0.45% or 0.9% sodium chloride fluid. The primary trial outcome was decline in mental status, as measured by Glasgow Coma Scale scores. Secondary outcomes included short-term memory and brain injury status during DKA treatment, and memory and IQ status 2 to 6 months after DKA treatment. The study concluded that neither the rate of administration nor the sodium chloride content of the intravenous fluid significantly influence neurological outcomes in children with DKA.


SUMMARY
This four-site, prospective cohort study evaluated children < 18 years transported by EMS to pediatric EDs for evaluation of CSI after blunt trauma with the objective to determine the interobserver agreement between EMS and emergency department (ED) providers for cervical spine injury (CSI) risk assessment variables and overall gestalt. The study examined 1,372 paired observations for 29 variables. The primary trial outcome was the level of interobserver agreement between EMS and ED providers in their risk assessment of CSI. All variables achieved moderate to better agreement including eight variables previously shown to be independently associated with CSI in children: diving mechanism, high-risk motor vehicle collision, altered mental status, focal neurological findings, neck pain, torticollis, substantial torso injury, and predisposing medical condition. The study concluded that emergency medical services and ED providers achieved at least moderate agreement in the assessment of CSI risk factors in children after blunt trauma which supports the development of a pediatric CSI risk assessment tool for EMS and ED providers to reduce interventions for those children at very low risk for CSI while still identifying children with injury.

**NEW FACES & NODAL NEWS**

**DCC Node**

**Brad Barney** is the newest biostatistician at the DCC. Brad received his Ph.D. in Statistics at Texas A & M University, and was a faculty member at Kennesaw State University and more recently at BYU. Brad has clinical research experience, including work at the Cleveland Clinic and the M.D. Anderson Cancer Center.

**Michelle Wilcox** is the newest member of the DCC’s admin support team and will be assisting PECARN. She’s recently worked as a Paraeducator, an Executive Secretary, and a Pediatric Residency Coordinator.

**Adrianne Neiss** joined PECARN in April 2018. She has a PhD in Biochemistry from Trinity College, a MS in Graphic Design from the Univ. of Mass. Lowell, and a MS in Life Sciences from Univ. Maryland College Park. The DCC wishes **Amy Watson** farewell. It has been an honor working with such a wonderful colleague over the years. We’d like to thank her for her help and kindness and wish her continued success wherever life may take her.

**WBCARN Node**

**David Lewander** joined the Boston Children’s PECARN research team in May of 2018. He graduated George Washington University with a B.S. in Public Health in 2016, where he concentrated his studies in urban health and global health policy. He will be applying to medical school in 2019 in hopes of pursuing a future in pediatric emergency medicine.

**Ar’Reon Watson**, new RA at CNMC, recently graduated with a Bachelor’s in Psychology and Law from Kenyon College in Ohio. He’s originally from Saint Louis, MO. He plans to obtain a Ph.D. in clinical/forensic psychology.

**Ryan Pearman** is a Research Assistant in the Children’s National Emergency Department. He holds a BA in Psychology from the University of Southern California. His future goals include attending medical school.

**Amanda Barkho**, new RC at Lurie Children’s Hospital, attended the DePaul University Bachelor of Arts and Sciences (BAS) program where she majored in Psychology with concentration in Research Methods, Community Psych and Human Development and a minor in Sociology.

**Dr. James Chamberlain** (WBCARN PI) was honored by the Society for Academic Emergency Medicine (SAEM) in March of this year with the Nathan Kuppermann Award for Mentorship in Pediatric Emergency Medicine Research. Congratulations, Jim!!

In April, 2018-Dr. Chamberlain, MD established the Center for Data Analytics and Informatics in the Division of Emergency Medicine at Children’s National and became its Founding Director. Their mission is to develop a robust informatics infrastructure to support research as well as quality improvement initiatives in the Division of Emergency Medicine. The establishment of the Center builds on Dr. Chamberlain’s work as one of the lead investigators in the development of PECARN Core Development Project (PCDP) and PECARN Registry and recognizes the potential of capitalizing on EHR data to improve patient care.

