

#### Goal of a Nation

- To produce a well-educated and healthy adult population that is sufficiently skilled to participate in a global economy and to become responsible stakeholders in a productive society.
  - American Academy of Pediatrics Technical Report—2012
     "The Lifelong Effects of Early Childhood Adversity and Toxic Stress"



#### How Do We Do That

- Use good science to make good investments
  - Need to invest in evidence-based practices that address complex social, economic, environmental, and developmental issues that influence population-based health disparities



### Impact of Neglect





Bruce Perry, MD

## Critical Concepts in Early Brain Development



- Brain growth and plasticity
- Critical periods of sequential development
  - Molecules in the brain that stimulate neural plasticity
- Role of experience

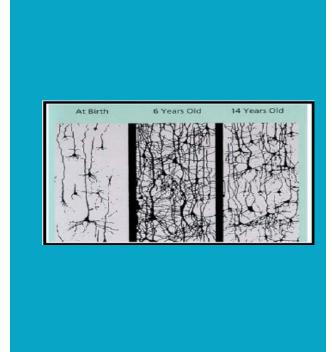
#### Synapses = Connections

- The human brain is shaped through neuronal connections
- · Changes in these connections

• birth: 50 trillion synapses

1 year: 1,000 trillion20 years: 500 trillion

The remodeled brain facilitates efficiency and learning

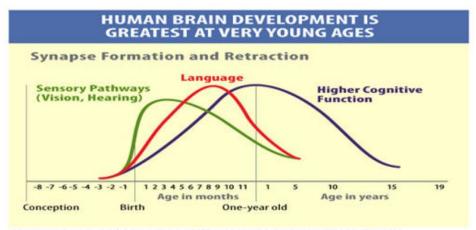


### Synaptic Growth and Pruning

- Synaptic pruning occurs in areas that are infrequently used
  - Results in decreased number of synapses between neurons
  - Maximum number of synapses occurs around age 3 y/o
- Allows for improved functionality and efficiency of synaptic transmission in the brain
- Plasticity (the ability to change your brain) essentially reaches adult levels by age 10 y/o



## Brain Development as a Measure of Synapse Formation

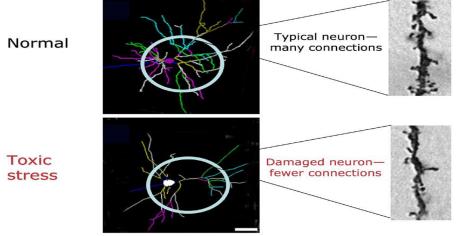


SOURCE: C. A. Nelson in From Neurons to Neighborhoods, 2000





#### **Persistent Stress Changes Brain Architecture**



Prefrontal Cortex and Hippocampus

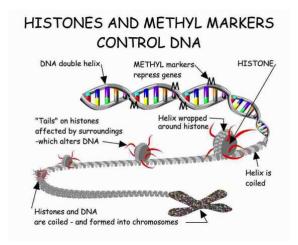
Sources: Radley et al. (2004) Bock et al. (2005)

### Physiologic Response to Stress in Kids

- Stress without the buffering response of a strong adult relationship causes prolonged, brain-controlled secretion of stress hormones
  - Cortisol, norepinephrine, epinephrine, etc.
- Stress responses are beneficial in the short term with adult support, but can be damaging to health if they occur over long periods of time
  - Constant wear and tear
  - Potentially permanent changes in gene regulation



#### **Epigenetics**





### **Epigenetics in Rats**

- Rat mothers who groom and lick their pups during the first week of life have pups that have a less vigorous response to stress as adults than mothers who don't groom well
  - Appears to be caused by DNA methylation and histone changes in stress-related genes
- Stressed rat mothers with bad nurturing behavior have pups with poor cognitive skills as adults and persistent changes in stress-related gene expression



#### Childhood Epigenetic Changes

- Kids raised in institutional environments (Romanian orphanages)
  - · Epigenetic changes in regions of brain development
- Adults exposed to abuse as kids:
  - 997 different genes had methylation patterns that were different than from adults who were not abused
    - Genes were involved with cell signaling pathways, brain development, immune function, stress regulation, etc
  - Similar results from adults from the foster care system, adults exposed to violence as kids, adults exposed to neglect as kids...



