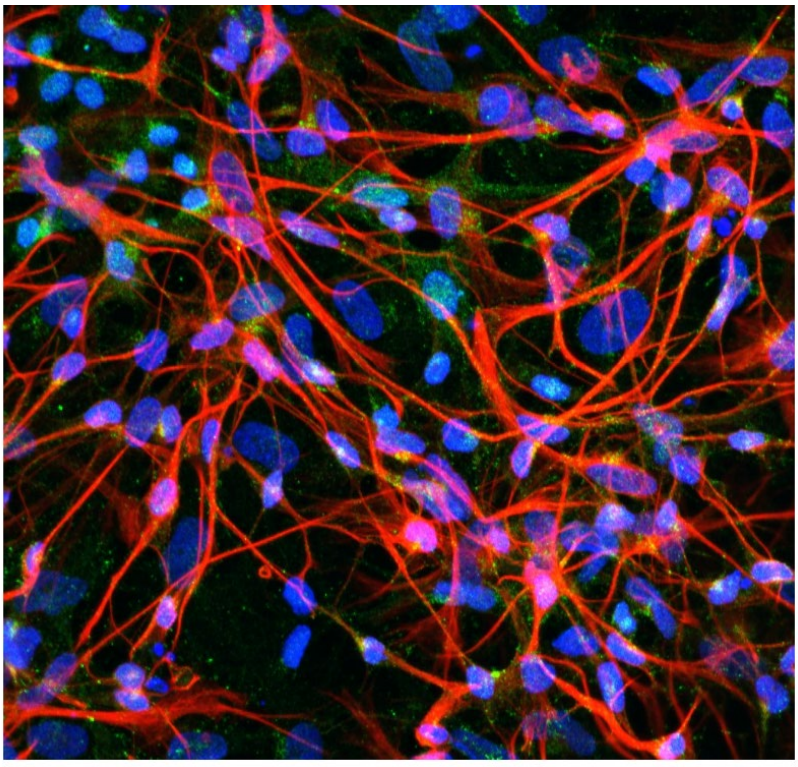
Icahn School of Medicine at Mount Sinai

Child Health Research Day

Sponsored by

The Jack and Lucy Clark Department of Pediatrics
The Mindich Child Health and Development Institute
The Department of Environmental Medicine and Public Health

Program & Abstracts



April 7, 2022
Hatch Auditorium & Guggenheim Pavilion - Atrium 7

A Program of

The Jack and Lucy Clark Department of Pediatrics
The Mindich Child Health and Development Institute
The Department of Environmental Medicine and Public Health

Keynote Speaker:

Michael DeBaun, MD, MPH
Director, Vanderbilt-Meharry Center for Excellence
in Sickle Cell Disease
Professor, Pediatrics and Medicine
Vice Chair for Clinical and Translational Research,
Department of Pediatrics
J.C. Peterson Chair in Pediatrics

Child Health Research Day
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Icahn School of Medicine at Mount Sinai
Child Health Research Day

Schedule of Events

April 7, 2022
In-Person and Live Stream

7:45-8:00 a.m.	**Coffee and Tea**
8:00-8:05 a.m.	**Welcome and Introduction** Robert O. Wright, MD, MPH, Ethel H. Wise Professor and Chair, Department of Environmental Medicine and Public Health Director, Institute for Exposomic Research Lisa M. Satlin, MD, Herbert H. Lehman Professor and Chair, Jack and Lucy Clark Department of Pediatrics
8:05-9:00 a.m.	**Grand Rounds: The Dr. Howard Rappaport Memorial Lecture** "Academic Activism: Choosing the Right Time and the Right Place" Michael DeBaun, MD, MPH Director, Vanderbilt-Meharry Center for Excellence in Sickle Cell Disease Professor, Pediatrics and Medicine Vice Chair for Clinical and Translational Research, Department of Pediatrics J.C. Peterson Chair in Pediatrics
9:00-9:30 a.m.	**Breakfast**
9:30 a.m.	**Welcome to CHRD and Introduction of the Moderators- Hatch Auditorium** David Dunkin, MD, Associate Professor, Pediatric Gastroenterology, and Nutrition
9:30-10:25 a.m.	"**Long Talks"** **Moderators**: Dania Valvi, MD, MPH, PhD and Lauryn Choleva, MD, MSc
9:30-9:40 a.m.	**SARS-CoV-2 Seroprevalence in Kenyan Youth Living with HIV** Mary Boyle, Winstone Nyandiko, Allison Delong, Ashley Chory, Josephine Aluoch, Celestine Ashimosi, Dennis Munyoro, Whitney Beigon, Emma Gillette, Janet Lidweye, Jack Nyagaya, Edwin Sang, Manjot Singh, Eslyne Jepkemboi, Millicent Orido, Vladimir Novitsky, Joseph Hogan, Rachel Vreeman, Rami Kantor
9:40-9:50 a.m.	**Sleep Neurophysiology in Children with Autism Spectrum Disorders: Development and Evaluation of a Machine Learning Model to Identify Atypical Sleep Microarchitecture Features** Caroline Martinez, Zhe Sage Chen
9:50-10:00 a.m.	**The Harmine and Exendin-4 Combination Markedly Expands Human Beta Cell Mass In Vivo in Diabetic Mice** Kara Beliard, Yansui Li, Alexandra Alvarsson, Peng Wang, Keya Thakkar, Daniela Guevara, Andrew F. Stewart, Sarah A. Stanley, Adolfo Garcia-Ocaña, Carolina Rosselot

10:00-10:10 a.m.	**Insights Into the Cell-Type Specific Effects of Prenatal Alcohol Exposure in The Human Placenta** Randy Williams, Corina Lesseur, Sandra W. Jacobson, Joseph L. Jacobson, Ke Hao, Jia Chen, R. Colin Carter
10:10-10:20 a.m.	**A Multimodal Curriculum to Improve Pediatrics and Internal Medicine Residents™ Knowledge in the Care of Youth with Developmental Disabilities** Alexis Tchaconas, Jasmine Blake, Guillaume Stoffels, Joseph M. Truglio
10:20-10:30 a.m.	**RASopathy Drug Discovery Aimed at Treating Hypertrophic Cardiomyopathy** Kimberly Stephens, Jared Gatto, Jianping Hu, Cèline Guichard, Rupa Mirmira, Tirtha Das, Husnu Kaniskan, Jian Jin, Ross Cagan, Bruce D. Gelb
10:30-11:30 a.m.	**"Short Talks"** **Moderators**: Dania Valvi, MD, MPH, PhD and Lauryn Choleva, MD, MSc
10:30-10:34 a.m.	**Quantitative Analysis of Persistent Organic Pollutants (POPs) in a Single Dry Blood Spot (DBS) for Etiological Studies of Pediatric Diseases** Blessing Akintunde, Priyanthi S. Dassanayake, Julia Hageman, Jaime Chu, Lauren Petrick
10:34-10:38 a.m.	**Unmet Social Needs in Spanish and English-Speaking Families Screened for Social Determinants of Health (SDH) at a Pediatric Clinic in New York City** Jennifer Acevedo-Sanchez, Lauren Zajac, Sonia Khurana, Paige Cloonan, Arthi Vickneswaramoorthy, Eden Alin, Eve Spear, Jenna Wisch, Maya Venkatraman, Leora Mogilner
10:38-10:42 a.m.	**JAK1 Inhibition in Blood Samples from Peanut Allergic Children: Decreased Th2 Cytokine Secretion from Peripheral Blood Mononuclear Cells and Decreased Basophil Activation** Nicole Ramsey, Matthew Phelan, Jiaming Lin, Cecilia Berin
10:42-10:46 a.m.	**How to Teach Cross Cultural Communication: A Workshop Using the Experiential Learning Model** Angie Buttigieg, Deanna Chieco, Maria Maldonado, Kelly Wang, Allison Gault, Leora Mogilner
10:46-10:50 a.m.	**Implementation of Teach-Back Method Strategies to Increase Parental Recall of Inpatient Discharge Instructions in a Pediatric Community Hospital** Luisa Isabel Misa, Jose Quitain, Yingying Chen, Eliana Diaz
10:50-10:54 a.m.	**Oral Mannose Supplementation Dampens Liver Fibrosis in Vivo Through Immune Modulation** Yvette Carbajal, Isaac Alter, Joshua Morrison, Xin Chen, David Dunkin, Charles DeRossi, Jaime Chu
10:54-10:58 a.m.	**Racial and Ethnic Differences in Children with Eosinophilic Esophagitis** Kaizia Johnson, Talaya McCright-Gill, Mary Samarneh, Shadia Rahman, Tyler Italiano, Lauren Solinsky, Mirna Chehade

10:58-11:02 a.m.	**Qualitative Feedback from Caregivers in a Multidisciplinary Pediatric Neuromuscular Clinic** Skylar Hess, Elaine Lin, Kristin Shadman, Liam Butler, Cordelia Elaiho, Sheena Ranade, Brijen Shah, Robert Fields
11:02-11:06 a.m.	**PedsTalk: A Pilot Communication Skills Education Program for Pediatric Residents** Samuel Kase, Caroline Christianson, Lindsay Dow, Katherine Guttmann, Andrea Weintraub,
11:06-11:10 a.m.	**Evaluating Genetic Associations with Hyperphagia, Glucose Tolerance, and Pediatric Obesity** Sarah Zafar, Clint E. Kinney, Joan C. Han
11:10-11:14 a.m.	**Resolving Incomplete Penetrance in Primary Immunodeficiencies (PIDs): via Monoallelic Expression (MAE)** O'Jay Stewart, Conor Gruber, Roosheel Patel, Dusan Bogunovic
11:14-11:18 a.m.	**Baked Egg and Baked Milk Oral Desensitization Outcomes in a Pediatric Cohort** Shouling Zhang, Jacob Kattan, Mary Grace Baker, Roxanne C. Oriel, Scott H. Sicherer, Allison M. Schaible, Marion E. Groetch, Amanda L. Cox
11:18- 11:22 a.m.	**Longitudinal Assessment of Maternal Depression and Later Life Childhood Asthma and Wheeze: Effect Modification by Child Sex** Cecilia Alcala, Paloma Orozco Scott, Marcela Tamayo-Ortiz, Carmen Hernández, Lourdes Schnaas, Kecia N. Carroll, Rosalind Wright, Robert O. Wright, Martha Maria Téllez-Rojo, Hsiao-Hsien Leon Hsu, María José Rosa
11:22-11:26 a.m.	**Detection of SARS-CoV-2 Antibodies in Immunoglobulin Products** Kimberley Cousins, Kaori Sano, Disha Bhavsarb, Gagandeep Singhb, Stephanie Jeonga, Nouran Aboelregala, His-en Ho, Florian Krammer, Charlotte Cunningham-Rundles
11:26-11:30 a.m.	**Efficacy of ED Screening Tests for Children Admitted to An Inpatient Psychiatric Unit for Acute Mental Health Emergencies** William Bonadio, Connor Welsh, Carly Rosen, David Lam, Wesley Spiro, Eric Legome
11:45a.m.-12:45 p.m.	**Poster Session-Guggenheim Pavilion 7 Atrium**
12:45- 1:00 p.m.	**Poster Session Award Ceremony and To-Go Lunch**

COVER IMAGE FIGURE LEGEND

This is a confocal microscopy maximum projection image of human induced pluripotent stem cell (hiPSC)-derived astrocytes, expressing the classical astrocyte markers, S100 (green) and glial fibrillary acidic protein (GFAP) (red). (Image courtesy of Denise Jurczyszak, PhD, Postdoctoral Fellow in the Bogunovic Laboratory)

Annual Child Health Research Day

April 7, 2022

WELCOME

We welcome you to the 24th Annual Child Health Research Day at Mount Sinai! This event aims to highlight the outstanding research activities of students, housestaff, clinical and research post-doctoral fellows, research staff, social workers, nurses and junior faculty across the Icahn School of Medicine at Mount Sinai and Mount Sinai Health System whose work is broadly related to the health and welfare of infants, children, and adolescents. Today's plenary and poster sessions exemplify the commitment to scientific discovery and scholarship central to our academic mission. The event provides a unique opportunity for junior investigators in the Departments of Pediatrics and Environmental Medicine and Public Health as well as the Mindich Child Health and Development Institute to share the results of their research with colleagues, and thereby discover new applications for their work or identify potential future areas for collaboration. We thank you for attending and congratulate all the participants on their accomplishments!

Lisa M. Satlin, MD
Chair, The Jack and Lucy Clark Department of Pediatrics

Bruce D. Gelb, MD
Director, The Mindich Child Health and Development Institute

Robert O. Wright, MD, MPH
Chair, The Department of Environmental Medicine and Public Health

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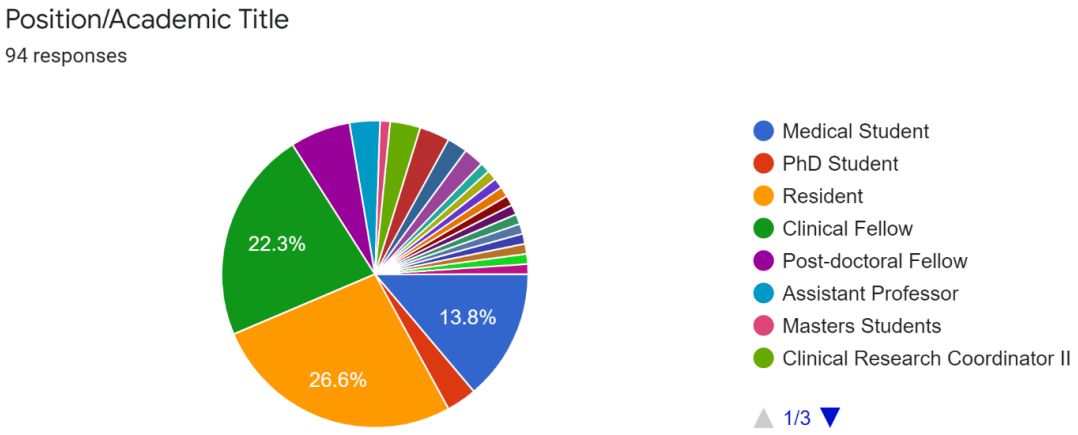

SARS-Cov-2 Seroprevalence in Kenyan Youth Living With HIV

Author Names: Mary Boyle, Winstone Nyandiko, Allison Delong, Ashley Chory, Josephine Aluoch, Celestine Ashimosi, Dennis Munyoro, Whitney Beigon, Emma Gillette, Janet Lidweye, Jack Nyagaya, Edwin Sang, Manjot Singh, Eslyne Jepkemboi, Millicent Orido, Vladimir Novitsky, Joseph Hogan, Rachel Vreeman, Rami Kantor

Department: Pediatrics, Biostatistics, Global Health and Health System Design

Division: Infectious Diseases

Institution Affiliations: Icahn School of Medicine at Mount Sinai, College of Health Sciences, Moi University, Eldoret, Kenya, Academic Model Providing Access to Healthcare (AMPATH), Eldoret, Kenya. School of Public Health at Brown University

Institute Affiliation: Arnhold Institute for Global Health

Introduction: SARS-CoV-2 seroprevalence studies can inform pandemic spread, superior to self-report or laboratory testing. Prior estimates demonstrated 11%-62% seroprevalence in diverse Kenyan populations, with geographic variability and temporal increase. The impact of HIV on seropositivity, particularly in youth living with HIV (YLWH) is unclear.

Hypothesis: We hypothesized that SARS-CoV-2 seroprevalence in Kenyan YLWH differs from earlier population estimates.

Methods: During February to September/2021, we cross-sectionally enrolled perinatally-infected YLWH in western Kenya in four sites and determined seropositivity using the Bio-Rad Platelia assay. Additional evaluations included HIV viral load (VL), CD4 and a COVID-19-focused survey. Multiple logistic regression was used to measure associations with age, gender, enrollment month, site, HIV treatment failure (VL>1,000 copies/ml), and CD4 (≥500 vs <500 cells/μL).

Results: Of 241 YLWH, 29% were seropositive, 68% seronegative and 4% equivocal. Temporal trends and geographic variability (Eldoret-25%, Kitale-20%, Turbo-25%, Webuye-56%; p=0.027) were observed. Seropositivity was associated with being male (OR, 1.06 [95% CI, 0.57-1.98], p=0.848), and age 15-17 years vs <15 (OR, 2.57 [95% CI, 1.16-5.93], p=0.023), not with failure or CD4. Among seropositives, high titers were seen in 57%.

Conclusions: Of 241 Kenyan YLWH, 29% were SARS-CoV-2 seropositive by August 2021, with geographical, temporal, and age differences, and most seropositives mounting a robust response. Increased prevalence in rural Webuye may reflect less widespread mask-wearing, or its location on a busy international route. Speculations on why seropositivity is low compared to earlier estimations, like HIV status, failed seroconversion, waning immunity, perception of risk promoting adherence to mitigations, or exposure to research-related guidance, should be investigated.

Sleep Neurophysiology in Children with Autism Spectrum Disorders: Development and Evaluation of a Machine Learning Model to Identify Atypical Sleep Microarchitecture Features

Author Names: Caroline Martinez, Zhe Sage Chen

Departments: Pediatrics, Psychiatry, Neuroscience and Physiology

Institution Affiliations: Icahn School of Medicine at Mount Sinai; New York University Grossman School of Medicine

Institute Affiliation: Neuroscience Institute

Introduction: Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by social communicative deficits, restricted and repetitive behaviors and interests, and sensory sensitivities. Sleep disorders are one of the most frequent comorbidities in children with autism spectrum disorder, affecting 50-90% of the population. Sleep-related problems can have significant mental and physical health impacts and have been linked to impaired quality of life and poor family functioning. While many studies have demonstrated sleep deficits in autism, there are limited studies examining polysomnographic sleep macro and microarchitecture.

Hypothesis: Machine learning models based on sleep neurophysiological signals will distinguish children with autism from typically developing controls

Methods: Sleep polysomnogram data was obtained from the Nationwide Children' Health Sleep DataBank. 149 children with autism and 197 age matched controls without neurodevelopmental diagnosis were selected for analysis. Edf and hypnogram files were processed for feature extraction with Mne and Yasa python signal extraction toolboxes. Features of interest included periodic and non-periodic EEG characteristics:Sleep stages, Spectral power , sleep spindle characteristics and aperiodic signals. Machine learning tools Gaussian, L1 Logistic Regression, Support Vector Classification (SVC), and Random Forest models were trained using these features. Area under the receiver operating characteristics curve (AUC), accuracy, sensitivity, specificity and F1-scores were used to evaluate model performance. Independent age matched control group from the CHAT study was used to validate the models.

Results: The SVC outperformed all other models with a test AUC of 9.5, accuracy of 94%, specificity of 96%, and a sensitivity of 87%. The Logistic Regression and Random Forest models performed comparably across multiple metrics. The Gaussian model resulted in an AUC of .90, though re-running the model with the top 10 selected features enhanced the performance to AUC .95. CHAT study patient data Logistic and Random Forest models were superior-both had an AUC of 1, while SVC showed an AUC of .97 The Gausian model resulted in AUC of .96 and with a decrease to .94 when restricted to subset features. Sleep spindle density, amplitude, slow oscillation coupling and aperiodic signal slope and intercept in addition to decreased percentage REM sleep were key model contingencies.

Conclusions: The results of this analysis suggest that machine learning methods can be used to identify eeg signals during sleep that are associated with autism spectrum diagnoses. Development of machine learning algorithms trained with sleep polysomnogram data may provide a clinically relevant method for the evaluation of sleep disorders in Autism Spectrum Disorders with the goal of enhancing appropriate treatment for patients.

The Harmine and Exendin-4 Combination Markedly Expands Human Beta Cell Mass In Vivo in Diabetic Mice

Author Names: Kara Beliard, Yansui Li, Alexandra Alvarsson, Peng Wang, Keya Thakkar, Daniela Guevara, Andrew F. Stewart, Sarah A. Stanley, Adolfo Garcia-Ocaña, Carolina Rosselot

Department: Pediatrics

Division: Pediatric Endocrinology and Diabetes

Institution Affiliation: Icahn School of Medicine at Mount Sinai

Institute Affiliation: Obesity and Metabolism Institute

Introduction: Diabetes results from diminished functional beta cell mass. Recent work from our lab has uncovered that small molecule inhibitors of Dual Specificity Tyrosine Phosphorylation Regulated Kinase 1A (DYRK1A) markedly increase human beta cell replication in vitro, and in vivo in human islets transplanted in immunosuppressed mice. Furthermore, combination of DYRK1A inhibitors such as Harmine with widely clinically used glucagon-like peptide 1 receptor agonists such as Exendin-4 (Exenatide) further enhance human beta cell proliferation. However, whether Harmine plus Exenatide drug combination can enhance human beta cell mass in diabetic conditions is unknown.

Method: In the current study, we applied an improved tissue clarification technique named 3D imaging of solvent-cleared organs plus (iDISCO+) and Imaris software to analyze the volume of human beta cells in islet grafts transplanted into streptozotocin-induced diabetic immunodeficient Rag1-/- mice. These mice were treated with vehicle (V), Harmine (H), Exenatide (E) or the combination H+E for three months using minipumps delivery system.

Results: Transplanted diabetic mice who received the combination of H+E showed a significant increase of human beta-cell volume up to 600% compared with mice treated with V or the drugs alone. This increase correlated with a significant increase in plasma human insulin levels, sustained normalization of blood glucose and significantly improved glucose tolerance.

Conclusion: Together with previous data indicating the safety of harmine plus exendin-4 treatment, these studies indicate that the harmine plus exendin-4 drug combination can enhance human beta cell mass in diabetes suggesting a potential therapeutic future for the treatment of diabetic patients.

Insights Into the Cell-Type Specific Effects of Prenatal Alcohol Exposure in the Human Placenta

Author Names: Randy Williams, Corina Lesseur, Sandra W. Jacobson, Joseph L. Jacobson, Ke Hao, Jia Chen, R. Colin Carter

Department: Environmental Medicine and Public Health

Institution Affiliations: [1].Department of Environmental Medicine and Public Health, Icahn School of Medicine at Mount Sinai, New York, NY., [2].Department of Behavioral Neurosciences, Wayne State University School of Medicine; Department of Human Biology, University of Cape Town Faculty of Health Sciences. [3].Institute of Human Nutrition and Departments of Emergency Medicine and Pediatrics, Columbia University College of Physicians and Surgeons, New York, NY.

Introduction: Fetal alcohol spectrum disorders (FASD) are the most common preventable cause of birth defects and neurodevelopmental disorders worldwide. The Cape Coloured community in South Africa has one of the highest prevalence of FASD in the world. The placenta is the crucial interphase between mother and fetus involved in fetal growth and development. Prenatal alcohol exposure (PAE) has been shown to influence bulk tissue placental gene expression, but few studies have examined this relationship at the cellular level.

Hypothesis: PAE influences the cellular composition of the placenta.

Methods: We constructed a placental cell-specific gene expression reference panel by leveraging an existing placenta single-cell RNA-seq dataset. Next, we used this reference to perform cell-type deconvolution of bulk placental tissue RNA-seq data from 35 heavy drinking pregnant women and 34 controls in a prospective birth cohort in Cape Town, South Africa. We used bivariate analyses and adjusted linear regression models to assess the effects of PAE on the RNA-seq inferred placental cell-type proportions.

Results: Deconvolution analyses showed heterogeneous cell-type composition; stromal, endothelial and cytotrophoblasts were the predominant cell-types. Average ounces absolute alcohol/day consumed around conception was associated with higher percent of Hofbauer cells (ß= 0.10, *P*=0.03) in linear models adjusted for maternal age, infant sex, and gestational age.

Conclusion: Our findings suggest that heavy alcohol exposure during pregnancy can influence the proportion of fetal placental villi macrophages (Hofbauer cells). Larger studies are needed to further characterize these effects and to assess the potential role of placental inflammation in FASD.

A Multimodal Curriculum to Improve Pediatrics and Internal Medicine Residents' Knowledge in the Care of Youth with Developmental Disabilities

Author Names: Alexis Tchaconas, Guillaume Stoffels, Joseph M. Truglio

Department: Internal Medicine-Pediatrics

Division: Internal Medicine - Pediatrics Residency Training Program

Institution Affiliation: Icahn School of Medicine at Mount Sinai

Introduction: While the ACGME mandates pediatric residency programs to provide trainees with a 1-month rotation in developmental-behavioral pediatrics, there are few published curricula to address transition to adult care or guardianship for adolescents and young adults with developmental disabilities (AYADDs). Internal medicine residents do not currently have ACGME-required educational experiences on AYADDs and it is not universally taught in medical school.

Hypothesis: After participating in a multimodal workshop on medical and social issues specific to AYADDs, internal medicine and pediatrics residents will have increased knowledge in these areas compared to baseline.

Methods: Ninety-one pediatrics and internal medicine residents participated in the workshop, a 1-hour session with interactive didactics, clinical cases and role plays that use two clinical cases to teach about school services, applying for guardianship and transitioning care from pediatric to adult providers for AYADDs. We assessed changes in knowledge among residents via questionnaires at baseline compared to 3 timepoints after the workshop: immediately, 2-months and 6-months after.

Results: There was a significant increase in knowledge from pre- to immediate post-workshop in the areas of transitions of care ($p<0.0001$), school services ($p=0.002$) and guardianship ($p=0.0003$). There were significant increases in overall knowledge from baseline to immediate post-workshop ($p<0.0001$) and baseline to 6-months post-workshop ($p=0.04$).

Conclusions: An interactive multimodal workshop on issues specific to AYADDs led to significant increases in internal medicine and pediatrics residents' knowledge, both immediately and 6-months after the workshop.

