

The Family Resilience Initiative

From ACEs to PCEs

UTHSC Norfleet Symposium

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Disclosure Statement

- I have no disclosures relevant to today's topic
- The Family Resilience Initiative Clinical and Research programs receive grant funding through the Urban Child Institute, the State of Tennessee, and the The National Philoptochos Society



Agenda

- Review Changing Landscape of Primary Care and Role of ACEs/PCEs
- Examine Process for Primary Care Screening
- Introduce the Family Resilience Initiative
- Review FRI Clinical Data
- Introduce the FRI Research Design and Data
- Additional Research Outcomes
- Next Steps

Shifts in Pediatric Primary Care

- Improvements in where children receive care, who provides that care, and how it is delivered
- Patient centered medical home model
- Electronic health care records, registries, clinical decision-making support tools
- Increase in visits related to behavioral and developmental issues
- New immunizations
- More children with special health care needs
- Changing payment models



Fiks, Ten Years Back and Ten Years Ahead, Policy Lab, Children's Hospital of Philadelphia, October 4, 2018

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Well Child Visits

- Health History
- Complete Physical Exam
- Lab Tests
- Immunizations
- Vision and Hearing Screening
- Developmental Surveillance
- Development/Behavioral Screening
- Advice on how to keep your child healthy



Periodicity Schedule



Recommendations for Preventive Pediatric Health Care Bright Futures/American Academy of Pediatrics



Each child and family is unique; therefore, these Recommendations for Preventive Pediatric Health Care are designed for the care of children who are receiving competent parenting, have no manifestations of any important health problems, and are growing and developing in a satisfactory fashion. Developmental, psychosocial, and chronic disease issues for children and adolescents may require frequent counseling and treatment visits separate from preventive care visits. Additional visits also may become necessary if circumstances suggest variations from normal. These recommendations represent a consensus by the American Academy of Pediatrics (AAP) and Bright Futures. The AAP continues to emphasize the great importance of continuity of care in comprehensive health supervision and the need to avoid fragmentation of care.

Refer to the specific guidance by age as listed in the *Bright Futures Guidelines* (Hagan JF, Shaw JS, Duncan PM, eds. *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents*. 4th ed. American Academy of Pediatrics; 2017).
The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.
The Bright Futures/American Academy of Pediatrics Recommendations for Preventive Pediatric Health Care are updated annually.

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AGE ¹	INFANCY									EARLY CHILDHOOD								MIDDLE CHILDHOOD					ADOLESCENCE										
	Prenatal ¹	Newborn ¹	3-5 d ¹	By 1 mo	2 mo	4 mo	6 mo	9 mo	12 mo	15 mo	18 mo	24 mo	30 mo	3 y	4 y	5 y	6 y	7 y	8 y	9 y	10 y	11 y	12 y	13 y	14 y	15 y	16 y	17 y	18 y	19 y	20 y	21 y	
HISTORY																																	
Initial/Interval	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
MEASUREMENTS																																	
Length/Height and Weight		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Head Circumference		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Weight for Length		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Body Mass Index ²																																	
Blood Pressure ³		★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	
SENSORY SCREENING																																	
Vision ⁷		★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	
Hearing		● ¹	● ¹	→	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	
DEVELOPMENTAL/BEHAVIORAL HEALTH																																	
Developmental Screening ¹¹									●																								
Autism Spectrum Disorder Screening ¹¹										●																							
Developmental Surveillance		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Psychosocial/Behavioral Assessment ¹¹		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Tobacco, Alcohol, or Drug Use Assessment ¹⁴																						★	★	★	★	★	★	★	★	★	★	★	★
Depression Screening ¹¹																							●	●	●	●	●	●	●	●	●	●	●
Maternal Depression Screening ¹⁴				●	●	●	●																										
PHYSICAL EXAMINATION¹⁷		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
PROCEDURES¹⁴																																	
Newborn Blood		● ¹⁹	● ²⁰	→																													
Newborn Bilirubin ²¹		●																															
Critical Congenital Heart Defect ²²		●																															
Immunization ²³		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Anemia ²⁴						★				★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	
Lead ²⁵						★	★	★	● or ★ ²⁶		★	● or ★ ²⁶	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	
Tuberculosis ²⁷				★			★		★		★		★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	
Dyslipidemia ²⁸																						→	→	→	→	→	→	→	→	→	→	→	
Sexually Transmitted Infections ²⁹																						★	★	★	★	★	★	★	★	★	★	★	
HIV ³⁰																						★	★	★	★	★	★	★	★	★	★	★	
Hepatitis C Virus Infection ³¹																																	
Cervical Dysplasia ³²																																	
ORAL HEALTH³³								● ³⁴	● ³⁴	★		★	★	★	★	★	★																
Fluoride Varnish ³⁵								→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	
Fluoride Supplementation ³⁶								★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	
ANTICIPATORY GUIDANCE	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	

Adverse Childhood Experiences

- Early detection can prevent negative health outcomes
- The primary care setting is an ideal place for
 - Universal screening
 - Health promotion
 - Disease prevention
- The American Academy of Pediatrics recommends routine screening
- Only 10% of youth and 12% of caregivers have heard of the term ACEs and know what it means

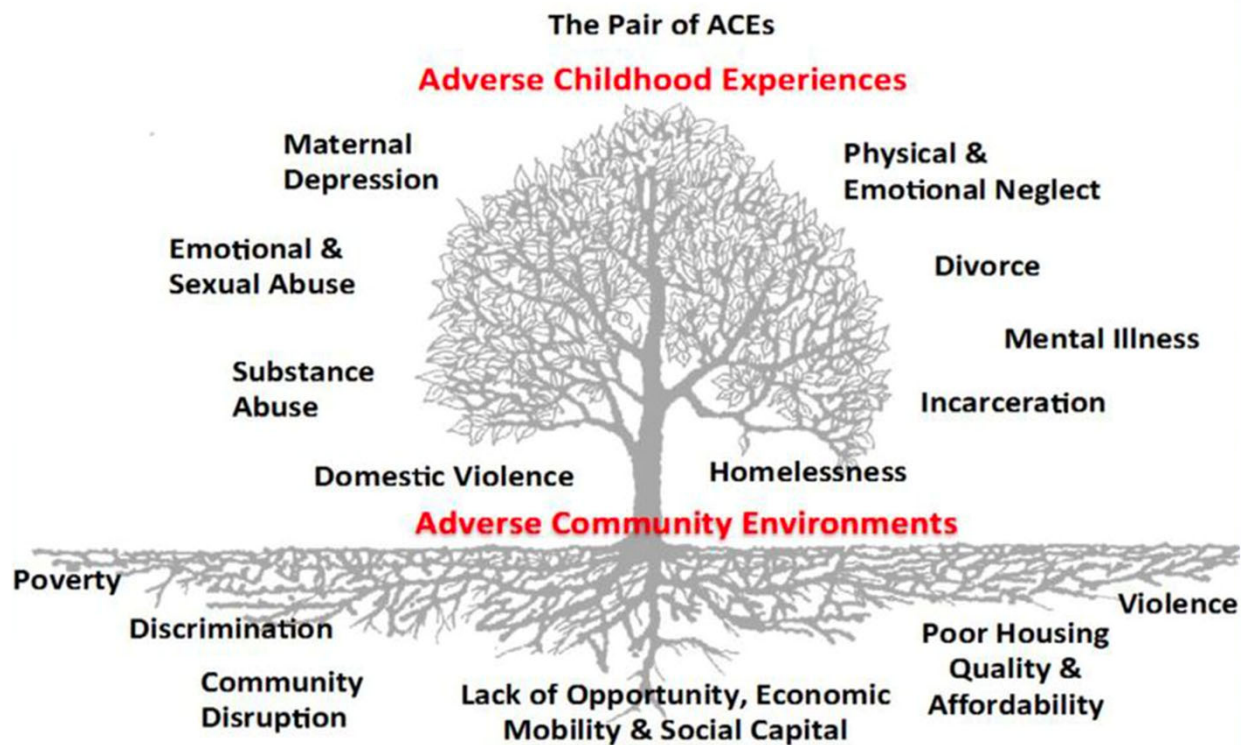


Garner AS, Shonkoff JP; Committee on Psychosocial Aspects of Child and Family Health; Committee on Early Childhood, Adoption, and Dependent Care; Section on Developmental and Behavioral Pediatrics. Early childhood adversity, toxic stress, and the role of the pediatrician: translating developmental science into lifelong health. *Pediatrics*. 2012;129(1)

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A Pair of ACEs



Ellis W. & Dietz W. BCR Framework. Academic Peds (2017).

Shelby County ACEs Survey

- 2014 telephone survey to 1,506 residents
- 52% reported having at least one ACE
- 12% reported experiencing four or more ACEs
- Most prevalent ACEs
 - Substance abuse
 - Emotional abuse
 - Violence between adults in the home
- 37% of adults in Shelby County have witnessed a shooting or stabbing
- Residents of the City of Memphis, those living in poverty, and those with less than a high school education were more likely to have 4 or more ACEs



Health Outcomes

ACES can have lasting effects on....



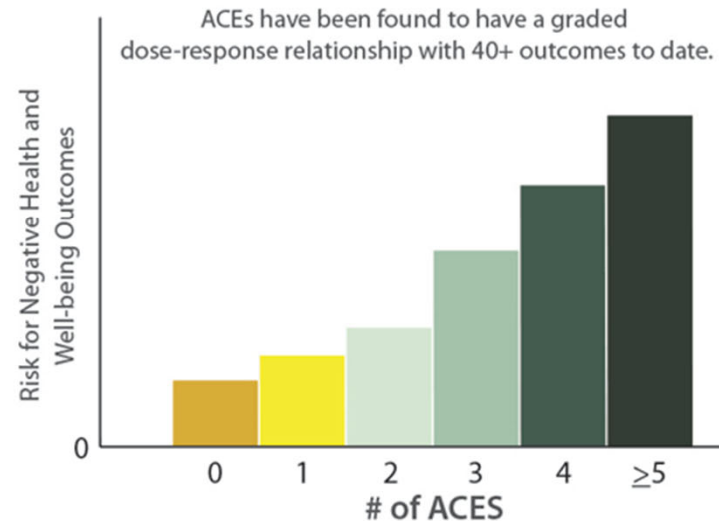
Health (obesity, diabetes, depression, suicide attempts, STDs, heart disease, cancer, stroke, COPD, broken bones)



Behaviors (smoking, alcoholism, drug use)

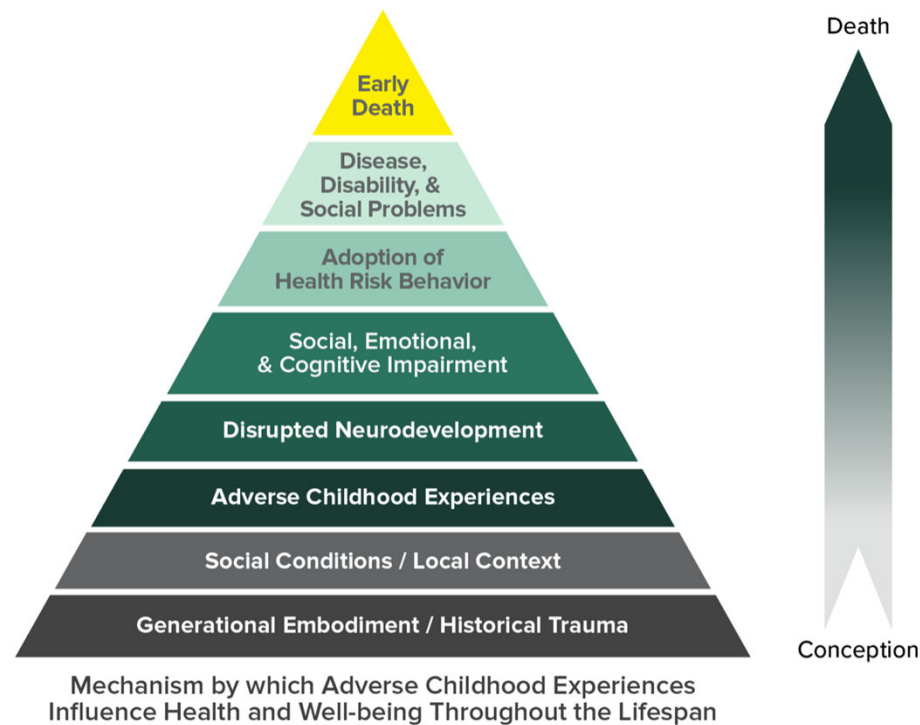


Life Potential (graduation rates, academic achievement, lost time from work)



*This pattern holds for the 40+ outcomes, but the exact risk values vary depending on the outcome.

Health Outcomes

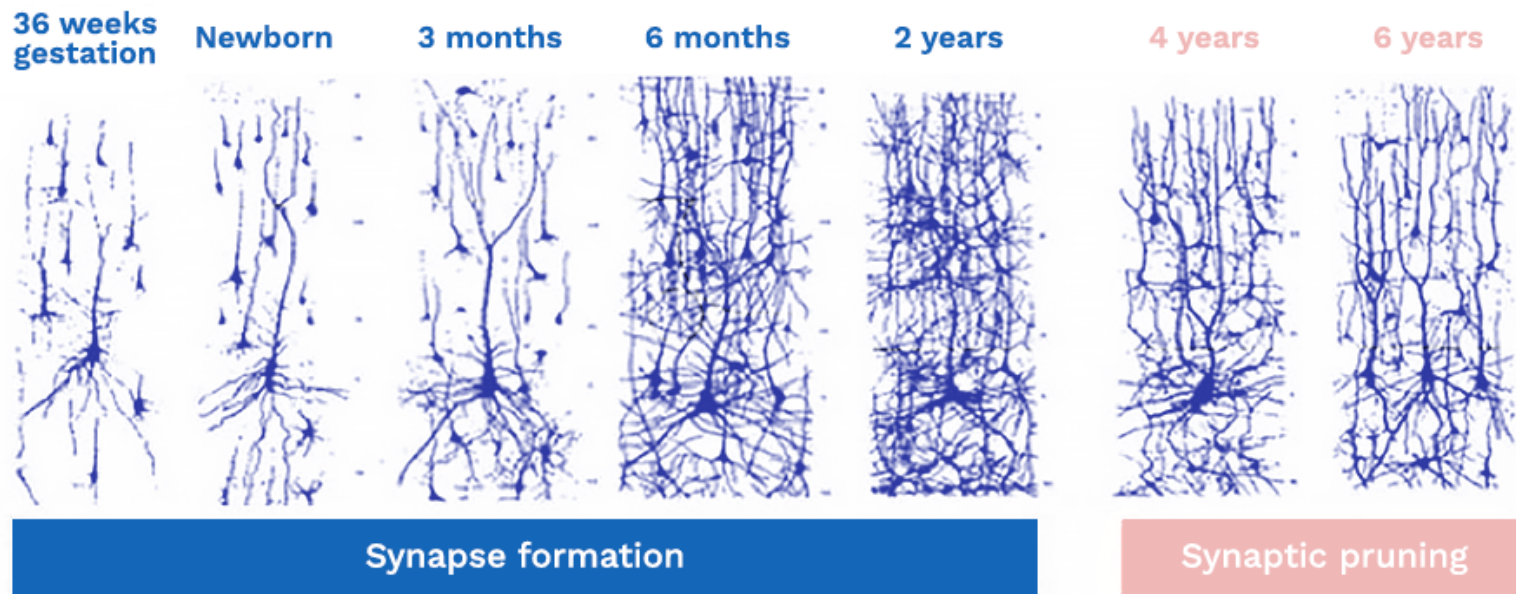


Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, Division of Violence Prevention