### How Do These Epigenetic Changes Affect Stressed Kids

- <u>Structural brain changes:</u> Smaller hippocampus (memory), smaller corpus callosum (connections between the hemispheres of the brain), smaller prefrontal cortex (reasoning, emotional control), larger amygdala (anxiety and release of stress hormones from the pituitary)
- Inflammation/immunological changes: C-reactive protein, stress cytokine levels elevated in adults with history of early adversities
- <u>Endocrine changes</u>: Dysregulation of stress hormones, decreased oxytocin



### Epigenetics Passed from Moms to Children

- Fetal exposure to maternal stress influences future stress responses in a negative way through epigenetics
  - Moms who are stressed (stressful event—famine, increased anxiety, depression) during pregnancy are more likely to have kids with:
    - · Preterm birth
    - Poor emotional coping skills
    - Decreased cognitive abilities
    - Increased fear response to stimuli
    - Increased anxiety
    - Decreased immune function
    - Autism
    - Lots of others....



#### Epigenetics Passed from Dads to Sons

- Offspring of Civil War prisoners (4600 kids)
  - Sons—died earlier
    - Sons born before the war didn't have any mortality differences
  - · Daughters-unaffected
- Seems to occur through transmitted RNA molecules rather than methylation or histone modification



#### **Telomeres and Stress**

- Telomeres appear to be impacted by trauma in childhood
  - Adults exposed to trauma as a child had shortened telomeres
    - Marker of accelerated ageing and disease



Pasleka/Photo Researchers Inc



### But These Epigenetic Effects Can Be Reversed

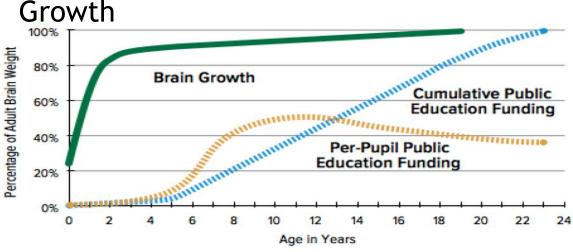
- Prevention programs that result in improved family function and better parenting skills result in:
  - Reversal of epigenetic changes in young children
    - · Reverses the brain changes seen in adulthood
  - Improved health outcomes
  - Decreased mental health issues
  - Decreased costs



### Public Investment in Children by Age



## Public Investment in Children by Brain Growth

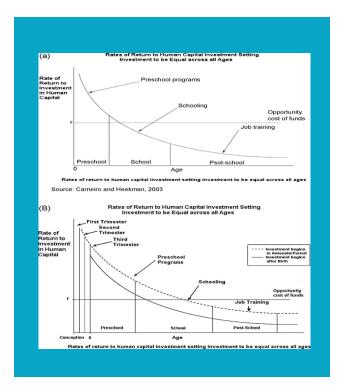




### Econometrics of Early Intervention & Prevention

 Funding early interventions provides the largest possible return on investment

Doyle et al. (2009) Investing in Early Human Development. In: Economics and Human Biology v7:pp1-6



#### Costs of Child Abuse: USA

- Over \$124 billion in costs/year (Fang et al., 2012)
- Lifetime cost per victim of nonfatal child maltreatment is \$210,012:
  - -\$144,360 productivity losses
  - -\$6,747 criminal justice costs
  - -\$32,648 childhood health care costs
  - -\$10,530 adult medical costs
  - -\$7,999 special education costs
  - -\$7,728 child welfare costs



#### A Common Language to Explain Development

#### 10 adverse childhood experiences surveyed:

- 1. Physical abuse
- 2. Sexual abuse
- 3. Emotional abuse
- 4. Emotional neglect
- 5. Physical neglect
- 6. Witness domestic violence
- 7. Mental illness in home
- 8. Family member incarcerated
- 9. Alcohol/drug problems
- 10. Parental separation or divorce



#### ACEs: Prevalence data

- Prevalence of ACEs in study group:
  - Sexual abuse = 21%
  - Domestic violence in childhood home = 13%
  - Substance abuse in home = 28%
  - Parental separation or divorce = 24%
  - Physical abuse = 28%
  - Emotional neglect = 15%
  - Emotional abuse = 11%
  - Physical neglect = 10%
  - Mental illness in home = 20%
  - Criminal household member = 5%

M Dong et al. (2003) Child Abuse and Neglect v27, pp 625-639.