RASopathy Drug Discovery Aimed at Treating Hypertrophic Cardiomyopathy

Author Names: Kimberly D. Stephens, Jared Gatto, Jianping Hu, Cèline Guichard, Rupa Mirmira, Tirtha Das, Husnu Kaniskan, Jian Jin, Ross Cagan, Bruce D. Gelb

Department: Pediatrics

Division: Pediatric Cardiology

Institution Affiliation: Icahn School of Medicine at Mount Sinai

Introduction: RASopathies are pleomorphic genetic traits, predominantly resulting from gain of function in RAS/MAPK signaling. Hypertrophic cardiomyopathy (HCM) is a leading therapeutic target because of its association with early mortality in affected infants. Developing effective RASopathy therapeutics has proven challenging. Therefore, we used phenotype-driven, whole-organism chemical screening in Drosophila RASopathy models to discover therapeutics.

Hypothesis: Using a fly-based platform, we can identify novel therapeutics for RASopathies.

Methods: We generated transgenic Drosophila bearing pathogenic alleles associated with HCM and screened a chemical library for compounds based on rescuing lethality. We chemically evolved our best hit, M1, iteratively and assessed rescue efficacy. We assessed putative targets using similarity ensemble analysis.

Results: JH107-7 was the best M1-derivative for the *RAF1* model, achieving 50% rescue with 1-uM dosing and near complete rescue in *PTPN11* N308D flies but not *BRAF* W531C. M1-derivative JH93-178T rescued 45% of *BRAF* flies but was ineffective for other models. To assess potential as cancer therapeutics, we tested M1-derivatives against RAS-driven colon cancer fly models. Both JH107-7 and JH93-178T nearly matched the efficacy of combination chemotherapy with trametinib/zoledronic acid. JH107-7's top ten target predictions included RAF1, BRAF and mTOR.

Conclusion: Two M1-logs show efficacy for RASopathies and cancer in transgenic flies with likely in-animal dosing of 5-50 nM. We are currently assessing M1 derivatives' impact on signaling pathways using LacZ-reporter lines. Also, we are imaging fly hearts in order to determine if the M1-derivatives' impact HCM in mutant lines.

Quantitative Analysis Of Persistent Organic Pollutants (Pops) in a Single Dry Blood Spot (DBS) for Etiological Studies Of Pediatric Diseases

Author Names: Priyanthi S. Dassanayake, Blessing Akintunde, Julia Hageman, Jaime Chu, Lauren Petrick

Departments: Environmental Medicine and Public Health, Pediatrics

Division: Pediatric Hepatology (Senator Frank R. Lautenberg Environmental Health Sciences Laboratory)

Institution Affiliation: Icahn School of Medicine at Mount Sinai

Institute Affiliation: Institute for Exposomic Research

Introduction: Persistent organic pollutants (POPs) are man-made toxic organic chemicals that do not readily degrade and persist in the environment, leading to a high prevalence of human exposure. Serum/plasma is the main matrix used for POPs quantification in humans, often requiring volumes ≥500 µL. However, obtaining venous blood might be difficult or almost impossible for infants and children. Alternatively, capillary blood (≤50 µL) collected with dried blood spots (DBS) is minimally invasive. For this reason, we developed a method for analyzing POPs in a single DBS.

Hypothesis: POPs can be reliably quantified in DBS.

Methods: We spiked whole blood pools at two concentration levels and spotted Guthrie cards to make DBS. The concentrations of three classes of POPs (organochlorine pesticides, OCPs; polychlorinated biphenyls, PCBs; polybrominated diphenyl ethers, PBDEs) in the samples were analyzed using GC-MS/MS.

Results: Excellent repeatability (%RDS < 5) was observed for the eight-replicate analysis for the pools and reference material tested. The method detection limit ranged from 0.005-0.02 for PCBs; 0.005-0.03 for PBDEs and 0.003-0.04 for OCPs. The average recovery at low-spike (~0.1ng/ml) and high-spike (~1ng/mL) of POPs were 75±5% and 80±2%, respectively. In the analysis of un-spiked human DBS, we quantified five PCBs, three PBDEs and five OCPs. Validation of our method was performed in archived newborn DBS from the NYS biobank.

Conclusion: DBS can be reliably used for quantitative analysis of POPs. Our method overcomes technical barriers to studying the role of POPs in etiology of pediatric diseases and disorders.

Unmet Social Needs in Spanish and English-Speaking Families Screened for Social Determinants of Health (SDH) at a Pediatric Clinic in New York City

Author Names: Jennifer Acevedo, Lauren Zajac, Sonia Khurana, Paige Cloonan, Arthi Vickneswaramoorthy, Eden Alin, Eve Spear, Jenna Wisch, Maya Venkatraman, Leora Mogilner

Departments: Pediatrics, Environmental Medicine and Public Health

Divisions: General Pediatrics; Preventive Medicine and Community Health

Institution Affiliations: Icahn School of Medicine at Mount Sinai, Barnard University, NYIT College of Osteopathic Medicine, New York University Post-Baccalaureate Program

Institute Affiliation: Institute for Exposomic Research

Introduction: Unmet social needs are associated with poor health outcomes. Screening for and addressing social determinants of health (SDH) has shown to be a valuable intervention to improve children's health. A screening too that adapts to the needs of the target population is important.

Hypothesis: Unmet social needs of English and Spanish-speaking caregivers are significantly different.

Methods: From November 2020-December 2021 an SDH screening tool assessing 12 unmet needs was administered to caregivers by phone. Community resources and referrals to those with unmet needs were offered. Chi-square and Mann Whitney U-tests examined differences by language.

Results: We called 1,568 families and 997 (49%) answered the phone. 771 (77%) of 997 completed the full screener. 707 (91%) of parents spoke English and 64 (9%) Spanish. 698 (91%) had children with public insurance and 69% received SNAP or WIC benefits. 238 (59%) of children were identified as Hispanic. The average number of unmet needs was 1.4 (1.4), with 3.1 (1.6) for Spanish-speakers and 1.3 (1.4) for English-speakers ($p<0.001$). For Spanish-speakers, top unmet needs were English proficiency (64%), and food insecurity (59%). For English-speakers, top unmet needs were home environmental issues (25%) and food insecurity (21%). 95% of Spanish-speaking caregivers accepted a referral compared to 78% of English-speaking parents ($p<0.001$).

Conclusions: A phone based SDH screener successfully identified a range of unmet social needs. Spanish-speaking caregivers reported more needs and were more likely to accept resources. Expanding screenings for Spanish-speaking caregivers may be a valuable intervention in pediatric outpatient settings.

JAK1 Inhibition in Blood Samples from Peanut Allergic Children: Decreased Th2 Cytokine Secretion from Peripheral Blood Mononuclear Cells and Decreased Basophil Activation

Author Names: Nicole B. Ramsey, Matthew Phelan, Jiaming Lin, M. Cecilia Berin

Department: Pediatrics

Division: Allergy and Immunology

Institution Affiliation: Icahn School of Medicine at Mount Sinai

Institute Affiliation: Jaffe Food Allergy Institute

Introduction: JAK1 is a signaling molecule downstream of IL- 4R alpha. Abrocitinib is an oral biologic medication that inhibits JAK1 selectively and is a safe and effective option that is FDA approved for adults with atopic dermatitis. Th2 cytokines, including IL-4, IL-9 and IL-13 are upregulated in food allergic patients. Basophil activation is a key immunologic process that is correlated with clinical reactivity in food allergic patients. Our rationale for inhibiting JAK1 in food allergy is based on the decrease in IgE and Th2 cytokines found with inhibiting IL4R alpha.

Hypothesis: We hypothesize abrocitinib will decrease cytokine secretion from peanut allergic peripheral blood mononuclear cells (PBMCs) and will decrease basophil activation in whole blood samples. Our goal is to support the use of JAK1 inhibitors as a monotherapy or as an adjuvant to peanut oral immunotherapy in upcoming clinical trials that will enroll food allergic patients.

Methods: PBMCs were isolated from four pediatric peanut allergic patients, and incubated for five days with peanut protein, abrocitinib and/or Staphylococcus Enterotoxin B. Supernatants were harvested and frozen until analysis. Analysis was performed using a 12-plex immunoassay. In addition, whole blood samples from four peanut allergic patients were stimulated with purified peanut protein and basophil activation measured by detection of CD63 expression by flow cytometry.

Results: Peanut stimulation of PBMCs increased the concentration of IL-5, IL-13, IL-10, IL-9, IL17a, IL-6, TNF alpha, IL-22. At 10 ng/ml, abrocitinib induced a statistically significant dose dependent inhibition in IL-5, IL-13, IL-10, IL-9, IL-17a, and IL-6 in the presence of peanut stimulation. Significant changes were not seen with Interferon gamma, TNF alpha, IL-17F, IL-22, IL-4, or IL-2. Abrocitinib decreased basophil activation to peanut in a dose dependent manner at 10 and 100 ng/ml.

Conclusions: These results support our hypothesis that JAK1 inhibition decreases Th2 cytokine signaling and basophil activation and may be useful in peanut allergic patients. Abrocitinib may be an effective adjunctive immune modulator in conjunction with peanut oral immunotherapy or as a monotherapy for food allergic patients. To test this hypothesis further, a pilot study for abrocitinib in food allergic adults with atopic dermatitis will be recruiting this spring and a peanut oral immunotherapy clinical trial with abrocitinib as an adjuvant is currently being designed for adolescents and adults.

How to Teach Cross Cultural Communication:
A Workshop Using the Experiential Learning Model

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Introduction: In 2020, the ACGME updated pediatric residency requirements, including competence communicating with patients from diverse backgrounds. We designed a cross cultural communication (CCC) workshop using the experiential learning model to teach two CCC models, Kleinman's 8 questions and LEARN (Listen, Explain, Acknowledge, Recommend, Negotiate.)

Hypothesis: This workshop increases awareness of the effect of cultural identity on CCC and increases familiarity/confidence in CCC.

Methods: Workshop design included active reflection on cultural identity, introduction to two CCC models, and application to a cross-cultural case. We delivered the workshop to residents and medical students at two sites. We administered an anonymous, retrospective, pre/post survey, measuring awareness of effects of cultural identity on CCC, familiarity with and confidence using CCC models with 5-point Likert scales. We analyzed responses using Wilcoxon signed-rank tests.

Results: We gave the workshop to 62 trainees, 44 completed the survey (71%); 84% were pediatric residents. Post-workshop, 36.4% were extremely aware of the effect of their cultural identity on CCC compared to 4.5% pre-workshop ($p<0.0001$). Responses of "quite" or "extremely" familiar with CCC models increased post-workshop compared to pre (68.2% vs. 6.8% $p<0.0001$) and (83.7% vs. 2.3% $p<0.0001$), respectively. Confidence managing cross-cultural misunderstandings when conveying a diagnosis and explaining management increased post-workshop compared to pre (70.4% vs. 25%, $p<0.0001$) and (70.5% vs. 20.5%, $p<0.0001$), respectively.

Conclusions: A workshop teaching CCC increased participants' awareness of how cultural identity affects CCC and increased familiarity with and confidence in using two CCC models, providing programs with a useful tool to meet ACGME requirements.

Implementation of Teach-Back Method Strategies to Increase Parental Recall of Inpatient Discharge Instructions in a Pediatric Community Hospital

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Introduction: Elmhurst Hospital Center serves a community where 65% of the population are foreign-born immigrants and 27% of adults over the age of 25 reported no formal education based on the 2019 US Census Bureau survey. Low levels of formal education and limited English proficiency are barriers to achieving health literacy.

Hypothesis: By training pediatric residents to use the teach-back method when giving discharge instructions, parental recall of their child's discharge diagnosis and medications will increase by 15% and follow-up appointments by 5% from the pre-intervention baseline within a 12-month period in the pediatric inpatient floor.

Methods: Plan-do-study-act (PDSA) cycles were implemented: PDSA #1: web-based training at teachback.org and posters in the work room; PDSA #2: teach-back phrase in the discharge summary; PDSA #3: perform a validated Single Item Literacy Screen upon admission; PDSA #4: include teach-back in the floor team orientation. The residents would call parents 1-2 days after discharge and document parental recall of the patient's diagnosis, medications, and follow-up.

Results: Baseline data showed a recall of 81% for diagnosis, 79% for medication and 92% for follow-up appointments. A total of 248, 276 and 297 responses for recall of diagnosis, medication and follow-up were collected respectively. Run charts created for each recall factor had a median of 100% throughout the implementation of the PDSA cycles.

Conclusion: The four PDSA cycles were able to successfully increase parental recall of their child's diagnosis and medication by over 15% and their follow-up appointment by over 5% from the pre-intervention baseline.

Oral Mannose Supplementation Dampens Liver Fibrosis *In Vivo* Through Immune Modulation

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Introduction: Liver fibrosis is a key pathological process of chronic liver diseases and its progression leads to cirrhosis and hepatocellular carcinoma. Despite increased understanding of the mechanisms of fibrosis, there remains a need for the development of antifibrotic treatments. Mannose, a hexose sugar, has shown promising results in altering immune responses. We recently reported that mannose supplementation can reduce fibrogenic activation in culture-activated hepatic stellate cells (HSCs), the driver cells of liver fibrosis. Here we aimed to investigate the in vivo efficacy of mannose on liver fibrosis and immune response in mice.

Hypothesis: We hypothesized that mannose supplementation can attenuate liver fibrosis in mouse liver tissue through altering immune cell response.

Methods: Mice received intraperitoneal injections with 20% CCl_4 (3x/week for 4 weeks) or Corn Oil as control. Each group was treated with 5% or 20% mannose in drinking water or standard drinking water for 4 weeks. Liver tissue was collected for histopathological examination, mRNA extraction for qPCR analysis, and immune cell profiling by flow cytometry.

Results: Mannose supplementation led to a reduction in profibrotic gene expression and collagen deposition compared to CCl_4-treated mice receiving standard drinking water. Notably, in mannose treated fibrotic livers, flow cytometry analysis revealed dampening of monocyte infiltration and interferon expression, and increased M2 polarization in mannose-treated fibrotic livers.

Conclusions: Oral mannose supplementation at low- and high-concentrations suppresses liver fibrosis in vivo, potentially through an immunomodulatory effect on monocytes. These data suggest potential clinical applications in oral mannose supplementation as a novel antifibrotic therapy.

Racial and Ethnic Differences in Children with Eosinophilic Esophagitis

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Introduction: Eosinophilic Esophagitis (EoE) is a chronic esophageal inflammatory disease. Studies report that >70% of children diagnosed with EoE are White. We aimed to investigate differences in histological and endoscopic severity of EoE among various racial groups in children treated at the Mount Sinai Center for Eosinophilic Disorders.

Hypothesis: We hypothesize that racial minority patients have more severe disease than White patients.

Methods: A retrospective chart review was performed. Inclusion criteria were age 0-19 years, histologically active disease (esophageal eosinophil count 15/HPF) on initial endoscopy, and absence of concurrent non-EoE. We compared racial and ethnic groups with respect to age at diagnosis and endoscopic and histological inflammatory disease severity.

Results: 263 subjects were identified, mean age 9.7±4.9 years. Race distribution was 83.1% White, 5.3% Black, 3.4% Asian, 7.1% other/unknown. As for ethnicity, 8.3% were Hispanic, 85.3% non-Hispanic, 1.1% unknown. White patients were significantly older than Black and Asian patients (10.2 vs. 6.0 and 6.8 years, respectively, $p<0.05$), no difference was seen with respect to ethnicity. No differences were seen in peak esophageal eosinophil counts among racial/ethnic groups. Endoscopic furrows were significantly different among racial groups (White 81.8% vs. Black 61.5% vs. Asian 37.5%, $p<0.01$), but not white exudates.

Conclusions: Racial differences exist in EoE children with respect to age at presentation and endoscopic features of inflammation. Investigation is ongoing to examine other measures of disease severity (symptoms, comorbidities, response to therapy). This will help tailor diagnostic and therapeutic approaches to children with EoE for better outcomes.

Qualitative Feedback from Caregivers in a Multidisciplinary Pediatric Neuromuscular Clinic

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Introduction: Multidisciplinary care teams are an essential part of caring for children with complex medical needs, yet there are few published studies on families' experiences in multidisciplinary clinics. Our team consists of providers from 13 specialties that provide coordinated care in a single visit to patients with cerebral palsy and various neuromuscular disorders.

Hypothesis: We hypothesize that effective communication and care coordination drive family satisfaction in a multidisciplinary pediatric neuromuscular clinic.

Methods: Caregivers of clinic patients were administered a survey assessing sentiments toward the efficiency, care coordination, and communication they experienced. Surveys were audio-recorded, transcribed, and qualitatively coded by two researchers. Descriptive statistics were used to analyze data.

Results: When asked how confident caregivers felt in taking care of their child as a result of the clinic, the median response was 5/5 (range 4-5). Providers adequately communicated the next steps in the patient's care according to 100% of caregivers. Families most frequently emphasized communication, convenience, and support (Figure 1). Caregivers affirmed that the unique format of the clinic improves access to care, efficiency, and provider teamwork. Families noted that organization of pre-visit schedules and after-visit summaries, as well as ensuring that the clinic environment is suitable for patients with complex needs, could be improved.

Conclusions: Multidisciplinary team models have great potential to streamline medical care and promote teamwork among providers caring for children with complex medical needs. Our study demonstrates that caregivers believe this model is both efficient and convenient and can be enhanced with pre-visit schedules and after-visit summaries.

Table 1. Patient Demographics (N=14)

Characteristics	N (%)
Sex	
Male	**9 (64.3%)**
Female	**5 (35.7%)**
Race	
African-American	**2 (14.3%)**
Asian	**2 (14.3%)**
White	**3 (21.4%)**
Other	**7 (50.0%)**
Ethnicity	
Hispanic	**8 (57.1%)**
Non-hispanic	**6 (42.9%)**
Primary Language	
English	**12 (85.7%)**
Spanish	**2 (14.3%)**
Primary Insurance	
Private	**4 (26.6%)**
Public	**10 (71.4%)**
Median Confidence Score (Q1, Q3)	**5 (4, 5)**
Median Age in Years (Q1, Q3)	**3 (2, 7.75)**

Figure 1. Distribution of Major Themes
Themes were manually counted to generate frequencies, which were then calculated as percentages relative to the total number of comments about themes. For example, communication, the most common theme, was mentioned 25 times out of 118 comments about various themes, generating a value of 21%.

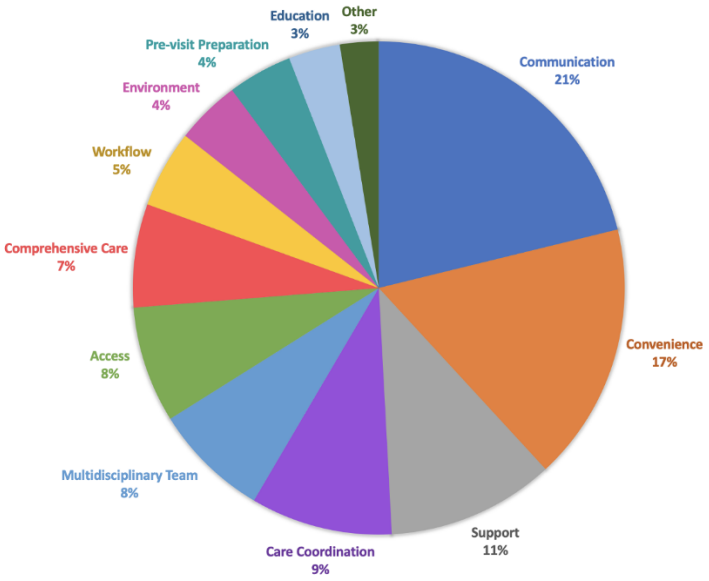

Table 2. Notable Survey Themes and Quotes
Notable survey themes and associated quotes from caregivers are displayed in order of highest to lowest theme frequency.

Theme	Quote
Communication	"They communicate with me for everything - if they will do a procedure, if I have a question, they always communicate."
Convenience	"It's amazing that I can come here and have him be seen by multiple people in 1 setting. I'm not moving all over the place, this is amazing."
Support	"Getting an idea of where he's at. Because sometimes if you don't see doctors for a while you kind of feel like 'Was I supposed to do something, am I missing something?' Even if they're like, 'Oh good, we don't have anything to talk about or it's the same plan,' It's just nice to get an update and nice to see their face."
Care Coordination	"Keeping everyone on the same page and moving together as a team in the right direction."
Multidisciplinary Team	"They do more than just Peds. I know the dentist came. She also has a G-tube, they also take care of that. It's just more than 1 thing they do here, not only 1 criteria."
Access	"It's also how easily accessible the doctors are. You can reach out to them, and they can reach back, form a plan for when he comes in."
Comprehensive Care	"It helped me see more specialists that I would've not necessarily known I'd have to see. Like the orthopedist, I didn't really know there was a problem with his foot that required surgery until I started coming here."
Environment	"We just wish the clinic was more comfortable, you know, suitable. For example feeding…the pump, there's nothing to hang it. A lot of these kids may, like my son, have a G-tube. We need something to hang it on the wall, like a pole or something here so we are able to accommodate his needs here."
Pre-Visit Preparation	"I would like to have a more clear outline of who's coming. In a rough estimate of, 'is there anything I need to bring in.' A general outline of who's coming in, their names."
Education	"They sometimes educate me on things that I didn't realize could be a potential problem. Like the neurologist today educated me about seizures, which it's kind of good to hear that stuff reinforced."

PedsTalk: A Pilot Communication Skills Education Program for Pediatric Residents

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Introduction: Effective communication skills are critical to patient care. Few pediatric residency programs offer communication skills education and residents report lacking confidence in these skills.

Hypothesis: We hypothesize that a communication skills program utilizing simulation and coaching will increase pediatric resident confidence in using skills during challenging conversations with patients/families.

Methods: Pediatric residents completed a demographics survey and needs assessment to determine baseline communication skills experiences. In collaboration with adult palliative care physicians, we identified pediatric faculty communication champions and developed a communication skills program for pediatric residents, PedsTalk, based on the VitalTalk framework. A pre-course module introduced skills before a half-day of simulation with trained actors. Faculty and peers offered real-time coaching during simulations. Program participants reported confidence with communication skills using a 5-point Likert scale in pre-/post-program survey responses. Analysis was completed using Wilcoxin Signed Rank Test.

Results: Surveys were distributed to 60 pediatric residents (response rate 73%). Pre-course needs assessment identified the need for communication skills training in residency. 25 residents (~40% of residency program) participated in PedsTalk, with 17 post-program survey responses (response rate 68%). After PedsTalk, participants reported significant improvements in confidence with: ‘difficult conversations’ ($z=-2.804$, $p<0.005$), ‘using silence’ ($z=-2.653$, $p<0.008$), ‘headline statements’ ($z=-2.924$, $p<0.003$), eliciting “VALUES” ($z=-3.334$, $p<0.001$), and asking permission to proceed ($z=-3.082$, $p<0.002$).

Conclusion: PedsTalk improved confidence in communication skills among pediatric residents. Assessment of retention and skill use is key and planned for four months post-PedsTalk participation. Interdisciplinary partnership and engagement of pediatric faculty communication champions offers a novel and sustainable approach to communication education in pediatrics.

Evaluating Genetic Associations with Hyperphagia, Glucose Tolerance, and Pediatric Obesity

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Introduction: The contributions of genetics to the development of pediatric obesity and type 2 diabetes are key to understanding their pathophysiology. We examined genetic testing results in patients evaluated in our Pediatric Endocrinology Clinic.

Hypothesis: We hypothesized that patients with deleterious genetic variants would have higher hyperphagia scores and higher hemoglobin A1c (HbA1c).

Methods: Sequencing of 79 genes associated with leptin pathway signaling and adipocyte function was performed for youth (N=119) with BMI $\geq 97^{th}$ percentile for age/sex. Genetic variants were evaluated in silico (FATHMM, MutationTaster, PolyPhen2, SIFT) for impact on protein function. HbA1c and parent-reported Dykens questionnaire hyperphagia score were compared by variant category adjusting for age, sex, race/ethnicity, and BMI using ANCOVA.

Results: There were no significant correlations among genetic variant category, HbA1c, or hyperphagia score. However, race/ethnicity was significantly associated with HbA1c ($p=0.049$) after controlling for age, sex, and BMI; with Black subjects being significantly higher than both Hispanic White ($p=0.023$) and Non-Hispanic White ($p=0.008$).

Conclusions: We were unable to demonstrate that hyperphagia or glucose tolerance is a predictor of genetic variant status though our sample size may not have been adequately powered to detect such an effect.

Resolving Incomplete Penetrance in Primary Immunodeficiencies (PIDs): via Monoallelic Expression (MAE)

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Introduction: Primary Immunodeficiencies (PIDs) are monogenic disorders of the immune system. Phenotypic variability of PIDs provide challenges studying and clinically managing these inborn errors. Recent studies indicate that 10% of autosomal genes randomly commit to expression of a single allele, termed monoallelic expression (MAE). Unlike X-inactivation or imprinting, MAE is independent of other genes and leads to a diverse population of cells at the transcript level. Despite an increase in the understanding of MAE, both the functional and mechanistic impact in disease is unknown.

Hypothesis: Monoallelic expression contributes to the phenotypic variability of PIDs.

Methods: Single T cells were sorted from healthy donor PBMCS (n=6) and expanded into monoclonal populations (n=57). Genomic DNA was isolated from donors for WES and 431 PID genes were examined for exonic heterozygous SNPs. Bulk RNA-seq of the clonal populations was used to determine allele specific expression of PID genes.

Results: WES identified 172 PID genes with heterozygous SNPs from the 6 donors. RNA-seq data of 18 clones from 4/6 donors identified 15 PID genes that display allelic bias. While MAE occurs in 6 of the assessed PID genes.

Conclusions: Using this system of monoclonal T cell populations, 6 genes which cause inborn errors of immunity were found to be subject to MAE. Almost all of the identified genes have reports of incomplete penetrance. Mutations in 3 of these genes are known to cause autosomal dominant inherited disease, facilitating further study in patient samples.