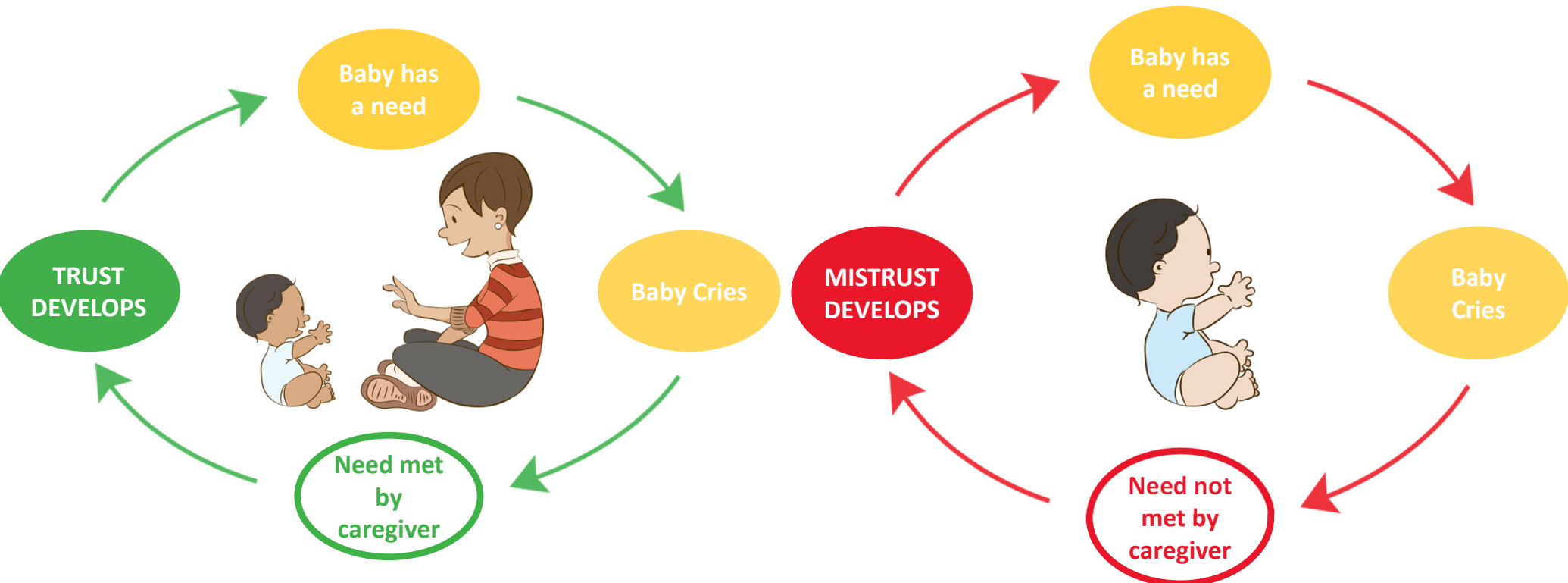
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Early Brain Development



Attachment Cycles



Preventing Toxic Stress

- Early Relational Health
- Develop and sustain Safe, Stable, and Nurturing Relationships (SSNRs)
 - Buffer childhood adversity
 - Promotes future resilience
- Impact of Positive Childhood Experiences (PCEs)

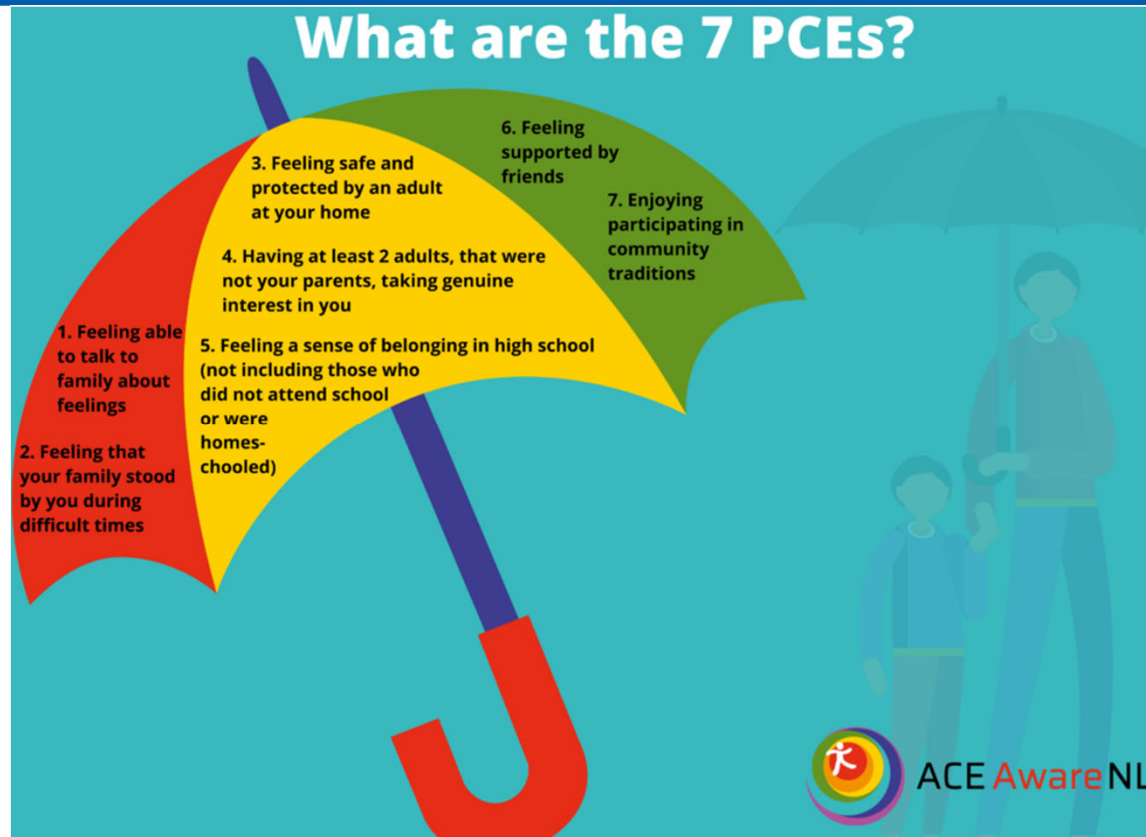
Andrew Garner, Michael Yogman; COMMITTEE ON PSYCHOSOCIAL ASPECTS OF CHILD AND FAMILY HEALTH, SECTION ON DEVELOPMENTAL AND BEHAVIORAL PEDIATRICS, COUNCIL ON EARLY CHILDHOOD, Preventing Childhood Toxic Stress: Partnering With Families and Communities to Promote Relational Health. *Pediatrics* August 2021; 148 (2): e2021052582. 10.1542/peds.2021-052582

Bethell C, Jones J, Gombojav N, Linkenbach J, Sege R. Positive Childhood Experiences and Adult Mental and Relational Health in a Statewide Sample: Associations Across Adverse Childhood Experiences Levels. *JAMA Pediatr.* 2019;173(11):e193007. doi:10.1001/jamapediatrics.2019.3007

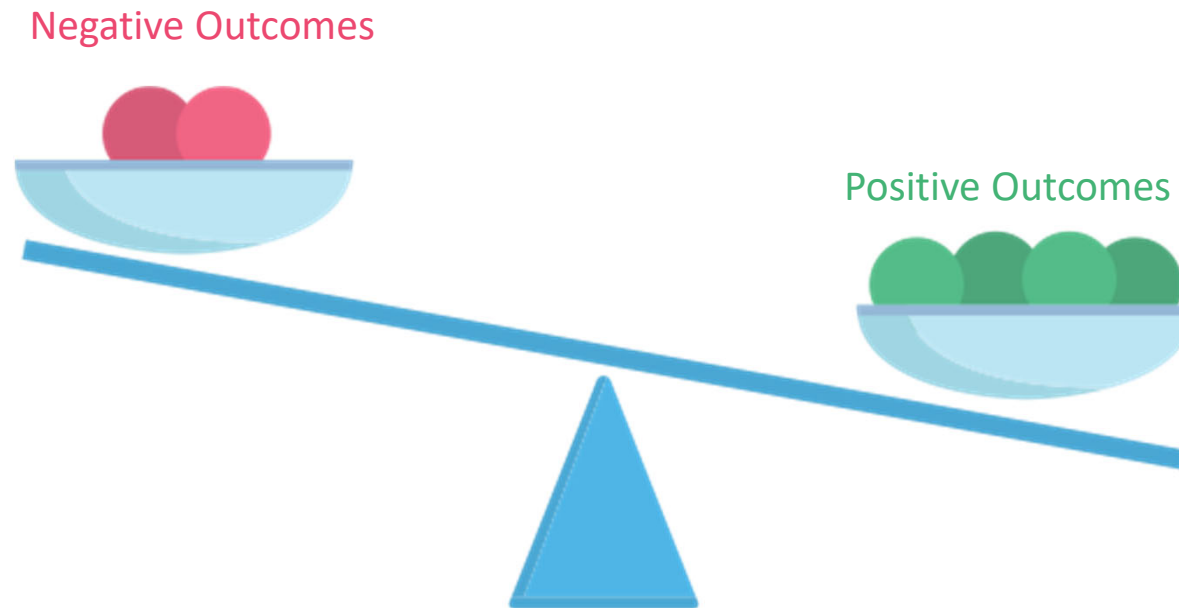
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Positive Childhood Experiences



Fostering Resilience



AAP Policies: Trauma Informed Care

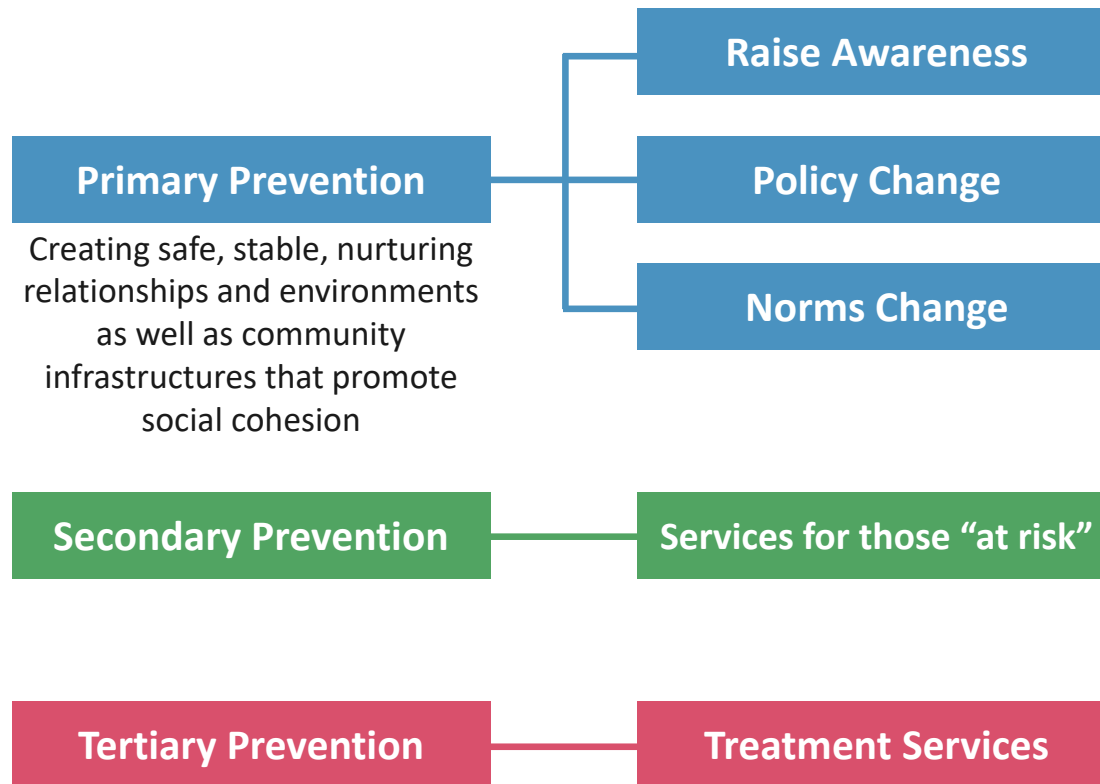
- Knowledge about trauma and its potential lifelong effects
- Support for the caregiver-child relationship to build resilience and prevent traumatic stress reactions
- Screening for trauma history and symptoms
- Recognition of cultural context of trauma experiences, response, and recovery
- Anticipatory guidance for families and health care workers
- Avoidance of retraumatization
- Processes for referral to counseling with evidence-based therapies when indicated
- Attention to the prevention and treatment of secondary trauma stress and associated sequelae

Heather Forkey, Moira Szilagyi, et al.; THE COUNCIL ON FOSTER CARE, ADOPTION, AND KINSHIP CARE, COUNCIL ON COMMUNITY PEDIATRICS, COUNCIL ON CHILD ABUSE AND NEGLECT, COMMITTEE ON PSYCHOSOCIAL ASPECTS OF CHILD AND FAMILY HEALTH, Trauma-Informed Care. *Pediatrics* August 2021; 148 (2): e2021052580. 10.1542/peds.2021-052580

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Public Health Approach



Public Health Approach

Public Health Level	Types of Prevention	Approaches to Toxic Stress	Examples	Approaches to Relational Health
3	Tertiary	<u>Indicated treatments</u> for toxic stress related diagnoses (e.g, anxiety depression, PTSD)	ABC PCIT CPP TF-CBT	<u>Repair strained</u> or compromised relationships
2	Secondary	<u>Targeted interventions</u> for those at higher risk for toxic stress responses	Parent/Child ACEs SDoH BStC	<u>Identify and address</u> potential barriers to SSNRs
1	Primary	<u>Universal preventions</u> for all	Positive parenting ROR Play Consistent messaging	<u>Promote SSNRs</u> by building 2-generational skills

Garner A, Yogman M, COMMITTEE ON PSYCHOSOCIAL ASPECTS OF CHILD AND FAMILY HEALTH, SECTION ON DEVELOPMENTAL AND BEHAVIORAL PEDIATRICS, COUNCIL ON EARLY CHILDHOOD. Preventing Childhood Toxic Stress: Partnering With Families and Communities to Promote Relational Health. Pediatrics. 2021;148(2):e2021052582

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Social Determinants of Health

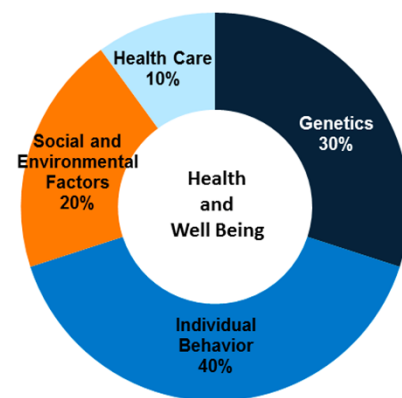
Economic Stability	Neighborhood and Physical Environment	Education	Food	Community and Social Context	Health Care System
Employment	Housing	Literacy	Hunger	Social integration	Health coverage
Income	Transportation	Language	Access to healthy options	Support systems	Provider availability
Expenses	Safety	Early childhood education		Community engagement	Provider linguistic and cultural competency
Debt	Parks	Vocational training		Discrimination	Quality of care
Medical bills	Playgrounds	Higher education			
Support	Walkability				

Health Outcomes

Mortality, Morbidity, Life Expectancy, Health Care Expenditures, Health Status, Functional Limitations

Figure 2

Impact of Different Factors on Risk of Premature Death



SOURCE: Schroeder, SA. (2007). We Can Do Better — Improving the Health of the American People. *NEJM*. 357:1221-8.