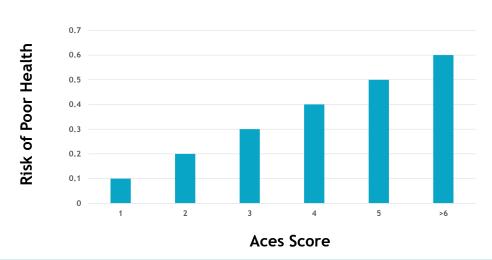


#### ACEs: Adult Health

- Key finding:
  - About 2/3rd of those surveyed reported at least one ACE.
  - The 1/3 of participants with no reported ACEs were consistently healthier across all measures.



#### ACEs Score = Dose Response





#### Health Measures Now Linked to Adverse Childhood Experiences Score

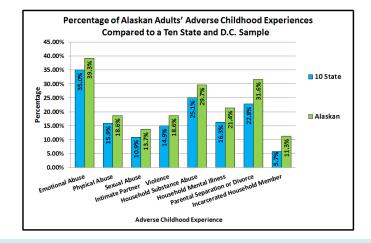
#### Stepwise increased risk for:

- Heart disease
- Asthma
- Diabetes
- Cancer
- COPD
- Skeletal fractures
- Sexually transmitted diseases
- · Liver disease
- Autoimmune disorders
- Osteoarthritis
- Smoking
- Alcohol abuse
- · Over eating and obesity
- · Illicit drug use
- Promiscuity
- IV drug use
- · Clinical depression

#### ▶ And

- Autobiographical memory disturbance
- Poor anger control
- Relationship problems
- Employment problems
- Early age at first intercourse
- Teen pregnancy
- Unintended pregnancy
- Teen paternity
- Fetal death
- Suicide
- Domestic violence
- Anxiety disorders
- Hallucinations
- Sleep disturbances
- · Chronic pain
- Headaches
- · Early death

#### ACEs: Alaska vs. 10 States



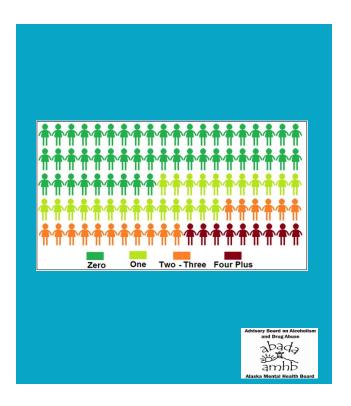
Advisory Board on Alcoholism and Drug Abuse