Baked Egg and Baked Milk Oral Desensitization Outcomes in a Pediatric Cohort

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Introduction: Oral desensitization is an emerging therapeutic option for food allergy. Safety and efficacy data of desensitization protocols are limited for baked egg (BE) and baked milk (BM).

Methods: A 5-year retrospective chart review of pediatric patients undergoing oral desensitization to BE and/or BM was conducted at a food allergy referral center.

Results: 65 children underwent BE and/or BM oral desensitization from 2016-21. Oral desensitization involved initial low dose challenge (8-500mg BE protein; 15-166mg BM protein) with incremental dose escalation for baked muffin over an average 3.9 months. Median age at start of therapy was 6 years. Atopic history was notable for atopic dermatitis (92%), asthma (60%), allergic rhinitis (78%), prior anaphylaxis to food (49%), and prior anaphylaxis to egg or milk (36%). Mean baseline skin prick test (SPT) and food-specific IgE levels (sIgE) were: egg white SPT wheal diameter 9.6mm (3-17mm), egg white sIgE 17.0kU/L (1.0-70.9kU/L), ovomucoid sIgE 10.9kU/L (0.1-61.7kU/L), cow's milk SPT 9.9mm (6-14mm), cow's milk sIgE 24.3kU/L (2.0-67.5kU/L), and casein sIgE 22.8kU/L (0.5-78.4kU/L). Most participants reached maintenance, including 67% for BE (n=32, 1-2g BE protein) and 63% for BM (n=12, 660-1330mg BM protein). Reasons for discontinuing BE (n=8) included allergic symptoms (38%), allergy resolution (13%), scheduling (13%), anxiety (13%), boredom with muffin (13%), and unknown (13%). Reasons for discontinuing BM (n=3) included allergic symptoms (n=2) and unknown (n=1).

Conclusions: Most children undergoing BE and/or BM oral desensitization achieved maintenance. Reasons for discontinuation included dose-related allergic symptoms, especially with BM. Future studies optimizing protocols for BM and BE oral desensitization are encouraged.

Longitudinal Assessment of Maternal Depression And Later Life Childhood Asthma and Wheeze: Effect Modification By Child Sex

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Introduction: Studies report associations between maternal mental health and adverse respiratory outcomes in children; however, the impact of timing and duration of maternal distress remains understudied.

Hypothesis: Maternal depression will be associated with asthma and wheeze and will differ by sex.

Methods: Maternal depression (n=605) was assessed using the Edinburgh Depression Scale questionnaire, dichotomized at a clinically relevant cutoff (>12) a) during pregnancy, b) postpartum, and c) postpartum and subsequent time points postnatally (recurrent depression). Report of wheeze in the past 12 months (current wheeze) and asthma were obtained using a validated survey at 48 and 72 months. Associations were analyzed using a modified Poisson regression adjusted for covariates, and in interaction models.

Results: Prenatal depression was observed in 17%, postpartum depression in 25%, and recurrent depression in 16% of mothers. Current wheeze and asthma at either time point were reported in 12% and 5% of children, respectively. Both postpartum and recurrent depression were associated with higher risk of current wheeze (RR: 1.88, 95% CI: 1.21, 2.92; RR: 2.39, 95% CI: 1.52, 3.78) and asthma at 48 months (RR: 2.79, 95% CI: 1.13, 6.87; RR: 3.14, 95% CI: 1.26, 7.84). Recurrent depression was also associated with higher risk of asthma at 72 months (RR: 2.51, 95% CI: 1.05, 6.03). In interaction analyses, associations were stronger in females than males.

Conclusions: Postpartum and recurrent depression were associated with higher risk of wheeze and asthma in children, and associations were stronger in females than males. Our results highlight the importance of maternal depression on respiratory disease.

Detection of SARS-CoV-2 Antibodies in Immunoglobulin Products

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Introduction: For patients with a diagnosis of primary antibody deficiency the first line therapy is replacement with immunoglobulin (Ig) products. Prior to the SARS-CoV-2 pandemic, Ig products were not found to have antibodies with specificity for this virus. There has been limited data presented on these antibodies in the Ig products currently used in the management of these immunodeficiencies.

Hypothesis: To quantitatively examine immunoglobulin products for SARS-CoV-2 antibodies.

Methods: 208 vials of 11 different brands of Ig for intravenous (IV) and subcutaneous (SC) delivery, used in the Mount Sinai Infusion Center or for home care were examined for IgG binding activities against recombinant SARS-CoV-2 receptor binding domain (RBD), spike, and nucleocapsid protein (NP) by ELISA. The area under the binding curves (AUC) were calculated and used for statistical analyses. Cut-off values for a positive versus negative titer were determined by the AUC of pre-pandemic samples.

Results: Significantly increased AUC values were observed in products with expiration dates in the years 2023 and 2024, as compared to Ig products from 2020, previously tested in our laboratory. 9 60% and 85% of the Ig products with expiration dates of 2023 and 2024 were positive for anti-SARS-CoV-2 proteins, respectively. Five brands of IV) Ig and three (SC) products had anti-SARS-CoV-2 in the tested vials. Analysis of samples of three other brands revealed no detectable anti-SARS-CoV-2 proteins. AUC values were significantly higher in products with later expiration dates. Higher levels of antibody were noted in intravenous products versus SC products used in the home.

Conclusion: Overall, Ig products with expiration dates between 2023 - 2024 contained significantly higher binding activities against SARS-CoV-2 proteins as compared to lots collected earlier, or pre-pandemic products. Normal donor SARS-CoV-2 antibodies may provide a therapeutic benefit for patients who do not make a robust vaccine response.

Efficacy of ED Screening Tests for Children Admitted to an Inpatient Psychiatric Unit for Acute Mental Health Emergencies

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Objective: To determine the efficacy and cost of performing a standard battery of ED screening tests used to identify an occult medical issue prior to psychiatric inpatient admission of children with acute mental health emergencies.

Methods: We reviewed consecutive pediatric ED cases of children with acute mental health emergencies requiring inpatient admission to a psychiatric unit during a 4-year period. A standing protocol endorsed that all patients receive performance of a medical history and physical examination; if negative for an otherwise acute medical issue, and psychiatric evaluation deemed inpatient care was indicated, a standard battery of [up to] 9 pre-admission screening medical tests was performed, including: complete blood count [CBC], basic metabolic panel [BMP], thyroid stimulating hormone [TSH], rapid plasma reagent [RPR], hepatic function panel; urinalysis [U/A], urine qualitative toxicology panel [U-tox], urine pregnancy test [UPT for menstruating females]; and 12-lead EKG.

Results: A total of 607 consecutive cases with an acute psychiatric condition were evaluated in the pediatric ED. Four patients were admitted to the medicine unit [all were intentional toxic ingestions identified by history]; the other 603 consecutive cases were admitted to the inpatient psychiatric ward, comprising the study group. There were 4,430 screening medical tests performed, with only 2.6% classified as abnormal, and 0.3% prompting a change in management [further lab testing]; no abnormality was associated with in-hospital subspecialist consultation or change in disposition. The total cost for performing these tests was $650,036; the calculated average cost per patient was $1,078.
Conclusion: We conclude that performing medical screening tests for all children with acute psychiatric emergencies requiring admission to a psychiatric unit is not effective in identifying occult medical problems; and results in significant and unnecessary medical expenditure.

Prediction of Alcohol use Initiation in Pre-Adolescents Using the Generalized Kernel Machine Approach on Multi-View Data from the ABCD Study

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Introduction: The multifaceted nature of psychosocial risk factors for early onset of alcohol use makes the examination of specific at-risk phenotypes difficult. The goal of the current study is to use a novel machine learning method to characterize variables from different domains of risk factors (e.g., impulsivity, psychopathology, and emotion reactivity) that are most predictive of alcohol initiation in pre-adolescents.

Hypothesis: We hypothesize that higher impulsivity, higher psychopathologies and neurobiological deficits in emotional reactivity will significantly differentiate alcohol initiators from non-initiators.

Methods: Using the Generalized Kernel Machine (GKM) approach, we isolated variable triplets across trait impulsivity (from the UPPS-P scale), psychopathology (from the Child Behavior Checklist), and emotional arousal (select behavioral and activation of regions of interest from the EN-back task) domains that most robustly predict alcohol initiation in a randomly selected sample of 1,000 participants (of whom 250 endorsed alcohol sipping) from the ABCD study (release 3.0).

Results: Of all possible triplets, 5 triplets differentiated the groups at $p \leq 1.0 \times 10^{-05}$, yielding 4 unique impulsivity measures (positive urgency, sensation seeking, and lack of premeditation and perseverance), 3 psychopathologies (depression, total problems, and oppositional defiant disorder), and 4 measures of emotional arousal (activation in the right thalamus, left amygdala, left cerebellum cortex and task accuracy). At $p \leq 0.05$, 64 triplets differentiated the groups yielding positive urgency (17 times), internalizing problems (11 times), and activations of the thalamus (12 times) and amygdala (11 times) as the most frequently appearing variables.

Conclusions: Application of the GKM approach to multi-view data in a pilot sample considerably reduced the variable space and isolated features for accurately phenotyping at-risk youth. Similar analysis on a larger sample is underway.

The Association Between Public Versus Private Insurance and Poor Asthma Control in the Pediatric Population Using the 2013 and 2018 National Health Interview Survey

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Introduction: In the United States, public insurance has previously been correlated with poor asthma control in children. Prior studies assessing the relationship between public insurance and poor asthma outcomes have been limited by small sample sizes. We hypothesized that public versus private insurance is associated with a higher odds of poor asthma control in children when evaluated in a large, nationally representative dataset.

Hypothesis: Public Insurance is associated with worse asthma outcomes when compared to private insurance

Methods: We conducted a cross-sectional study using the 2013 and 2018 National Health Interview Survey (NHIS) data where a total of 1,420 children under the age of 18 were identified as having active asthma through self-reported healthcare utilization related to an asthma diagnosis. Multiple logistic regression was used to examine the association between public versus private insurance type and poor asthma control.

Results: When controlling for sex, age, race/ethnicity, parental education level, and preventative asthma medication use, children with public insurance had 47% increased odds (aOR 1.47, 95% CI 1.01 – 2.15) of having at least one of three outcomes of poor asthma control (having a visit to the emergency room in the past 12 months, hospital admission in the past 12 months or using more than three canisters of a rescue inhaler or a disk in the past three months), compared to children with private insurance.

Conclusions: Public insurance versus private insurance is associated with an increased risk of poor asthma control in US children when assessed in a robust, nationally representative sample.

Barriers to Routine Home Oral Hygiene Practice and Dental Care among Children with Autism Spectrum Disorder and Developmental Delay

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Introduction: The burden of oral disease is disproportionately higher among children with Autism Spectrum Disorder (ASD) and/or developmental delay (DD) compared with children without such conditions. This oral health disparity was shown to have originated from difficulties in home oral hygiene care and provider availability who are willing to treat this population.

Hypothesis: We hypothesized caregivers of this patient population have difficulty in maintaining proper oral hygiene and accessing dental care for their child due to inadequate oral health knowledge and difficulty in finding dental providers.

Methods: The study included a convenience sample of caregivers of children who are diagnosed with ASD/DD enrolled at the Department of Behavioral Pediatrics (MS). A survey was developed and reviewed by faculty from the Department of Behavioral Pediatrics and Department of Dentistry. Caregiver's primary language, oral health knowledge, child's home oral hygiene practice, dental insurance type, and barriers to receiving dental care were included in the questionnaire. Caregivers were asked to rank barriers in accessing dental care. Barriers examined included but were not limited to: provider availability, cooperation level of child, and dental insurance.

Results: Survey responses will be collected and analyzed prior to presentation date.

Conclusion: The outcome of this study will provide understanding about the barriers that caregivers face in maintaining oral hygiene and accessing timely dental care for their child with ASD/DD. Using the results from our study will help to coordinate individualized, quality, and accessible dental care for caregivers of these children.

Coarctation of the Aorta, Hypertension and Obesity: A Growing Paradigm

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Background: Increased incidence of hypertension (HTN), cerebrovascular vascular accidents (CVA) and coronary artery disease (CAD) have been described in adult patients (pts) after coarctation of aorta (CoA) repair. This study assesses the relationship between body mass index (BMI) and HTN in patients post CoA repair.

Methods: Single center retrospective study analyzing pts ≥ 10 yrs of age, with COA repair (with no residual arch obstruction) between 2011 & 2020. BMI was classified as follows: normal (< 25 kg/m2) vs increased (≥ 25 kg/ m^2). Primary interventions, age at primary intervention and number of antihypertensive medications were recorded. Cholesterol panel and triglyceride (TG) levels were documented. T-test was used to compare means and chi square test to compare nominal variables.

Results: Average age was 28±12 years. N =108 patients, 42% of pts. had increased BMI, while 33% were on antihypertensive medications. Average age of pts with increased BMI was 9 years older. Obese pts. were more likely to be on multiple antihypertensive medications. Pts with normal BMI had a significantly lower TG levels (Table. 1)

Conclusions: Improvement in modifiable risk factors like BMI, HTN and TG may benefit the long term management of pts. with repaired CoA to help reduce the risk for CVA and CAD.

	Normal BMI	BMI ≥ 25	P value
Number	61	46	
Age (years)	24 ± 10	33 ± 14	<0.01
Weight (kg)	58 ± 13	88 ± 16	<0.01
Bicuspid Aortic Valve	47	34	
Primary Intervention			0.41
Surgical	56	40	
Trans catheter	5	6	
Age at Primary Intervention			0.04
Neonatal	14	5	
Infancy	19	13	
Childhood	10	15	
Adolescent	14	7	
Adult	1	5	
Patients on Antihypertensive Medications	14	21	0.02
Number of Antihypertensive Medications per person			0.02
0	47	25	
1	9	9	
≥ 2	5	12	
Current Systolic Blood Pressure	118 ± 15	125 ± 14	0.04
LDL	96 ± 35	91 ± 30	0.67
Average Triglyceride	76 ± 28	134 ± 61	0.003
HbA1c	5.3 ± 0.36	5.4 ± 0.48	0.44
Sleep Apnea	1	3	0.4
Smoking	1	0	

Clinical Utility of Serial Fetal Echocardiography in Structural Congenital Heart Disease

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Introduction: Fetal echocardiography (FE) is a highly accurate diagnostic tool that can reduce morbidity and mortality in fetuses with major congenital heart disease (CHD). There is no consensus on how often serial FE should be performed for specific types of structural CHD. We aimed to investigate how often management changes occur based on a repeat FE.

Hypothesis: We hypothesized that fetuses with CHD lesions with potential for progression would have a higher incidence of management changes based on repeat FE.

Methods: We performed a retrospective review of all patients who presented to Mount Sinai's Children's Heart Center between January 2012 to January 2019 and had serial FE performed for structural CHD. We reviewed consult notes to determine whether management changed based on serial FE.

Results: Among 253 patients, a total of 507 repeat FE were performed. The frequency of a management change based on a repeat FE was 45/507 (8.9%). Management changed most frequently for balanced atrioventricular canal (17.1%), pulmonary valve abnormality/noncritical pulmonary stenosis (15.6%) and left ventricular outflow tract obstruction/aortic valve abnormality/coarctation/interrupted aortic arch (15.5%). Management changed least frequently for ventricular septal defects (0%) and truncus arteriosus (0%).

Conclusions: Serial FE led to changes in management in fetuses with certain forms of structural CHD. Management changed most frequently for types of CHD that are associated with coarctation or have the potential for progression. The type of CHD diagnosed at the initial visit should determine the number of repeat FE performed.

Isolation Clinical Practices in Pediatric Dentistry and Change in Practices During the COVID-19 Pandemic

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Introduction: Proper isolation practice is an integral part of dentistry. During COVID-19 pandemic there was increased emphasis on isolation practices to decrease amount of aerosols generated during dental procedures.

Hypothesis: We hypothesized there is variability in isolation practices by provider age, years in practice, types of practice and treatment (preventive, restorative, endodontic). We expect there is significant change in isolation practice during the pandemic compared to practice prior to the pandemic.

Methods: To investigate isolation practice and change during the pandemic, we developed and emailed a survey to 6671 pediatric dentists. Total responses were 519 (7.8% response rate). Chi-square test and multivariate regression analysis were used to analyze outcomes.

Results: Results reflect that 66% of responders are practicing for more than 10 years and 83% are in private practice. The most commonly used isolation practice for preventive treatment is cotton roll (34%) followed by single use mouthpiece (29%). Rubber dam was the main practice for isolation in both restorative and pulp therapy for primary teeth 50% and 60% respectively. Results show providers 41 and older prefer to use cotton roll isolation (40%) for preventative treatment and rubber dam (60%) for restorative treatment while providers 40 and younger prefer to use single use isolation for both preventative (39%) and restorative treatment (34%). 91.5% of responders indicate using same isolation practice prior to and during the pandemic.

Conclusions: While isolation practices were different by types of dental treatment, there was no significant change in isolation practice prior to and during the pandemic.

A Systematic Review of Malnutrition Assessment Tools in the Pediatric Population

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Introduction: Malnutrition is a widely tested metric in the pediatric population. Identification of a child with malnutrition is important to prevent developmental delay and other co-morbidities. Many of the models used to measure nutritional status of children have not been validated or compared.

Hypothesis: We hypothesize lack of congruity on validated assessment tools used to evaluate pediatric malnutrition in different settings.

Methods: This systematic review searches the literature to compile different tools used to assess nutritional status in the pediatric population. A protocol adhering to PRISMA-P guidelines was developed, and four electronic databases (MEDLINE-ALL (OVID), EMBASE (OVID), HAPI, Scopus) were used to identify articles published up until August 2020. Papers were included that incorporated a distinct nutrition tool and reported validity, reliability, and/or agreement data. Literature search results were uploaded to Covidence for abstract and full-text screening.

Results: The database search resulted 6,236 references. 1,151 abstracts fit the inclusion criteria and continued onto full-text review, where 75 texts were selected for inclusion. Data extraction from the final 75 manuscripts was completed and analysis is underway. The final studies incorporate tools tested in the settings of inpatient, clinic, and community. The most highly studied tools are arm circumference, skinfold thickness, and body composition by bioimpedance analysis/DXA. The most reported validity data are sensitivity, specificity, positive and negative predictive values, and agreement.

Conclusions: This review will provide physicians and researchers with the knowledge to determine which tool(s) may be most effective and applicable to test for malnutrition in their specific pediatric population.

Characterizing Patient Population and Understanding Quality of Life for Children with Cerebral Palsy at a Multidisciplinary Pediatric Neuromuscular Care Clinic

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Introduction: Multidisciplinary care clinics provide coordinated healthcare for children with complex medical conditions who often see many providers multiple times per year. Our neuromuscular care clinic represents 13 specialties (Figure 1), allowing patients to see all pertinent providers in one day, which has the potential to improve both patient and caregiver quality of life.

Hypothesis: We hypothesize that the baseline Cerebral Palsy Quality of Life Questionnaire (CPQoL) scores will be an effective tool for investigating the impact of our clinic on patients' quality of life.

Methods: Caregivers of patients attending the clinic were administered a survey that assesses patient demographics in conjunction with the CPQoL. Descriptive statistics were used to analyze data.

Results: Demographic data for 24 patients from January 2021 and December 2021 is available in Table 1. A majority of the patients belong to minority racial and ethnic groups and are covered by public insurance. Most patients receive physical, occupational, and speech therapy. The median number of healthcare visits per year was 12 (5.25–19.75), and 29.2% of caregivers were required to miss over 10 days of work per year for these healthcare visits. The CPQoL scores for both teen and child cohorts are available in Table 2.

Conclusions: This patient population has extensive needs and potential barriers to care. The multidisciplinary care model may be able to address these barriers by streamlining care and enhancing coordination between providers. We hope to further investigate the clinic’s ongoing impact on quality of life by re-administering the CPQoL at patient follow up visits.

Figure 1: Medical Specialties Represented at Multidisciplinary Clinic

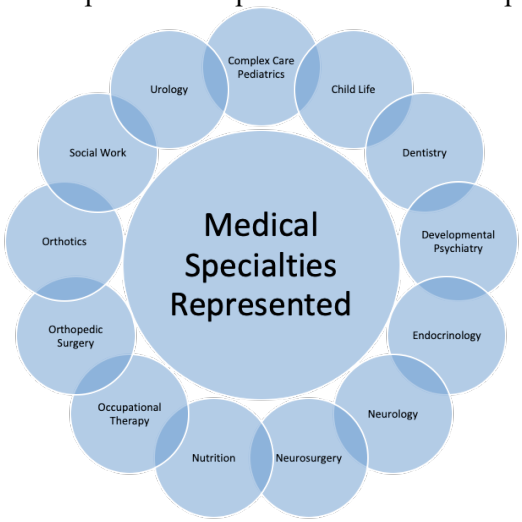

Table 1. Patient Demographics

Characteristic	Clinic Patients (n=24)
Median Age (Q1 - Q3) - years	4 (2 - 9)
Sex	
Male - n (%)	14 (58.3)
Female - n (%)	10 (41.7)
Race	
Asian - n (%)	3 (12.5)
African American - n (%)	6 (25.0)
Other - n (%)	14 (58.3)
White - n (%)	1 (4.2)
Ethnicity	
Hispanic - n (%)	14 (58.3)
Non-Hispanic - n (%)	10 (41.7)
Primary Insurance	
Public - n (%)	21 (87.5)
Private - n (%)	3 (12.5)
Home Care Services	
Home Attendant - n (%)	6 (25.0)
Home Nurse - n (%)	9 (37.5)
None - n (%)	9 (37.5)
School Attendance	
Yes - n (%)	11 (45.9)
Therapy Participation	
Feeding Therapy - n (%)	11 (45.9)
Occupational Therapy - n (%)	17 (70.8)
Physical Therapy - n (%)	20 (83.3)
Speech Therapy - n (%)	17 (70.8)

Table 2. Cerebral Palsy Quality of Life Questionnaire Domain Scores for Child and Teen Cohorts

Cerebral Palsy Quality of Life Domain	Child; n=20 (Mean ± SD)	Teen; n=4 (Mean ± SD)
Access to Services	71.5 ± 21.9	46.8 ± 33.3
Communication and Physical Health	N/A	63.3 ± 26.1
Emotional Well-being and Self-Esteem	78.7 ± 23.1	N/A
Family Health	71.1 ± 23.1	60.2 ± 23.8
Feelings about Functioning	66.4 ± 24.8	56.3 ± 33.1
General Well-being and Participation	N/A	65.0 ± 25.9
Pain and Impact of Disability	35.8 ± 32.6	N/A
Participation and Physical Health	68.9 ± 23.5	N/A
School Well-being	N/A	79.3 ± 21.2
Social Well-being	N/A	84.8 ± 25.8
Social Well-being and Acceptance	74.5 ± 20.8	N/A

Caption: Certain domains are only specified by either the Child or Teen QP QoL Questionnaire. The domains that are not specified for a specific CP QoL are marked with "N/A"

Comparative Study of Pediatric Trauma and Fractures Before, During, and After the Peak of COVID-19 Pandemic in New York City

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Introduction: New York City (NYC) was the initial epicenter of the COVID-19 pandemic in the United States. Previous literature has shown a decrease in pediatric trauma and fractures during the pandemic, but few have analyzed those rates beyond the peak of the pandemic.

Hypothesis: We hypothesize that pediatric trauma volume in NYC decreased during the pandemic.

Methods: Five timeframes were studied: I) April 1 to June 22 in 2018 and 2019 (pre-pandemic), II) April 1 to June 22, 2020 (peak pandemic), and III, IV, and V) trauma cases after June 22, 2020, broken into 3-month intervals; the latter four were each compared to the respective pre-pandemic period. Group characteristics were compared through Chi-squared and t-tests.

Results: During the peak, a greater proportion of trauma cases were fractures ($p=0.03$) and the fracture rate significantly decreased ($p<0.01$). Fractures made up a larger percentage of trauma cases 0-3 ($p<0.01$) and 4-6 months post-peak ($p=0.02$) until no difference was noted 7-9 months post-peak ($p=0.40$). Likewise, 0-3 months post-peak, fracture rates similarly compared to pre-pandemic ($p=0.19$) but significantly lowered 4-6 ($p<0.01$) and 7-9 months post-peak ($p<0.01$).

Conclusions: Demand for pediatric trauma care drastically reduced during the height of the COVID-19 pandemic in NYC and has yet to return to pre-pandemic levels. An initial increase in fracture rate post-peak pandemic may indicate patients sustaining injuries during the initial lockdown but hesitating to seek care given fears of COVID-19. This analysis may inform and improve long-term resource allocation in hospital settings for future potential surges and variants.

