



Investigator: Zachary Grinspan, MD **Grant Award Year:** 2019

Amount of PERF™ Grant: \$500,000

Investigator Institution: Weill Medical College – Cornell University

Project Title: A Learning Healthcare System for Pediatric Epilepsy Part II

Project Description: This proposal is designed to continue and expand our work, through several linked activities.

Project Goals/Objectives: 1) Improve the foundations of a Pediatric Epilepsy Learning Health System (PELHS) by drafting and approving a charter, an academic conduct guideline, and a plan for sustainability. 2) Expand data collection from 8 to 20 sites. 3) Continue to develop “computable phenotypes”, i.e. algorithms that allow computer to automatically identify individuals with specific subtypes of epilepsy. 4) Implement and field test three quality metrics for child neurology care, and link the metrics to quality improvement initiatives at each of our sites. 5) Conduct a comparative effectiveness study examining different treatments for neonates with hypoxic ischemic encephalopathy, and how the treatment affects the risk of developing infantile spasms.

Outcome of Research: 1) A charter, authorship policy, and high-level sustainability plan were completed. A business plan draft was included in the sustainability plan. 2) They have data in hand for 20 sites. 3) Computable phenotypes were developed and evaluated for infantile spasms (IS), status epilepticus, treatment-resistant epilepsy, HIE requiring therapeutic hypothermia, and adolescent onset generalized epilepsy. 4) Partially completed quality metrics for infantile spasms (e.g. first line treatment). 90% of children with IS were receiving timely 1st line therapy. Shifted focus to looking at other outcomes in IS such as relapse rate. 5) For neonates with HIE, completed comparative effectiveness of selection of therapeutic hypothermia technique on subsequent development of IS. Computable phenotype and data analysis suggested no effect of selective head cooling vs. whole body cooling on development of IS.

Subsequent Funding None to report.

Year: 2021

Funder: The BAND Foundation

PERF™ Post Award Report

Amount: \$200,000

Project: Pediatric Epilepsy Mortality Initiative (PEMI)

Year: 2023

Funder: NINDS

Amount: \$2.5M

Project: Neonatal Seizures, Predicting Epilepsy and Assessing Comparative Effectiveness (NS-PEACE)

Year: 2019 and 2022

Funder: Morris and Alma Schapiro Fund

Amount: \$60,000 (2019) | \$175,000 (2022 over three years)

Project: To support in-person PELHS and PERC meetings (2019) | To support pediatric epilepsy data science (2022)

Year: 2019 and 2022

Funder: Weill Cornell Medicine

Amount: \$400,000 (2019 over three years) | \$100,000 (2022)

Project: To support ongoing research (2019) | To support pediatric epilepsy data science (2022)

Abstracts

Grinspan ZM, Shellhaas R, Berg A, Bucchalter J, Goodkin H, Axeen E, Morgan L, Wu A, Basma N, Loddenkemper T, Yang Y, Yozawitz E, Coryell J, Singhal N, Gaillard WD, Mbwana J, Patel A. Center to center variations in recommended care delivery for infantile spasms. Quality measurement through the Pediatric Epilepsy Learning Healthcare System. Abstract presented at the American Epilepsy Society Annual Meeting, Baltimore, MD, December 2019.

Shah P, Yun M, Storey M, Sokoloff M, Shellhaas R, Turnage C, Axeen E, Goodkin H, Patel A, Wentzel E, **Grinspan ZM**. Pediatric Epilepsy Learning Healthcare System Quality of Life Questions (PELHS-QOL-2), a Novel QOL Instrument for Use in Clinical Care. Abstract presented at the American Epilepsy Society Annual Meeting, Baltimore, MD, December 2019.

Grinspan ZM, Bolton J, Yozawitz E, Basma N, Wu A, Mbwana J, Gaillard W, Axeen E, Goodkin H, Shellhaas R, Zampi A, Patel A, Mytinger J, Berg A, Morgan L, Coryell J, Singhal N, Buchhalter J. What outcomes should be measured to improve care for children with infantile spasms? Abstract presented at the Child Neurology Society Annual Meeting. (October 2020, virtual).

Shah PD, Yun M, Wu A, Arnesen RA, Storey M, Sokoloff M, Shellhaas RA, Turnage C, Axeen EJ, Goodkin HP, Patel AD, Wentzel E, **Grinspan ZM**. Overcoming Floor Effects in Existing Pediatric Epilepsy Quality of Life Instruments with the PELHS-QOL-2. Abstract presented at AES 2020 (December 2020, virtual).

Grinspan ZM, Basma N, Berg AT, Bolton J, Loddenkemper T, Morgan LA, Murray T, Patel AD, Shahid S, Tchapyjnikov D, Wu A, Shellhaas RA. Infantile Spasms after whole body vs selective head cooling. Preliminary findings from the Pediatric Epilepsy Learning Healthcare System. Abstract presented at the 2021 Child Neurology Society Annual Meeting.

Grinspan ZM, Marquis BO, Patel AD, Gaillard WD, Shellhaas RA, Goodkin HP, Perry MS, Singhal NS, Yozawitz E, Axeen E, Tchapyjnikov D, Berg AT, Coryell J, Morgan LA, Loddenkemper TI. Death in Children with Seizures and Epilepsy in the Pediatric Epilepsy Learning Healthcare System. American Epilepsy Society Annual Meeting, Chicago, IL, December 2021.

