KEEP IT REAL:
HOW ONE PEDIATRICIAN MAKES MEDICAL HOME WORK FOR CHILDREN EXPOSED TO VIOLENCE

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Disclaimer

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DEFENDING CHILDHOOD
PROTECT HEAL THRIVE

JUSTICE FOR VICTIMS
JUSTICE FOR ALL
Office for Victims of Crime
OVCA
Intro to ACEs: Health Impacts of Trauma

- Introduction
- Review of Adverse Childhood Experiences
- The CPMC Bayview Child Health Center Experience
The ACEs Study

- Vincent J. Felitti, MD and Robert J. Anda, MD, MS
- Asked 26,000 adults at Kaiser, San Diego’s Dept of Preventive Medicine.
- 17,421 participated in the study.
- Participants completed a questionnaire.
ACEs Criteria

1. Recurrent physical abuse
2. Recurrent emotional abuse
3. Contact sexual abuse
4. An alcohol or drug abuser in the household
5. An incarcerated household member
6. Someone who was chronically depressed, institutionalized, or suicidal
7. Mother treated violently
8. One or no parents, or parents divorced.
9. Emotional or physical neglect
Results

- 12.6% of the population had ACEs ≥ 4

- Dose-Response relationship between adverse childhood events and numerous organic diseases.
Headaches

- Each of the ACEs was associated with an increased prevalence and risk of frequent headaches. As the ACE score increased the prevalence and risk of frequent headaches increased in a "dose-response" fashion.

- The risk of frequent headaches increased more than 2-fold (odds ratio 2.1, 95% confidence interval 1.8-2.4) in persons with an ACE score ≥5, compared to persons with and ACE score of 0.

- The dose-response relationship of the ACE score to frequent headaches was seen for both men and women.
Compared to people with an ACE Score of 0, those with an ACE Score of ≥ 4 had 2.6 times the risk of prevalent COPD, 2.0 times the risk of incident hospitalizations, and 1.6 times the rates of prescriptions (p<0.01 for all comparisons).

These associations were only modestly reduced by adjustment for smoking.

The mean age at hospitalization decreased as the ACE Score increased (p<0.01).

Lung Cancer

- Compared to persons without ACEs, the risk of lung cancer for those with ≥ 6 ACEs was increased approximately 3-fold.
- After a priori consideration of a causal pathway (i.e., ACEs --> smoking --> lung cancer), risk ratios were attenuated toward the null, although not completely.
- For lung cancer identified through hospital or mortality records, persons with ≥ 6 ACEs were roughly 13 years younger on average at presentation than those without ACEs.

Liver Disease

- Each of 10 ACEs increased the risk of liver disease 1.2 to 1.6 times (P<.001).

- The number of ACEs (ACE score) had a graded relationship to liver disease (P<.001). Compared with persons with no ACEs, the adjusted odds ratio of ever having liver disease among persons with 6 or more ACEs was 2.6 (P<.001).

- The ACE score also had a strong graded relationship to risk behaviors for liver disease.

- The strength of the ACEs-liver disease association was reduced 38% to 50% by adjustment for these risk behaviors, suggesting they are mediators of this relationship.

Nine of 10 categories of ACEs significantly increased the risk of IHD by 1.3- to 1.7-fold versus persons with no ACEs. The adjusted odds ratios for IHD among persons with ≥ 7 ACEs was 3.6 (95% CI, 2.4 to 5.3).

The ACE-IHD relation was mediated more strongly by individual psychological risk factors commonly associated with ACEs than by traditional IHD risk factors.

Significant association was observed between increased likelihood of reported IHD (adjusted ORs) and depressed affect (2.1, 1.9 to 2.4) and anger (2.5, 2.1 to 3.0) as well as traditional risk factors (smoking, physical inactivity, obesity, diabetes and hypertension), with ORs ranging from 1.2 to 2.7

Autoimmune Disease

- First hospitalizations for any autoimmune disease increased with increasing number of ACEs (p < .05).
- Compared with persons with no ACEs, persons with ≥ 2 ACEs were at a 70% increased risk for hospitalizations with Th1, 80% increased risk for Th2, and 100% increased risk for rheumatic diseases (p < .05).