Memphis Poverty Statistics

- Overall poverty rate is 21.4% (24.7% for non-Hispanic blacks; 12.2% for non-Hispanic whites)
- Child poverty rate is 32.7%
- Memphis is the poorest statistical metropolitan area with a population over 1M people
- Worst child poverty ranking in the US, although the percentage is improving
- Poverty rates now similar to 2019 data
- Differences in poverty rates of minority groups and non-Hispanic whites are striking
- The poor in Memphis tend to be minorities
- Disparities in Shelby County are larger than in the US as a whole



Health Related Social Needs Questions



Social drivers of health are conditions that help shape a child's physical and mental health and can include family income, family life, stress levels, neighborhood, and access to education, housing, and health care.

Pediatricians may ask parents about these conditions and suggest options to help form the best care plan for the child, including:

- Providing social work or community health support
- Connecting to resources or benefits that can help with food and housing
- Offering virtual visits if transportation is a concern

What should parents know?

- ▶ These questions are asked of all families. They may feel uncomfortable to talk about and can be answered privately.
- ▶ The questions are not meant to embarrass anyone or lead to your child being taken away. Parents can talk to the clinic about why they are asking questions and who will see the answers.

Raising a child is challenging and sometimes unpredictable. It can be useful to talk to your child's doctor about your concerns.

Health Related Social Needs Questions

- What is your **housing** situation today?
- Think about the place that you live. Do you have any problems with (infestation, mold, lead, heat, oven/stove, smoke detectors, water leaks)? (**living situation**)
- Within the past 12 months, you worried that your **food** would run out before you got money to buy more. (Often, sometimes, never true).
- Within the past 12 months, the food you bought just didn't last and you didn't have money to get more. (Often, sometimes, never true).
- In the past 12 months has lack of **transportation** kept you from medical appointments, meetings, work or from getting things needed for daily living?
- In the past 12 months has the electric, gas, oil, or water company threatened to shut off services in your home? (**utilities**)
- How often does anyone, including family, physically hurt you/insult or talk down to you/threaten you with harm/scream or curse at you? (**safety**)

Billieux, A., K. Verlander, S. Anthony, and D. Alley. 2017. *Standardized screening for health-related social needs in clinical settings: The accountable health communities screening tool*. Discussion Paper, National Academy of Medicine, Washington, DC. <https://nam.edu/wp-content/uploads/2017/05/Standardized-Screening-for-Health-Related-Social-Needs-in-Clinical-Settings.pdf>.

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- Beyond the Walls
 - Address the needs of children beyond the hospital's walls, particularly those at risk, through preventative community strategies, investments, and partnerships
 - **Risk reduction**
 - **Intervention** to promote healthy child development
 - **Promoting health** and well being of families
 - More than **20 programs**
 - **250 employees** in the community division
 - Collaboration with **400 community partners**



ULPS General Pediatrics Clinic

- Academic pediatrics clinic for large multispecialty practice group with hospital and university affiliation
- 15,000 general pediatrics visits per year
- Approximately 95% TennCare population
- Resident teaching practice site for continuity clinic and ambulatory rotations
- Continuity clinic site for Pediatrics and Med/Peds Residents
- Co-located behavioral health care services
- Prior to 2018, no ACES screenings were being performed and only limited SDoH screenings



Integrating ACEs Screenings



Stage 1: Prepare the Foundation

- Refresh your knowledge about ACEs, toxic stress, trauma-informed care, and evidence-based interventions
 - Get informed
- Determine how to generate organizational support for screening
 - Engage leadership and peers
- Establish your implementation team
- Develop a high-level implementation plan and timeline

Stage 2: Select Your Approach

- Determine who you will screen and how
 - Who and when
 - Which tool
 - How and where
- Prepare your clinical response for treating toxic stress
 - The clinical response and resources
- Map out how you will integrate ACE screening into your workflow

Stage 3: Implement the Program

- Launch your program
- Monitor
- Evaluate
- Improve



Stage 4: Build Sustainability

- Review and update internal policies
- Ongoing training
- Treatment of toxic stress
- Remaining a trauma informed organization

FRI Mission and Vision

- Screen patients and families for ACEs and SDOH that affect their physical, mental, and emotional well-being.
- Provide collaborative wrap around services that will prevent ACEs, build resiliency, and buffer the effects of these stressors through SSNRs and PCEs.
- Create a trauma informed clinic and program that has the capacity and understanding to serve our patients well.
- Create a research program that can examine the biological effects of stress, including any changes in trajectory as a result of program participation
- Follow health outcomes of participants, including BMI, development, school readiness, health care utilization, and well being

The Family Resilience Initiative

Article

Whole Child Well-Child Visits: Implementing ACEs and SDOH Screenings in Primary Care

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August Marshall, MA¹, Jonathan A. McCullers, MD^{1,2},
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Clinical Pediatrics

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Abstract

Adverse childhood experiences (ACEs) and social determinants of health (SDOH) negatively affect health outcomes. This program was developed to screen for ACEs and SDOH in the primary care setting in families with children 9 months to 5 years of age at well-child checks and provide interventions that support families and build resiliency. Programmatic criteria were identified, referral resources were developed, and a database was implemented, with 246 families enrolled in year 1; 56.9% of caregivers reported 1 or more ACEs for their child, 63% of caregivers reported an SDOH need, and 39.4% of caregivers reported both. The average number of ACEs was 0.94. This program was created to address ACEs and SDOH, to empower families, build resiliency, and provide buffers to mitigate and prevent ACEs. It provides a model that can be implemented in a primary care setting while providing wraparound resources, including integrated mental health resources and referrals, to measure the success of these interventions.

Yaun JA, Rogers LW, Marshall A, McCullers JA, Madubonwu S. Whole Child Well-Child Visits: Implementing ACEs and SDOH Screenings in Primary Care. *Clinical Pediatrics*. 2022;61(8):542-550. doi:[10.1177/00099228221093279](https://doi.org/10.1177/00099228221093279)

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Program Development

- FRI Implementation Team established
- Review of existing ACEs and SDOH screening tools
- Review of existing programs conducting similar work
- Review of evidence-based or best-practices interventions
- Funding secured through the state of TN and the Urban Child Institute

Yaun JA, Rogers LW, Marshall A, McCullers JA, Madubuonwu S. Whole Child Well-Child Visits: Implementing ACEs and SDOH Screenings in Primary Care. *Clinical Pediatrics*. 2022;61(8):542-550. doi:[10.1177/00099228221093279](https://doi.org/10.1177/00099228221093279)

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FRI Clinical Team

- Program Manager
- Outreach Coordinators
- Clinical Staff and Physicians
- Mental Health Provider
- Program Evaluator



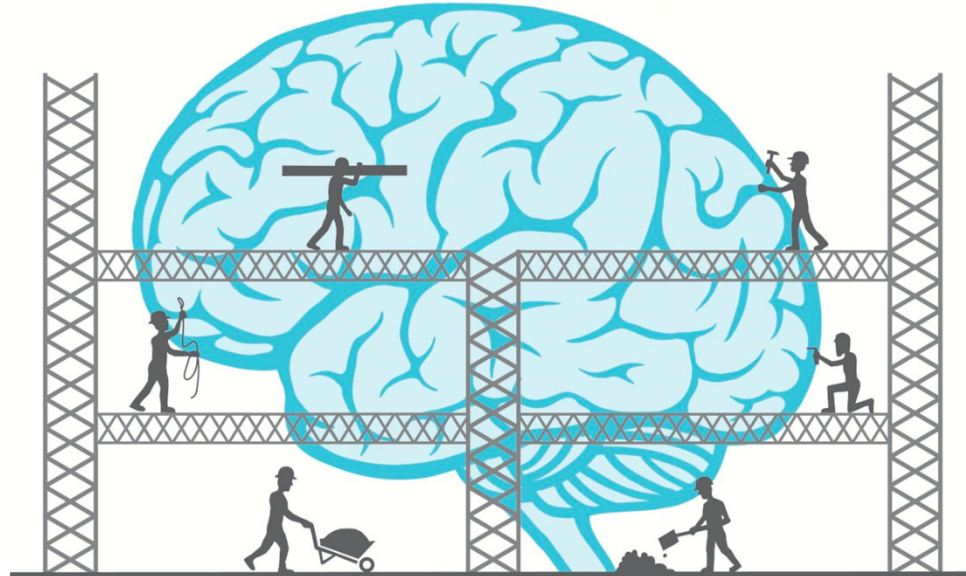
Yaun JA, Rogers LW, Marshall A, McCullers JA, Madubonwu S. Whole Child Well-Child Visits: Implementing ACEs and SDOH Screenings in Primary Care. *Clinical Pediatrics*. 2022;61(8):542-550. doi:[10.1177/00099228221093279](https://doi.org/10.1177/00099228221093279)

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Tennessee's ACEs Initiative

BUILDING STRONG BRAINS TENNESSEE



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Model Programs



Dr. Nadine Burke Harris
Founder & Former CEO Center for Youth Wellness
Surgeon General of California



Dr. Dayna Long
Children's Hospital Oakland
Medical Director Center for Community Health & Engagement,
and Founder of Findconnect

Screening

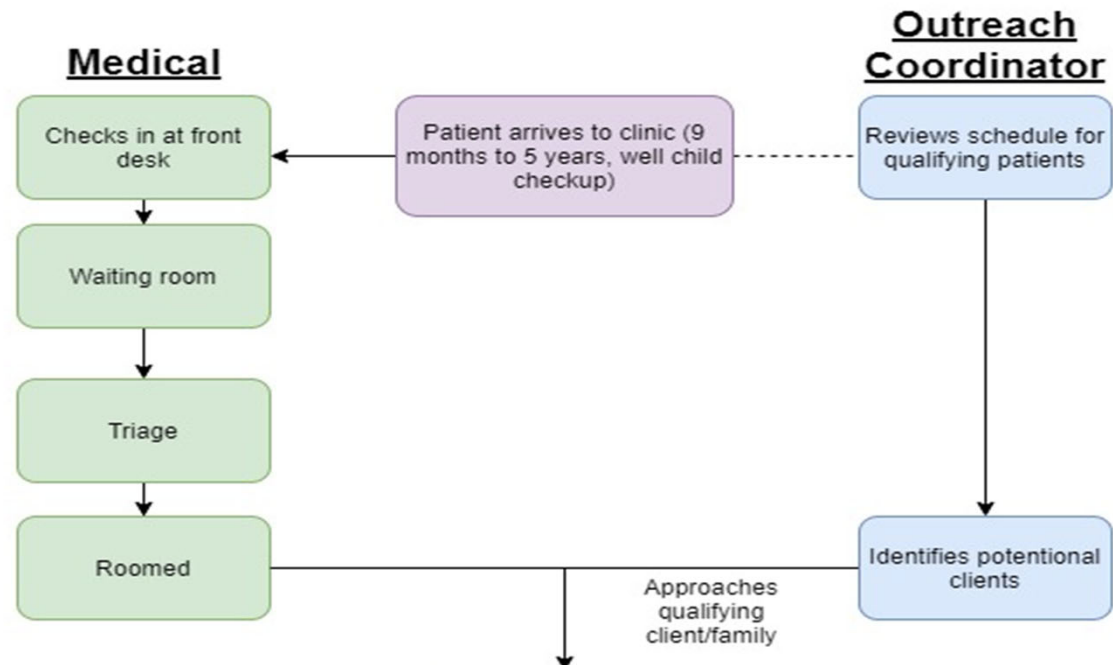
- Collaboration across all staff members: physicians, residents, nurses, medical assistants, non-clinical staff, and FRI staff
- Physician, staff, and resident education on trauma informed care
- Screenings patients for ACEs and SDOH from the ages 9-60 months
 - Performed by Outreach Coordinators in office as part of well child visits during morning visits
- Modified version of the Pediatric ACEs and Related Life-Event Screener (PEARLS)
 - 10 original ACEs and 7 “new” ACEs
- Health Related Social Needs Screening Questionnaire
- Flourishing Questions
- Developmental Screening

Yaun JA, Rogers LW, Marshall A, McCullers JA, Madubonwu S. Whole Child Well-Child Visits: Implementing ACEs and SDOH Screenings in Primary Care. *Clinical Pediatrics*. 2022;61(8):542-550. doi:[10.1177/00099228221093279](https://doi.org/10.1177/00099228221093279)

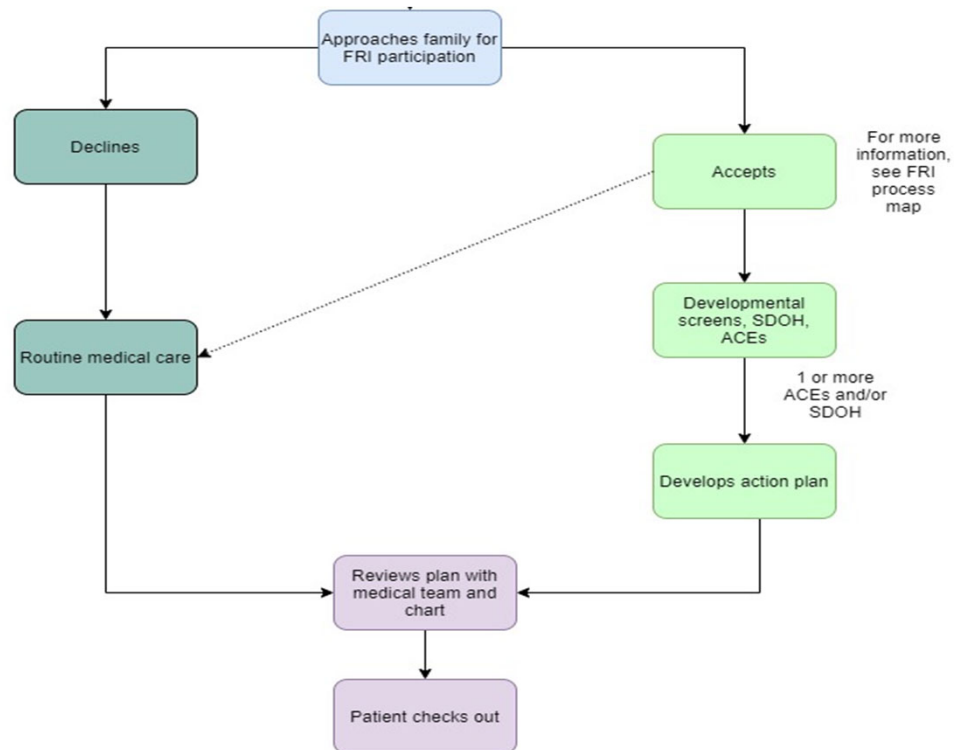
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Clinic Process Map



Clinic Process Map



Yaun JA, Rogers LW, Marshall A, McCullers JA, Madubuonwu S. Whole Child Well-Child Visits: Implementing ACEs and SDOH Screenings in Primary Care. *Clinical Pediatrics*. 2022;61(8):542-550. doi:[10.1177/00099228221093279](https://doi.org/10.1177/00099228221093279)

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PEARLS

- The Pediatric ACEs and Related Life-events Screener (PEARLS) is used to screen children and adolescents ages 0-19 years for ACEs
- Available in 17 languages
- Allows for identified or de-identified screening
- PEARLS child tool, for ages 0-11, to be completed by a parent/caregiver.
- PEARLS adolescent tool, for ages 12-19, to be completed by a parent/caregiver.
- PEARLS for adolescent self-report tool, for ages 12-19, to be completed by the adolescent

PEARLS Part 1

PART 1: Please check "Yes" where apply.