Table 1. Patient Demographic and Trauma Characteristics before, during, and after COVID-19 Pandemic

	Pre-Pandemic (N=992)	Peak Pandemic (N=91)	0-3 Months Post-Peak Pandemic (N=277)	4-6 Months Post-Peak Pandemic (N=211)	7-9 Months Post-Peak Pandemic (N=170)
Age					
Median [Q1-Q3]	9.00 [5.00-14.0]	7.00 [3.00-12.5]	7.00 [3.00-13.0]	5.00 [2.00-12.0]	5.00 [2.00-10.0]
Age by Group					
0 to 5	294 (29.6%)	36 (39.6%)	110 (39.7%)	113 (53.6%)	86 (50.6%)
6 to 11	308 (31.0%)	29 (31.9%)	79 (28.5%)	43 (20.4%)	50 (29.4%)
12 to 17	390 (39.3%)	26 (28.6%)	88 (31.8%)	55 (26.1%)	34 (20.0%)
Insurance Status					
Commerical	203 (20.5%)	20 (22.0%)	70 (25.3%)	65 (30.8%)	53 (31.2%)
Public	705 (71.1%)	64 (70.3%)	192 (69.3%)	129 (61.1%)	101 (59.4%)
Self Pay	84 (8.5%)	7 (7.7%)	15 (5.4%)	17 (8.1%)	16 (9.4%)
Fracture Diagnosis					
Yes	159 (16.0%)	23 (25.3%)	63 (22.7%)	40 (19.0%)	15 (8.8%)
No	833 (84.0%)	68 (74.7%)	214 (77.3%)	171 (81.0%)	155 (91.2%)
Fractures Per Week					
Mean ± SD	6.77 ± 2.93	2.48 ± 1.40	4.93 ± 1.39	2.96 ± 1.35	1.35 ± 1.10
Acuity					
Immediate	1 (0.1%)	1 (1.1%)	0 (0%)	0 (0%)	0 (0%)
Emergent	67 (6.8%)	6 (6.6%)	29 (10.5%)	27 (12.8%)	17 (10.0%)
Urgent	225 (22.7%)	34 (37.4%)	103 (37.2%)	58 (27.5%)	65 (38.2%)
Less Urgent	653 (65.8%)	48 (52.7%)	129 (46.6%)	116 (55.0%)	78 (45.9%)
Non Urgent	0 (0%)	0 (0%)	8 (2.9%)	2 (0.9%)	0 (0%)

Table 2. 3-Month Intervals of Pre-Pandemic Patient Demographic and Trauma Characteristics

	Pre-Pandemic (January-March) (N=688)	Pre-Pandemic (July-September) (N=887)	Pre-Pandemic (October-December (N=785)
Age			
Mean ± SD	9.36 ± 5.51	8.23 ± 5.34	9.08 ± 5.55
Age by Group			
0 to 5	213 (31.0%)	345 (38.9%)	272 (34.6%)
6 to 11	181 (26.3%)	247 (27.8%)	194 (24.7%)
12 to 17	294 (42.7%)	295 (33.3%)	319 (40.6%)
Insurance Status			
Commerical	143 (20.8%)	214 (24.1%)	181 (23.1%)
Public	506 (73.5%)	600 (67.6%)	536 (68.3%)
Self Pay	39 (5.7%)	73 (8.2%)	68 (8.7%)
Fracture Diagnosis			
Yes	76 (11.0%)	127 (14.3%)	101 (12.9%)
No	612 (89.0%)	760 (85.7%)	684 (87.1%)
Fractures Per Week			
Mean ± SD	3.04 ± 1.91	5.13 ± 2.39	4.17 ± 1.81
Acuity			
Immediate	0 (0%)	4 (0.5%)	3 (0.4%)
Emergent	45 (6.5%)	81 (9.1%)	68 (8.7%)
Urgent	136 (19.8%)	222 (25.0%)	198 (25.2%)
Less Urgent	469 (68.2%)	530 (59.8%)	486 (61.9%)
Non Urgent	0 (0%)	0 (0%)	0 (0%)
Missing	38 (5.5%)	50 (5.6%)	30 (3.8%)

Extra Corporeal Membrane Oxygenation:
A Bridge to Palliation in Single Ventricle Physiology

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Background: The use of extracorporeal membrane oxygenation (ECMO) in congenital heart disease is mostly well established. ECMO has served as a bridge to recovery, decision, or transplant in the setting of myocardial decompensation. ECMO has provided support for single ventricle patients at different postoperative stages of the palliation. Little is known regarding the use of preoperative ECMO support in this population. We aim to evaluate the outcomes of patients with single ventricle physiology supported with ECMO as a bridge to palliation.

Methods: Data was collected from the Extracorporeal Life Support Organization (ELSO) registry between 2016 to 2021. Patients were included in the study if they had single ventricle physiology and required ECMO support prior to their first stage palliation. Multiple variables including demographics, pre ECMO course, indications for ECMO, cannulation details, ECMO duration, course, complications and survival to hospital discharge data were collected. Descriptive statistics and student t-test was used to compare continuous variables. Dichotomous variables were compared using chi square and fisher tests. A *p*-value of 0.1 was considered as statistically significant in univariate analysis.

Results: Sixty-six patients met inclusion criteria. Of the 66 patients, 24 died on ECMO prior to first stage palliation (36%). Thirty-nine of the 66 patients died before discharge (59%). There was no significant difference in weight and age between patients who died and survived on ECMO. Patients who died on ECMO had significantly longer ECMO runs than those who survived (248 hrs vs. 115 hrs; $p<0.001$) . Patients who died on ECMO were significantly more likely to have a higher initial paO_2 (49 mmHg vs. 40 mmHg; $p=0.027$) and oxygen saturation (77% vs. 69%; $p=0.076$), than those who survived. Patients who died on ECMO were significantly more likely to have more than four complications during their course than those who survived (63% vs. 17%; $p<0.001$).

Conclusions: A third of patients supported with ECMO prior to initial single ventricle palliation died on ECMO. Those who died on ECMO were significantly more likely to undergo a longer ECMO run, suffer more complications, have a higher initial paO_2 and oxygen saturation than those who survived ECMO.

Molecular Bacterial Vaginosis and Prospective Risk of Cervicovaginal Chlamydia Trachomatis Infection in Adolescents

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Introduction: Adolescents and young adults (AYAs) make up a quarter of the population but account for over half of all sexually transmitted infections. Symptomatic bacterial vaginosis (BV) has been associated with an increased risk of acquiring *Chlamydia trachomatis* (CT). We sought to explore the prospective association between subclinical BV and the risk of acquiring CT infection.

Hypothesis: We hypothesize that subclinical BV, as diagnosed by *molBV* score, would increase the risk of subsequently acquiring sexually transmitted CT.

Methods: We conducted a nested case-control study within a longitudinal cohort study of sexually active AYAs.Cervicovaginal samples were collected six months before CT infection (prospective visit, t-1), at CT diagnosis (index visit, t), and six months after treatment (post-treatment visit, t+1). Cases were matched 1:2 to matched controls. We assessed the presence of subclinical BV using a validated molecular score (*molBV*).

Results: Subclinical detection of BV by *molBV* score at the prospective visit (t-1) significantly predicted risk of CT diagnosis at the index visit (RR=1.78, 95%CI=1.05-3.03). Adjusted cross-sectional analysis of index visit samples revealed an even stronger association between *molBV*-BV positive status and clinical detection of CT (RR=2.90, 95%CI=1.74-4.85), whereas following CT treatment there were no differences between cases and controls in their *molBV* scores (p=0.5).

Conclusion: It is known that clinical diagnosis of BV is associated with cervicovaginal CT. We demonstrate a prospective association between detection of subclinical BV by *molBV* score and an increased risk of acquiring CT infection.

Screening Middle-School-Age Patients for SCD/SCA During Well Visits in a Pediatric Outpatient Clinic

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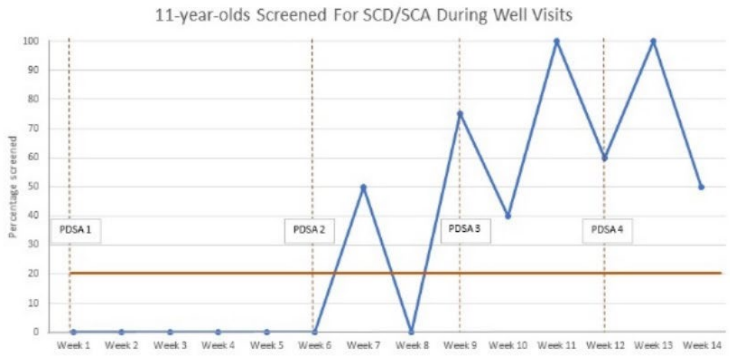
Background: The American Academy of Pediatrics (AAP) published a policy statement in July 2021 focusing on the importance of using 4 screening questions by primary care providers to screen and prevent sudden cardiac death (SCD) and sudden cardiac arrest (SCA) in all children who are about to enter middle school regardless of their athletic status.

Objective: Implement a standardized screening process for SCD/SCA at 11-year-old well child visits at our Tuesday Pediatric Primary Care Clinic by December 2021.

Design/Methods: At the onset of the QI project all providers received an email notifying them of the release of the AAP 2021 SCD/SCA policy statement and requesting they administer a 4-question screening for SCD/SCA for all 11-year-old well visits (PDSA 1). This was followed by the creation of a "smart phrase" with the questions that could be added to a provider note in our EMR (PDSA 2). Subsequently, we sent weekly messages via the EMR to all providers reminding them to screen their 11-year-old patients (PDSA 3). Lastly, the screening questions were embedded in residents' well visit EMR note template (PDSA 4). The charts of all 11-year-olds seen on Tuesdays for well exams in our pediatric primary care clinic from August 31st through December 7th were reviewed to determine the number of patients screened. In addition, we reviewed charts of all referrals to pediatric cardiology 3 months prior to our intervention to determine the rate of SCD/SCA referral as our balancing measure.

Results: During our initial PDSA cycle, no patients were screened. With successive PDSA cycles, we increased the rate of screening to an average of 17% screened during PDSA 2, 72% during PDSA 3 and 70% during PDSA 4. Baseline referral to pediatric cardiology for SCD/SCA risks in the charts reviewed of 11-year-old patients (n=120) in the 3 months prior was 1.7%. None of the patients screened during the QI project (n=14) were positive for SCD/SCA risk factors.

Conclusion(s): Our findings suggest that simply educating providers about the guidelines and asking them to screen was not sufficient to affect change. It was only after adjustments to the EMR were made and weekly reminders were sent, that providers significantly increased their screening for SCD/SCA. We were concerned that increased screening may generate a significant number of unnecessary pediatric cardiology referrals, but we did not observe this. Screening rates remained variable, likely due to time constraints associated with the number and complexity of the questions as well as language barriers, suggesting further strategies are needed for universal adoption within our clinic.


11-year-olds Screened For SCD/SCA During Well Visits
Percentage screened
100
90
80
70
60
50
40
30
20
10
0
PDSA 1
PDSA 2
PDSA 3
PDSA 4
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Week 9
Week 10
Week 11
Week 12
Week 13
Week 14

Milk-specific Th2 Cells Are Restricted to the Esophagus in Eosinophilic Esophagitis

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Introduction: Eosinophilic esophagitis (EoE) is a non-IgE mediated allergic inflammatory disease that is triggered by food allergens, most commonly milk. EoE is characterized by a progressive esophageal dysfunction which defined as having at least 15 eosinophils per high-power field on endoscopic esophageal biopsy along with esophageal symptoms such as vomiting, dysphagia, and feeding difficulties. Many elements of EoE pathophysiology are regulated by type 2 cytokines, and dupilumab (anti-IL-4/13) effectively treats EoE. However, the role of allergen specific Th2 cells in the development and maintenance of this disease remains unclear.

Hypothesis: Tissue resident allergen-specific Th2 cells are responsible for the persistence of EoE.

Objective: To identify and functionally characterize the milk-specific Th2 cells in esophageal tissue and peripheral blood in patients with EoE.

Methods: Tissue biopsies from non-EoE individuals (n=10) and EoE patients (n=10) were stimulated with either Phorbol 12-myristate 13-acetate (PMA) or cow's milk proteins (CMP) together with Brefeldin A for 16h. After culture, supernatants were collected for quantifying secreted cytokines by LEGENDplex™ and cells isolated for their characterization by intracellular cytokine staining (ICS) using spectral flow cytometry. Peripheral blood mononuclear cells (PBMCs) obtained from the same subjects (IgE-mediated milk-allergic subjects were also included, n=10) were stimulated with CMP for 6 hours in the presence of Brefeldin A. Milk-specific T cells identified by the upregulation of the activation marker CD154 and their functional profile characterized by ICS. Stained cells were acquired using a 5-laser Cytek™ Aurora and spectral flow cytometry data was analyzed using Flowjo.

Results: The percentages of CD4+CD8- and CD4+CD8+ T cells were significantly increased in biopsies from EoE patients compared with non-IgE subjects. Both T cell subsets were characterized by a Th2 cytokine profile (increased expression of IL4, IL9, IL10, and IL13). Stimulation of EoE biopsies with CMP induced the significant increased release of the Th2 cytokine IL-5 compared with non-EoE controls. Based on the upregulation of the activation marker CD154, circulating milk-specific T cells were not identified in EoE patients after PBMCs stimulated with CMP.

Conclusion: Our results reveal that milk-specific Th2 cells are restricted to the esophageal mucosa and responsible for the local release of the type 2 cytokines that drives EoE progression. Tissue resident allergen-specific Th2 cell responses may represent a novel diagnostic approach for detecting dietary triggers of EoE.

Structure-Function Analysis of $p57^{KIP2}$ in the Human Pancreatic Beta Cell: Implications for Congenital Hyperinsulinism

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Introduction: The canonical cell cycle inhibitor $p57^{KIP2}$ plays a critical role in pediatric endocrine disorders, including the Focal Variant of Congenital Hyperinsulinism, Beckwith-Wiedemann Syndrome, IMAGe Syndrome, and Russell-Silver Syndrome. Additionally, human beta cell regenerative drugs lead to suppression of $p57^{KIP2}$ emphasizing its therapeutic relevance for Type 1 and Type 2 Diabetes. Despite this clinical relevance, little is known about the function of $p57^{KIP2}$ in any cell type, including the human beta cell.

Hypotheses: 1) $p57^{KIP2}$ plays an integral functional role in human beta cell physiology, mediated by its specific structural domains. 2) Differences among the clinical syndromes reflect sites of $p57^{KIP2}$ mutations. 3) Site-directed mutagenesis will reveal unanticipated novel and essential roles for $p57^{KIP2}$ unique to the human beta cell.

Methods: Adenoviruses expressing wild-type $p57^{KIP2}$ as well as deletion mutants for the putative PAPA, CDKI, PCNA and NLS domains were prepared and expressed in human islets. The expression of canonical beta cell differentiation markers is assessed by quantitative PCR. $p57^{KIP2}$ intracellular trafficking is determined by laser confocal microscopy. The effects on human beta cell proliferation is performed using Ki-67 and insulin co-immunolabeling.

Results: Expression of mutant $p57^{KIP2}$ isoforms leads to alterations in human beta cell markers, including MAFA, PCSK1, INS, GLUT2 and GLP1R. All constructs demonstrate nuclear localization of $p57^{KIP2}$, with the exception of p57ΔNLS, which remains cytoplasmic.

Conclusions: Subcellular localization demonstrates that the putative NLS is indeed a functional NLS. Additional studies are in progress to explore the function of specific $p57^{KIP2}$ domains on beta cell proliferation and differentiation.

Parental Empowerment and Efficacy Among Food Insecure Families at a Pediatric Practice in East Harlem, New York City

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Introduction: Parental empowerment (PE) promotes child well-being. The relationship between food insecurity (FI) and PE has not been well-studied. With the rise in FI and unmet social needs due to COVID-19, we explored these factors to inform interventions to improve family health.

Hypothesis: Families with greater FI will have lower PE scores.

Methods: We screened families for SDH prior to visits to a NYC pediatric clinic. Those with FI were offered enrollment in a prospective study assessing impact of FI interventions on family health. Caregivers completed a survey assessing FI and the Parent Empowerment and Efficacy Measure (PEEM). We used univariate analyses and regression modeling to explore relationships between FI and PEEM score.

Results: From June-December 2021, 125 of 406 (31%) families screened for SDH endorsed FI and were offered enrollment. Of 48 caregivers enrolled, 25% of families had marginal food security, 52% had low security, and 8% had very low security. Caregivers' median overall PEEM score was 173.5 / 200, with 100.5 / 110 for the "efficacy to connect" subscale and 74.5 / 90 for the "efficacy to parent" subscale. Higher FI levels were associated with lower PEEM scores ($p<0.0001$). Employed caregivers had lower overall PEEM scores than those unemployed and not seeking employment ($p<0.001$).

Conclusions: Caregivers with greater FI felt less empowered as parents, and employment status was not protective. The impact of the SDH screening program and onsite pantry on FI and PE are being evaluated in a prospective study.

Aneurysms of the Fetal Arterial Duct are Usually Benign

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Introduction: Fetal arterial duct aneurysm, defined as saccular or fusiform enlargement of the arterial duct, affects more than 8% of pregnancies. It is uncommonly associated with serious sequelae postnatally, including thromboembolic events such as stroke and left pulmonary artery obstruction, rupture with demise, and vocal cord compression. Risk factors include maternal diabetes, late maternal age, maternal blood type A, large newborn size for gestational age, and fetal connective tissue disorders. The true clinical importance remains unknown, making it difficult to determine whether and how to monitor this finding postnatally.

Hypothesis: We hypothesized that there are rarely adverse outcomes related to fetal arterial duct aneurysm.

Methods: This is a retrospective echocardiogram study to assess the outcomes of fetally diagnosed arterial duct aneurysm. Images and clinical records were reviewed to confirm the diagnosis and assess risk factors and outcomes. Descriptive statistics were performed.

Results: Fifty-three fetuses with arterial duct aneurysm were identified. The median gestational age at diagnosis was 34.9 weeks (IQR 32.6, 36.6). The median maternal age was 31 years (IQR 27.3-34.1). Eight (15%) had maternal diabetes. The most common blood type was O. The median maximal dimension of the aneurysm was 7.6 mm (IQR 6.1, 8.7). No patients sustained postnatal demise related to the duct, rupture of the ductal aneurysm, cerebral infarction, or other sequelae. No patients underwent ductal intervention.

Conclusion: In our experience, no adverse outcomes related to the ductal aneurysm were identified. Routine clinical follow up may not be necessary, though should be considered for very large aneurysms.

Equity in Mental Health Services for Youth at Clinical High Risk for Psychosis: Considering Marginalized Identities and Stressors

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Introduction: Prevention and early intervention programs have been initiated worldwide to serve youth at Clinical High Risk for Psychosis (CHR-P) – adolescents and young adults experiencing subclinical psychosis and functional impairment. The primary goals of these efforts are to prevent or mitigate the onset of clinical psychosis, while also treating comorbid issues. It is important to consider issues of diversity, equity, and inclusion in CHR-P work, especially as these programs continue to proliferate around the world. Further, there is a long history in psychiatry of misdiagnosing and mistreating psychosis in individuals from minoritized groups.

Hypothesis: The framework of this narrative review and call to action is based on minority stress and intersectional models of health. We broadly hypothesized that there would be significant intersectional health disparities in CHR-P work.

Methods: We used a narrative review and call to action approach for this work, focused on exploring distinct literatures and generating empirically based recommendations. Our search terms included CHR-P/related terms, terms related to intersectional identities, and terms including and related to diversity, equity, and inclusion.

Results: Although there have been significant developments in early intervention psychosis work, there is evidence that minoritized groups (e.g., intersectional identities related to development; race, ethnicity, and culture; faith; immigration status; geography/residence; gender identity; sexual orientation; socioeconomic status/class; ability status) are underserved by current CHR-P clinical and research efforts. These issues are compounded by the contexts of continued social marginalization and significant mental health disparities in general child/adolescent services.

Conclusions: Clinical, research, and policy recommendations are provided.

Advances in Pediatric Otolaryngology Airway Simulation Training: A Review of Current Instructional Methods

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Introduction: In the field of Pediatric Otolaryngology, simulation has become a vital component to resident training. Endoscopic management of the pediatric airway represents a subset of pediatric surgery that is high acuity and risk, but low frequency, thus serving as an ideal candidate for simulation training. The goal of this study was to assess the state of resident simulation training in the management of the pediatric airway.

Methods: A literature review was performed through PubMED, with the following terms queried: [pediatric airway simulation], [simulation AND airway management], [(Virtual Reality OR Augmented Reality) AND pediatric airway], [simulation training AND pediatric otolaryngology]. A total of 34 studies were selected and evaluated with 10 deemed appropriate for further review.

Results: Current simulation options for pediatric airway management training include virtual and physical models. Virtual models include virtual reality simulators with or without haptics (simulated touch) and augmented reality simulators that overlay images on a real-world backdrop. These are most accessible but least realistic for practicing tactile skills. Physical models include animal airway, isolated laryngeal, full mannequin simulators, and 3D-printed physical models, though not yet widely used. Physical models are more expensive, less mobile, and require more extensive assembly than virtual models.

Conclusion: Although simulation training in resident education is valuable, current pediatric airway options lack soft tissue models with anatomical specificity relevant to the pediatric otolaryngologist. The use of 3D-printing to build pediatric airway simulators could make physical models more accessible and less expensive for residency programs to implement. An increase in access to physical simulation models has the potential to improve pediatric airway management training.

Implementation Of a Patient-Reported Outcome Measure Into Clinical Practice Following Pediatric Liver Transplantation: The Starzl Network Experience

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Institute Affiliation: AdventHealth Transplant Institute

Introduction: Patient-reported outcome measures (PROMs) are not routinely used in pediatric post-liver transplant clinical care. The Starzl Network for Excellence in Pediatric Transplantation (SNEPT) implemented the Pediatric Liver Transplant Quality of Life (PeLTQL) questionnaire as an inaugural initiative.

Hypothesis: We hypothesized that an iterative process would result in successful and sustainable implementation.

Methods: A mixed methods feasibility and implementation project was conducted across ten centers to assess administration processes, barriers, and user experiences related to the integration of the PeLTQL. The project involved four phases: initial pilot, extended pilot, initial mobile app development and testing, and mobile app implementation. User experience surveys were administered at each phase. Strategies were modified based on an iterative process involving stakeholder feedback.

Results: 149 patient / parent dyads completed the PeLTQL during outpatient clinic visits across phases I and II. Clinicians, parents, and patients reported that implementation was feasible. However, most (8/10) sites stopped administering the measure within one year after the pilot phase. In response to stakeholder feedback, the PeLTQL was made available on the RealTime Clinic mobile application. Feedback from parents and clinicians on the mobile app was overwhelmingly positive, with 96% (22/23) of parents indicating that it was "very easy" or "easy" to enter PeLTQL responses electronically.

Conclusions: Implementation of a PROM into pediatric post-liver transplant care was feasible during the pilot, but sustained implementation was stalled due to logistical challenges, including lack of time during clinic visits. Uncoupling PROM assessments from clinic visit times using a mobile app is preferable.

Echocardiographic Predictors of Medium-term Left Ventricular Remodeling After Ross Aortic Valve Replacement in Children and Young Adults

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Introduction: Aortic valve replacement (AVR) guidelines for chronic aortic regurgitation (AR) are underdeveloped in pediatrics and may differ from adults given longer exposure to AR. Ross AVR is attractive in young people due to durability and avoidance of anticoagulation. We sought to describe preoperative (preop) echocardiographic predictors of medium-term remodeling of ventricular size and function after Ross AVR for AR in pediatrics and young adults.

Hypothesis: We hypothesized that decreased pre-Ross AVR ejection fraction, increased left ventricular end-diastolic/systolic volume, and worse global longitudinal and circumferential strain indices would be associated with increased left ventricular end diastolic volume and lower ejection fraction a medium-term follow-up.

Methods: We included patients 10-25 years with ≥moderate AR before Ross AVR and follow-up >5 months. Predictors were LV volumes, strain, and ejection fraction (preEF). Outcomes were follow-up LV end diastolic volume Z-score (LVEDVZ) >2.0 and EF<56%. Linear regression and ROC analysis evaluated correlation and diagnostic ability of predictors.

Results: Of 18 patients (median age 20.3 years) over median follow-up 1.4 years, the LVEDVZ decreased (median 4.9 to 1.0; p<0.001) and 7 (39%) had LVEDVZ >2.0. Median EF decreased (62 to 57% p=0.016) and 5 (28%) had EF <56%. PreEF correlated with follow-up EF (R^2 0.32 p=0.015) but did not predict follow-up EF<56%. Follow-up LVEDVZ correlated with preEF (R^2 0.55 p<0.001), BSA-indexed end-systolic volume (ESVi; R^2 0.30 p=0.018), and midventricular global circumferential strain (mvGCS; R^2 0.42 p=0.004). LVEDVZ>2 was predicted by preop: preEF (AUC 0.99; 71% sensitivity, 100% specificity at preEF<60%); ESVi (AUC 0.77; 100% sens, 55% spec at ESVi>53 ml/$m^{2)}$; and mvGCS (AUC 0.94; 71% sens, 100% spec at mvGCS worse than-25%). Adjusting for preop EF, GCS did not predict follow-up LVEDVZ (p=0.41). Although 5 (28%) had preop ≥moderate aortic stenosis (AS), there was no association of preop AS gradient with outcome.

Conclusions: A high proportion of pediatric and young adult patients with AR have a dilated LV at medium term follow-up after Ross AVR. Preop EF <60% and mvGCS worse than -25% predict lack of regression to normal LV size. These parameters should guide referral for surgical intervention. GCS should be explored further as a novel biomarker.

Adapting an In-Person Adolescent Diabetes Prevention Program to a Virtual Platform

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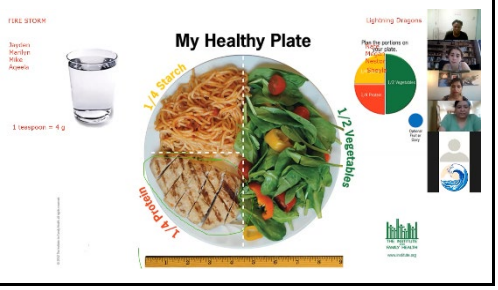
Introduction: In-person interventions to prevent or delay the progression of prediabetes to diabetes are difficult to deliver and sustain.