abada amhb



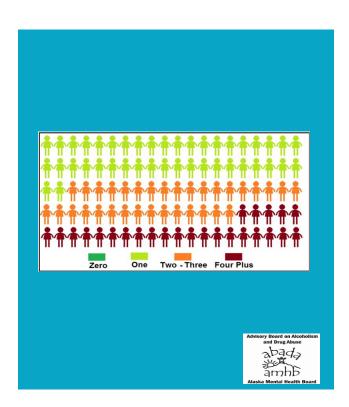
## Alaska ACEs in Children

 Alaska Children and Youth ACEs in the General Population



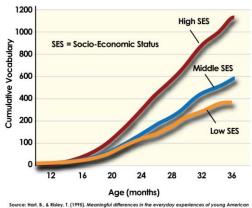
## Alaska ACEs in Children

 Alaskan Children and Youth ACEs for those who Experienced Low Income



### Disparities in Vocabulary Development



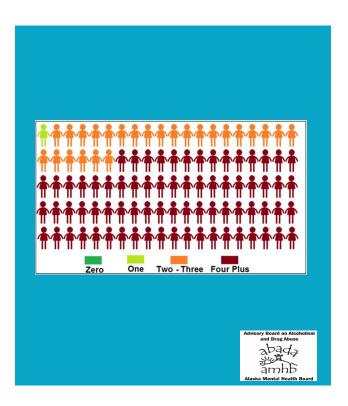


Source: Hart, B., & Risley, T. (1995). Med children, Baltimore, MD: Brookes



### Alaska ACES in Children

 Alaskan Children and Youth ACEs for those who Witness **Domestic Violence** 



### Intimate Partner Violence and Child Maltreatment

- 8.4% of Alaska moms report some form of intimate partner violence during the 12 months prior to or during pregnancy
  - >60% of children born to these moms experienced a report to OCS
- And.....intimate partner violence was present in 19.6% of children who had an OCS report



Jared Parish-State of Alaska

### Maternal Stress and OCS Referrals

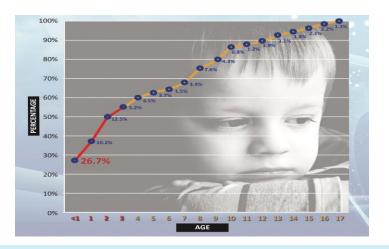
 Before 7 y/o, half of all children born to moms with 4 or more stressors are reported for child maltreatment

#### **Stressors:**

- 1. Being homeless
- 2. Husband/partner went to jail
- 3. Being in a fight
- 4. Loss of job even though wanted to keep working
- 5. Husband/partner lost job
- 6. Argued with husband/partner more than usual
- 7. Close family member very sick or hospitalized
- 8. Separated/divorced
- 9. Moved to a new address
- 10. Husband/partner said they didn't want pregnancy
- 11. Has a lot of bills couldn't pay
- 12. Someone close had problem with drinking/drugs
- 13. Someone close died

Jared Parish-State of Alaska

### Age When US Kids Accumulate Half of Their Lifetime ACEs





### Costs

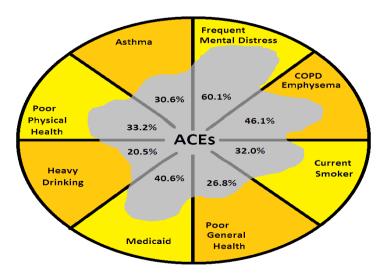
Alaskan adults who report <u>four or more</u> ACEs compared to Alaskan adults who report <u>zero</u> ACEs.

- 49% more likely to be unemployed
- 274% more likely to be unable to work
- 92% more likely to earn less than \$20,000 annually

Source: 2013 Alaska Behavioral Risk Factor Surveillance System, Analysis by Alaska Mental Health Board/Advisory Board on Alcoholism and Drug Abuse Staff

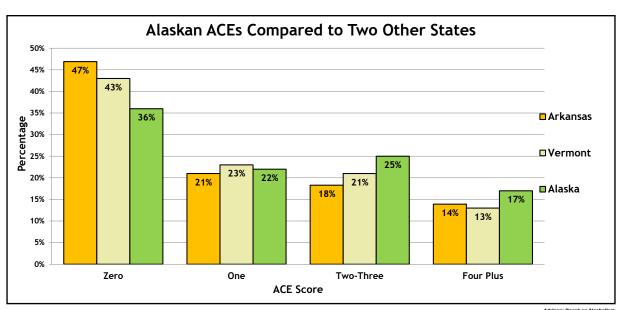


### Population Attributable Risks in Alaska





Source: Alaska data from the 2013 Alaska Behavioral Risk Factor Surveillance System, Alaska Department of Health and Social Services, Division of Public Health, Section of Chronic Disease Prevention and Health Promotion, Graphic: AMHB/ABADA



http://healthvermont.gov/research/brfss/documents/2010\_data\_brief\_ace.pdf http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5949a1.htm