1. Has your child ever lived with a parent/caregiver who went to jail/prison?
2. Do you think your child ever felt unsupported, unloved and/or unprotected?
3. Has your child ever lived with a parent/caregiver who had mental health issues?
(for example, depression, schizophrenia, bipolar disorder, PTSD, or an anxiety disorder)
4. Has a parent/caregiver ever insulted, humiliated, or put down your child?
5. Has the child's biological parent or any caregiver ever had, or currently has a problem with too much alcohol, street drugs or prescription medications use?
6. Has your child ever lacked appropriate care by any caregiver?
(for example, not being protected from unsafe situations, or not cared for when sick or injured even when the resources were available)
7. Has your child ever seen or heard a parent/caregiver being screamed at, sworn at, insulted or humiliated by another adult?
Or has your child ever seen or heard a parent/caregiver being slapped, kicked, punched beaten up or hurt with a weapon?
8. Has any adult in the household often or very often pushed, grabbed, slapped or thrown something at your child?
Or has any adult in the household ever hit your child so hard that your child had marks or was injured?
Or has any adult in the household ever threatened your child or acted in a way that made your child afraid that they might be hurt?
9. Has your child ever experienced sexual abuse?
(for example, anyone touched your child or asked your child to touch that person in a way that was unwanted, or made your child feel uncomfortable, or anyone ever attempted or actually had oral, anal, or vaginal sex with your child)
10. Have there ever been significant changes in the relationship status of the child's caregiver(s)?
(for example, a parent/caregiver got a divorce or separated, or a romantic partner moved in or out)

How many "Yes" did you answer in Part 1?:



PEARLS Part 2

PART 2:

Please check "Yes" where apply.

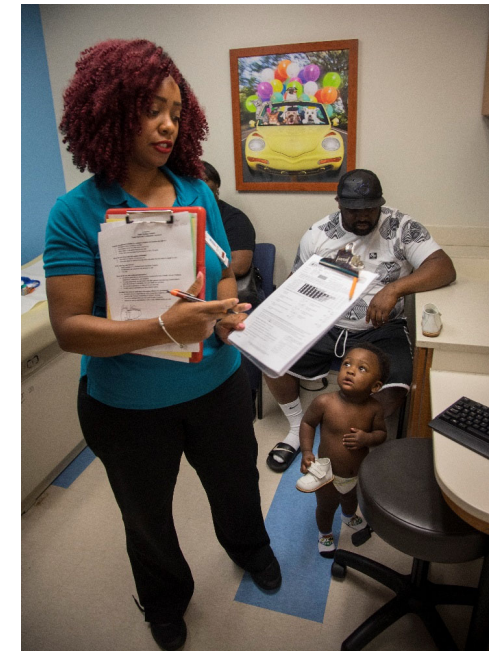


1. Has your child ever seen, heard, or been a victim of violence in your neighborhood, community or school?
(for example, targeted bullying, assault or other violent actions, war or terrorism)
2. Has your child experienced discrimination?
(for example, being hassled or made to feel inferior or excluded because of their race, ethnicity, gender identity, sexual orientation, religion, learning differences, or disabilities)
3. Has your child ever had problems with housing?
(for example, being homeless, not having a stable place to live, moved more than two times in a six-month period, faced eviction or foreclosure, or had to live with multiple families or family members)
4. Have you ever worried that your child did not have enough food to eat or that the food for your child would run out before you could buy more?
5. Has your child ever been separated from their parent or caregiver due to foster care, or immigration?
6. Has your child ever lived with a parent/caregiver who had a serious physical illness or disability?
7. Has your child ever lived with a parent or caregiver who died?

How many "Yes" did you answer in Part 2?:

Interventions

- Outreach coordinators screen as part of the medical visit
- Families receive referrals, support services, and education
- Positive ACEs screening will trigger referral to embedded mental health component
- Positive SDOH screen will trigger referrals per family priority
 - Strong community referral resource network exists
- Warm handoffs to physicians, psychologists, community resources, etc.
- Database system to track referrals and outcomes



Yaun JA, Rogers LW, Marshall A, McCullers JA, Madubonwu S. Whole Child Well-Child Visits: Implementing ACEs and SDOH Screenings in Primary Care. *Clinical Pediatrics*. 2022;61(8):542-550. doi:[10.1177/00099228221093279](https://doi.org/10.1177/00099228221093279)

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Building Resiliency

- Outreach coordinators, social workers
- ACEs Education
- Appropriate medical treatment
- Wellness
- Mental Health Services
- Memphis CHiLD Medical-Legal Partnership
- Triple P Positive Parenting Program for families
- LENA Start Trainings
- Parent Advisory Board



Yaun JA, Rogers LW, Marshall A, McCullers JA, Madubuonwu S. Whole Child Well-Child Visits: Implementing ACEs and SDOH Screenings in Primary Care. *Clinical Pediatrics*. 2022;61(8):542-550. doi:[10.1177/00099228221093279](https://doi.org/10.1177/00099228221093279)

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Mental Health Interventions

- Infant Mental Health Services – Family and Group Options
 - Interventions provided in the medical home with UT partner psychologists and community therapists providing infant mental health
 - Working with parents/guardians and their child(ren).
 - Same day appointments may be available.
 - Parent Support Groups conducted by one of our UT partner psychologists
 - Provide a short-term, four-session parent group on child development.
 - Two curriculums, 8 weeks-12 months for babies, and 12-36 months for toddlers, addressing topics of attachment, development, including child behaviors, and parenting skills.

Triple P

- Triple P (Positive Parenting Program) is an evidenced based international parent training
- Provides parents with tools to positively deal with misbehaviors
- FRI team are accredited providers of Triple P Primary Care
 - Deliver the program one-on-one with the caregiver
 - One to four individual sessions
 - Addresses the specific problem behavior
- FRI team members are also accredited providers of Triple P Discussion Groups
 - Deliver the program in a one-time group setting with 10 – 15 parents
 - Address a specific problem behavior and providing steps to make a positive difference
- Both modalities are for guardians/parents with children up to 12 years.

LENA Start

- Language Environment Analysis
- 13 weekly group sessions
- Instructions for parents and caregivers to increase infant directed speech
- Average of 134 additional interactions added to their daily routine
- Children gain nearly 2 months of developmental skills for every month participating

LENA
START®



Family Advisory Board

- Small group of active FRI families who meet quarterly
- Review program offerings and provide input on potential program offerings to FRI families through an open discussion
- Families share about utilization of services and what they wish they had access to
- A meal and compensation is provided
- Open to any legal guardian who is the primary caregiver for the child

Reach Out and Read

- National literacy program
- Physicians prescribe books and encourage families to read together
- Begins at the 6-month checkup and continues through age 5
- Only ½ of parents in the US read to their young children daily
- Published research studies (15+) show that Reach Out and Read improves the home literacy environment and developmental outcomes for children



Early Literacy Promotion



<h2>TOUCH</h2> <p>Holding and cuddling your baby every day makes him feel safe and loved.</p> <ol style="list-style-type: none"> 1 Gently hold your baby's hand or let your baby hold your finger. 2 Cradle your baby in your arms, look into your baby's eyes and smile. 3 Kiss your baby's forehead. 4 Respond sensitively to your baby's cry. This is how he knows he can trust you to be there for him. <p> You can't spoil your baby.</p>	<h2>TALK</h2> <p>Your baby begins to learn sounds and words when she hears your voice.</p> <ol style="list-style-type: none"> 1 Speak softly and gently to your baby – tell her you love her. 2 Sing a lullaby when you are putting your baby down to sleep. 3 Tell your baby what is happening like, "Now I'm going to change your diaper." 4 Repeat familiar terms like body parts during bath time. <p> Speaking to your baby in at least 5-word sentences will help her learn more words.</p>	<h2>READ</h2> <p>Reading to your baby now will greatly improve his reading and writing later.</p> <ol style="list-style-type: none"> 1 Read a favorite story to your baby at the same time each day. 2 If you don't like to read, just pick up any book or magazine and talk about the pictures. 3 Give your baby a few books that are safe to hold and explore. 4 Use a playful or sing-song voice when you read to your baby. <p> Reading to your baby is a proven factor for kindergarten readiness.</p>	<h2>PLAY</h2> <p>Even simple games help build your baby's future problem-solving and creative thinking skills.</p> <ol style="list-style-type: none"> 1 Play "peek-a-boo" with your baby. 2 Crawl on the floor and play "chase." 3 Dance to playful music together. 4 Give your baby a rattle or other baby toy that makes noise. Even pots and pans can be fun! <p> Unstructured play improves your baby's attention span.</p>

Program Outcomes

- Number of families served
- Family satisfaction with interventions
- Family perceptions on health and well-being as a result of interventions
- Connection with and utilization of resources
- Compliance with therapeutic regimens



Current Enrollments and Services December 2018 – February 2024

- **1,648** families approached
 - 41% declined or ineligible
- **777** screened and consented
 - 674 (86.7%) with at least 1 ACE and/or unmet SDOH
 - Average of 1 ACE per child
 - Ranging from 0 to 11
 - 601 referrals for psychological counseling
 - 128 referrals to medical-legal partnership
- **1,074** renewals
- **21,453** follow-up activities

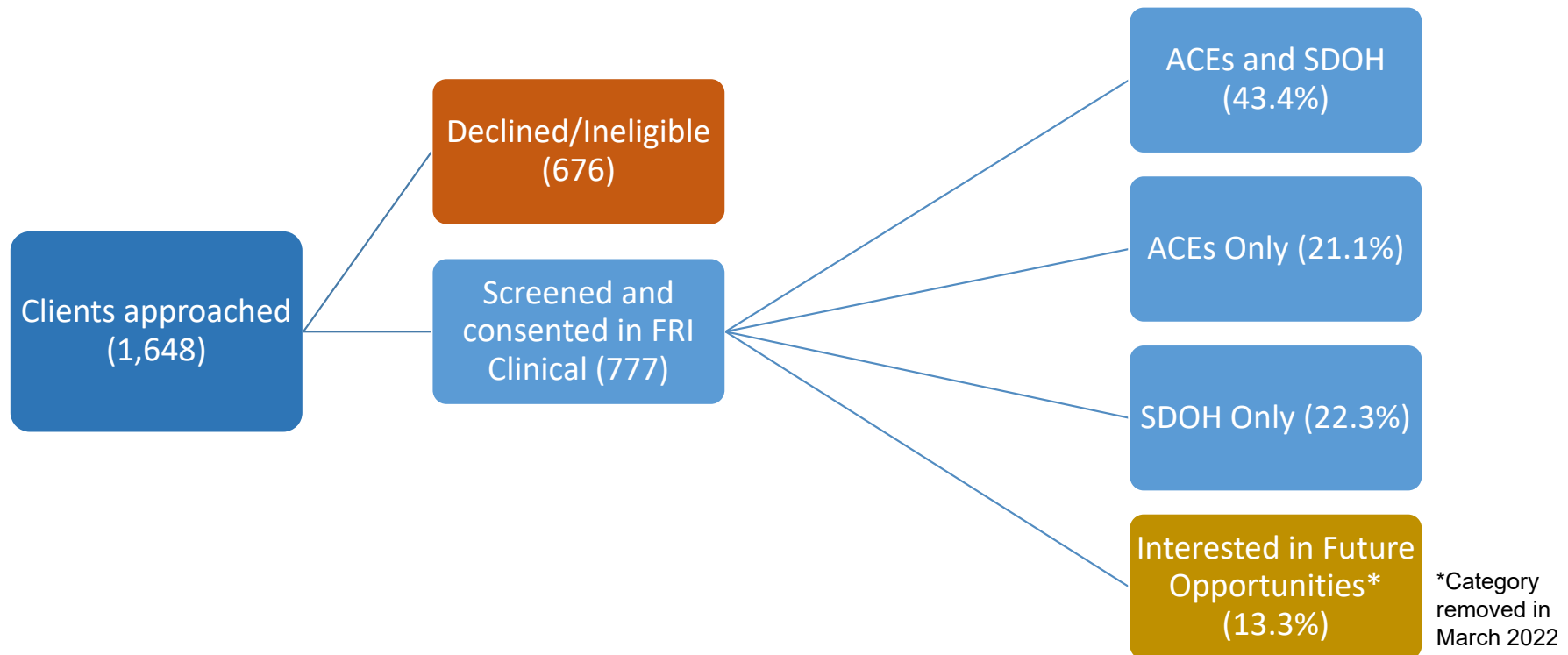


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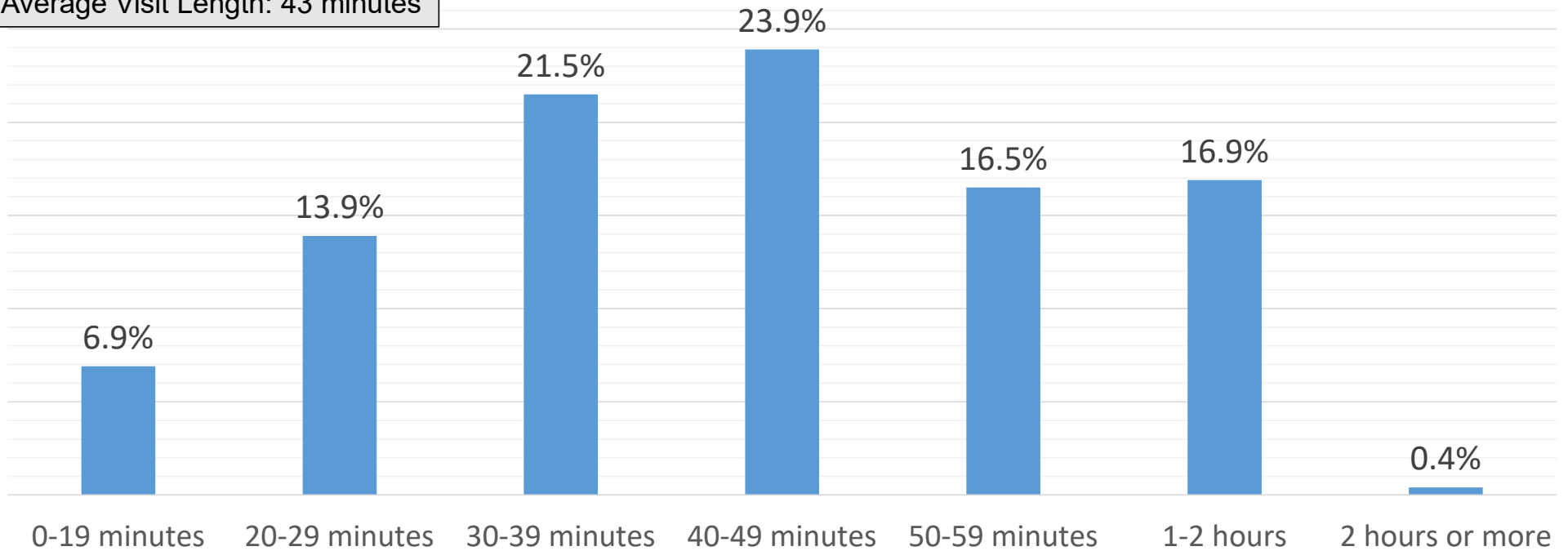
Screening and Enrollment