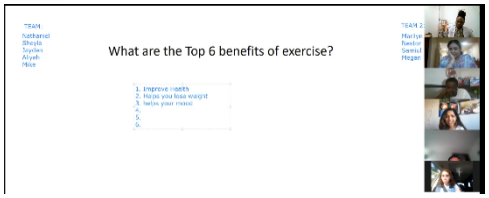
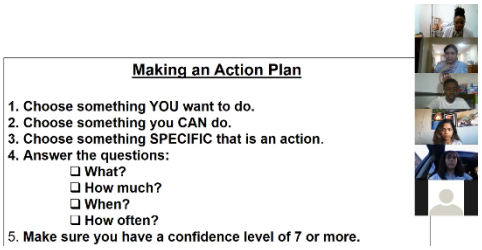
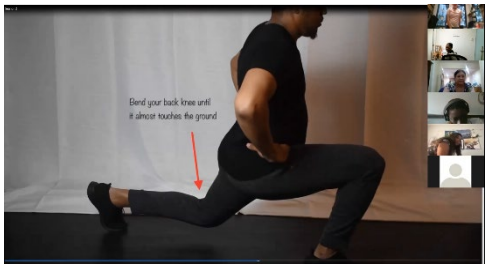
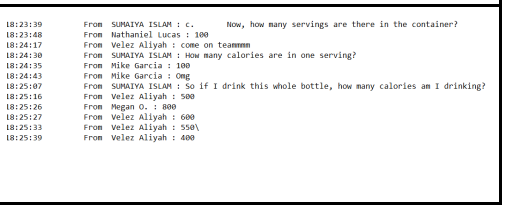
Hypothesis: We hypothesized that virtual adaptation of a community-based youth diabetes prevention program would be a feasible and acceptable strategy to deliver a lifestyle modification program to at-risk youth.

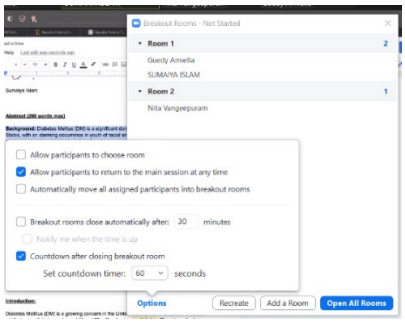
Methods: We conducted a 2-hour feasibility pilot in December 2020 with 5 participants who previously attended our in-person workshop and 5 members of our Community Action Board technology subcommittee. We implemented the full 12-session pilot program from June to September 2021 with 14 prediabetic adolescents (ages 13-17) recruited from our general pediatric clinic. Trained peer educators led weekly sessions on a HIPAA compliant Zoom platform. Sessions focused on promoting healthy eating and physical activity using behavioral techniques (e.g., goal setting, brainstorming, and problem solving).

Results: We adapted the in-person workshop content for delivery on Zoom (Table 1). Adolescents who attended the 12-session pilot program reported that they learned about healthy eating and active living, developed skills such as goal setting and behavior tracking and enjoyed the interactive, engaging content (rated the activities 4.5 out of 5). We employed several Zoom features (e.g., chat box, reactions, profile pictures, screen share, annotation and breakout rooms) to engage with youth in ways that were acceptable and helpful to them.

Conclusion: Our peer-led youth diabetes prevention program was successfully adapted and implemented in a virtual format and was well accepted by at-risk youth. Future research is needed to examine the impact of virtual youth lifestyle interventions on behavioral and clinical outcomes.

In person	**Virtual Adaptation**	**Screen Shot**
Charts with key workshop content made by leaders using flip charts based on samples in peer leader binder.	Create PowerPoint slides with all charts for hard copy and electronic binders for peer leaders and participants. Share slides in real-time during the virtual workshop session by using screen share.	

Write on flip charts for brainstorming, problem-solving, and other activities.	Utilize the “white-board” and annotation functions on Zoom to document ideas shared.	
For setting weekly goals, peer leaders walk around the room and assist participants with making their goal if needed. They then ask for a volunteer and go around the room to share plans.	Ask for a volunteer and then call on participants based on the order they are listed in the Zoom participant list. Participants may also choose to share their goal in the chat box with peer leaders prompting them for any information that is missing to make the goal as specific as possible or encouraging them to modify their goal so that they have a high confidence level that they can complete it.	
Bring in, and share, food and drink labels.	Create PowerPoint slides with images of relevant nutrition labels for hard copy and electronic binders. Use screen share or Google doc link to share during workshop sessions.	
“Let’s get moving” group exercise activity.	Share premade exercise videos using screen share and then spotlight a peer leader to model the exercises in real time on camera to increase motivation and support. Plan modifications not only for different ability levels but also for teens with limited space to exercise. Create a library of videos for participants to use any time.	
Use buzzer or hit the table when participants know answers to questions during interactive games.	Ask participants to type specific words or the answer in the chat box to keep track of who gave the correct answer first and award points.	

Divide the group into teams for games and small group activities.	Assign teams to breakout rooms for games and small group activities supervised by peer leaders and study staff.	

Development of a Text Message Platform to Enhance a Youth Diabetes Prevention Program

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Introduction: There are barriers in access to and engagement with youth diabetes prevention programs.

Hypothesis: Text messaging may provide additional support and motivation for prediabetic youth participating in a lifestyle-based prevention program.

Methods: Results from focus groups we previously conducted with youth from our community were used to develop text-message content. There are five message types focused on healthy eating and active living: goal setting, behavior tracking, individually tailored guidance, motivational messages, and photo diary (Table 1). We conducted a pilot of the 12-week texting program with 13-prediabetic teens.

Results: Adolescents (ages 15-21, 77% female, 77% Hispanic/Latino/a) received an average of two automated messages per day. The system correctly sent messages 84% of the time. Highly responsive participants (46%) responded more than 75% of the time to interactive-messages sent over 12-weeks, and 69% of participants were still engaged at week 12 (Figure 1). During a focus group conducted after program completion, teens remarked that the message frequency was appropriate. Those who participated in our in-person workshops reflected that the messages were reminiscent of the workshop content. Participants rated goal setting, behavior tracking, and tailored messages most highly and informed planned adaptations to the platform (Table 2).

Conclusion: Our study incorporated youth in the initial content development and pilot testing of a novel text-messaging platform to support diabetes prevention. This study is also unique in its triple partnership between academia, technology developers, and minority youth to develop an mHealth platform to address disparities in obesity and diabetes rates.

Table 1: Message Types

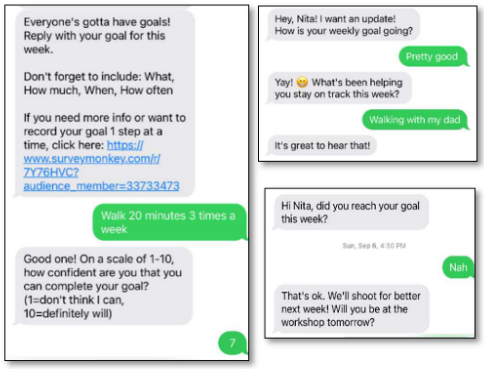
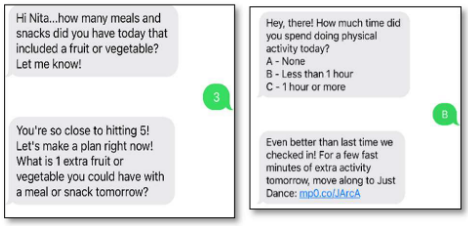
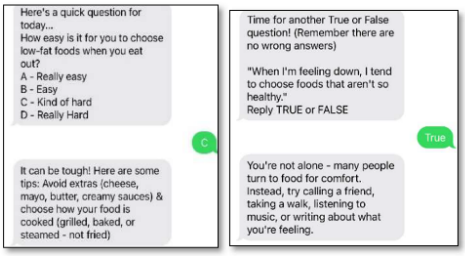
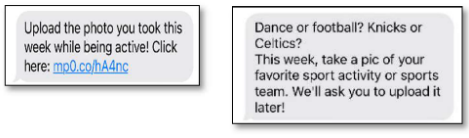
Message Type	Description	Example
Goal Setting	Teens are prompted to enter a weekly goal, check in about progress, and report on goal completion.	
Behavior Tracking	Participants report on behaviors (e.g., reading nutrition labels) and record key behaviors over time (fruit and vegetable intake, screen time, physical activity, and servings of sugary beverages) with weekly individualized feedback.	
Tailored	Participants receive automated messages with feedback based on responses to questions.	
Motivational	Inspirational quotes and links to motivational graphics with text.	
Photo Diary	Teens are prompted to upload images pertaining to healthy eating and active living.	

Table 2: Planned Adaptations to Text Message Platform	
Findings from Pilot Testing	**Planned Adaptations to Platform**
Message Frequency "You felt like the program was coming to an end once the messages started coming less frequently. It was a little sad since I was doing it since school started so it was part of my routine."	Maintenance of same message frequency throughout program with less frequent messages only after workshop completion (an average of two daily messages in the first 12 weeks followed by an automated weekly maintenance message and additional manually initiated messages through 12-month follow-up).
Tailored Messages "It served to remind me of the things I could be doing...These types were the best for me when I was very busy because they were very quick...they're simple, short, quick facts." "If it was a little more interactive, I would have benefitted more from it, instead of responding and forgetting about it."	Personalization of messages using data entered when creating user profile (personal characteristics, habits, and goals). Increase interactivity with more two-way exchanges and detail in dialogues.
Goal Setting "I think they were great. I just wish they were more repeated at the date and time that I chose to set my goal for." "Maybe [the system should] ask "what troubles did you have?" and then after you respond it should follow up with "would you like to talk with a peer mentor?"– if you say yes, it will schedule one, and if you say no you can continue on with your day."	Use natural language understanding and peer leader messaging through the engagement console for personalization of goal reminders. Hybridization of automated messaging and human interactions to trouble shoot challenges with goal completion.
Behavior Tracking "The frequency, the variety of these types of messages are good as is. I got a link to Just Dance, but I have to be honest I didn't press on the link mainly because of the timing of those messages. I think it was always while I was on the bus coming home from work and the last thing I really wanted to do was watch a video."	Personalization of messages using data entered when creating user profile (personal characteristics, habits, and goals). Customization of message timing based on user schedules.
Workshop Specific Messages "I agree that the messages of my plate reminded me of activities from the actual program." "Because they were short, I liked them. They did remind me of the workshop. These are good for small reflections."	Increase frequency of messages reflecting workshop content.
Motivational Messages "I liked a good amount of the linked ones…but the quotes were just better and easier than the linked ones."	Increase focus on inspirational quotations for motivation instead of links to graphics.
Photo Diary "I thought it was going to be a more collaborative thing when we sent the photos. Without that it feels like we're sending the photos for nothing."	Create a shared space for photos to increase interactions between participants.
I'm Just a Bot Messages "I knew it was bound to happen because it's a bot with automated messages. But I just tried to stop myself from saying random things because the bot doesn't understand."	Remove "I'm Just a Bot. I don't understand." messages, refine artificial intelligence and natural language understanding capabilities, and monitor engagement console for instances when system cannot handle messages.
Peer Leader Initiated Messages "I noticed a difference in my response to Cordelia's personal messages–I thought "oh it's a human, so I can actually respond and a person's going to read it right then and there and possibly respond. So I made a more lengthy response –something more meaningful."	Increase hybridization of automated messages and peer leader-initiated messages for increased engagement.
Additional Suggestions Quick stats, facts, and tips Short quizzes Group competitions Visual content	Addition of brief messages focused on diabetes statistics, facts, tips, and quizzes about workshop content. Increase social interaction with friendly competitions (step challenges, etc.). Share group accomplishments visually and incorporate visual story telling message content.

Perspectives from Diverse Stakeholders in a Youth Community-Based Participatory Research (CBPR) Study

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Introduction: Process evaluations often assess the effectiveness and impact of the CBPR method but generally do not reflect all relevant viewpoints.

Hypothesis: The perspectives of all stakeholders, particularly participants and young study team members, are invaluable to study evaluation and we suggest ways to increase the voice of youth in research.

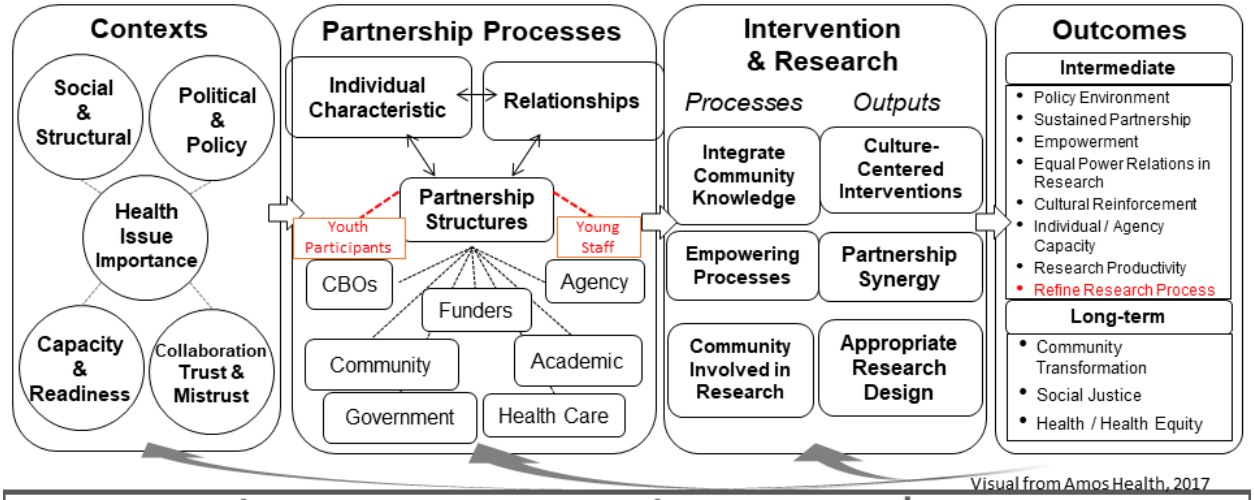
Methods: We conducted 44 individual interviews with representatives from 6 stakeholder groups: study participants, peer leaders, study interns and coordinators, and younger and older community action board members.

Results: Themes included: 1) Endorsement of the CBPR model and feedback on the research process, including the benefits of involving young people in different roles; 2) Reflections on the intervention workshops, the peer education model, and sustainability; 3) Recognition of the professional and personal impact of the study. Key findings informed lessons learned and strategies for future youth CBPR studies: 1) Youth are more likely to contribute to research if they see their input is valued, take part in various aspects of the research, and develop relationships with different members of the team. 2) An infrastructure for positive interactions among stakeholders, including youth, is important. 3) Including both community and study team members allows for study updates, diversity of viewpoints, and feedback that might not otherwise be obtained to inform adaptations.

Conclusion: We assessed and critically analyzed feedback from diverse study stakeholders, including young people with various roles. Findings provide insight on the value of youth participation in research and proposed adaptations to a traditionally cited CBPR conceptual model (Figure 1).

CBPR Conceptual Model

Adapted from Wallerstein et al, 2008 & Wallerstein et al, 2018, https://cpr.unm.edu/research-projects/cbpr-project/cbpr-model.html



Visual from Amos Health, 2017

Contexts

- Social-Structural: Social-Economic Status, Place, History, Environment, Community Safety, Institutional Racism, Culture
- Role of Education and Research Institutions
- Political & Policy: National / Local Governance / Stewardship Approvals of Research; Policy & Funding Trends
- Health Issue: Perceived Severity
- Collaboration: Historic Trust / Mistrust between Partners
- Capacity: Community History of Organizing / Academic Capacity / Partnership Capacity

Partnership Processes

Partnership Structures:
- Diversity: Who is involved
- Complexity
- Formal Agreements
- Control of Resources
- % Dollars to Community
- CBPR Principles
- Partnership Values
- Bridging Social Capital
- Time in Partnership

Individual Characteristics:
- Motivation to Participate
- Cultural Identities/Humility
- Personal Beliefs/Values
- Spirituality
- Reputation of P.I.

Relationships:
- Safety / Respect / Trust
- Influence / Voice
- Flexibility
- Dialogue and Listening / Mutual Learning
- Conflict Management
- Leadership
- Self & Collective Reflection / Reflexivity
- Resource Management
- Participatory Decision- Making
- Task Roles Recognized
- Peer Education Models

Commitment to Collective Empowerment

Intervention & Research

- Processes that honor community and cultural knowledge and voice, fit local settings, and use both academic & community language lead to Culture-Centered Interventions
- Empowering Co-Learning Processes lead to Partnership Synergy
- Community Members Involved in Research Activities leads to Research/Evaluation Design Reflecting Community Priorities
- Bidirectional Translation, Implementation & Dissemination

Outcomes

Intermediate System & Capacity
- Policy Environment: University & Community Changes
- Sustainable Partnerships and Projects
- Empowerment – Multi-Level
- Shared Power Relations in Research / Knowledge Democracy
- Cultural Reinforcement / Revitalization
- Growth in Individual Partner & Agency Capacities
- Research Productivity: Research Outcomes, Papers, Grant Applications & Awards

Long-Term Outcomes: Social Justice
- Community / Social Transformation: Policies & Conditions
- Improved Health / Health Equity

Characterization Of Antibodies Derived from Peanut-Specific Igg Memory B Cells in Pediatric Peanut Allergy

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Introduction: Studies in murine models demonstrated a role of memory IgG1 B cells as precursors for high affinity IgE producing plasma cells, and evidence from a number of human studies is consistent with a similar differentiation model for human allergen-specific IgE plasma cells. Due to this relationship, it is likely that peanut allergic subjects harbor peanut specific IgG1 cells that recognize Ara h 2, the dominant peanut allergen, and that may display cross reactivity to other peanut allergens such as Ara h 1 and Ara h 3. Here we studied the binding patterns of recombinant monoclonal antibodies derived from Ara h 2-binding B cells from peanut allergic children.

Hypothesis: We hypothesized that peanut allergic subjects harbor peanut specific IgG1 memory B cells that recognize Ara h 2 with high affinity and that cross react with other peanut allergens.

Methods: B cells from peanut allergy patients were sorted using fluorescent Ara h 2 multimers, and their B cell receptors (BCRs) were sequenced. Ultimately, 15 unique sequences derived mostly from IgG1 memory B cells, were expressed as recombinant monoclonal antibodies (mAbs). Binding patterns of mAbs to peanut extract and to Ara h 1/2/3 were determined by ELISA. Biolayer interferometry, performed on a ForteBio Octet RED96 system, was used to determine mAbs affinities for Ara h 2 and Ara h 3.

Results: Of the 15 IgG1 mAbs tested for binding affinity against Ara h 1/2/3 and peanut extract, 8 were considered to be “high binders” based on comparison to a positive control antibody. Of the 8 high binders, 3 showed high affinity binding to Ara h 2 based on a benchmark dissociation constant (Kd) of 10-09 (4C8G1=3.42x10-11; P1BC6=1.13x10-09; P1DC5=9.09x10-11). Several of those high binders also displayed moderate to high affinity for Ara h3 (P1BC6=1.23x10-07; P4EC10=5.86x10-09; P1BC5=5.26x10-09; P1EC5=1.55x10-08; P1CC6=2.76x10-08).

Conclusion: Through the expression of recombinant monoclonal antibodies derived from IgG1 memory B cells, we demonstrated that peanut allergic children have IgG1 cells that recognize peanut allergens with high affinity. These IgG1 cells recognize Ara h 2 with high affinity and Ara h 3 with moderate to high affinity.

Importance of Coding for BMI and Associated Counseling During Well Visits in an Academic Pediatric Primary Care Setting

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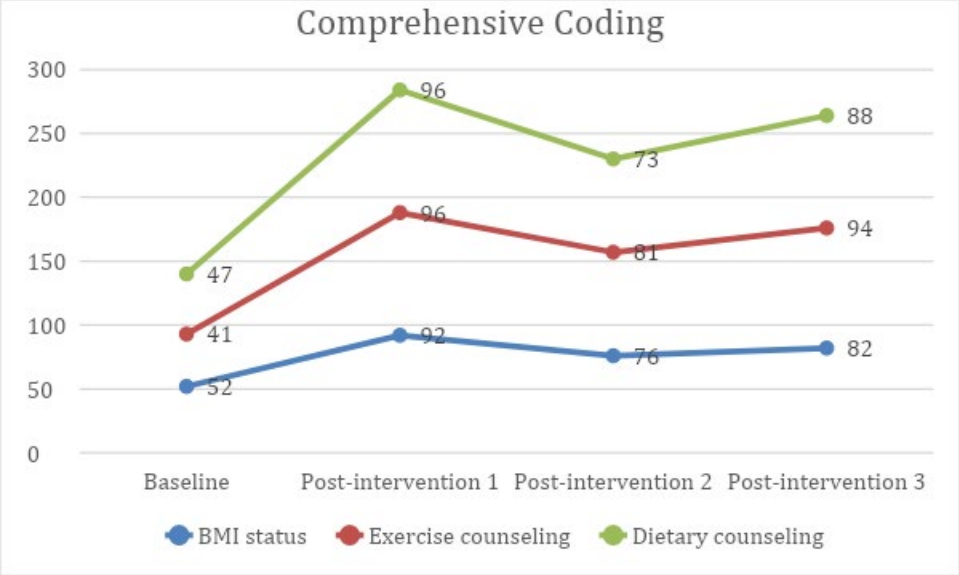
Introduction: Comprehensive coding that incorporates BMI status draws attention to the patient's medical problem and can trigger appropriate workup and treatment. Documenting dietary and exercise counseling is important in recognizing the work that providers do and may improve health system revenue capture.

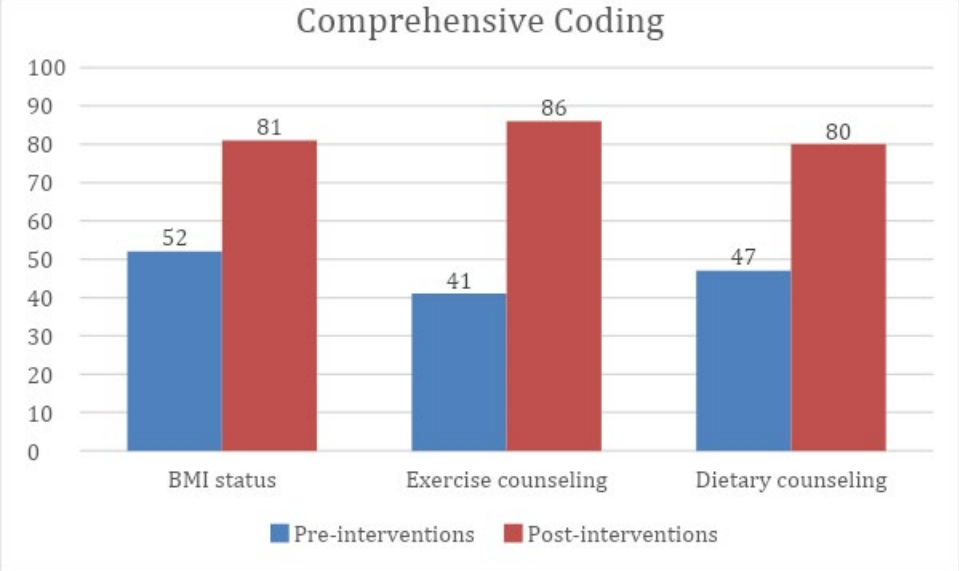
Aims/Objectives: Primary aim: To increase the frequency of correct coding of BMI status by 50% from baseline. Secondary aim: To increase the documentation of counseling provided to patients for nutrition and exercise by 50% from baseline.

Methods: We conducted a quality improvement project using multiple PDSA cycles. We randomly reviewed charts pre (March-June 2021) and post (October 2021- February 2022) intervention to capture data for correct coding of BMI categories, documentation of nutrition and exercising counseling for patients 2-12 years old at well child visits. We performed 3 PDSA cycles consisting of the following:1. Education and demonstration of comprehensive coding.2. Introduction of EMR Smart Sets with a check list for well visits.3. Email reminders for reinforcement.

Results: At baseline 52% (34/64) had BMI coding, 41% (27/64) exercise counseling and 47% (31/64) nutrition counseling. After the three interventions, coding for BMI improved to 81% (104/129), exercise counseling 80% (103/129) and nutrition counseling 86% (111/129). There was a 50% increase in coding from baseline after the above interventions.

Conclusion: Verbal reminders, e-mails as well as EMR tools such as Smart Sets increased the frequency of coding for BMI and associated counseling. Our work is applicable across healthcare because optimizing coding provides benefits including optimizing patient care, record keeping, and revenue collection.


Comprehensive Coding
300
250
200
150
100
50
0
96
88
73
96
94
81
47
41
92
82
76
52
Baseline
Post-intervention 1
Post-intervention 2
Post-intervention 3
BMI status
Exercise counseling
Dietary counseling


Comprehensive Coding
100
90
80
70
60
50
40
30
20
10
0
81
86
80
52
41
47
BMI status
Exercise counseling
Dietary counseling
Pre-interventions
Post-interventions

Establishing the Need and Priority Areas for a Pediatric Environmental Asthma Program

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Introduction: Environmental exposures and unmet social needs impact asthma outcomes, though few pediatric hospitals have programs addressing these needs. This pilot program identified the prevalence of environmental and social barriers to care for children with poorly controlled asthma.

Hypothesis: Partnering with families of children with poorly-controlled asthma will allow us to determine priority areas for a comprehensive Environmental Asthma Program (EAP).

Methods: Children aged 2-21 y.o. with poorly-controlled asthma were referred to our 12-month program through inpatient or ambulatory clinics (Figure 1). Inpatient visits or intake calls with families assessed environmental concerns and barriers to asthma management. Patients were scheduled for clinical visits within a month of referral. Descriptive statistics were performed for enrollment and first visit.

Results: From March 2021-February 2022, 56 patients were referred to our program and 37 (66%) were successfully enrolled; of those, 92% are publicly insured and 62% live in public housing (Table 1). 94% reported ≥1 common asthma trigger (mold and/or pests), and 68% reported tobacco smoke incursions from neighbors (Table 2). The most common barriers to asthma management were housing issues, lack of access to/appropriate use of controller medications and missed appointments. Eighteen families (49%) were referred to a community partner for additional services; twenty (57%) completed their first clinical EAP visit.

Conclusions: Our pilot identified priority areas for a comprehensive EAP, including common environmental asthma triggers and unmet social needs that can be mitigated by patient-tailored education, resources, and referrals to community partners. Next steps include further refinement of EAP protocol and evaluation of asthma outcomes over time.