Young Min J, Axeen E, Basma N, Berg AT, Bhalla S, Bolton J, Coryell J, Demarest S, Gaillard W, Goodkin HP, Hussain SA, Loddenkemper T, Mbwana J, Morgan LA, Patel AD, Perry SM, Sands T, Shellhaas RA, Singhal N, Tchapyjnikov D, Wu A, Yozawitz E, Zafar M, **Grinspan Z**. Oxcarbazepine Use and the Risk of Infantile Spasms Among Children with Epilepsy. American Epilepsy Society Annual Meeting, Chicago, IL, December 2021.

Grinspan Z, Wu A, Axeen E, Coryell J, Demarest S, Gaillard W, Goodkin H, Morgan L, Sands T, Wu J, Yozawitz E, Zafar M, Patel A, Shellhaas R. Pharmacoepidemiology Foundations for Comparative Effectiveness Research in Pediatric Epilepsy — First and Second line therapy for children 0 to 5 years. Child Neurology Society Annual Meeting, 2022.

Wu A, Yozawitz E, Hussain S, Wu J, Perry S, Sands T, Singhal N, Mbwana J, Zafar M, Loddenkemper T, Axeen E, Coryell J, Demarest S, Bhalla S, Gaillard W, Goodkin H, Morgan L, Patel A, Shellhaas R, Zafar M, **Grinspan Z**. Variations in Prescribing Practices for Early Life Epilepsy, a Pediatric Epilepsy Learning Healthcare System study. American Epilepsy Society Annual Meeting. Nashville, TN. December 2022.

Basma N, Shellhaas R, Axeen E, Coryell J, Singhal N, Demarest S, Gaillard W, Goodkin H, Axeen E, Bhalla S, Loddenkemper T, Gurcharran K, Wagner J, Friedman D, Morgan L, Sands T, Patel A, **Grinspan Z**. Mortality in Children and Young Adults with Epilepsy - Review of Electronic Health Records at Multiple Centers. American Epilepsy Society Annual Meeting. Nashville, TN. December 2022.

Axeen E, Wu A, Basma N, **Grinspan Z**, PELHS Consortium. Practice pattern variability in anti-seizure medication use for TSC-related epilepsy as demonstrated by the Pediatric Epilepsy Learning Healthcare System network. American Epilepsy Society Annual Meeting. Orlando, FL. December 2023.

Subsequent Publications None to report.

Grinspan ZM, Patel AD, Shellhaas RA, Berg AT, Axeen ET, Bolton J, Clarke D, Coryell J, Gaillard WD, Goodkin HP, Koh S, Kukla A, Mbwana J, Morgan LA, Singhal NS, Storey MM, Yozawitz EG, Abend NS, Fitzgerald MP, Fridinger SE, Helbig I, Massey SL, Prelack MS, Buchhalter J. Design and Implementation of Electronic Health Record Common Data Elements for Pediatric Epilepsy: Foundations for a Learning Healthcare System. *Epilepsia*. 2021 Jan;62(1):198-216.

Fitzsimons M, Hwang H. Creating the conditions for a learning epilepsy care system. *Epilepsia*. 2021 Jan;62(1):217-219. (Editorial commenting on our work) Hess-Homeier D, Parikh K, Basma N, Vella A, **Grinspan Z**. Automated Identification and Quality Measurement for Pediatric Convulsive Status Epilepticus. *Epilepsia*. 2021 Feb;62(2):337-346.

Pan S, Wu A, Weiner M, **Grinspan ZM**. Development and Evaluation of Computable Phenotypes in Pediatric Epilepsy:3 Cases. 2021 Oct;36(11):990-997.

Shah S, Yun M, Wu A, Arnesen R, Storey M, Sokoloff M, Shellhaas RA, Turnage C, Axeen E, Goodkin H, Patel AD, Modi A, **Grinspan ZM**. Pediatric Epilepsy Learning Healthcare System Quality of Life (PELHS-QOL-2): A Novel HRQOL Screening Instrument for Children with Epilepsy. *Epilepsia* 2022 Mar;63(3):672-685.

Subsequent Presentations None to report.

At National Meetings

Grinspan ZM. "Epilepsy Learning Healthcare Systems. Early Wins and Future Opportunities". Presidential Symposium. Child Neurology Society Annual Meeting. 11 October 2022.

Grinspan ZM. The Pediatric Epilepsy Learning Healthcare System (PELHS): Answering Big Questions with Bigger Data. Pediatrics State of the Art Symposium. American Epilepsy Society Annual Meeting. December 2022.

At International Meetings

Invited Speaker. The Pediatric Epilepsy Learning Healthcare System. ILAE North American Virtual Epilepsy Meeting 2020. Toronto, Ontario, Canada. 27 Sept 2020. (virtual)

Invited Speaker. The Pediatric Epilepsy Learning Healthcare System. Taiwan Epilepsy Society Annual Meeting 2022. Taipei, Taiwan. April 2022. (virtual)