Unpublished data

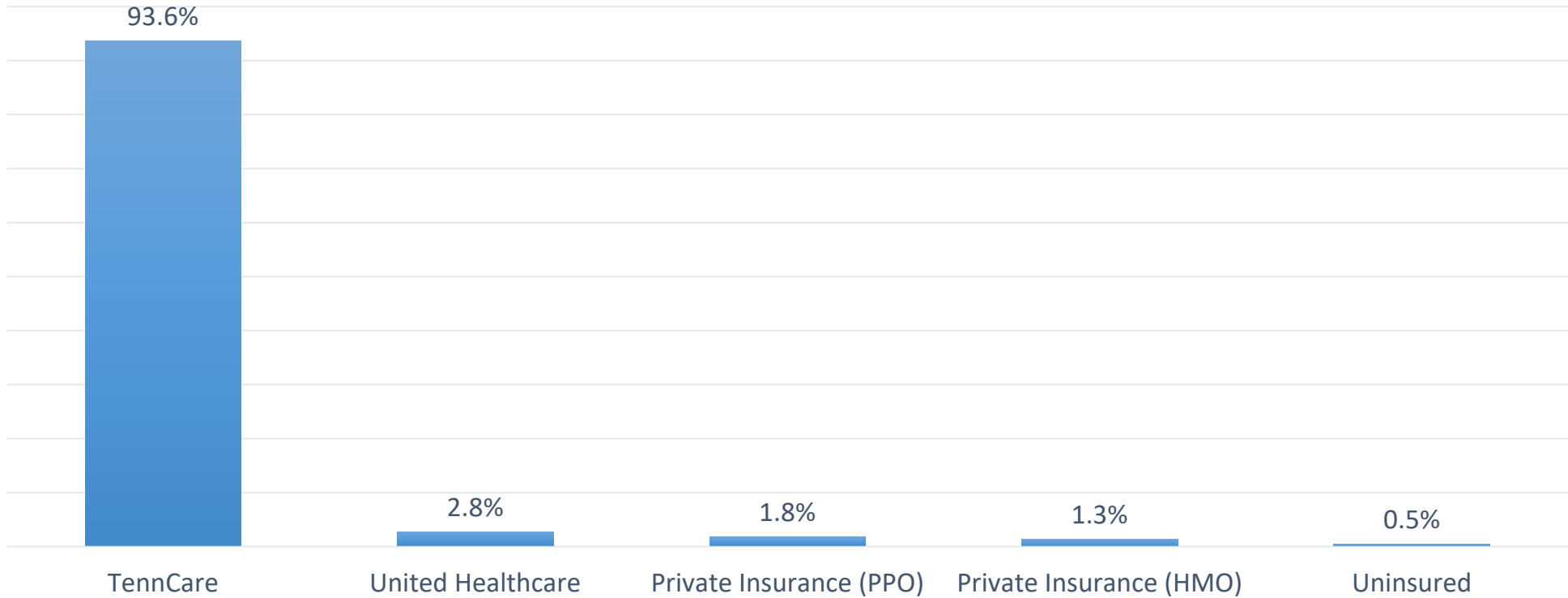
Visit Length

Average Visit Length: 43 minutes



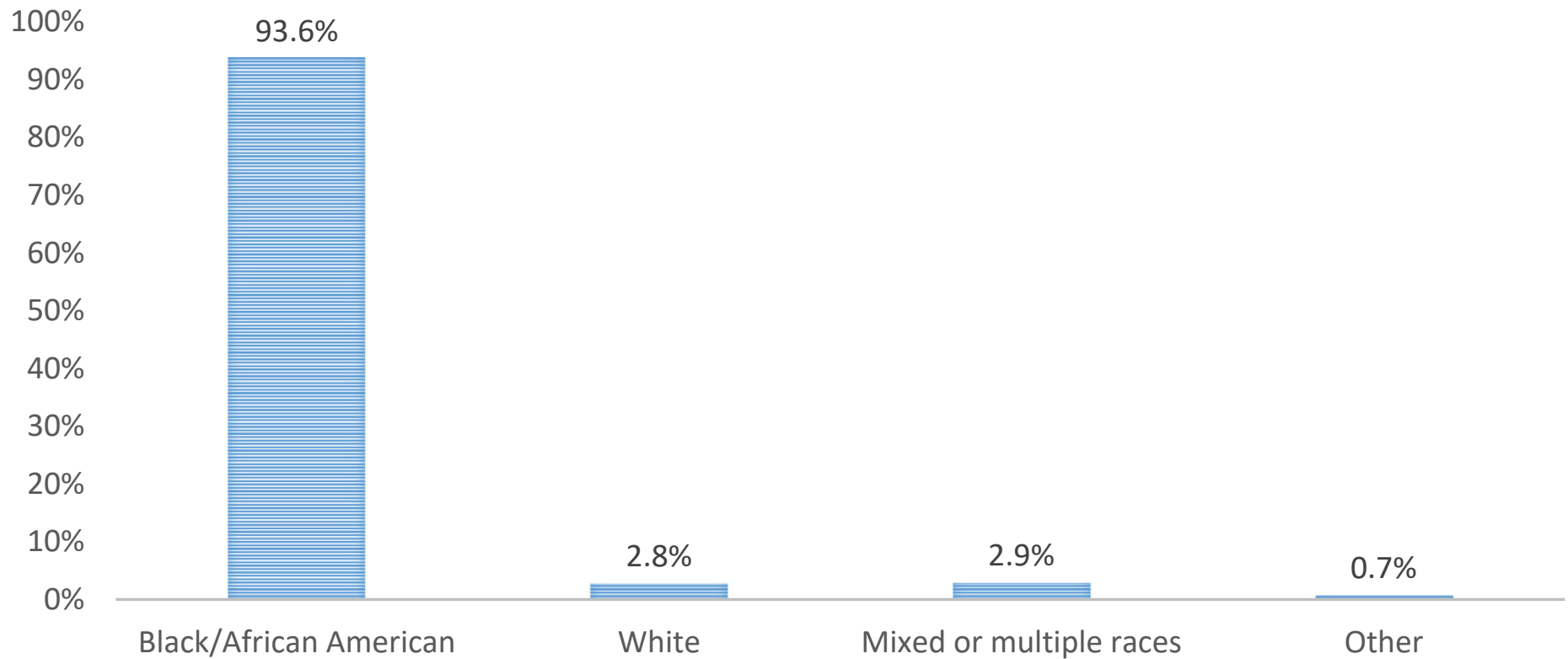
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Child Demographics - Insurance



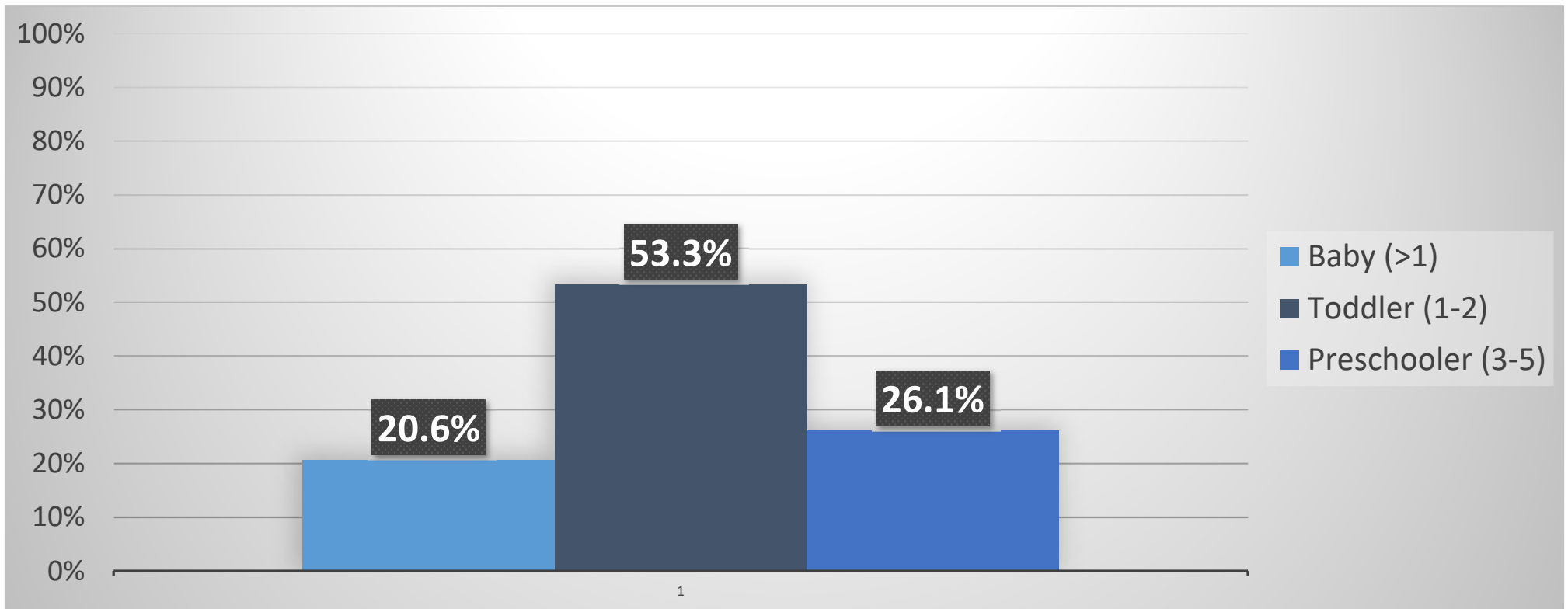
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Client Demographics – Child’s Race



Unpublished data

Client Demographics – Child’s Age

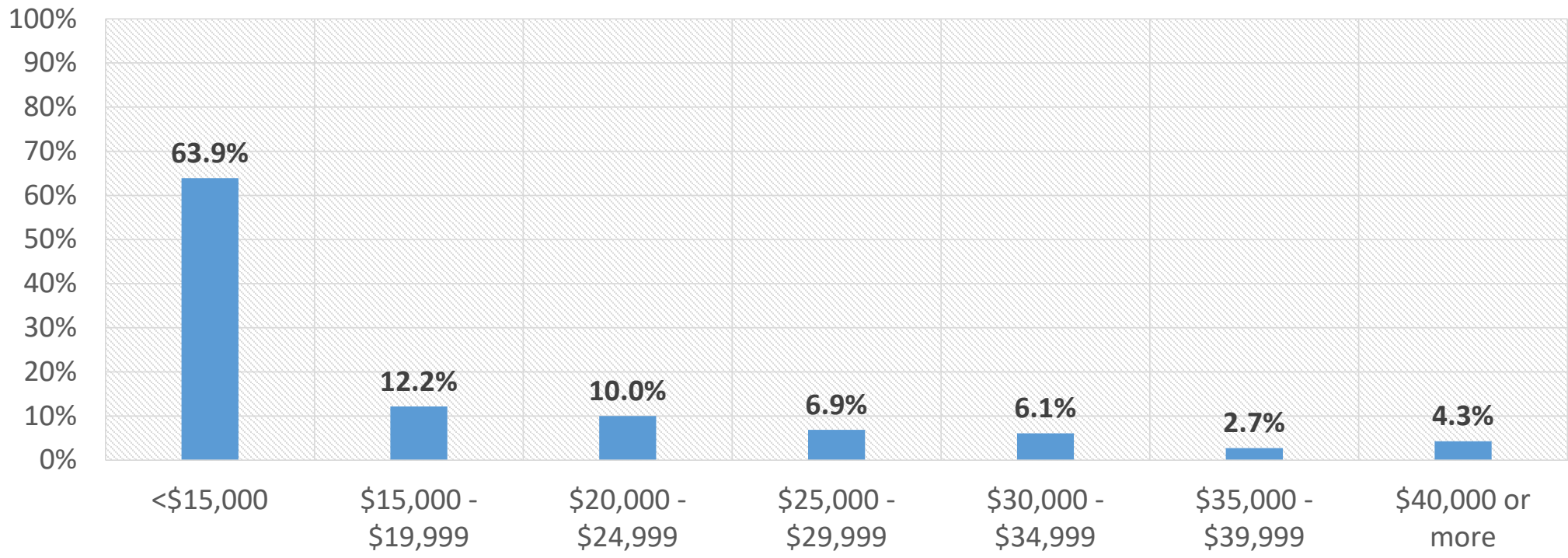


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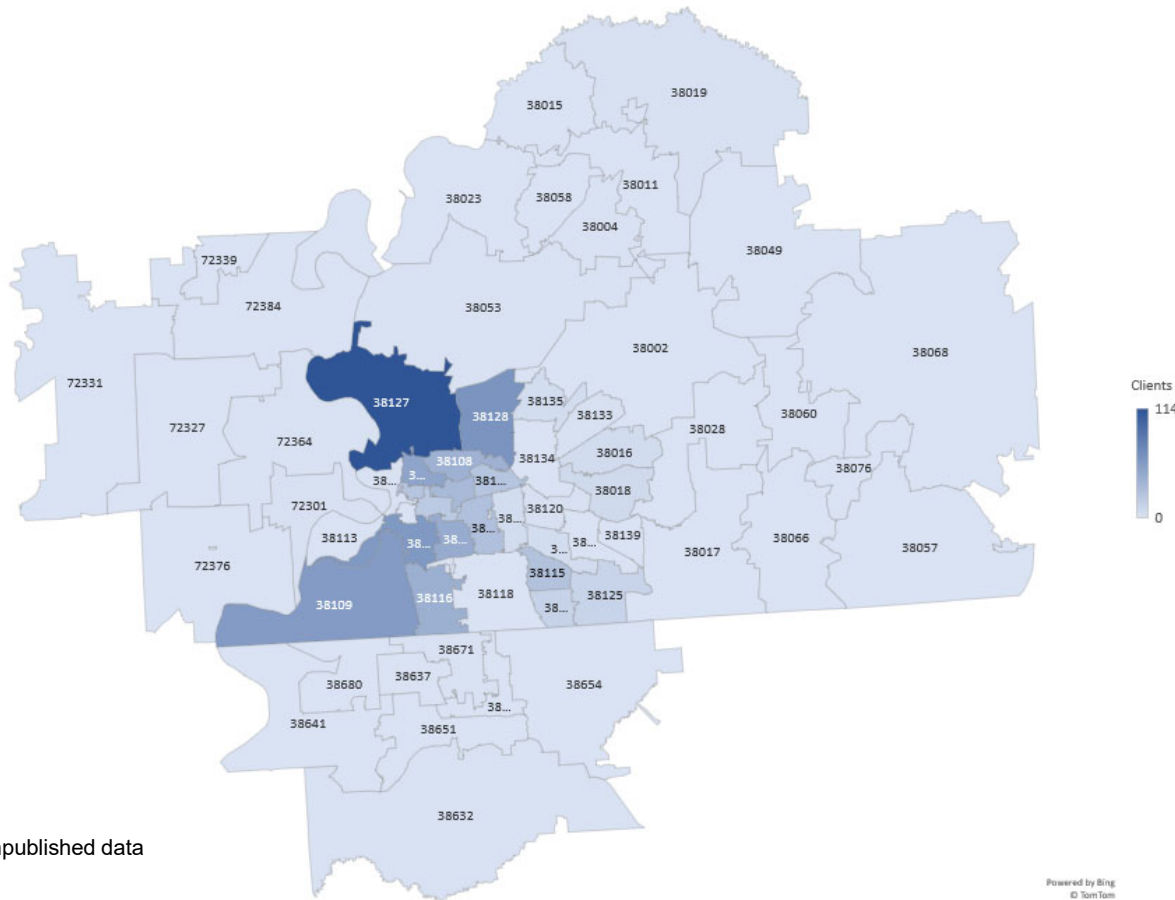

Children's Hospital

Client Demographics – Annual Income



Unpublished data

FRI Enrollment by ZIP Code



- Top ZIP Codes:
- 1.38127
 - 2.38128
 - 3.38106
 - 4.38109
 - 5.38107

Unpublished data

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Adverse Childhood Experiences (ACEs)

- Number of ACEs ranged from 0 to 11
 - Average of 1 ACE per child
- Most common ACEs:
 1. Your child's parents or guardians were separated or divorced (51.5%)
 2. Your child lived with a household member who was depressed, mentally ill, or attempted suicide (12.5%)
 3. Your child often saw or heard violence in the neighborhood or the school neighborhood (9.1%)
 4. Your child lived with a household member who served time in jail or prison (6.4%)
 5. Your child had a serious medical procedure or life-threatening illness (6.2%)

Social Determinants of Health



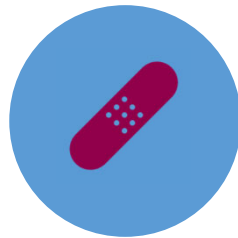
29.7% OF CLIENTS
REPORTED FOOD
INSECURITY