Table 1: Characteristics of children enrolled in the initial phase of the Mount Sinai Pediatric Environmental Asthma Program from March 2021 – February 2022 (N=37)

	n (%)*
Female Gender	15 (47%)
Age, mean (SD), y	7.1 (4.7)
Age at asthma diagnosis, mean (SD), y	2.7 (2.2)
Hispanic/Latino Ethnicity	17 (61%)
Race	

Black	16 (60%)
White	2 (7%)
More than one race	1 (4%)
Other	3 (11%)
Unknown/Not reported	5 (18%)
Public health insurance	33 (92%)
Asthma medication usage	
Rescue inhaler (used when child has symptoms)	27 (73%)
Controller medication (daily)	18 (49%)
Spacer used with inhalers	22 (59%)
Biologic for asthma or allergies	0 (0%)
Allergy covers used for child's pillow and mattress	10 (39%)
Child receives care from asthma specialist	10 (39%)
Referred to community partners	18 (49%)
Referral to community partners complete	12 (67%)
Completed first clinical visit	20 (54%)
Of those who completed first clinical visit (n=20)	**Median (range)**
Asthma-related hospital visits in last 12 months	1 (0-2)
Asthma-related ER/urgent care visits in last 12 months	1 (0-3)
Lifetime asthma-related hospitalizations	1 (0-20)
Lifetime asthma-related ICU admissions	0.5 (0-11)
# missed asthma controller doses per week	5 (0-14)

** Demographic variables collected at intake, such as race, were optional. Not all variables will add up to*

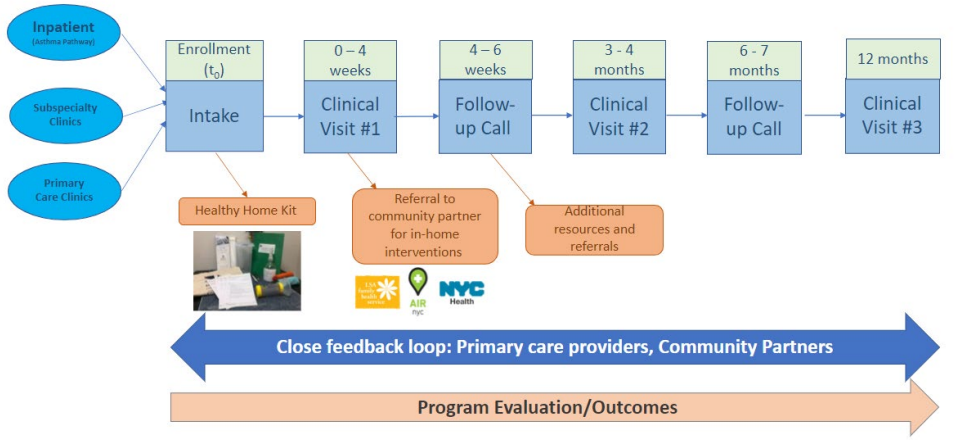
N = 37 (100%).

Table 2: Housing and Environmental Asthma Triggers in patients enrolled in initial phase of the Mount Sinai Pediatric Environmental Asthma Program from March 2021 – February 2022 (N=37).

	n, (%)
Building type	
Apartment	29 (97%)
One-unit building	1 (3%)
Home ownership	
Public housing	18 (62%)
Private rental	9 (33%)
Home owner	2 (7%)
Common asthma exposures	
Roaches	20 (65%)
Mold	21 (68%)
Water leaks	13 (42%)
Musty, damp odor	11 (35%)

Mice/Rats	10 (32%)
Holes or cracks where pests can enter	19 (61%)
None of the above	2 (6%)
Exterminator (pesticides) usage in last 12 months	
Yes	15 (60%)
No/not sure	10 (40%)
Tobacco-related exposures	
Household member smokes cigarettes and/or vapes	3 (10%)
Household smells tobacco drift from neighbor	21 (68%)
Irritants used in the home	
Air fresheners (plug-in/aerosol sprays)	20 (83%)
Perfumes	20 (83%)
Candles/incense	16 (67%)
Toilet bowl deodorizers/cakes	5 (21%)
Moth balls/flakes	4 (17%)
Bleach cleaning products	22 (92%)

Figure 1. Pediatric Environmental Asthma Program



Investigating The Change in Dietary and Oral Hygiene Habits During the Pandemic and its Relationship to Caries Incidence

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Institute Affiliation: Institute for Family Health (IFH)

Introduction: Due to the COVID-19 pandemic, time spent home increased for many children and this may change home oral hygiene practice and snacking frequency. This study aimed to examine if tooth brushing and snacking frequency during the pandemic is associated with dental caries.

Hypothesis: We hypothesize children with more frequent tooth brushing and children with less frequent sugar-containing snacking have a significantly lower incidence of new caries when compared to children with less frequent tooth brushing and children with more frequent snacking during the pandemic.

Methods: 67 pairs of children (age 6 to 12) and their parents were included in this study. All children had two periodic exams: prior to 3/1/2020 and after 10/1/2021. A parent based questionnaire was administered on their child' daily tooth brushing (1 vs 2 or more) and snacking frequency (1-3 vs more than 3 times) before and during the pandemic. All participants were examined clinically and for any changes in new caries or change in the size of existing caries. Chi-square test was used to identify associations.

Results: Children who had 1-3 snacks a day had a significantly lower caries incidence compared with children who had snacks more than 3 times a day ($chi2=17.9$; $p<0.0005$). Number of months between two exams and daily tooth brushing frequency was not associated with changes in caries incidence.

Conclusions: Children who reported frequent consumption of sugar-containing snacks are at a higher risk of developing caries. More research is needed to assess association between brushing frequency and caries incidence.

Human-Microbial-lectins Influence Monocyte Differentiation

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Introduction: The microbiome has been shown to have a potential role in the pathogenesis of many human diseases including inflammatory bowel disease (IBD). The mechanisms through which human microbiota affect disease pathogenesis are largely unknown. We believe bacterial lectins may be critical regulators of host-microbe interactions important to disease pathogenesis. Lectins are non-enzymatic glycan binding proteins that mediate cell interactions. In previous studies we demonstrated that genes predicted to encode for lectins are highly prevalent in human microbiota though almost entirely uncharacterized. Functional studies of a highly prevalent human microbial gene predicted to encode for a lectin (i.e human-microbial-lectin) demonstrated that this lectin (Cbeg5) activates blood and intestinal myeloid cell populations, especially CD14+ monocytes. The *in vivo* expression of Cbeg5 in mouse models increases populations of monocyte derived macrophages in the intestinal lamina propria. CD14+ monocytes differentiate into monocyte-derived M1 and M2 macrophages and monocyte-derived dendritic cells suggesting in these preliminary studies that Cbeg5 may affect CD14+ monocyte differentiation.

Hypothesis: Cbeg5 influences CD14+ monocyte differentiation into monocyte derived macrophages.

Methods: We exposed human peripheral blood mononuclear cells (PBMCs) and isolated CD14+ monocytes *in vitro* to Cbeg5, PBS and a truncated Cbeg5 protein lacking the functional carbohydrate binding domain (Fn5 - fibronectin domain of Cbeg5). Cells were then analyzed by flow cytometry at multiple time points (0 to 96 hours).

Results: We found a relative reduction in the percentage of CD14+ monocytes in PBMCs exposed to Cbeg5 and an increase in the percentage of CD14loCD206+ cells, markers of monocyte-derived macrophages. In CD14 isolated cell populations we did not observe a similar effect of Cbeg5 on CD14+ monocyte number or in the percentage of CD14 derived cell populations.

Conclusions: Bacterial lectins may play a role in key host-microbe interactions related to the maintenance of intestinal myeloid cell populations. Cbeg5 alone may be sufficient to induce macrophage *in vitro,* though it is unclear if this is a result of a direct effect on CD14+ monocytes or mediated through other cell types present in PBMC especially dendritic cells or other monocyte cell populations that were previously demonstrated to be activated in the presence of Cbeg5.

Housing Conditions and Access to Care for Children with Asthma During COVID-19 Pandemic in New York City

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Introduction: Coronavirus disease 2019 (COVID-19) pandemic disproportionately affects families of low socioeconomic status. Asthma is particularly vulnerable to changes associated with the pandemic due to its well-established environmental triggers, particularly indoor allergens.

Hypothesis: We hypothesized that having public versus private insurance would correlate with differences in access to healthcare for children with asthma during the pandemic and aimed to understand indoor exposures during shelter-in-place orders.

Methods: A community survey was conducted in families with children who have asthma in New York City. The survey collected information on demographics, housing conditions, access to COVID-19 information, and barriers to asthma care for patients aged 5-20 years between March 1st and August 31st, 2020.

Results: A total of 51 families participated in the survey (25 with public insurance). Families with public insurance were more likely to report environmental asthma triggers inside the home, specifically cockroach and mold (p-value <0.01 and p-value 0.026, respectively). Families with private insurance were more likely to leave NYC and transition to remote work (p-value <0.001 for both). Families with public insurance tended to report more barriers accessing medical care, but these differences did not reach statistical significance.

Conclusions: Families with public insurance were in environments less conducive to social distancing and were more likely to have asthma triggers in their homes. Our findings highlight the significant disparities in social and environmental determinants of health between populations based on socioeconomic status during the pandemic.

Improving Transitions of Care in a Pediatric Oncology Population

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Introduction: Increased survival rates of patients treated for pediatric cancers have led to greater numbers of patients surviving into adulthood, this population faces unique health challenges. Long-term survivorship in pediatric oncology posttreatment focuses on medical surveillance for late effects from the disease or treatment, detection of recurrent or secondary cancers, and the gradual return to care by adult providers.

Hypothesis: There is a need to equip pediatric cancer survivors with the tools to attain proper follow up healthcare as they transition from pediatric to adult care.

Methods: We plan to implement a transition program in the pediatric oncology clinic enrolling patients age 14+ who received or are receiving oncological treatment. The program was designed based on strategies from GotTransition: a federally funded national resource to improve the transition from pediatric to adult care. We plan to enroll these patients in the Passport for Care (PfC) web application to allow the patient access to their specific cancer diagnosis and treatment information and automatically links that information with Long Term Follow-Up Guidelines published by the Children's Oncology Group.

Results: We expect that we will be able to enroll 90% of eligible patients in the Kravis transition program and the PfC by December 2022.

Conclusion: By enrolling eligible patients in the transition program and PfC we will improve patient knowledge about their disease course, treatments received, and long term follow up needs, as well as empowering adolescents to navigate the adult medical system as they age out of pediatric care.

Factors Associated with Malnutrition in Children with Eosinophilic Gastrointestinal Diseases

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Introduction: Eosinophilic gastrointestinal (GI) diseases, including Eosinophilic Esophagitis (EoE) and Eosinophilic GI Disorder with esophageal involvement (EGID/E), are chronic inflammatory GI diseases. No studies to date have investigated the association between EoE and EGID/E and signs of malnutrition.

Hypothesis/Research Question: What are factors associated with malnutrition in children with EoE and EGID/E?

Methods: A retrospective chart review of children 2-20 y.o. seen at the Mount Sinai Center for Eosinophilic Disorders was conducted. Patients with ≥15/HPF in ≥1 esophageal area at diagnosis were included. Histological severity was categorized by the maximum/mean peak value for each patient. Malnutrition was assessed using anthropometric data collected ± 3 weeks from biopsy. Weight-for-age and height-for-age z-scores were calculated. Spearman's Correlation Coefficients were calculated to determine association between z-scores and histological severity.

Results: 107 subjects were identified (29.0% Female, 77.6% EoE). Median weight-for-age and height-for-age z-scores were -0.134 [IQR -1.115,0.543] and -0.389 [IQR -1.031,0.309] respectively. Median maximum and mean peak esophageal eosinophil counts were 70.0 [IQR 41.5,99.5] and 52.3 [IQR 31.0,75.2] respectively. Overall and for each diagnosis, no statistically significant association was found between z-scores and histological severity.

Conclusions: Signs of malnutrition were found in our subjects. They were not associated with esophageal histological severity or more extensive GI eosinophilic involvement. Investigation is ongoing to examine other measures of malnutrition (micronutrient deficiencies) and additional factors potentially influencing malnutrition (age at diagnosis/symptom onset, symptom duration/severity). Additional timepoints will also be studied to determine if malnutrition can be reversed with disease remission.

Mapping the Pediatric Cystic Fibrosis Airway Through Single-Cell RNA-Sequencing

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Institute Affiliation: Mount Sinai Center for RNA Biology and Medicine

Introduction: Cystic fibrosis (CF) is a multisystemic, autosomal recessive disorder with the majority of morbidity and mortality extending from lung disease. Disease-related changes in the CF airway were observed in explanted lung tissue from persons with CF undergoing lung transplant through single-cell RNA-sequencing (scRNA-seq). The development of a minimally-invasive workflow to detect such changes would not only inform the underlying pathogenesis of CF lung disease but also offer new targets for therapeutic development.

Hypothesis: We hypothesized that we could detect and characterize disease-related changes in the pediatric CF airway through the application of scRNA-seq to airway samples obtained via minimally-invasive brush biopsies during clinically-indicated flexible bronchoscopy.

Methods: Respiratory cells collected from an infant with CF and an age- and sex-matched peer at two distinct locations, trachea and distal bronchus, were profiled through scRNA-seq. Respiratory epithelial cell (REC) clusters and subclusters were identified, and their respective differentially expressed gene (DEG) profiles were analyzed.

Results: The resulting cohorts of RECs differed between the infant with CF and his peer. The infant with CF demonstrated an overall paucity of RECs with only the major cell types represented, including multiciliated and secretory cells, while his peer demonstrated the full complement of RECs, including rarer cell types like the pulmonary ionocyte. Furthermore, multiciliated and secretory cell subclusters differed in composition with DEG analysis suggestive of altered functionality in the CF airway.

Conclusions: Our workflow allows for the characterization of disease-related changes in the pediatric CF airway through minimally-invasive sampling, offering new insight into CF pathogenesis.

Variation in Periodicity and Frequency in Silver Diamine Fluoride (SDF) Application

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Introduction: This study aimed to examine the difference in SDF application periodicity and frequency among pediatric dental programs, and to examine if patient and program characteristics are associated with the SDF periodicity and frequency.

Hypothesis: I hypothesized that various pediatric dental residency programs followed different SDF periodicity and frequency protocols, and that patient and program characteristics influenced the protocols followed.

Methods: An online survey was sent to 104 pediatric dental residency program directors. The survey consisted of 16 questions regarding program site characteristics, SDF application protocol, periodicity of SDF application, and frequency of SDF application.

Results: Out of 104 pediatric dental residency program directors, 17 responded to the survey (16%). Nine programs (53%) were hospital-based, and 8 programs (47%) were academic or university-based, community health center based, and academic or university-based programs with community health center components. All programs teach SDF application to arrest caries, however 3 programs (18%) stated their pediatric dental residents did not routinely apply SDF to patients. Most of the programs (11 programs, 65%) routinely scheduled SDF re-evaluation and re-application on buccal, lingual or occlusal caries in 2-4 weeks. The results showed that there are a wide range of SDF application protocols, and that more than half of the program directors were not confident that their current protocols are adequate enough to arrest caries.

Conclusions: Because of the wide range of SDF re-application periodicity and frequency among pediatric dental residency programs, it is necessary to implement evidence-based universal clinical guidelines for SDF re-application. Future studies need to determine the optimal SDF re-application periodicity and frequency to achieve the best possible outcome, with the minimum number of patient visits and resources.

Diagnostic Yield of Echocardiogram in Asymptomatic Children with an Abnormal Electrocardiogram

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Introduction: The pediatric Appropriate Use Criteria provides guidelines for the initial outpatient evaluation of patients by an echocardiogram (TTE). Patients with an "abnormal electrocardiogram (ECG) without symptoms" have been rated as an "Appropriate" indication to perform a TTE. Although this document specified certain ECG findings where TTE was indicated, it did not identify the diagnostic yield of specific findings on ECG. This study compared the yield of specific ECG abnormalities in a group of asymptomatic children with no other indication for a TTE.

Hypothesis: We hypothesized that in otherwise asymptomatic children, some ECG abnormalities have a high yield of abnormalities on echo.

Methods: A retrospective review of outpatient pediatric cardiology clinic records from March 2018 to September 2021 was done. All patients ≤ 18 years old who were asymptomatic and had an initial outpatient evaluation where a TTE was performed for the indication of an abnormal ECG, were included. All ECGs and TTEs were reviewed by one pediatric cardiologist.

Results: The total number of patients eligible for this study was 242. Most patients (80%) were African American, 15% Hispanic, 5% other. Eighty-eight percent of the patients were between 6-18 years old. TTE abnormalities were found in 15% of patients. Table 1 demonstrates the summary of the results and the odds ratio of TTE abnormality for each ECG finding with its 95th%ile confidence interval (CI). The odds ratio of abnormality on TTE for non-specific ST/T wave abnormalities on ECG compared with other findings was the only significant finding (5.97), with left ventricular hypertrophy on TTE being the most common abnormality in those patients. Overall, atrioventricular valve abnormalities included 2 mitral valve prolapses, 2 tricuspid regurgitations, 1 mitral regurgitation, and 1 Ebstein anomaly. Abnormalities in the aortic valve and root included 4 aortic insufficiencies and 4 dilated aortic roots. Biventricular hypertrophy on ECG was the only finding that did not yield any abnormal TTE findings.

Conclusions: Echocardiographic abnormalities are frequently seen in asymptomatic patients with abnormal ECGs. Non-specific ST/T wave abnormalities on ECG account for more than 40% of those abnormal findings. Larger studies are needed to better define the yield of TTE in other ECG abnormalities.

Abrocitinib Inhibits Polyclonal and Antigen-specific T-cell Activation in Peanut Allergic Patients

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Introduction: Therapeutics are being investigated for the treatment of food allergies but there are currently limited oral medications for peanut allergy. Abrocitinib is an oral Janus kinase 1 (JAK1) selective inhibitor that has recently received FDA approval for the treatment of adults with moderate to severe atopic dermatitis. The JAK-STAT pathway modulates downstream signaling of Th2 cytokines such as IL-4, IL-5, and IL-13 which are important mediators of food allergy. This project aims to investigate the effect of Abrocitinib on T cell activation in peanut allergic patients.

Hypothesis: We hypothesized that Abrocitinib will inhibit the activation of polyclonally stimulated CD4+ T cells and antigen-specific T cells activated by purified peanut antigen.

Methods: CD4+ effector and regulatory T cells (Tregs) were identified from the peripheral blood of children with food allergy and healthy controls. Activation of CD4+ memory T cells was identified by CD154 expression after 24 hours of stimulation with CD3/CD28 T cell activation beads (polyclonal T cells) and with purified peanut antigen (antigen specific T cells). Cells were stained with an antibody cocktail and analyzed using flow cytometry. CD137 expression was measured to identify activation of Tregs.

Results: Results show suppression of T cell activation marker CD154 when stimulated by CD3/CD28 beads and peanut antigen in the presence of 10 ng of Abrocitinib. Activation of Treg populations was preserved in the presence of Abrocitinib.

Conclusions: These results demonstrate the capacity of Abrocitinib to inhibit the activation of polyclonal and antigen-specific CD4+ T cells, key mediators of the allergic response, while simultaneously preserving essential Tregs.

Financial Worry and Food Insecurity in Families at a Pediatric Clinic in East Harlem, New York City

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Introduction: To address rising food insecurity (FI) in Pediatric Associates since the COVID-19 pandemic, we connected our social determinants of health (SDH) screening program to an onsite food pantry and linked families with resources that address social needs. We aimed to characterize the baseline relationship between FI and financial worry in a prospective study.

Hypothesis: Families with greater FI will report increased financial worry.

Methods: We screened families for SDH by phone or in-person prior to pediatric visits. Those reporting FI were offered enrollment, and a food package and referral to a pantry partner. Caregivers completed a self-administered survey including FI and financial worry measures. We assessed the relationship between FI level and financial worry with descriptive statistics, ANOVA, and linear regressions.

Results: From June-December 2021, we enrolled 48 caregivers. 58% of caregivers reported unemployment and 85% of children were publicly insured. Most families had marginal (25%) or low (52%) food security. Caregivers were “quite a bit” or “extremely” worried about money running out (48%), not paying bills (48%), holiday/travel limitations (44%), not affording things (42%), and inadequate living conditions (33%). Adjusting for covariates, as FI increased, financial worry also increased ($p=0.0002$). Caregivers who did not complete high school had lower financial worry ($p=0.006$) compared to those with graduate education (control).

Conclusions: Increased financial worry was associated with greater FI, and higher caregiver education did not confer protection. Resource referral to entitlement programs addressing FI and financial worry may benefit families. SDH program impact will be evaluated over one year.

Social Determinants of Health:
Connecting Patients from Clinic to Community Resources

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Introduction: Our Pediatric Primary Care Clinic at Elmhurst Hospital regularly screens patients for social determinants of health (SDOH), and clinic providers give families in need a computer-generated list of community resources. But we had limited ability to connect families in need with these resources and no data on resource referral efficacy.

Hypothesis: Adding a patient navigator familiar with community resources to speak with patients who screen positive for SDOH needs would increase the utilization of these resources.

Methods: From October 10 to November 30, 2021, a patient navigator spoke with patients positive for SDOH, detailing the community resources available and providing a warm handoff when possible. A follow-up 2-3 months later via phone call determined self-reported use of resources for these patients. A chart review of positive SDOH screens was conducted for the 2 weeks preceding the patient navigator's arrival, and these patients were also called 2-3 months after their visit to determine resource usage rate and compare to the cohort that spoke with the patient navigator.

Results: Given only the list of resources, 20.8% (n=48) of patients with a positive SDOH screen utilized them. In comparison, 56.8% (n=37) of those positive for SDOH that spoke with a patient navigator utilized provided resources.

Conclusions: Placing a patient navigator in a clinic with many SDOH positive patients increased access of patients to a person knowledgeable in community resources and patient usage of these resources.

Frequency of Appropriate Post Laceration Repair Instructions in an Academic Pediatric Emergency Department

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Introduction: Lacerations are a common cause of ED visits with an estimated **7-9** million treated annually. Providing appropriate discharge instructions increases patient and caregiver understanding and may decrease complications and re-presentation.

Hypothesis: We aimed to increase by 10% the inclusion of appropriate discharge instructions in the EMR After Visit Summary post any type of laceration repair, assess association between appropriateness of discharge instructions and complication rate, and increase by 10% resident knowledge of laceration after care.

Methods: Baseline data was obtained by chart review assessing for appropriateness of discharge instructions. Over 3 months following baseline data collection, electronic reminders were sent to residents and similar reminders were posted in the ED workstations. The same search parameters were used for chart review after intervention. Complications were also recorded**.** Residents received a survey before intervention, then an educational handout, followed by another survey to assess knowledge.

Result: At baseline, 68.7% had correct instructions and 4.2% had complications, of which 83.3% had correct discharge instructions. After intervention, 75.6% had correct discharge instructions and 3.9% had complications, of which 83.3% had correct discharge instructions. Residents answered 60% of questions correct at baseline and 62% after intervention.

Conclusions: Continued reminders helped increase attachment of appropriate discharge instructions to patient AVS, although complication rates remained the same. The small increase in resident knowledge underscores the importance of continued education and use of standardised instructions.

Activated PI3 Kinase Syndrome in a Pediatric Patient

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Introduction: An 8-year-old female with asthma presented to our clinic for further evaluation given frequent episodes of bacterial infections in setting of low IgG, IgA, and elevated IgM. Despite receiving monthly IVIG from 3 years of age, she continued to have multiple episodes of sinusitis and pneumonia, requiring at least 1-2 admissions annually. Laboratory workup showed poor antibody response to vaccines, normal lymphocyte panel, mitogen panel, and negative genetic testing for hyper-IgM (AICDA, UNG, CD40 mutations). Numerous biopsy results including a biopsy of her cervical and retroperitoneal lymph nodes were negative for malignancy but showed lymphoid proliferation and polyclonal B cells. Her bone marrow biopsy showed trilineage hematopoiesis. On repeat genetic testing, patient was found to have a dominant activating mutation of the PI3 kinase gene. She was started on rituximab and sirolimus and continues on IVIG.

Patient Presentation: An 8-year-old female with chronic history of sinusitis, pneumonia, and watery stools presented to our clinic for further evaluation. She had an unremarkable birth history and no known family history of immunodeficiencies or consanguinity. She was noted to have microcytic anemia and IgA <6, IgG 30, and IgM 1190 on initial workup. Despite starting IVIG therapy at the age of 3, she continued to have several episodes of sinusitis and pneumonia each year (about 10 combined) and was hospitalized twice the year of presentation for sepsis and a viral upper respiratory infection. She did not produce serum antibodies to vaccines. Her lymphocyte screen and mitogen panel were normal. Given low IgG, IgA, and elevated IgM, patient was clinically diagnosed with hyper-IgM syndrome and continued monthly IVIG. A genetic panel screening for mutations associated with autosomal forms of hyper-IgM (AICDA, UNG, and CD40) were negative. On multiple encounters, patient was noted to have cervical lymphadenopathy that persisted despite antibiotics, pancytopenia, as well as hepatosplenomegaly. Biopsy of her lymph nodes and bone marrow were negative for malignancy.

Testing: Because no specific genetic mutation was originally identified, additional genetic testing for hyper-IgM was pursued and whole exome sequencing was performed.

Diagnosis: Whole exome sequencing done on a research basis showed a E1021K mutation in the p110 delta subunit of phosphoinositide 3-kinase delta (PI3Kδ) PI3 kinase, consistent with a dominant activating mutation. This diagnosis was then verified at the Associated Regional and University Pathologists (ARUP) laboratory. Bone marrow and lymph node biopsies were also pursued to rule out malignancies including lymphoma prior to treatment.