**SW Node**

**SW Node welcomes EMSA RC in Tucson, Arizona, Jeff Tolson.** Jeff graduated from the University of Arizona in May 2018 with a degree in Biomedicine and Biochemistry. After volunteering with the University of Arizona Emergency Medical Services for three years, he joined the research team with the Department of Emergency Medicine. Jeff loves to travel, especially to Italy. His favorite restaurant is The French Laundry by Thomas Keller and his favorite food is pizza.

**Amanda Barkho**, new RC at Lurie Children’s Hospital, attended the DePaul University Bachelor of Arts and Sciences (BAS) program where she majored in Psychology with concentration in Research Methods, Community Psych and Human Development and a minor in Sociology.

**Dr. James Chamberlain** (WBCARN PI) was honored by the Society for Academic Emergency Medicine (SAEM) in March of this year with the Nathan Kuppermann Award for Mentorship in Pediatric Emergency Medicine Research. Congratulations, Jim!!

In April, 2018-Dr. Chamberlain, MD established the Center for Data Analytics and Informatics in the Division of Emergency Medicine at Children’s National and became its Founding Director. Their mission is to develop a robust informatics infrastructure to support research as well as quality improvement initiatives in the Division of Emergency Medicine. The establishment of the Center builds on Dr. Chamberlain’s work as one of the lead investigators in the development of PECARN Core Development Project (PCDP) and PECARN Registry and recognizes the potential of capitalizing on EHR data to improve patient care.
NEW FACES & NODAL NEWS

**Prime Node**

UC Davis says farewell to Cindy Valencia who is off to pursue a PhD in Public Health Sciences, but happily welcomes Maria Marois as the new PRIME Nodal Administrator! Maria has an outstanding background and experience, and we know she will be a great addition to PRIME.

We also have several outstanding new PCs coming on board.

**Amia Andrade**, Assistant RC, started in August and will take over several of Rebecca Kim’s projects while she is on maternity leave.

Maria worked for many years coordinating several occupational and environmental health studies. Prior to joining PECARN, she served as research manager for the Personalized Research for Monitoring Pain Treatment clinical trial. She holds a PhD in epidemiology from UC Davis and received her MPH with an emphasis in health promotion from San Diego State University.

Amia recently graduated from Loma Linda University (LLU) with her MPH in Research Epidemiology. She is also an alumna of UC Davis (UCD) with a Bachelor’s of Science in Cell Biology, and a Bachelor’s of Arts in Psychology.

Children’s Hospital of Philadelphia and the CHOP ED welcomes three new PCs: Ima Samba, Casey Swan and Peter McBride! Ima graduated from Northwestern University in June 2017, where she pursued both religious studies and biological sciences. She’s interested in autoimmune diseases in women and aspires to become a rheumatologist.

Casey is pursuing a career in medicine in hopes of working with underserved populations. She holds a Masters in education from the University of Pennsylvania and a double major in Music and Italian Studies from the College of William & Mary.

Peter graduated from the University of Connecticut with a Bachelor’s of Science in Electrical Engineering and hopes to become a Physician Assistant.

**Glemscrn Node**

Publications/special presentations:


**William Bryant** graduated from the Ohio State University in 2017 with a B.S in Neuroscience. He plans to become a clinical psychologist and conduct research in early childhood developmental disorders.

Andres Cuesta was born in Colombia and came to the U.S. to attend college and play soccer on a scholarship.

**Molly McNamara** graduated from Ohio State in May 2018 with a BS in Biomedical Science.

**Chris Korth** graduated from Ohio University with a degree in Human Biology. He has been trained as an EMT, a scribe, and a ninja.

**Preet Dhanoa** is a recent graduate from Ohio State University, where he acquired a Bachelor’s of Science in Pharmaceutical Sciences.


**Homerun Node**

Dr. Quayle is a graduate of Washington University School of Medicine. She completed her residency at St. Louis Children’s Hospital, and her fellowship in Pediatric Emergency Medicine at Washington University School of Medicine. She serves as Division Chief as the Dana Brown Chair in Pediatric Emergency Medicine since 2017. She also oversees clinical care as the Medical Director for St. Louis Children’s Hospital ED.