25.2% REPORTED
HOMELESSNESS OR
HOUSING ISSUES



22.1% REPORTED
UTILITY ISSUES



17.2% REPORTED VERBAL
OR PHYSICAL ABUSE



20.6% REPORTED
TRANSPORTATION ISSUES

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Client Primary Concern

Top concerns, as identified by client:

1. Food
2. Housing
3. Utilities
4. Child Behavioral Issues
5. Child's Developmental Health

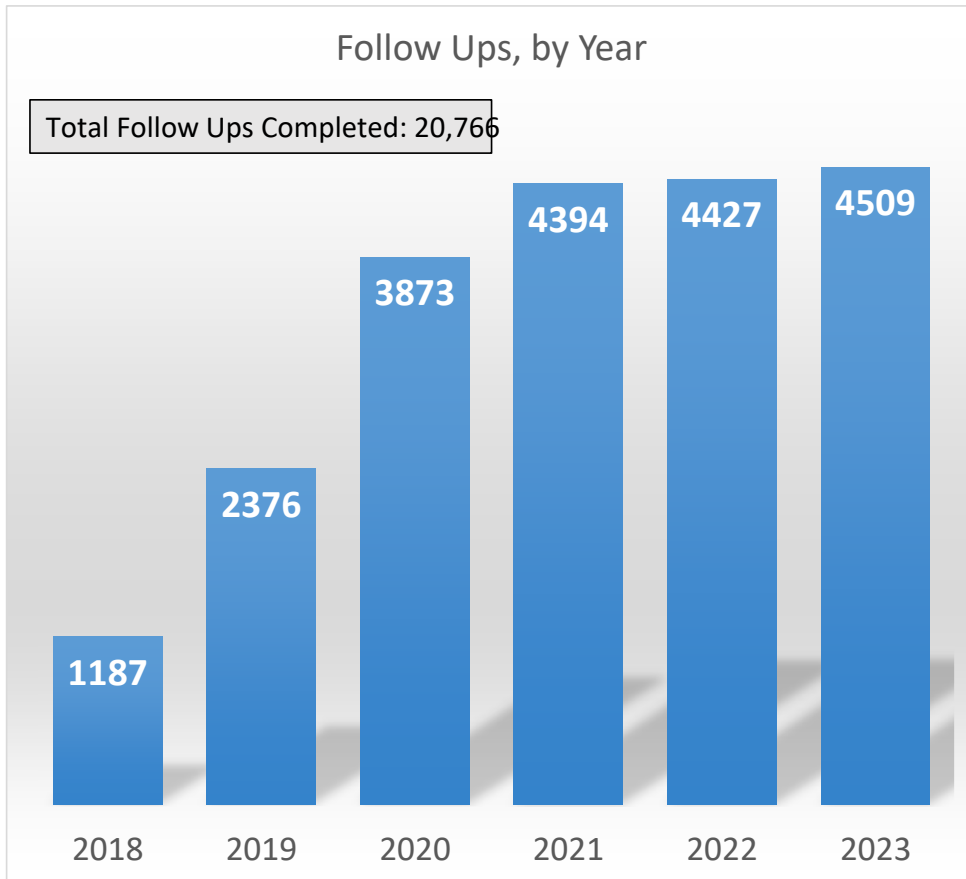
Referrals

- 58.7% of clients received a referral at initial intake
 - Many clients received multiple referrals
 - Additional referrals can occur at follow up or renewal

Top referrals include:

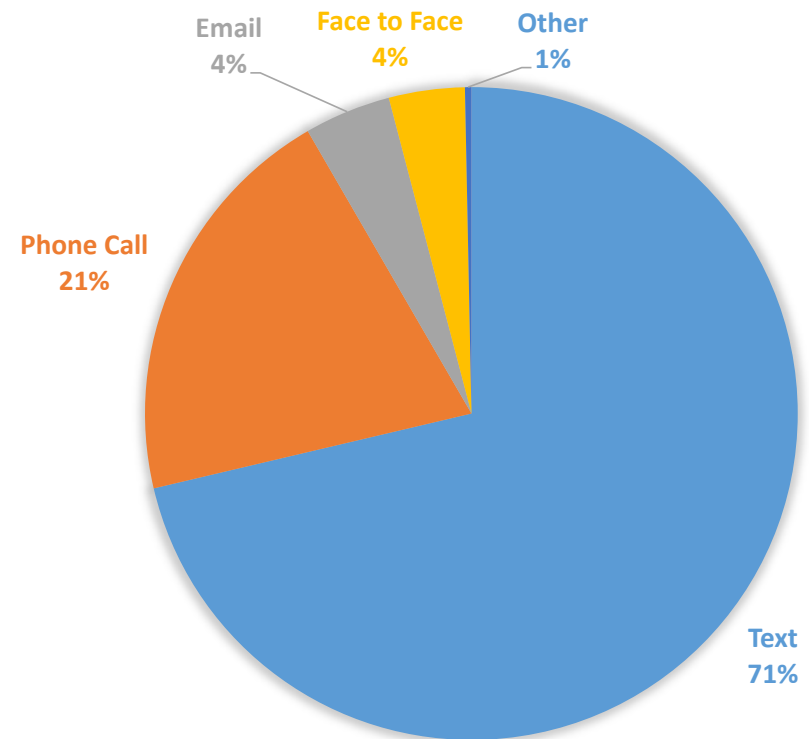
1. FRI Counseling
2. Mid-South Food Bank
3. Shelby County Community Services Agency
4. Memphis CHiLD
5. TennCare Transportation Assistance

Follow Up Activities

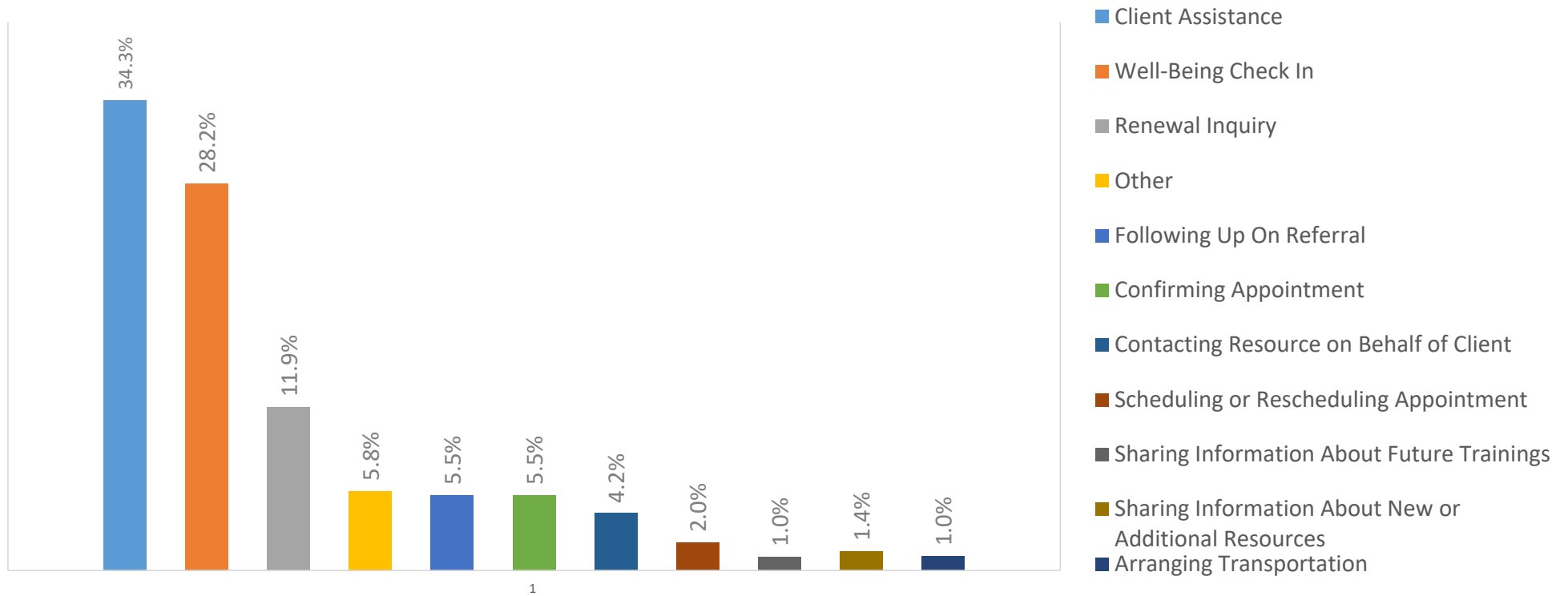


Unpublished data

FOLLOW UP TYPE



Types of Follow Up Activities



Client Satisfaction

- 89% were very satisfied with their FRI program experience
- 87% were very likely to recommend FRI to a friend or family member
- 99.5% felt supported by program staff



Unpublished data

Client Quotes

- “[She] was very helpful and very friendly to me and was very concerned about my needs and the children needs. I just love how professional and resourceful she was to me.”
- “[She] was very compassionate and sincere in offering help.”
- “Our visit was certainly informative and everything was explained thoroughly. I would gladly recommend to anyone.”
- “I love that you all are trying to help all the kids. Also to care for them like they are yall kids.”
- “Great Job! We need more programs like this.”
- “This is a invaluable resource.”

Client Story

- FRI Outreach Coordinator (previously a FRI client herself) approached a young mother at intake
- Mother was stressed due to crowded living situation and food insecurity
- Mother was initially hesitant to engage with FRI
- FRI Outreach Coordinator was able to pull from her own past experiences to discuss how the program can help and offered strategies for self care
- At follow-up the Outreach Coordinator was able to share information on income-based housing, job openings, and support with food insecurity
- After the conversation the mother stated she was more determined than ever to better herself for children

Client Story

- Grandmother caring for 3 grandchildren (2 enrolled in FRI)
 - Children are developmentally delayed with various chronic health conditions
 - Grandmother is in the process of adopting all 3 children
- Children have a history of toxic stress
 - Experienced neglect, caregivers in prison, and substance abuse in the home
 - Children enrolled in FRI were a year old with 7 ACEs already
- FRI Outreach Coordinator referred family to MCHiLD to assist with
 - Adoption process, children's disability and governmental assistance, issues with their landlord
- FRI Outreach Coordinator connected her with CCR&R to assist with a daycare facility better suited to children's health needs and to allow grandmother to start working again
- Family was referred to psychology services
- Family was referred to food pantries, diaper resources, and Neighborhood Christian Center for clothing resources

Whole Child Well Child Visits

- Programs like FRI are feasible in the primary care setting
- Use of a standardized screening instrument and database allow for replication
- ACEs are common, even in young children
- SDOH affect the entire family and may be intertwined with ACEs in children
- Warm hand offs are critical, but difficult to implement
- Frequent follow ups are a key component
- Addressing ACEs can create PCEs

Lessons Learned

- Develop rapport and build trust first
 - Example, asking SDOH questions first
- Reduced the number of ACEs required for psychology referral
 - These are very young children
 - Increase in psychology referrals during COVID
- Continuing trauma informed care trainings is critical, but difficult
 - COVID and staffing issues
- Be flexible and adapt
- Family, caregiver, and staff voices are critical

Clinical Applications



ACE-Associated Health Conditions: Pediatrics

Symptom or Health Condition	For $\geq X$ ACEs (compared to 0)	Odds Ratio
Asthma ^{26, 33}	4	1.7 - 2.8
Allergies ³³	4	2.5
Dermatitis and eczema ³⁹	3*	2.0
Urticaria ³⁹	3*	2.2
Increased incidence of chronic disease, impaired management ²⁵	3	2.3
Any unexplained somatic symptoms ²⁵ (eg, nausea/vomiting, dizziness, constipation, headaches)	3	9.3
Headaches ³³	4	3.0
Enuresis; encopresis ⁵	–	–
Overweight and obesity ³	4	2.0
Failure to thrive; poor growth; psychosocial dwarfism ^{5, 2, 41}	–	–
Poor dental health ^{16, 22}	4	2.8
Increased infections ³⁹ (viral, URIs, LRTIs and pneumonia, AOM, UTIs, conjunctivitis, intestinal)	3*	1.4 - 2.4
Later menarche ⁴⁰ (≥ 14 years)	2*	2.3
Sleep disturbances ^{5, 31}	5**	PR 3.1
Developmental delay ³⁰	3	1.9
Learning and/or behavior problems ³	4	32.6
Repeating a grade ¹⁵	4	2.8
Not completing homework ¹⁵	4	4.0
High school absenteeism ³³	4	7.2

Future Clinical Applications



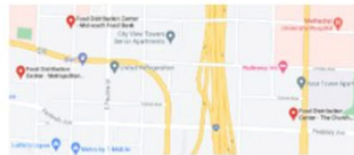
- Transportation issues
- Food insecurity
- Housing issues

It seems that you have issues with housing, food, and transportation. What would you say is your most stressing need right now?

struggling to buy enough food.

I would be more than happy to assist you with that. Do you mind sharing your zip code

38127



October 2014

Mo	Tu	We	Th	Fr	Sa	Su
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	1	2	3	4
5	6	7	8	9	10	11

I found some food distribution centers near you. Please select the one that suits you the most and schedule a day.

Detected Issues

SDoH

Results of SDoH screener
Food Insecurity (primary concern)
 transportation difficulty
 lead-based paint in the house

ACEs

Results of ACEs screener
 Living with incarcerated parent
 Living with Mentally ill parent
 Living with parent with substance abuse

Symptomatology

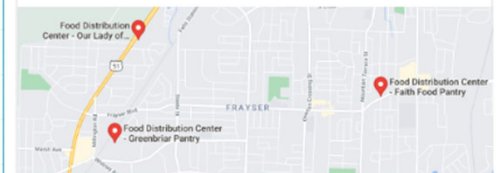
Suggested by the knowledge graph. Click follow up to load those into the conversation.
 frequent crying (confirmed)
 developmental regression

Follow up

Suggested resources

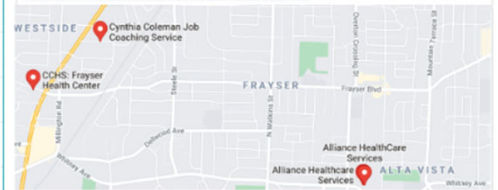
Accessible Food banks

Below are some resources within 38127 .



Accessible Psychology Clinics

Below are some resources within 38127 .



Select a resource or click share to load this into the chat window.

Share

N. Ammar et al., "SPACES: Explainable Multimodal AI for Active Surveillance, Diagnosis, and Management of Adverse Childhood Experiences (ACEs)," 2021 IEEE International Conference on Big Data (Big Data), 2021, pp. 5843-5847, doi: 10.1109/BigData52589.2021.9671303.

Future Clinical Applications

Assessment Summary

Risk Level

High

ACE score 3

Parent with substance Abuse
Mentally ill parent
Incarcerated parent

Symptoms or Health Conditions

developmental regression
frequent crying

SDoH

Food insecurities
Housing issues (lead-based paint)
Transportation issues

Relevant Facts about 38127

Mean distance to nearest farmers market (miles)
Mean distance to nearest psychology clinic (miles)
% Households w/o vehicle

Forward to
Care navigator

ACEs Assessment Report

Recommendations

This parent needs immediate referral to accessible community food banks in 38127
The child needs appropriate counseling.

Access Assessment
Summary

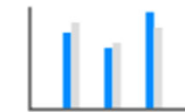
How this child/parent compare to other cases



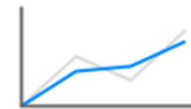
Most prevalent
Issues



Issues by
geographic location



Issues by Age groups



Trends overtime



SDoH ACEs associations

N. Ammar et al., "SPACES: Explainable Multimodal AI for Active Surveillance, Diagnosis, and Management of Adverse Childhood Experiences (ACEs)," 2021 IEEE International Conference on Big Data (Big Data), 2021, pp. 5843-5847, doi: 10.1109/BigData52589.2021.9671303.