Treatment: Once malignancy was ruled out, patient was started on rituximab and sirolimus. She was continued on monthly IVIG at maximum dosing. She was also started on trimethoprim and sulfamethoxazole for PCP prophylaxis.

Patient outcomes: Patient subsequently presented with several "flares" of her lymphoproliferative disease, as characterized by fatigue, subjective fevers, cervical lymphadenopathy, hepatosplenomegaly, and thrombocytopenia. She received multiple rounds of rituximab with intermittent response and was continued on her sirolimus and IVIG. Her course was also complicated by pancreatic insufficiency, bacteremia, and CMV viremia, prolonging her hospital stay.

Lessons Learned: Hyper-IgM is an immunodeficiency characterized by defective class-switching of immunoglobulins, leading to normal/elevated IgM, and low IgA, IgG, and IgE. Patients present with frequent sinopulmonary infections and are at increased risk of PCP infections and B-cell lymphomas. Genetically, hyper-IgM has been associated with autosomal recessive mutations in AICDA, UNG, and CD40 mutations. However, more commonly, an autosomal dominant mutation in the p110 delta subunit of PI3 kinase may be noted, which more commonly occurs also with lymphoid hyperplasia, autoimmunity, increased susceptibility to lymphoma and EBV/CMV. Therapies to target lymphoproliferation include rituximab and sirolimus but newer therapies with a small molecule PI3Kδ inhibitor have been developed and will be of use these patients. However, there is more to be learned about molecular therapeutics that are specific to the gene itself.

Improving After Visit Communication in a Multidisciplinary Pediatric Neuromuscular Program

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Introduction: Multidisciplinary care team visits are an essential part of the care for children with cerebral palsy and neuromuscular disorders. After visit summaries (AVS) from all specialty providers are critical in communication to families for care coordination and shared care planning.

Hypothesis: Provider education and use of standardized templates will improve AVS completion and quality.

Methods: A multidisciplinary stakeholder team noted large variation in completion and content of AVS in our institution's pediatric multidisciplinary neuromuscular clinic. Using quality improvement methodology, the team defined best practice as completion of AVS by all providers for each patient. The previously validated Family Experiences of Care Coordination (FECC) was chosen as the measure of quality care coordination for this population of children with medical complexity. A key driver diagram was constructed (Figure 1). Plan-Do-Study-Act (PDSA) cycles included 1) creation of a smartphrase for use in the AVS to standardize information 2) review of critical elements of the AVS with providers at each clinic day. Process measures included AVS completion by all providers at a visit and selected quality indicators of the FECC (including follow-up plan and provider contact information). Data were tracked via run charts.

Results: Median of a 6-month baseline period of completed AVS (n= 29) was 38.5% (Figure 2). After the initial intervention, median increased to 81% (n=40).

Conclusion: Implementation of a template summary was associated with improved completion and quality of AVS in a multidisciplinary neuromuscular clinic. Further efforts to understand patient-centered outcomes regarding our team's communication are ongoing through FECC survey of participating families.

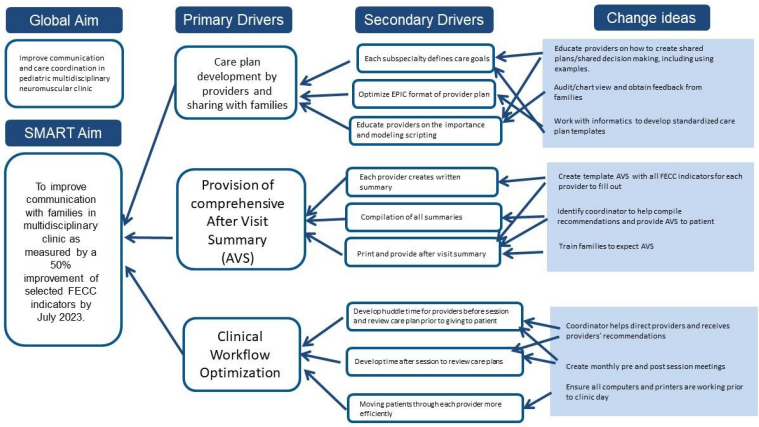

Figure 1. Key Driver Diagram.

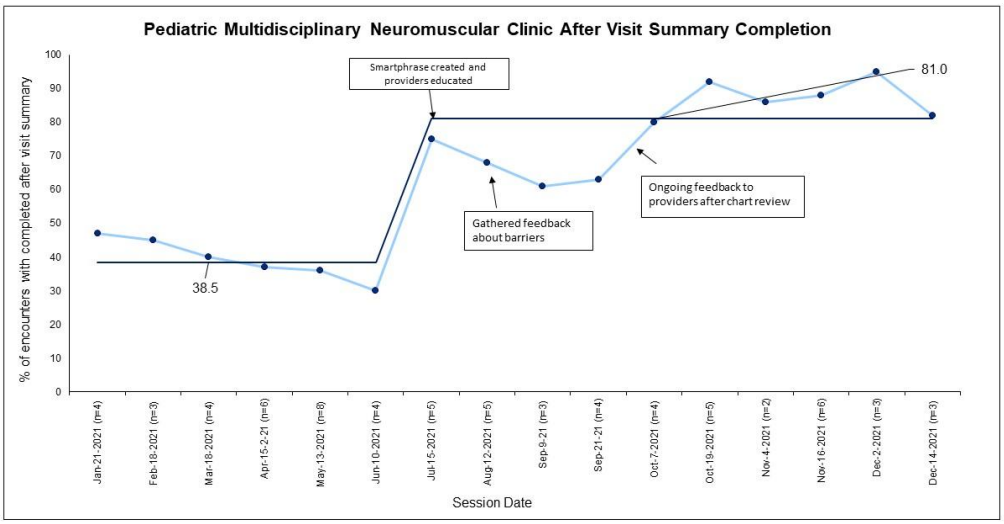

Figure 2. AVS completion rate. Medians are labeled.

Generation of iPSC-Derived Endocardial and Valvular Interstitial Cells

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Introduction: Congenital heart disease affects nearly 1% of births and includes valvular abnormalities. such as pulmonary valve stenosis, which commonly occurs in RASopathies. Critically, a differentiation strategy to generate valvular interstitial cells—the resident mesenchymal cells of the cardiac valve—is needed so that human valvular disease can be modeled *in vitro*. Recently, a feeder-dependent embryoid body differentiation strategy utilizing BMP10 has been shown to generate an endocardial population that is distinct from endothelial cells. Here, we show that iPSCs maintained without feeder cells can be differentiated as a monolayer towards mesoderm with the GSK3 inhibitor CHIR-99021 and subsequently to an endocardial lineage with BMP10 and bFGF. These endocardial cells can then undergo endothelial-to-mesenchymal transition (EndMT) to form valvular interstitial cells.

Hypothesis: iPSCs maintained under feeder-free conditions as a monolayer can be differentiated to endocardial cells with subsequent induction of CHIR-99021, followed by BMP10 and bFGF. These cells can then undergo EndMT to become VICs.

Methods: iPSCs grown to 80% confluence are treated with 8 uM of CHIR-99021 for 48 h, followed by 12 d with 10 ng/mL BMP10 and 50 ng/mL bFGF. EndMT can then be induced with 100 ng/mL BMP2, 0.3 ng/mL TGFb2, and 10 ng/mL bFGF for six days.

Results: iPSC-derived endocardial cells express high levels of endocardial markers, such as *NKX2.5*, *GATA4, GATA5*, and *NRG1*. Following EndMT, endocardial cells transition into VICs and upregulate key mesenchymal genes, such as *SOX9, CDH11*, and *COL1A1*.

Conclusions: iPSCs can be differentiated under feeder-free monolayer conditions into endocardium and VICs.

Action Myoclonus-Renal Failure Syndrome:
An Atypical Storage Disorder with a Treatment Dilemma

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Background: Action myoclonus-renal failure syndrome (AMRF) is a rare, autosomal recessive form of progressive myoclonic epilepsy associated with renal dysfunction, ranging from proteinuria to nephrotic syndrome and end stage renal disease, peripheral demyelinating polyneuropathy, and sensorineural hearing loss. *SCARB2*, the causative gene, encodes lysosomal-membrane type 2 protein (LIMP-2), a transmembrane protein responsible for trafficking of beta-glucocerebrosidase (GCase) to the lysosomes. LIMP-2 is particularly essential to GCase trafficking in neuronal cells, and in brains of LIMP-2 deficient mice, the significant reduction in GCase activity led to lipid storage, disturbed lysosomal function, and alpha-synuclein accumulation leading to neurotoxicity, although its necessity is somewhat tissue-dependent. Thus, *SCARB2* pathogenic variants result in a shortage of GCase in lysosomes, similar to the pathology underlying Gaucher disease (GD), and yet affected patients have a vastly different phenotype to GD. AMRF typically starts presenting in the late teens to early twenties, and is rapidly progressive, with most patients surviving only 7 to 15 years after symptoms first develop and succumbing to complications of aspiration pneumonia and renal failure. Typically, patients with AMRF are managed symptomatically with antiepileptics for myoclonus and seizure prevention, physical therapy, and dialysis or kidney transplantation for renal insufficiency, however these do not improve neurologic disease. We report a case of AMRF in a young adult male and discuss the theoretical basis for treatment with substrate reduction therapy classically used in GD.

Case presentation: Our patient, a male of Gambian descent, initially presented at 24 years old with imbalance, falls, and jerking movements in his arms, legs, and jaw. Over time, the intensity and frequency of these symptoms increased. He was admitted to an outside hospital for a seizure-like episode which started during sleep, and video EEG was suggestive of myoclonic epilepsy. Head CT and MRI were normal. EMG showed evidence of conduction blocks, with some motor and sensory axon loss, and he was diagnosed with demyelinating polyneuropathy. An epilepsy gene panel was obtained by his neurologist, which revealed *SCARB2* homozygous pathogenic variants (NM_005506.4(SCARB2):c.956del (p.Leu319fs)). The patient denied any family history of AMRF or other hereditary disorders. He was started on valproic acid and levetiracetam and had no further seizures.

The patient was referred to our clinic for evaluation and discussion of possible treatment for a lysosomal storage disorder. On our exam, he had tongue fasciculations, jerking movements of the face and jaw while speaking, and dysarthria. He had a resting tremor of the upper extremities and feet, and he had cerebellar signs with dysmetria and poor coordination with rapid alternating movements. His gait was stable, but he was unable to do heel-to-toe walk without losing balance. He reported difficulty chewing and progressive proximal muscle weakness. He was hypertensive and endorsed foamy-appearing urine.

He was found to have an elevated serum creatinine, microscopic hematuria, and moderate albuminuria, and we referred him to nephrology for further evaluation. A subsequent kidney biopsy showed diffuse podocytopathy without deposits in the glomeruli. A renal ultrasound showed mildly echogenic kidneys, consistent with nonspecific parenchymal disease. An audiology exam was normal. On follow-up several months later, the patient's dysarthria had worsened, and he reported decreased appetite. In anticipation of

possibly starting him on substrate reduction therapy with eliglustat, we obtained CYP2D6 genotyping and baseline GD biomarkers. He had reduced leukocyte GCase activity (within the "inconclusive range") in leukocytes, elevated plasma lyso-GL1 levels, and normal chitotriosidase activity, consistent with reports of other cases of AMRF.

Given the similar biochemical pathway underlying AMRF and GD, we explored utilizing established GD therapy for treatment of AMRF. Substrate Reduction Therapy (SRT) aims to reduce the rate of glycosphingolipid biosynthesis and theoretically does not require functional LIMP-2 to be effective. There has been one case report in which a patient was treated with miglustat, an SRT for Gaucher disease, which resulted in significant reduction in myoclonic jerks, regaining of the ability to sit and eat orally, and improvement in speech. Venglustat, an SRT with blood-brain-barrier penetration, may be able to more effectively treat or stabilize the patient's progressive neurological decline, however this medication is still in clinical trials.

Conclusions: AMRF is a very rare disorder with only about 40 individuals with the condition described in medical literature. The prognosis is poor, and, at this time, there is no treatment beyond symptom management. Our patient presented in his mid-20's with classic AMRF symptoms, including seizures, resting tremor, dysarthria, action myoclonus worsened by stress or fatigue, muscle weakness, and chronic kidney disease. His symptoms are progressing, and despite management with antiepileptics, he is becoming more limited in his activities of daily living. Clinical trials are needed to further explore if SRT is beneficial in ameliorating the neurological and/or renal manifestations of AMRF.

Limited Role of The Allergen-Specific Regulatory T-Cell Immunity in the Control of Effector Th2 Responses in Food Allergies

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Introduction: Type 2 allergen-specific T cells are essential for the induction and maintenance of food allergies, and allergen-specific regulatory T cells (Tregs) are assumed to be involved in their resolution. However, it has not been convincingly demonstrated whether allergen specific Treg responses are responsible for the generation of oral tolerance in humans.

Hypothesis: Circulating allergen-specific Tregs play a limited role in the systemic regulation of Th2-mediated food allergenic responses.

Objective: We sought to identify the relationship between allergen-specific effector T (Teff) cells and Tregs in food allergic children after exposure to allergen.

Methods: To study food allergen-specific T cell responses and to examine how T cells responded to oral exposure (as a one-time challenge) and oral immunotherapy (as treatment), we analyzed allergen-specific T cell responses in blood from allergic children by spectral flow cytometry.

Results: We found that chronic antigen exposure in the form of food allergen oral immunotherapy leads to a global Treg expansion only in those participants who developed clinical tolerance. In contrast to the early type 2 Teff response upon food allergen recognition, we did not find a food induced Treg response immediately after activation of peripheral blood mononuclear cells using *in vitro* assays based on allergen re-stimulation. However, we identified two distinct populations of food-responsive Tregs (CD137+CD154- and OX40+CD25+) that appear with delayed kinetics. We found that the late-induced Treg response was dependent on IL-2 secreted by allergen-specific effector Th2 cells. Furthermore, our analysis of TCR-b repertoire of Teff and Treg subsets showed a less diverse repertoire of Teff cells than Tregs, and lack of sharing of TCR usage between the populations. We provide evidence that the Teff-Treg circuit also operates *in vivo*. A single oral food challenge activates Teff cells, increases systemic IL-2, and upregulates activation of Tregs (determined by CD137 and OX40 expression), which limits the food-induced allergenic responses.

Conclusion: Our results demonstrate that activation of allergen-specific effector Th2 cells enables the IL-2-mediated expansion of activated Tregs that can modulate the food allergic responses.

Encouraging Big Smiles:
Improving Patients' Oral Health at Pediatric Associates

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Introduction: Dental caries are the most common chronic disease of childhood in the United States, predominately affecting children from lower socioeconomic backgrounds with less access to dental care. The AAP recommends fluoride varnish application in the primary care setting as an effective method of cavity prevention. A needs assessment was performed to identify gaps in pediatric residents' knowledge of oral health in preparation for a Quality Improvement (QI) project.

Hypothesis: An educational intervention will improve pediatric resident knowledge of oral health and comfort applying fluoride varnish.

Methods: Online surveys were developed and administered prior to and immediately following an educational intervention consisting of a didactic on causes, appearance, and prevention of dental caries and a video of fluoride application. Questions assessed pediatric residents' knowledge of oral health (13 multiple choice), comfort in performing oral health screening (Likert 1-5), and comfort applying fluoride varnish (yes or no).

Results: Pre and post intervention survey responses were 46 and 8, respectively (70 total residents). Aggregate knowledge scores increased (62% to 84%). Mean comfort score for performing oral health screenings increased (2.3 to 4). When asked to assess on comfort in applying fluoride varnish, 4.3% reported "yes" pre-intervention, and 75% reported "yes" post-intervention.

Conclusions: An educational intervention improved pediatric resident knowledge and comfort with screening for dental caries and applying fluoride varnish, although post intervention response rate was low. A QI project to implement a process to apply fluoride varnish in our pediatric practice is underway to improve the oral health of our patients.

The Cross-Cultural Translation and Adaptation of Menta Health Measures for Youth Living with HIV in Western Kenya

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Introduction: Researchers' ability to characterize the mental health challenges faced by youth living with HIV (YLHIV) in many sub-Saharan African settings is often limited by the lack of locally adapted, age-appropriate, and validated tools for measuring symptoms of common psychiatric disorders in adolescents and young adults. We sought to translate and adapt a set of mental health measures developmentally and culturally for YLHIV in Kenya.

Hypothesis: We hypothesized that mental health measures originally developed in Western settings could be culturally and developmentally adapted to achieve face validity for YLHIV in Kenya.

Methods: Commonly used measures of depression (PHQ-9), anxiety (GAD-7), and PTSD (CPSS, PCL-5 with LEC-5) were targeted for adaptation. Each underwent an iterative process of translation to Kiswahili and back translation to English by bilingual staff with continuous review by a panel of North American and Kenyan pediatricians and psychiatrists. Modifications towards cultural and developmental adaptation were made until the panel agreed the measures were ready for pilot testing.

Results: Several items from the included measures required significant modification beyond simple translation, such as the removal of idioms due to cultural irrelevance (e.g., "on edge") and the simplification of wording to improve comprehensibility for youth (e.g., references to "strong feelings"). Similar modifications to the English versions of the measures were also determined to be necessary.

Conclusions: Commonly used mental health measures may require considerable modification to achieve valid results in new cultural settings. Next steps include pilot testing of the adapted measures with Kenyan YLHIV to assess face validity.

Partial USP18 Deficiency Leads to Early Onset Childhood Inflammation

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Introduction: Type I interferonopathies are characterized by an overabundance of IFN-I, which cause a broad spectrum of clinical presentation. Ubiquitin Specific Peptidase 18 (USP18) plays an important role in regulating the IFN-I response by dampening the IFN-I signaling pathway. Autosomal recessive USP18 deficiency results in severe systemic inflammation and neurological anomalies, which is fatal in the perinatal period. In our study, we sought to understand the etiology of disease in three different patients with genetic variations in *USP18* who exhibited early onset autoinflammatory clinical features.

Hypothesis: Genetic variations in *USP18* causes hypomorphic protein function and lead to IFN-I mediated inflammation

Methods: HEK293T cells were transiently transfected with *USP18* variants, and expression of *USP18* mRNA and protein were measured using qPCR and western blot, respectively. Cells were transiently transfected and stimulated with IFN-I and levels of pSTAT1 and pSTAT2 were assessed using western blotting.

Results: *USP18* variants did not impair USP18 protein or mRNA expression. In contrast, we found that unlike WT USP18, the three distinct USP18 variants failed to prevent phosphorylation of STAT1 and STAT2 when stimulated with IFN-I.

Conclusions: Assessed genetic variations in *USP18* variants are hypomorphic in its ability to prevent type I interferon signaling and are likely causative of patient's autoinflammatory clinical features.

Psychological Stress Alters Maternal Regulatory Mechanisms To Influence Postnatal Immunity and Allergy Susceptibility

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Introduction: Maternal exposures to non-infectious stimuli like psychological stress (PNMS) have been implicated in lifelong changes in postnatal immunity and are associated with susceptibility to allergic diseases. However, PNMS impact on maternal and infant immunity and its contribution to disease outcomes is poorly understood.

Hypothesis: We hypothesized prenatal exposure to psychological stress targets maternal and fetal regulatory pathways to modulate allergic disease susceptibility.

Methods: Using the Programming of Intergenerational Stress Mechanisms (PRISM) birth cohort, we characterized immune signatures related to prenatal stress exposure and allergy outcomes. Maternal peripheral blood (n=40) was collected during the 3rd trimester with matching offspring cord blood collected at birth (n=25). Isolated plasma was analyzed for chemokine signatures, and mononuclear cells were immune profiled using spectral flow cytometry and subjected to stimulation with TLR4, TLR8, PMA/ionomycin for 6hrs. Cellular supernatant was collected and analyzed via multiplex immunoassays.

Results: Our analysis revealed mothers with the top 25% stress scores displayed higher production of Th2 and Th17 related signatures following stimulation. These signatures correspond with reduced antiviral immunity in newborns at birth. Lower antiviral response was observed in children who developed eczema.

Conclusion: Our results demonstrate that maternal prenatal stress results in significant modulation of Th2 and Th17 pathways during pregnancy. Exposure to such signals modulates antiviral immunity at birth, potentially increasing Th2 skewing and allergy susceptibility during postnatal period.

X-linked Adrenoleukodystrophy: A Case Series of Early Onset Disease

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Introduction: X-linked adrenoleukodystrophy (ALD) is caused by mutations in the ABCD1 gene encoding the adrenoleukodystrophy protein that transports very-long-chain fatty acids (VLCFAs) to peroxisomes for degradation. An early manifestation is primary adrenal insufficiency (AI). The peak incidence of AI is 3-10 years old, however there have been reports of infants as young as 4.5 months with AI. We present 2 asymptomatic boys with ALD demonstrating AI already at 6-7 months.

Hypothesis: The age of onset of the clinical manifestations of X-linked ALD such as adrenal dysfunction might be earlier than expected.

Methods: We screened for AI in children with X-linked ALD by obtaining a morning cortisol and ACTH every 6 months, followed by cosyntropin (ACTH) stimulation testing if screening ACTH >100pg/mL or cortisol <5μg/dL

Results: 2 children with X-linked ALD of ages 6 and 7 months were found to have abnormal ACTH stimulation testing with insufficient stimulated cortisol. Of note, one of the children also had neurological concerns such as persistent moro reflex and was unable to roll over at age 6 months.

Conclusions: These infants with early onset adrenal dysfunction raise the question of whether the peak incidence of adrenal insufficiency is earlier than previously thought, which supports the need for widespread newborn screening for ALD, followed by routine adrenal screening consistent with published guidelines to avoid adrenal crisis. Additionally, the early onset neurological findings in patient 2 support the need for interdisciplinary clinics with endocrinology and neurology.

An Assessment of the Relationship between BMI and Children Undergoing Surgical Procedures; A Retrospective Study

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Introduction: While multiple studies have documented that obesity increases the risk of operative complications among adults, little data exists on how obesity impacts surgical outcomes in children. Therefore, we set out to determine if obese children undergo different surgical procedures and have different post-operative outcomes than their peers.

Hypothesis: We hypothesized that obese children undergo different surgical procedures and have more post-operative complications.

Methods: A retrospective chart review was conducted of 875 patients between ages 2 and 18 who underwent surgery during 2018. Patients were stratified into 3 groups, including "obese", “overweight,” and “non-overweight” based on BMI percentile-for-age. Demographic information, medical comorbidities, and post-operative complications were collected. All categorical analyses were analyzed using chi square testing while quantitative information was evaluated using Student’s T tests and ANOVA.

Results: 82 patients were excluded due to lack of BMI data. Of the remaining 793 patients, 531 (67%) were considered “non-overweight”, 124 (15.6%) were “overweight,” and the remaining 138 (17.4%) were “obese” Obese patients underwent more tonsillectomies/adenoidectomies ($p<0.01$) and vascular access procedures ($p=0.02$) compared to their non-overweight counterparts. Additionally, obese patients were more likely to have a history of liver disease ($p<0.01$) and were more likely to experience post-operative wound dehiscence ($p<0.01$).

Conclusions: Obese children were more likely to require both tonsillectomies & adenoidectomies and vascular access procedures. Furthermore, they were more likely to have a history of liver disease as well as experience post-operative wound dehiscence. Future investigative efforts should seek to determine what mitigation measures might help close these surgical disparities.

No Single Diagnostic Test Confirms Voiding Dysfunction in the Pediatric Population

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Introduction: There currently exists no gold standard for diagnosing constipation related to pediatric voiding dysfunction. Therefore, this study compared five diagnostic tests used for evaluating constipation in children being evaluated for dysfunctional voiding.

Hypothesis: We hypothesized that the Dysfunctional Voiding Symptom Score (DVSS) would be a good predictor of evaluating constipation.

Methods: A prospective cohort study was used to evaluate dysfunctional voiding in 33 children between 2020 and 2021. A Bristol Stool Score, DVSS, Kidney Ureter Bladder X-Ray (KUB), Rome IV Criteria, and Bladder Ultrasound (US) were obtained for each patient. By using the Rome IV Criteria as our gold standard, we compared it to the other 4 tests in both bivariate and multivariate regressions. Then, the number of children who screened positive both for each diagnostic test and Rome IV criteria was evaluated.

Results: Five children were excluded from analysis. Bivariate regression revealed no significant associations in diagnostic tests with the Rome IV. Furthermore, no multivariate model had significant associations with the Rome IV. The DVSS appeared to be most aligned with Rome IV as 10 of the 12 children (83.3%) who screened positive for Rome IV also had a positive DVSS.

Conclusions: This is one of the first studies to contrast 5 diagnostic tests in evaluating constipation related to pediatric voiding dysfunction, with results suggesting that DVSS and Rome IV are most aligned in a positive screening result. Because of the need for a definitive measure of dysfunctional voiding, this study can potentially help inform future diagnostic options.

State Gun Regulations are Associated with Fewer Pediatric Firearm-Related Suicides

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Introduction: Few studies have investigated the relationship between specific gun regulations and gun ownership with the rate of firearm-related suicides across U.S. states. Therefore, this study seeks to determine if measures of state gun ownership and gun restrictions are related to the rate of firearm-related suicide in both the pediatric and overall populations.

Hypothesis: We hypothesized that higher state gun ownership and looser gun restrictions are related to increased firearm-related suicides in both the pediatric and overall population.

Methods: Thirteen measures of state gun regulations were collected, including firearm licensees, Giffords rankings, and specific firearm laws. Bivariate linear regression assessed the relationship between each variable and the rate of firearm-related suicide for all people and children across states. This was repeated using a multivariate regression controlling for poverty and mental health.

Results: In the bivariate regression, 8 of 13 gun control measures were statistically associated with fewer firearm-related suicides in the overall population vs. 5 of 13 in the pediatric population.