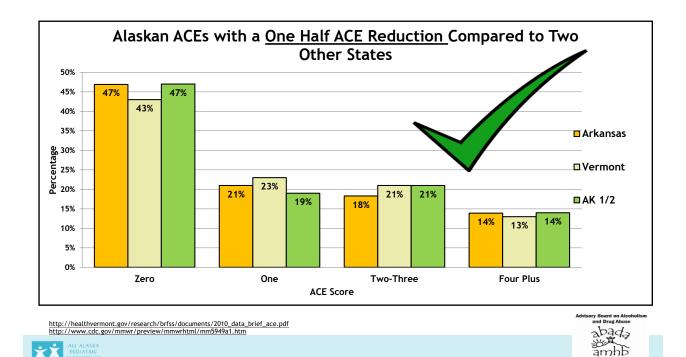


and Drug Abuse

and Drug Abuse

and Drug Abuse

Alaska Mental Health Board



### Reducing Alaska's ACE Score by ½ Point

- If we just look at the reduction of
  - Obesity
  - Adult Medicaid recipients
  - Smoking
  - Binge drinking
  - Diabetes
  - Arthritis
- Alaska will save \$90 million annually



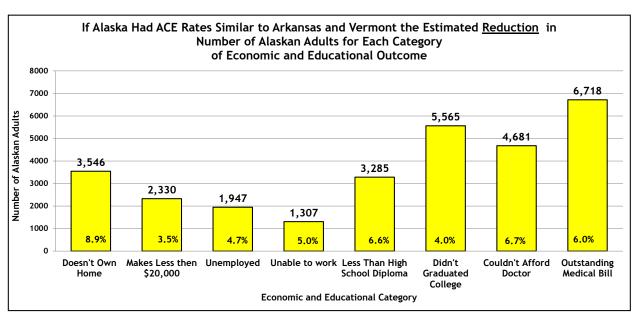
### What Does \$90 Million Buy in Alaska?

- · 258 three bedroom homes in Anchorage (average price \$347,000)
- 915 kindergarten teachers (wages only \$66,384 + 40%) \$97,938
- 846 police officers (wages only \$75,672 + 40%) \$105,941
- 518 mechanical engineers (wages only \$123,600 + 40%) \$173,040
- 339 pediatricians (wages only \$189,000 + 40%) \$264,600
- · Office of Children's Services General Funds 2016 Operations
- · All of the Behavioral Health State Medicaid Costs + \$18 million
- The General Funds for the Department of Commerce, Community & Economic Development + The Department of Labor & Workforce Development
- · 103,307 Flights from Ketchikan to Barrow in July (\$868)
- · Boeing 737-800 + \$17 million for fuel and crew.

Pick One!

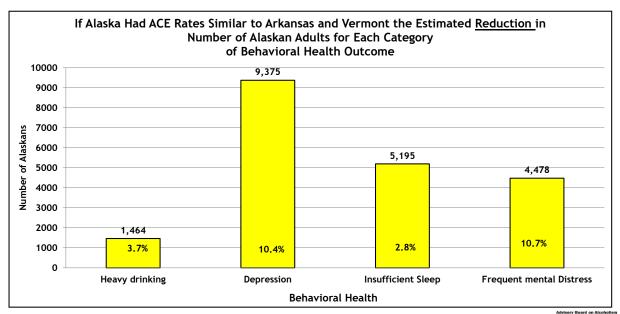
and Drug Abuse

http://live.laborstats.alaska.gov/occ/alloccs.cfm#L



Advisory Board on Alcoholism and Drug Abuse

Calculations based on 2013 Alaska BRFSS data conducted be the Alaska Mental Health Board and Advisory Board on Alcoholism and Drug Abuse Staff