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Research Program

- Purpose – to systematically study the impact of the FRI clinical program and compare it to standard of care practice
- Quazi-experimental design (non-randomized clinical trial)
 - FRI patients enrolled in morning clinics
 - Controls enrolled in the afternoon clinics
- 390 mother-infant dyads
- Examine the effects of participation in the FRI on clinical, behavioral, and social outcomes
- Outcomes collected at baseline and yearly for 3 years

Research Outcomes

- Objective 1: Determine the effect of the FRI clinical program on mental health, development and school readiness of children in the program compared to controls
 - Child Behavior Checklist (CBCL) – primary endpoint
 - Devereux Early Childhood Assessment- primary endpoint
 - Mental health and behavioral diagnoses via EMR review, MCHAT (autism screener)
 - Age appropriate Ages and Stage Questionnaire (developmental screener)
 - Flourishing Tool
 - Parental Stress Index – measure of maternal stress
 - Northwest Evaluation Association Measure of Academic Progress (NWEA MAP) score – obtained through Seeding Success as a measure of kindergarten readiness

Research Outcomes

- Objective 2: Determine the effect of the FRI clinical program on the physical health and healthcare utilization of children in the program compared to controls
 - EMR review
 - Obesity/Growth (Weight, Height, BMI)
 - Hypertension (BP)
 - Asthma/Allergy
 - Immunization status
 - Emergency Department Visits

Research Outcomes

- Objective 3: Determine the effect of FRI clinical program on methylation of DNA from blood and saliva of children and their mothers enrolled in FRI clinical program compared to controls
 - DNA of blood and saliva from mother/child dyads
 - Biological specimens are optional
 - 125 intervention and 125 control specimens

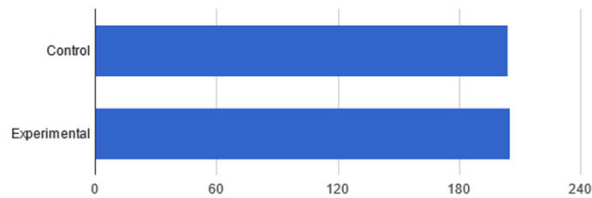
Research Data

- Total Enrollment June 2019-August 2023 (Completed)
 - 409 mother-infant dyads enrolled
 - 204 dyads in the control group
 - 205 dyads in the intervention group
- Biorepository Arm (Operational beginning September 2020)
 - 106 in the control group
 - 116 in the intervention group
- Annual Follow-ups (Ongoing)
 - Year 1 Follow-ups completed: 203
 - Year 2 Follow-ups completed: 181
 - Year 3 Follow-ups completed: 129

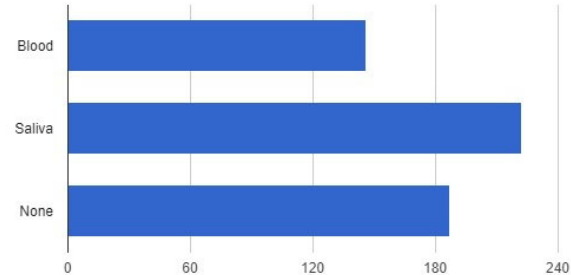
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Research Data

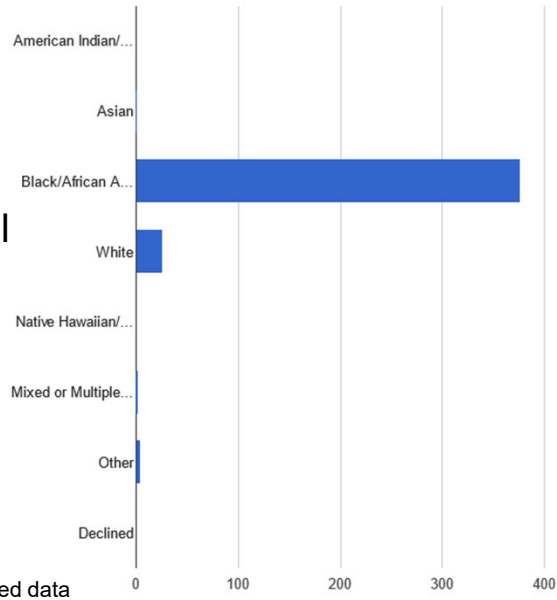
Subjects enrolled



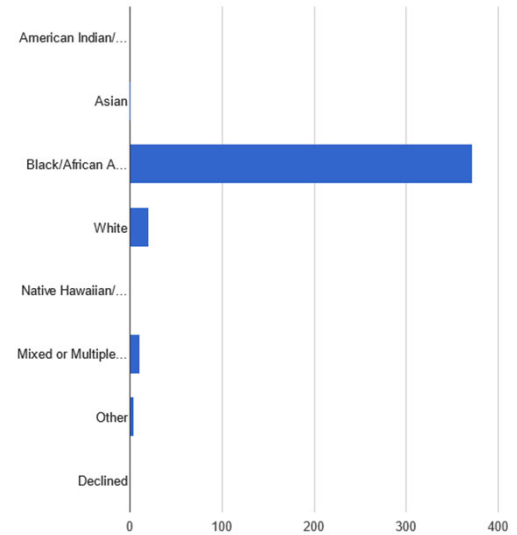
Biorepository samples collected



Maternal race



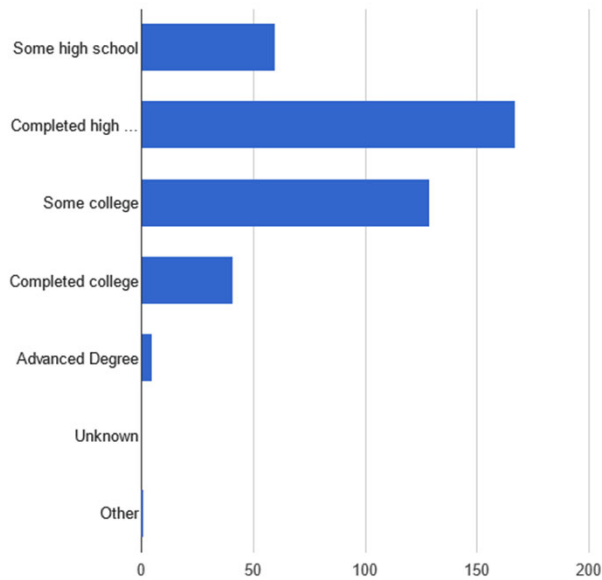
Child race



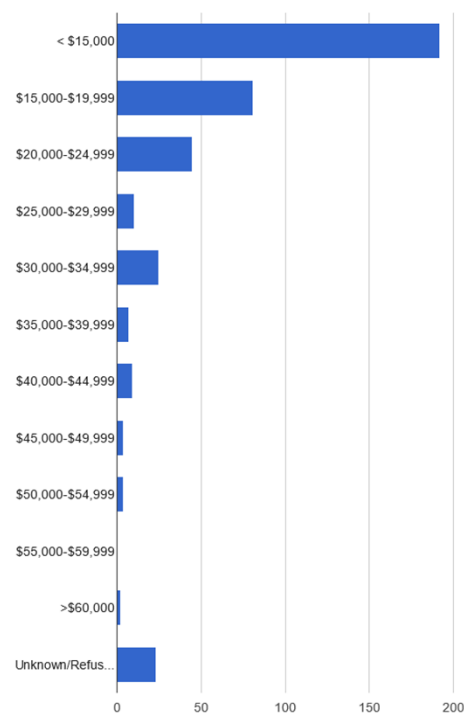
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Research Data

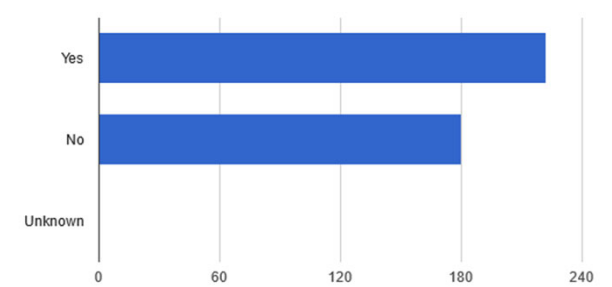
Maternal education



Household income



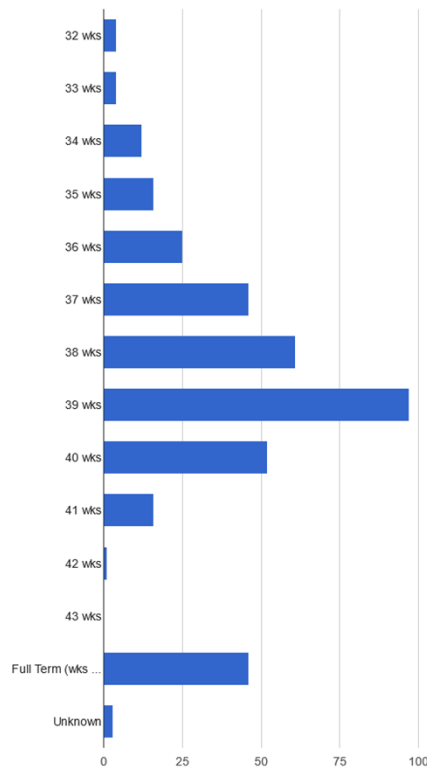
Maternal employment



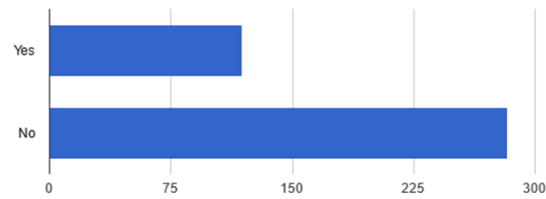
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Research Data

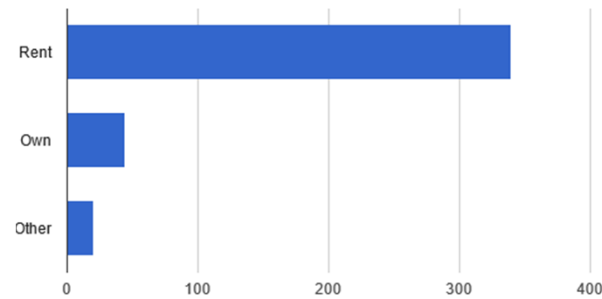
Gestational age of child



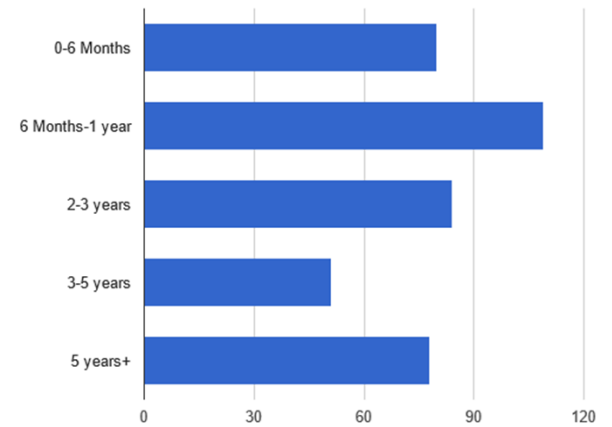
Biological father resides with child



Home owned or rented



Years at same address



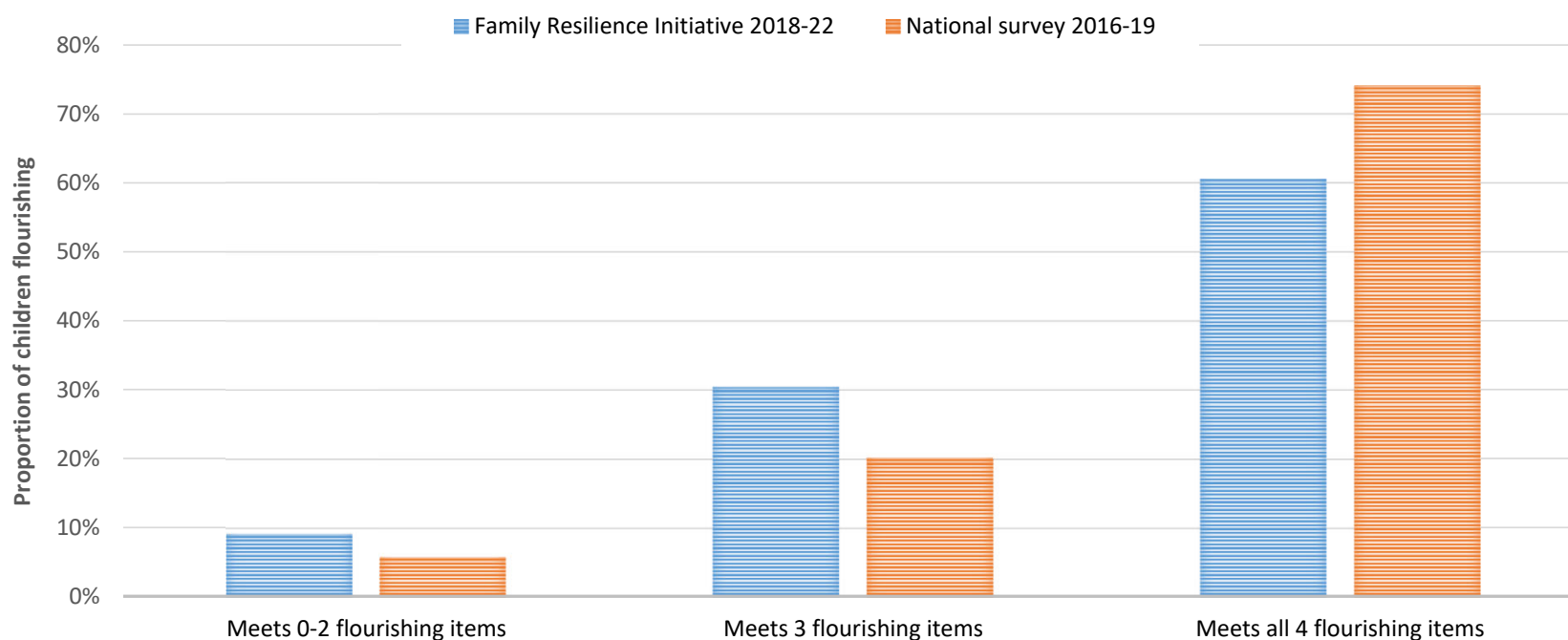
Unpublished data

Assessment of Flourishing in FRI Clinical Subjects

- The Flourishing survey was developed for the National Survey of Children's Health and comprises four questions that aim to capture curiosity and discovery about learning, resilience, attachment with parent, and contentment with life
- The parent is asked how true each statement is about the child using one of the three possible responses: definitely true, somewhat true, or not true
 - Child is affectionate and tender
 - Child bounces back quickly when things don't go his/her way
 - Child shows interest and curiosity in learning new things
 - Child smiles and laughs a lot
- Flourishing (adj.)
 - Marked by vigorous and healthy growth