After controlling for poor mental health and poverty, 7 of 13 measures were *still* statistically associated with fewer firearm-related suicides in the overall population vs. 4 of 13 measures in the pediatric population. No restrictions were associated with higher rates of suicide.

Conclusions: Ultimately, this is one of the first studies linking U.S. state gun restrictions and ownership with fewer firearm-related suicides. This data suggests that lawmakers should focus on strengthening gun restrictions and limiting firearms in circulation to potentially reduce the rate of firearm-related suicide in the U.S.

Mannose Supplementation as an Antifibrotic Therapy in Liver Disease: Investigating Changes in The Intestinal Microbiome

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Introduction: Liver fibrosis results from chronic liver injury, regardless of etiology, and its progression dictates the need for liver transplantation. A critical gap remains as there are no currently approved antifibrotic therapies. We and others have uncovered that supplementation with oral mannose, a simple sugar, can mitigate liver fibrosis in rodent models, but its mechanism is unknown. The gut microbiome has been implicated in chronic liver disease and may be altered with mannose supplementation.

Hypothesis: We hypothesize that mannose will alter the gut microbiome, inducing changes that will reduce the severity of liver fibrosis.

Methods: Mice with carbon tetrachloride (CCl4)-induced liver fibrosis (IP, 3x/week x 4 weeks) or controls (corn-oil (CO) injected) were supplied mannose supplements in their drinking water (15% or 20% w/v) for the duration of the experiment. Cecal microbial composition was identified by 16S metagenomic sequencing of purified DNA.

Results: Mice with liver fibrosis had decreased alpha diversity in cecal content compared to non-fibrotic controls. When mice with fibrosis were treated with mannose, the alpha diversity remained decreased, but bacterial populations changed in prevalence (increased phylum *proteobacteria*, class *bacilli*, order *enterobacteriales*), and *bacteroides*:*firmicutes* ratio increased.

Conclusion: Mannose supplementation ameliorates liver fibrosis and alters the microbiome in mice, but does not revert the microbiome to the pre-fibrotic state. Mannose supplementation did not affect microbiome diversity, but there were changes in bacterial prevalence across taxa and increased bacteroides:firmicutes ratio. The implications of these microbiome changes in liver fibrosis are still under investigation.

Safe Sleep in the Neonatal Intensive Care Unit: A Quality Improvement Project

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Introduction: The American Academy of Pediatrics Task Force on Sudden Infant Death Syndrome (SIDS) policy statement recommends that health care professionals in neonatal intensive care units (NICUs) and nurseries should model safe sleep practices for all eligible babies. Studies show modeling safe sleep behavior in the NICU increases the likelihood of similar practices upon discharge.

Hypothesis: Through caregiver education, environmental optimization and signage, we hypothesize we can increase the percentage of safe-sleeping eligible infants in the Mount Sinai Hospital NICU on any given day.

Methods: This is a quality improvement (QI) project. In the first phase beginning 7/1/2021, we audited the NICU on a weekly basis to establish baseline safe sleep rates for eligible patients who were ≥32 weeks corrected, ≥1500 grams, and on room air/LFNC. In the next phase beginning 10/28/21, we employed our interventions which included increasing staff awareness of the safe sleep policy, incorporation of safe sleep practice into the nursing discharge process map, and temperature regulation of the NICU. We continued weekly audits of safe sleep eligible infants in the NICU.

Results: Monthly run chart analysis showed an increase from 6% safe sleep before implementation of our interventions to 24% by January 2022. Of note, there has been a sustained improvement since November 2021 with > 20% of eligible patients in safe sleep.

Conclusion: Through targeted interventions, safe sleep practice in the NICU is improving. With continued efforts, we hope to have the majority of eligible babies sleeping safely at any time. This QI project is ongoing.

Variations in TBK1 Lead to Autoinflammation in Humans

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Introduction: Primary immunodeficiencies (PIDs) are genetic disorders present at birth which lead to autoinflammation or viral susceptibility. One cause of PIDs are mutations in TANK binding kinase 1 (TBK1), a regulator of innate immune pathways and TNF-mediated-cell death. The necessary functions of *TBK1* have been elucidated in humans with loss-of-function (LoF) mutations. Heterozygous LoF mutations lead to susceptibility to Herpes simplex encephalitis (HSE) due to decreased production of type I interferon (IFN-I). Conversely, homozygous LoF mutations lead to severe autoinflammation by increasing cell death. We have identified two heterozygous *TBK1* variations, E147K and H213Q, in three unrelated individuals who clinically present with a range of autoinflammation.

Hypothesis: We hypothesized that the heterozygous *TBK1* variations result in a gain-of-function activity which increases IFN-I signaling and is dominant-negative in controlling TNF-mediated-cell death.

Methods: We cloned the variants and tested their ability to activate the IFN-I signaling cascade as compared to WT TBK1.

Results: TBK1 variations increase the phosphorylation of innate immune proteins indicative of increased IFN-I signaling.

Conclusions: We have identified heterozygous variations in *TBK1* that increase IFN-I signaling and lead to autoinflammation in humans. This work highlights the important role of TBK1 as a regulator of innate immunity and its ability to cause illness in humans.

Growth Hormone Hypersensitivity Reaction in an 8-Year-Old Child: A Case Report

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Introduction: Hypersensitivity reactions to recombinant human growth hormone (rhGH) are uncommon and rarely reported. Reported reactions in the literature include local erythema, generalized pruritus, and urticaria, with both IgE-mediated (Type I) and type III immune complex reactions being implicated. Reactions are thought to be caused by preservatives, buffers, or the GH molecule itself.

Case Description: An 8-year-old girl with short stature was referred by endocrinology for growth hormone hypersensitivity. Patient began to develop urticaria 12 days after initiating treatment with somatropin, which continued at injection sites with subsequent doses. Due to reported reaction, treatment was discontinued for a month during which time patient was well without any reports of urticaria. Patient was then switched to preservative-free formulation of somatropin. Within 14 days of treatment, patient again began to develop urticaria on arms, legs, and back, sometimes separate from the injection site. Urticaria always resolved on their own without other symptoms. Patient initially underwent skin testing using the preservative-free somatropin. Skin prick testing to undiluted and 1:100 dilution was negative. Intradermal testing was negative for 1:10,000 dilution but positive with wheal and flare response for the 1:1000 dilution. Patient completed additional skin testing at a follow-up visit using both the preservative-containing and preservative-free somatropin, which was negative for all concentrations

Conclusion: Clinical history is concerning for IgE-mediated growth hormone allergy. Initial testing revealed positive intradermal testing to diluted preservative-free somatropin, however repeat testing was negative. Further discussion with drug allergy experts is necessary to determine the role of additional testing or desensitization.

Socioeconomic Impact on Health-Related Quality of Life in Children with Juvenile Idiopathic Arthritis

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Introduction: Children with Juvenile Idiopathic Arthritis (JIA) have worse Health-Related Quality of Life (HRQoL) than the average population, and disparities in socioeconomic factors have been shown to impact patient's chronic health conditions [1,2]. In this study, we aimed to evaluate the association between socioeconomic factors and HRQoL in children with JIA.

Hypothesis: Children with low socioeconomic status will have worse HRQoL.

Methods: Study subjects with a diagnosis of JIA were recruited between 10/2019 and 01/2022 [3]. Insurance type and average household income by zip code (AHI) were collected as determinants of socioeconomic status, and Juvenile Arthritis Disease Activity Score (JADAS), the validated measure of disease activity in JIA, was calculated [4]. Children or parent proxies completed pediatric PROMIS® questionnaires, a validated measure of HRQoL[5]. Descriptive statistics were calculated, and raw scores for PROMIS measures were converted to T-scores using standard software. Mann-Whitney U test and Spearman's correlations were performed as appropriate.

Results: 16 children were enrolled (62.5% female, 37.5% male), and 3 patients declined participation. 69% were on Medicaid, while the remaining 31% had private insurance. Insurance type was correlated with JADAS ($p=0.006$), while AHI was not ($p>0.05$). JADAS did not correlate with PROMIS measures ($p>0.05$); however, insurance type and AHI both correlated strongly with all PROMIS measures ($p<0.0001$).

Conclusions: This data suggests that socioeconomic factors have a strong association with HRQoL, as measured by PROMIS. This study is limited by small sample size; next steps include validation of findings in a larger sample and multivariable analysis for further characterization.

Novel Form of Human ISG15 Deficiency Causes Severe Lung Disease

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Introduction: Human ISG15 deficiency belongs to a group of monogenic disorders termed type I Interferonopathies. The clinical features of type I Interferonopathies include intracranial calcifications, systemic increase in type I interferon (IFN) and its signature, leading to sterile inflammations, and skin and neurological features. ISG15 is a type I IFN-inducible protein that interacts with and stabilizes USP18, a master negative regulator of IFN-I pathway, and it, therefore, acts in a negative feedback loop. Additionally, ISG15 can be conjugated to various proteins via ISGylation, the function of which is still being actively researched. Here, we describe the case of a 13-year-old female who presented with interstitial lung disease, in addition to classic features of elevated IFN-I signature and intracranial calcifications.

Hypothesis: Novel form of ISG15 leads to uncontrolled IFN-I signaling.

Methods: We used whole exome sequencing to identify the mutation on *ISG15*. Through molecular techniques, we cloned and transfected HEK293T cells to assess the expression and function of the mutated ISG15.

Results: We identified a cytosine duplication at position 463 of *ISG15*. This frameshift mutation generates a translatable mRNA transcript without a stop codon. Furthermore, it can stabilize USP18, but it cannot partake in ISGylation. Currently, we are using a lung organoid model to characterize the effect of this mutation on interstitial lung disease manifestation.

Conclusion: This novel form of ISG15 deficiency leads to typical and expanded clinical presentation inclusive of lung disease.

Survey on Food Allergy Management Practices

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Introduction: The current standard of care for most food-allergic patients is to recommend strict avoidance of all forms of the allergenic food. However, most food-allergic patients are not reactive to very low doses and many never experience severe reactions. For patients with a high threshold of reactivity (low dose tolerant, high dose mildly reactive), there may be management options other than strict avoidance that are safe and may improve quality of life. The purpose of this study is to survey practicing allergists to assess their approach to food-allergic patients who demonstrate tolerance to some amounts of an allergen but react to larger amounts.

Hypothesis: Our null hypothesis is that the majority of physicians will advise strict avoidance.

Methods: We developed a survey presenting allergists with questions on these topics, case scenarios and demographic questions, which will be disseminated to allergists through the American Academy of Allergy Asthma and Immunology.

Results: The survey is intended for distribution in late March or early April 2022, with results possibly available for analysis shortly thereafter.

Conclusions: Management practices for food-allergic patients who are high-threshold reactors may vary amongst allergists. Further research is necessary to understand current approaches and develop evidence-based guidelines to provide individualized recommendations for this subgroup of patients.

Non-Alcoholic Fatty Liver Disease:
Understanding the Impact of Low Resource Settings

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Introduction: The prevalence of pediatric non-alcoholic fatty liver disease (NAFLD) has doubled in the last 10 years. Fibrosis associated with NALFD can lead to end stage liver disease, cancer risk, and liver transplantation. The Community Deprivation Index (CDI) uses US Census data to calculate the degree of neighborhood disparity ranging from 0-1, with 1 indicating the most severe degree of resource deprivation.

Hypothesis: We hypothesize that prevalence of NAFLD will be higher in low resource settings as measured by CDI.

Methods: Retrospective review of Mount Sinai patients ages 1-21 with diagnosis of NAFLD from 4/2009-10/2020. NAFLD defined as ALT greater than age and gender appropriate norms on 2 occasions separated by at least 60 days. Descriptive statistics were used to analyze patient demographic and anthropometric data. CDI was calculated for the census tract correlating to each patient and compared to national and New York City (NYC) population data.

Results: 1147 visits comprising 157 unique patients. Age at diagnosis ranged from 2-18 years with mean age of 10.5 years. Body Mass Index ranged from 18.5 to 55.7 with mean of 28.6. NAFLD cohort mean CDI was significantly higher than national or NYC CDI at 0.51, 0.35, and 0.31, respectively. Median income and percentage of adults with a high school degree were decreased in NAFLD cohort compared to NYC.

Conclusions: Patients with NAFLD are more likely to reside in low resource settings than the general population. More work needs to be done to establish a causal link.

Feeding Dysfunction in Young Children with Eosinophilic Esophagitis

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Introduction: Eosinophilic esophagitis (EoE) is a chronic esophageal inflammatory disease that can cause dysphagia and food refusal. In young children, these symptoms may interfere with feeding skill development, and subsequently lead to chronic maladaptive eating behaviors. Our aim was to determine the prevalence of feeding dysfunction in young children with EoE.

Hypothesis: We hypothesized that feeding dysfunction is prevalent in young children with EoE.

Methods: Subjects 9 months-7 years old with confirmed EoE at the Mount Sinai Center for Eosinophilic Disorders were included. Exclusion criteria were history of feeding therapy, neurodevelopmental delays and non-EoE Gastrointestinal Eosinophilic Disorders. To assess feeding dysfunction, the validated Behavioral Pediatrics Feeding Assessment Scale (BPFAS) was completed by the patient's caregiver. Anthropometric data within 60 days of the survey date were recorded.

Results: 23 subjects (82.6% male, 82.6% White, 78.3% non-Hispanic) were identified, mean age 5.0±2.1 years. Seven participants (30.4%) had BPFAS frequency score >84 demonstrating feeding dysfunction. Eight participants (34.8%) had a parental problem score >9 demonstrating the caregiver identified a problem with the child's feeding behaviors. Mean[range] weight-for-age and height-for-age Z-scores for all patients were -0.6[-3.1,1.1] and -0.9[-2.1,0.9], respectively. No significant differences in Z-scores were found when comparing patients with high vs. normal BPFAS scores (p=0.535).

Conclusion: Feeding dysfunction is prevalent in young children with EoE regardless of malnutrition status. Screening is important for better clinical outcomes. Investigation is ongoing to identify potential risk factors for feeding dysfunction in these children, and to evaluate if it can be reversed with disease remission.

Tackling Food Insecurity with a Clinic-Based Food Pantry and Referrals to Community-Based Food Pantry in New York City

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Introduction: To address food insecurity (FI) among families attending Pediatric Associates, we launched an onsite food pantry providing food packages and referrals to our community partner, New York Common Pantry (NYCP), for ongoing food support and enrollment into benefit programs. Assessing families' feedback is critical to improve referral completion and services.

Hypothesis: Follow-up calls and analysis of family feedback will improve referral completion and quantify changes in food needs.

Methods: Families accessing the onsite pantry were contacted within 2 weeks to follow-up on enrollment. The NYCP network manager received contact information of caregivers interested in a referral and provided referral status updates. Families were contacted one month following NYCP enrollment to assess their experience. Descriptive statistics were calculated.

Results: From April-July 2021, 132 families received a food package from the onsite pantry and were offered a NYCP referral; 34% enrolled at NYCP and 38% declined enrollment. At 1-month follow up, 64% reported improved food needs and 36% reported unchanged food needs. 96% had increased confidence meeting food needs and 91% will continue NYCP services. To increase NYCP access, 44% of clients suggested a food delivery service and 19% suggested flexible hours for food package pickup. Of the 76 caregivers initially declining enrollment, 20% accepted a referral after receiving NYCP information, suggesting that follow-up calls were beneficial for increasing enrollment rates.

Conclusions: An onsite food pantry providing food assistance with a CBO referral for ongoing food support effectively addressed FI. Follow-up calls and close communication with the CBO may enhance outcomes.

Prescriptions For Prevention: Connecting Families to Local Resources & Interventions That Address Environmental Health Concerns

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Introduction: Given inadequate environmental health (EH) training in health professional training, practitioners often feel unprepared to address common environmental concerns such as mold, pests, and radon.

Hypothesis: Prescriptions for Prevention (Rxs for Prevention) address pediatric environmental health disparities by promoting EH screening and resources into routine pediatric care, providing evidence-based messaging and referrals to community resources.

Methods: An interdisciplinary team with members from five PEHSUs and NIEHS P30 Center Community Engagement Cores created the initial Rxs by curating evidence-based action steps and community resources. The program is primarily run by the New York State Children's Environmental Health Centers, with all seven Children's Environmental Health Centers across New York state integrating Rx for Prevention into clinical practice

Results: Currently, there are over 30 prescription topics available in English and Spanish. The Rxs have been adapted to serve diverse communities across New York State, Puerto Rico, the US Virgin Islands, and beyond. A successful application of the Rxs has been our EH E-screening program. This program helps health professionals and community partners incorporate EH screening into routine child healthcare and asthma care- using a screen/counsel/refer model - to connect at-risk families to community-based prevention resources. Efforts are underway to evaluate various aspects of the program, including their implementation into clinical practice.

Conclusions: Rxs for Prevention highlights the benefits of working with an interdisciplinary team of healthcare workers, community partners, governmental partners, and other stakeholders to help close knowledge gaps, integrate EH into Pediatric practice, and address EH disparities.

Assessment of Central Precocious Puberty Care for Racial and Socioeconomic Disparities

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Introduction: Health disparities continue to be a major problem. Central precocious puberty (CPP) in females is characterized by puberty onset before 8 years old. Timing of pubertal development varies by race and cultural perception of puberty may differ. Gonadotropin releasing hormone agonists (GnRHa) can aid in delaying pubertal symptoms. The objective was to determine the relationship between CPP treatment and insurance type, and CPP treatment and race.

Hypothesis: There is no association between CPP treatment and insurance type or race.

Methods: We performed a retrospective chart review of 66 females with CPP treated with GnRHa and collected data on patients' race, insurance type, age at first appointment, and treatment length.

Results: Mean age was 7.8±1.9 years at first appointment and treatment length was 2.2±1.4 years. Age at first appointment was significantly earlier for those with Medicaid (6.8±2.1 years) compared to those with commercial insurance (8.2±1.8 years, $P<0.05$). There was a significant difference between race and age at first appointment, with non-White patients being seen earlier than White patients (7.1±1.9 years versus 8.2±1.9 years, $P<0.05$). There was no difference between insurance type and GnRHa treatment length ($P=0.60$).

Conclusions: A lack of difference in such factors demonstrates a commitment to equity of care for all patients regardless of race or insurance coverage. The earlier presentation of non-White patients is consistent with normal racial differences in age of puberty onset. Assessment of treatment practices should occur on a continual basis as it plays an integral part in ensuring quality patient care.

(See next page for figures)

Figure 1: Length of treatment and age at first appointment, stratified by insurance type.

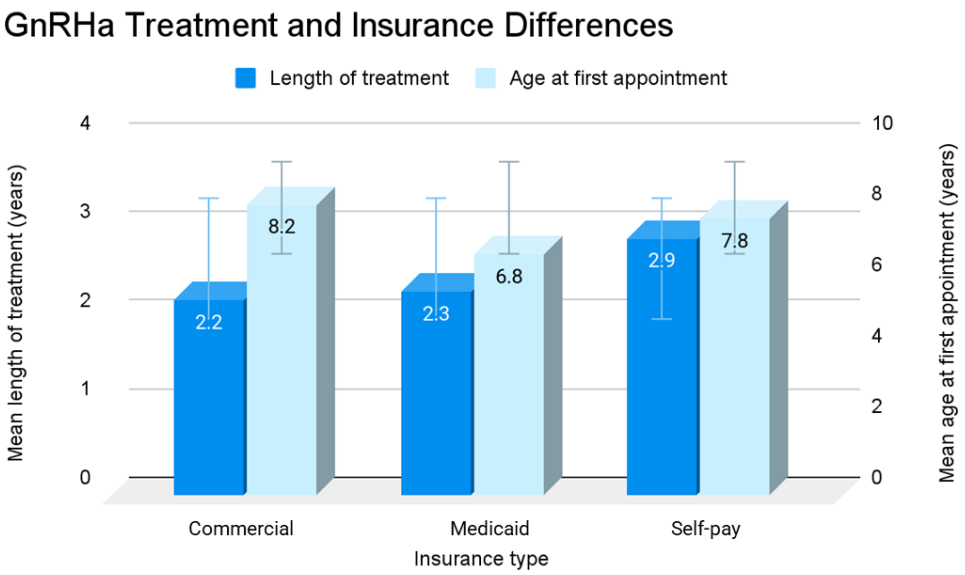
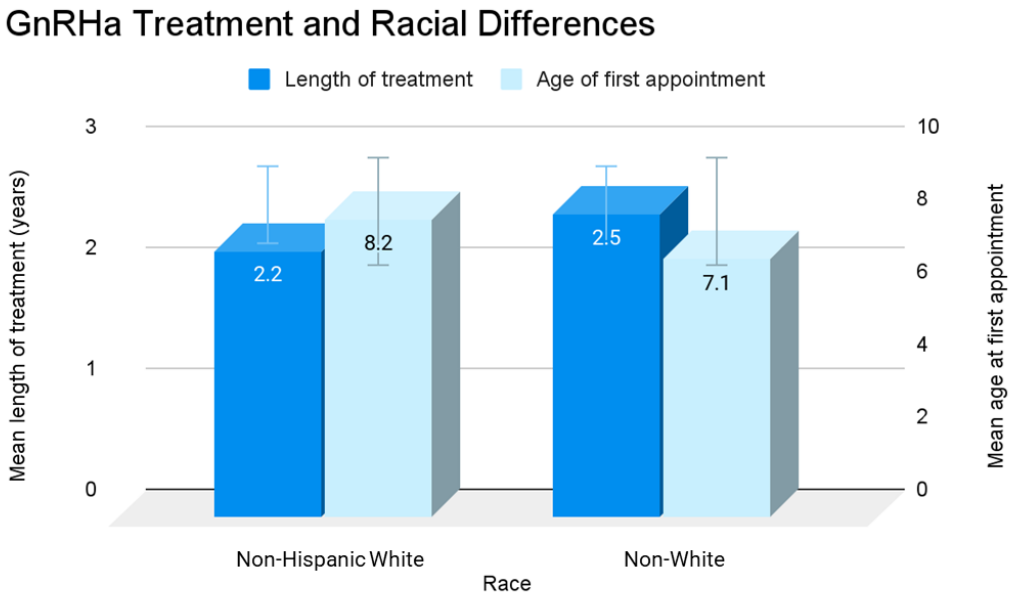


Figure 2: Length of treatment and age at first appointment, stratified by race.



Condom Use and Discontinuation Among Adolescents Using Long-Acting Reversible Contraception

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Introduction: Long-acting reversible contraception (LARC; intrauterine devices and implants) are highly effective for pregnancy prevention, yet do not protect against sexually transmitted infection (STI) acquisition. Previous studies show that concurrent condom (dual contraceptive) use was half as common in LARC vs non-LARC hormonal method users. This study aimed to assess condom use among adolescents using LARC vs non-LARC hormonal methods and to determine if the initiation of LARC decreases dual contraceptive use.

Hypothesis: We hypothesized that LARC users have lower condom use and a higher condom discontinuation rate compared to non-LARC non-hormonal method users.

Methods: Logistic regression analyses were used to examine condom use among LARC vs non-LARC users at baseline, among new hormonal contraception users, and among new hormonal method users who previously reported condom use. Moderation effect of age and number of sexual partners were assessed.

Results: Among baseline hormonal method users, LARC was associated with lower condom use compared to pills (OR =0.44, $p<0.05$), ring/patch (OR=0.49, $p<.05$), and injection (OR =0.40, $p<0.001$). Among new hormonal method users who previously reported condom use, LARC users were less likely to continue condom use than non-LARC users; however, this was not statistically significant. There was a significant interaction by age, but not by number of sexual partners.

Conclusions: LARC users had a much lower condom use rate compared to non-LARC hormonal method users, increasing their risk of STI. However, condom discontinuation was not significantly different among previous condom users following initiation of LARC or non-LARC hormonal methods.

Aberrant JAK/STAT Signaling in Nephrotic Syndrome

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Introduction: Nephrotic syndrome is one of the most common childhood kidney diseases worldwide; however, detailed understanding of the pathogenesis remains elusive. Current treatment involves steroids and long-term immunosuppression, which carry significant risk of morbidity and mortality. Depending on response to treatment and certain histologic features on biopsy, some patients face worse outcomes than others. However, the immunogenetic causes for these differences remain unknown. We recently identified *JAK1* gain-of-function mutation in a patient with nephrotic syndrome and multisystem immune dysregulation, which was successfully treated with a JAK inhibitor.

Hypothesis: We hypothesized that differential cellular derangements in JAK/STAT pathway cause different disease entities and treatment response in nephrotic syndrome.

Methods: Our proposal includes patients with varying etiologies and clinical severity of nephrotic syndrome. We performed robust CyTOF analysis for JAK/STAT activity.

Results: Preliminary results demonstrate different immune cell type profiles and JAK/STAT pathway activity between patients and controls.

Conclusions: Patients with nephrotic syndrome may have differential JAK/STAT pathway regulation in nephrotic syndrome, suggesting that the JAK/STAT pathway may play a role in the pathogenesis of nephrotic syndrome.

Trends in Adolescent Intentional Toxic Ingestion

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Introduction: Adolescence is a vulnerable period in childhood where many teenagers will engage in intentional self-harm or ingestion. Intentional overdoses are increasing in this population as the mental health crisis worsens among adolescents in the United States. This study seeks to analyze trends in adolescent toxic ingestion in New York City and the surrounding areas specifically in relation to the Covid-19 pandemic. By evaluating the frequency, severity, and type of intentional ingestions, healthcare providers can better predict and prepare for adolescents presenting with intentional ingestion.

Hypothesis: We hypothesize that adolescent intentional toxic ingestion has increased significantly since the start of the Covid-19 pandemic.

Methods: We will be conducting a retrospective observational study using data from the New York City Poison Control Center. The study population includes teenagers up to age 19.

Results: To Be Determined. We are still waiting on data from Poison Control.

Conclusions: To Be Determined. We are still waiting on data from Poison Control.