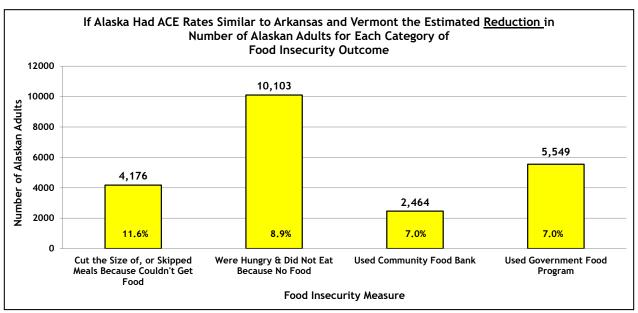
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Alaska Mental Health Roard



Calculations based on 2013 Alaska BRFSS data conducted be the Alaska Mental Health Board and Advisory Board on Alcoholism and Drug Abuse Staff



# How Do We Identify These Kids?



#### What We're Really Talking About Is Trauma-Informed Care

- This means we ask the question, "Let's have a conversation...." rather than "What's wrong with you?"
  - This fundamentally changes the way we interact with people
  - · Changes a interaction with a family from "I must fix you" to "I will listen to you"



### Behaviors Associated with Early Childhood Trauma

- Ages: 0-2
  - Dysregulated eating, sleeping patterns
  - Developmental regression
  - · Irritability, sadness, anger
  - Poor appetite, low weight gain
  - Increased separation anxiety, clinginess
- https://www.ecmhc.org/tutorials/trauma/m od3\_1.html
- https://www.samhsa.gov/childtrauma/recognizing-and-treating-childtraumatic-stress

#### Ages 3-6

- Increased aggression
- Somatic symptoms
- Sleep difficulties/nightmares
- Increased separation anxiety
- · New fears
- Increased distractibility/high activity level
- Increased withdrawal/apathy
- Developmental regression
- Repetitive talk/play about the event
- Intrusive thoughts, memories
- Absenteeism

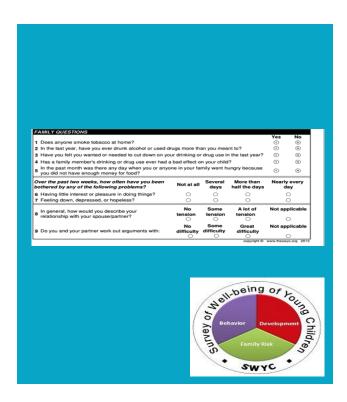
## Parent Screening Questionaire

- One-page questionnaire, completed by the parent
- Targets risk factors that jeopardize children's health, development and safety
- Administered at selected wellchild visits
- Free, available in 4 languages
- https://www.seekwellbeing.org/the-seekparent-questionnaire-



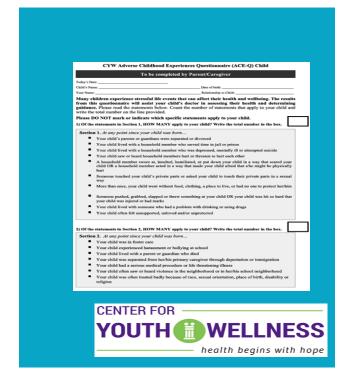
## Survey of Well-Being of Young Children

- Comprehensive screening instrument for children under 5. Forms available for each recommended well-child visit recommended by the AAP.
- Targets developmental milestones, social-emotional development, and family risk factors.
- Free; available in 3 languages
- theswyc.org



#### Center for Youth Wellness ACE-Q

Available for young kids and teens



#### Four Questions—Gets Almost Everything

- Has anything really stressful happened to your child since the last time I saw you?
- How has that affected your child's behavior?
  - Corollary question: How has this event and any changes in your child's behavior affected you?
- What have you done that's really fun with your child since the last time I saw you?
- Give me three words that describe your child to you



# Ok....so screening is positive...



#### Just Screening is Pretty Effective

- Studies suggest that screening alone for ACEs can improve health and reduce both ER (11%) and sick office visits (31%)
  - Just talking about past experiences with a respected provider relieves stress and improves physical and mental health
  - Suggests that screening should start immediately, but.....providers are nervous