Assessment of Flourishing in FRI Clinical Subjects

FLOURISHING – FRI VERSUS NATIONAL DATA



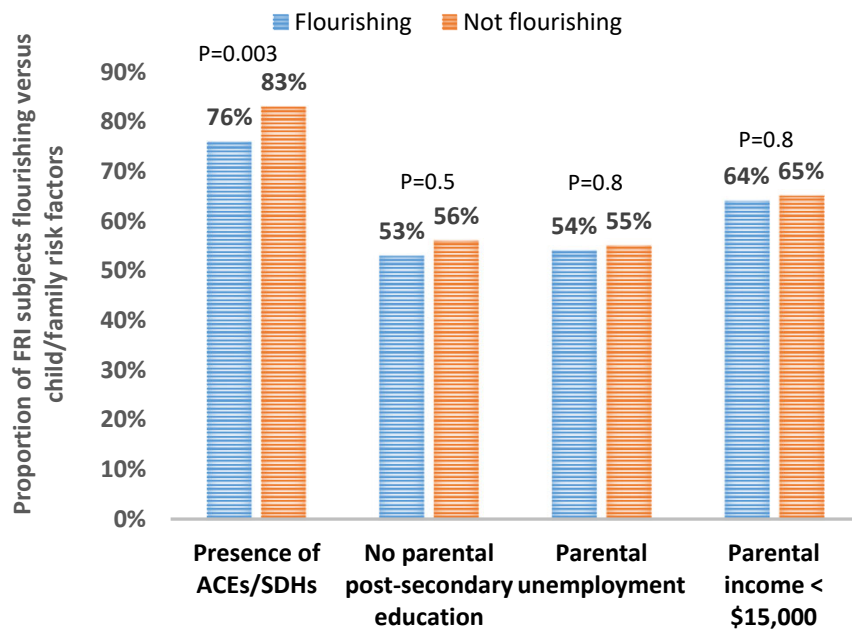
THE EFFECT OF ADVERSE CHILDHOOD EXPERIENCES AND SOCIAL DETERMINANTS OF HEALTH ON CHILD FLOURISHING. A Conner, L Wideman, J Yaun and SR Arnold, Memphis, TN. University of Tennessee Health Science Center Le Bonheur Children's Hospital

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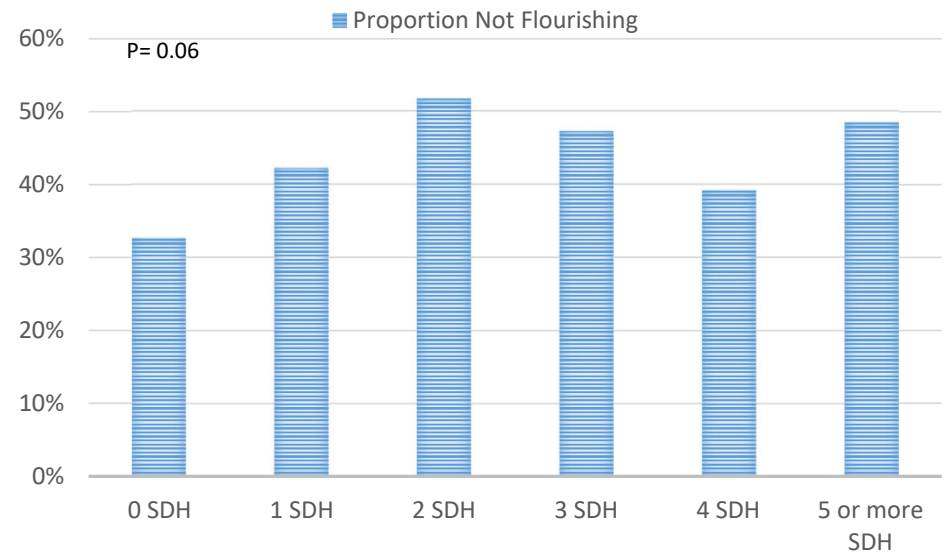
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Assessment of Flourishing in FRI Clinical Subjects

CHILDHOOD FLOURISHING



PROPORTION OF CHILDREN NOT FLOURISHING BY NUMBER OF SDH



THE EFFECT OF ADVERSE CHILDHOOD EXPERIENCES AND SOCIAL DETERMINANTS OF HEALTH ON CHILD FLOURISHING. A Conner, L Wideman, J Yaun and SR Arnold, Memphis, TN. University of Tennessee Health Science Center Le Bonheur Children's Hospital

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Impact of Incarceration and Violence

ACEs and PEARLS

for deeper insights into childhood adversity

ACEs

- 1 VERBAL ABUSE
- 2 PHYSICAL ABUSE
- 3 SEXUAL ABUSE
- 4 EMOTIONAL NEGLECT
- 5 PHYSICAL NEGLECT
- 6 DIVORCE OR SEPARATION
- 7 PHYSICAL ABUSE OF A PARENT
- 8 ALCOHOL OR DRUG ABUSE BY A PARENT
- 9 MENTAL ILLNESS OF A PARENT
- 10 INCARCERATION OF PARENT

PEARLS

- 1 EXPERIENCED VIOLENCE OR BULLYING
- 2 EXPERIENCED DISCRIMINATION
- 3 EXPERIENCED HOUSING INSECURITY
- 4 EXPERIENCED FOOD INSECURITY
- 5 EXPERIENCED SEPARATION FROM PARENT OR CAREGIVER DUE TO FOSTER CARE, OR IMMIGRATION
- 6 EXPERIENCED SERIOUS PHYSICAL ILLNESS OR DISABILITY OF PARENT OR CAREGIVER
- 7 EXPERIENCED THE DEATH OF A PARENT OR CAREGIVER

• PEARLS

- **Pediatric ACEs and Related Life-Events Screener**
- 10 “original” ACEs
- **7 additional ACEs**
 - Recognizing role of **SDOH** in childhood ACEs
- Identified or de-identified screeners
- Child, adolescent, and adolescent self-report, and adult tools
- Translated in over 17 languages

Thakur N, Hessler D, Koita K, et al.. Pediatrics adverse childhood experiences and related life events screener (PEARLS) and health in a safety-net practice. Child Abuse Negl. 2020;108:104685. doi:10.1016/j.chiabu.2020.104685.

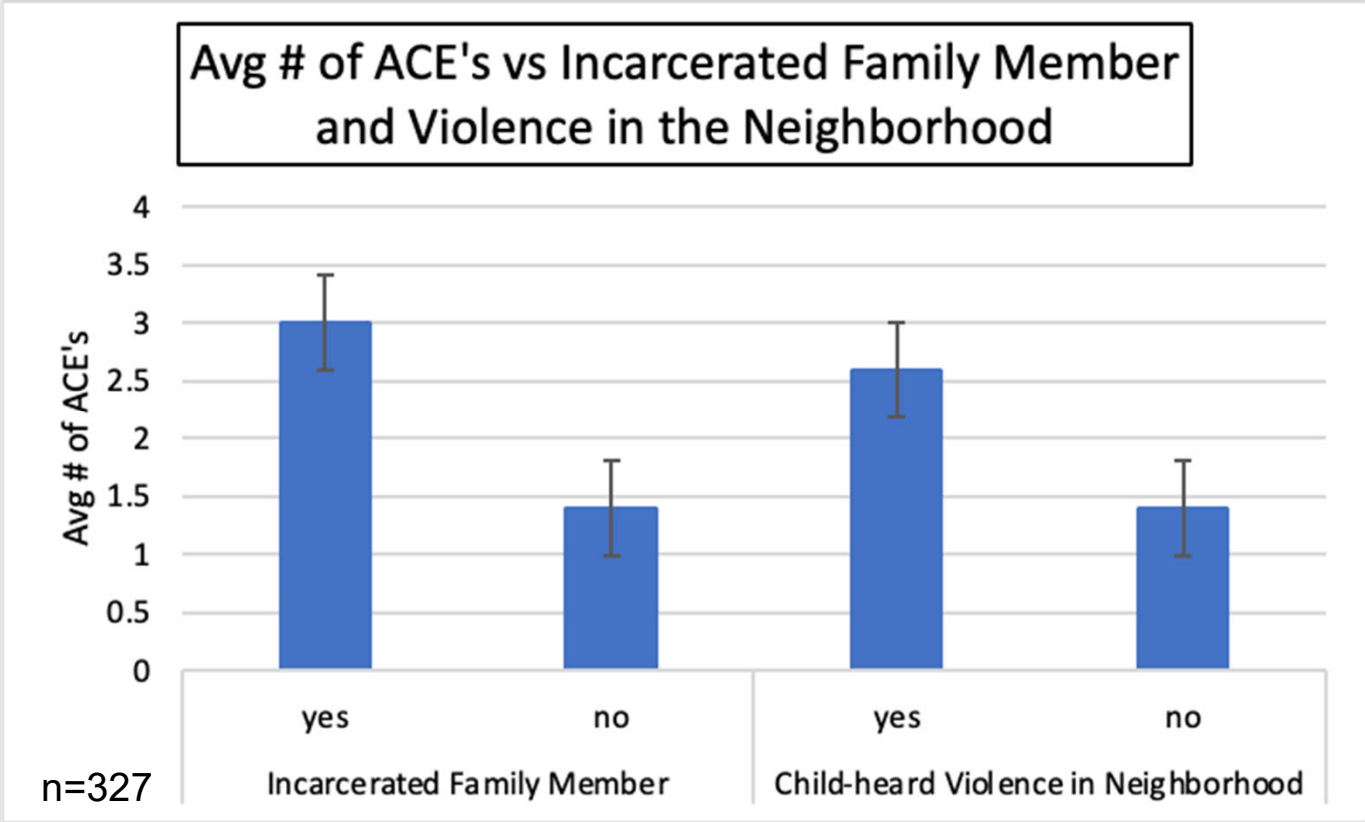
Impact of Incarceration and Violence

- About ½ of individuals incarcerated in US prisons are parents to minors
- Results in 1.25 M children with an incarcerated parent in the US
- Incarceration is a systemic issue, disproportionately impacting racial and ethnic minorities
- Research demonstrates associations between parental incarceration and decreased physical, cognitive and social emotional development in their children
- Memphis and US have experienced increasing levels of community violence in recent years

Impact of Incarceration and Violence

- Examined FRI patients reporting at least one ACE (n=327)
- 10.7% (n=35) reported living with a household member who spent time in jail/prison
- 15% (n=49) reported seeing or hearing violence in their neighborhood

Impact of Incarceration and Violence



EXAMINING THE IMPACT OF PARENTAL INCARCERATION ON ACE SCORE. RJ Tanenbaum, B Fickling, J Curry and J Yaun, Memphis, TN. University of Tennessee Health Science Center

Impact of Incarceration and Violence

- Those experiencing parental incarceration and community violence had higher overall ACEs scores
- These factors may contribute to toxic stress in young children and be associated with experiencing a higher ACEs score overall
- Structural and systemic policies around incarceration and community violence exposure should consider the impact on children
- Inequalities should be addressed through systemic policy changes

Transportation Access and Urban Sprawl

- Transportation access continues to be a leading SDOH
- Without regular access to transportation, it can be difficult for patients to attend medical appointments and get medications
- Lack of transportation has been proven to be associated with adverse health outcomes due to missed care, loss to follow up, and late intervention for preventable and manageable illness
- There is still little research exploring its effects in the pediatric population

Transportation Access and Urban Sprawl

- Memphis is a geographically large city spread out over 304 miles
- Lack of density makes both private and public transportation difficult due to time and cost
- Memphis Area Transportation Authority (MATA) is the only public transportation provider in the region
- In 2022, 9% of Shelby County residents had no access to personal transportation

Transportation Access and Urban Sprawl

- Cross-sectional study using data collected June-August 2023, examining
 - Transportation access
 - Attendance at healthcare appointments
 - Knowledge/use of the state Medicaid rideshare program
 - Participant input regarding ideal solutions to transportation barriers to the clinic
- Included any guardian or caregiver over the age of 18 accompanying a pediatric patient to their appointment
- Calculated descriptive statistics of the 665 participants
- Performed comparative statistics and logistic regression analysis of key transportation and quality of care metrics

Transportation Access and Urban Sprawl

Table 1: Demographics of the study population

Characteristic	N = 665 N (%) or median (range)
Median Age of Caregiver in Years	32 (18-19)
Race	
American Indian/Alaskan Native	8 (1.2)
Asian	12 (1.8)
Black/African-American	525 (79.0)
White	70 (11.0)
Other	50 (7.5)
Relation to Patient	
Parent	603 (91.0)
Non-Parental Relative	36 (5.4)
Non-Related Parental Guardian	5 (0.8)
Caregiver Not Otherwise Specified	21 (3.2)
Insurance Type	
TennCare	598 (90.0)
Private Insurance	59 (8.9)
Self-Pay	8 (1.2)
Education	
High-School Degree or Less	291 (43.8)
Some College or More	374 (56.2)
Employment	
Employed full/part time	438 (65.9)
Unemployed	227 (34.1)
Income	
≤20K	245 (36.8)
>20K	306 (46.0)
Unknown	114 (17.1)

Table 1: Demographics of the study population cont.

Characteristic	N (%)
Car Ownership	
N = 665	
Own Car	556 (83.6)
Do Not Own Car	109 (16.4)
Car Expense Burdens [select all]	
N = 556	
Gas	207 (37.2)
Routine Maintenance	154 (27.7)
Car Insurance	173 (31.1)
Accident Repair	64 (11.5)
Car loans	53 (9.5)
Other	8 (1.4)
Reasons for Not Owning Car [select all]	
N = 109	
No need	14 (12.8)
Purchase cost	82 (75.2)
Ownership costs	35 (32.1)
Purchase Process	12 (11.0)
No license/experience	18 (16.5)

TRANSPORTATION BARRIERS FACED BY PATIENTS IN A GENERAL PEDIATRICS CLINIC: THE IMPACT OF URBAN SPRAWL. WT Fesmire, A Alana, C Lock, C Zhao, J Wan, S Grimes and J Yaun, Memphis, TN. University of Tennessee Health Science Center

Transportation Access and Urban Sprawl

- Compared to caregivers who had reliable access to a car, those who had to use other options (i.e., bus, Uber/Lyft, Medicaid rideshare program, walking, other):
 - were younger (28 vs. 33 years, $p < 0.001$)
 - had a lower level of education (76% vs. 24%, $p < 0.001$)
 - were unemployed (59% vs. 41%, $p < 0.001$)
 - made $< \$20,000$ per year (83% vs. 17%, $p < 0.001$)

Table 2: Most Often Used Mode of Transportation to Clinic

Characteristic	N = 661 (%)
Your Own Car	501 (75.8)
Rider from Friend/Family	101 (15.3)
Bus	11 (1.7)
Taxi	0 (0.0)
Uber/Lyft	18 (2.7)
TennCare	19 (2.9)
Bike	0 (0.0)
Walking	3 (0.5)
Other	12 (1.8)

Transportation Access and Urban Sprawl

- 21% of caregivers had missed an appointment
- 26% had been late to an appointment
- Compared to caregivers on time for their appointments, a greater proportion of caregivers who were late/missed appointments:
 - had state Medicaid (94% vs. 87%, $p = 0.011$)
 - were unemployed (40% vs. 30%, $p = 0.013$)
 - made less < \$20,000 per year (57% vs. 36% $p < 0.001$)
- Patients with reliable access to a car were less likely to be late or to miss appointments (OR = 0.22, $p < 0.001$)

Transportation Access and Urban Sprawl

Preferred Solution to Transportation Barriers to Clinic (N = 246)



TRANSPORTATION BARRIERS FACED BY PATIENTS IN A GENERAL PEDIATRICS CLINIC: THE IMPACT OF URBAN SPRAWL. WT Fesmire, A Alana, C Lock, C Zhao, J Wan, S Grimes and J Yaun, Memphis, TN. University of Tennessee Health Science Center

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Transportation Access and Urban Sprawl

- Reliable access to a car is a primary determinant of health in cities experiencing urban sprawl
- Lack of reliable car access/car ownership is associated with late/missed appointments and having to leave appointments early
- Future Directions
 - Car expense burdens and intervention within clinic
 - State Medicaid rideshare program

Future Goals and Direction

- Expansion to adolescent populations
- Expansion to private practice models
- Continue to publish data and outcomes
- Use outcomes to develop policy recommendations around screening and intervention processes, reimbursement, replication, and scalability
- MCOs and government entities to pay for these types of programs and provide the supports necessary to carry them out
- Continue to follow families and collect data

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Questions?