#### If a Traumatic Stressor Is Identified:

- Assess for child and family safety
- Provide education/guidance about behavior management, routines and daily living activities to promote recovery and sense of safety
- Refer to social work, child protection, domestic violence team, etc, if needed
  - · Behavioral health/social work embedded into all clinics
- Alaska Child Trauma Center
- Help Me Grow Alaska



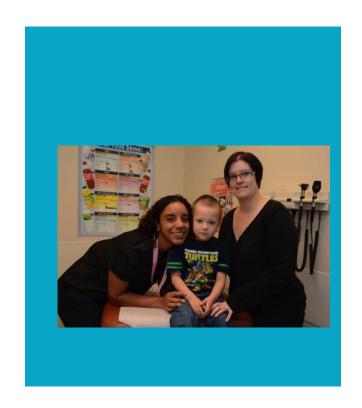
#### Resilience to ACEs

• The most important protective resource to enable a child to cope with exposure to violence is a strong relationship with a competent, caring, positive adult, often a parent—but doesn't have to be!



### Resilience— Ordinary Magic

 With the support of good parenting by either a parent or other significant adult, a child's cognitive and social development can proceed positively even with adversity



## So....Where Is the Best Place to Focus Society Efforts to Improve Family Health

 Data from the National Survey on Children's Health (2011-12) combining ACEs data with chronic child health outcomes, and overlaying environmental changes to see if there is an effect

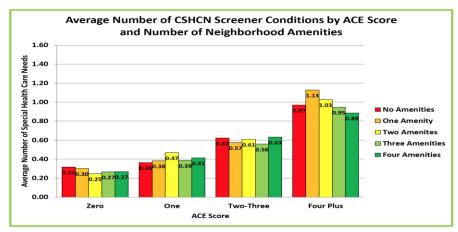


## Effect of Neighborhood Amenities on Child Health

- 1. Sidewalks
- 2. Parks
- 3. Recreational Center
- 4. Library



## Effect of Neighborhood Amenities on Child Health





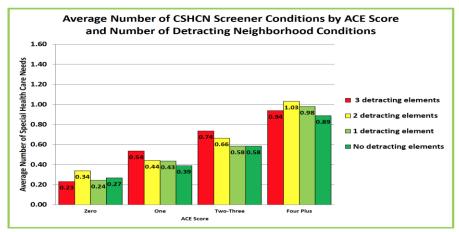


### Effect of Neighborhood Detracting Elements on Child Health

- 1. Litter or garbage about
- 2. Dilapidated housing
- 3. Broken windows or graffiti



### Effect of Neighborhood Detracting Elements on Child Health





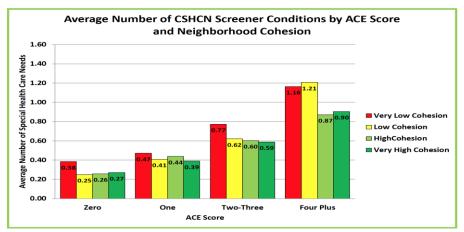


### Effect of Neighborhood Cohesion on Child Health

- 1. People help each other out
- 2. People watch each others children
- 3. People to count on
- 4. Adults I can trust



### Effect of Neighborhood Cohesion on Child Health





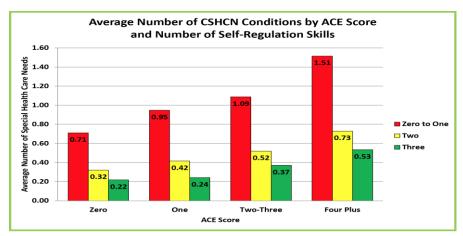


### Effect of Self-Regulation Skills on Child Health

- 1. Finishes tasks and follows through on commitments
- 2. Stays calm and in-control when facing a challenge
- 3. Shows interest and curiosity in learning new things



### Effect of Self-Regulation Skills on Child Health







### Keys to Resiliency

- Providing supportive adult-child relationships
- Scaffolding learning so the child builds a sense of self-efficacy and control
- Helping strengthen adaptive skills and self-regulatory capacities
- Using faith and cultural traditions as a foundation for hope and stability



### Self-Regulation: ARC Framework

- Attachment
  - · Caregiver affect management
  - Attunement
  - Consistent response
- Regulation
  - Identification
  - Modulation
  - Expression
- Competency
  - · Executive function
  - Self development
- Alaska Child Trauma Center—training available for organizations to implement ARC
  - https://www.acmhs.com/programs-services/child-family-services/alaska-child-trauma-center



## Strengthening Families

- 5 Protective Factors
  - Parental Resilience
  - Social Connections
  - Knowledge of Parenting and Child Development
  - Concrete Support in Times of Need
  - Social-Emotional Competence of Children

http://dhss.alaska.gov/ocs/Documents/families/Toolkit.pdf

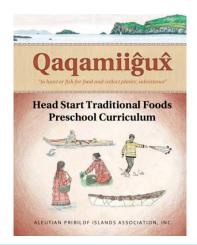


## Foundations of Healthy Development

- Healthy relationships
  - Consistent
  - Nurturing
  - Protective
- Healthy environment
  - · Free from toxins
  - Safe and active exploration
- Healthy nutrition
  - Breastfeeding support
  - Maternal nutrition\*\*
  - Traditional diet



#### **APIA Head Start**





### Building an Agenda for Families

- Universal screening for Social Determinants of Health to identify families at risk
  - https://www.texaschildrens.org/sites/default/files/uploads/documents/83176%20B RIEF%20Social%20Determinants%20of%20Health%20Policy%20Digital.pdf
- Support systems of Primary Care and Behavioral Health
  - Medicaid
  - Alaska 1115 Waiver
- · Child care and early education
  - · Universal, high-quality child care
  - Alaska SB 6
- Family economic stability
  - Employment support for parents
  - Paid parental leave
  - Flexible work hours to attend school activities



#### Building an Agenda for Families

- Support food security for families
  - The Children's Lunchbox
  - Food Bank of Alaska
- Support programs that train caregivers and parents to care for their children
  - Strengthening Families and Parenting Programs
- Support affordable, high-quality childcare for all families so that parents may work without compromising their child's development
  - Thread
- Support the development of trauma-informed schools
  - Transforming Schools: A Framework for Trauma Informed Practice in Alaska
  - Juneau Trauma-Informed Schools Pilot Project
- Support a safe place for kids to go after school
  - · Campfire Alaska



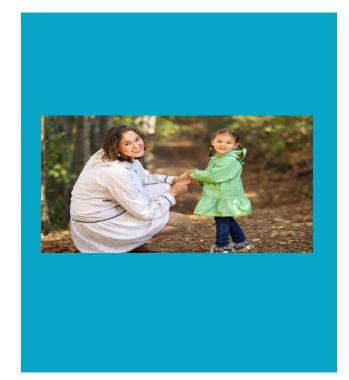
### Building an Agenda for Families

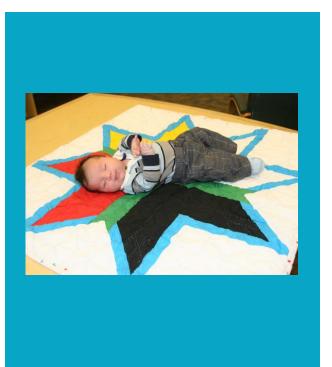
- · Community development
  - Housing
  - Environmental protection
- Support improved mental health services for families in all areas of Alaska
  - Judge Vanessa White's Family Court in Palmer
  - Alaska Child Trauma Center
- Support safe housing for families
- Support a living wage and ongoing training for teachers, Head Start workers, and childcare workers
- In general.....
  - Intensive intervention and support for families at high risk of experiencing toxic stress!!!



### Basically....

Families with young children are THE infrastructure of Alaska, and there's nothing more important to Alaska's successful future





### Finally....

• I didn't grow up having role models, I grew up having people I didn't want to be like and seeing situations I'd never want to be in. Not all of us are dealt the right cards, but that doesn't mean you can reshuffle your deck for a better outcome.

### Thank you!!!

#### Matthew Hirschfeld MD/PhD

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www.a2p2.org