Mechanism

- Death
- Whole Life Perspective
  - Conception
  - Adverse Childhood Experiences
    - Social, Emotional, & Cognitive Impairment
    - Adoption of Health-risk Behaviors
    - Disease, Disability, and Social Problems
    - Early Death

Scientific Gaps
Neurobiology

- Amygdala: mediates fear responses
- Prefrontal Cortex: mood, emotional and cognitive function including judgment.
- Hypothalamic-Pituitary-Adrenal (HPA) Axis: stress response
- Hippocampus: learning and memory (high density of glucocorticoid receptors)
- Noradrenergic nucleus in the locus coeruleus: regulation of affect, irritability, locomotion, arousal, attention and startle
Stress Response

- Activation of the HPA Axis - release of ACTH, epinephrine and cortisol
- Increase in centrally controlled peripheral sympathetic tone
- Nucleus Coeruleus activation of noradrenergic tone throughout the midbrain and forebrain including the cortex
Multi-systemic Impacts

- Neurologic:
  - HPA Axis Dysregulation
  - Reward center dysregulation
  - Hippocampal neurotoxicity
  - Neurotransmitter and receptor dysregulation

- Immunologic
  - Increased inflammatory mediators and markers of inflammation such as interleukins, TNF alpha, IFN-γ
Multi-systemic Impacts

- **Epigenetic**
  - Differential gene expression of pro-inflammatory transcription factors and neurotransmitter receptors
  - Epigenetic modifications leading to the reduction of glucocorticoid receptors in the brain, resulting in a increased HPA activity under both basal and stressful conditions

- **Endocrine**
  - Long-term changes in ACTH, cortisol and adrenaline levels.
CPMC Bayview Child Health Center
Trauma-Informed System of Care

- Step 1: Recognition of the impacts of trauma
  - On your clients
  - On your staff
  - On YOU
- Step 2: Put your own oxygen mask on
- Step 3: Create a system and a plan
- Step 4: Take the long-term view
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<tr>
<th>Denied</th>
<th>ACE Category</th>
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<td>ACE Category</td>
<td>Percentage</td>
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<td>ACEs $\geq 1$</td>
<td>67.2%</td>
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<td>ACEs $\geq 4$</td>
<td>12%</td>
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<td>ACEs $\geq 4$ and BMI $\geq 85%$</td>
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<td>2.0</td>
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<td>ACEs $\geq 4$ and learning/beh problems</td>
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<td>32.6</td>
<td>&lt; .001</td>
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N.J. Burke et al/ Child Abuse and Neglect 35(2011) 408-413
Example of Adverse Affects on Educational Outcomes

Figure 2: Learning/Behavior Problems by ACEs Score

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<th>ACES Score</th>
<th>NO Learn/Behavior Problems</th>
<th>YES Learn/Behavior Problems</th>
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<tr>
<td>ACES=0</td>
<td>97</td>
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<td>ACES=1-3</td>
<td>79.3</td>
<td>20.7</td>
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<tr>
<td>ACES&gt;=4</td>
<td>48.8</td>
<td>51.2</td>
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Multidisciplinary Rounds (MDR)

- Weekly team meeting including:
  - Medical team
  - Mental Health
  - Case Management
  - Reception
BCHC Protocol

- Every child screened for ACEs at the WCC
  - ACEs = 0 → Yah! Nothing to do.
  - ACEs = 1-3 w/o symptoms → anticipatory guidance
  - ACEs = 1-3 w/ symptoms → Refer to MDR.
  - ACEs ≥ 4 → Refer to MDR.
Gateway Questions

- Do you notice any learning or behavior problems with your child either at home or at school?
- Who lives at home? Has anyone come or gone from the household recently?
- Any concerns about sleep or bedwetting?
- Has your child ever witnessed any violence either at home or in the community?
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Sample Case

- 7 y/o female is accompanied by her mother for her well-child exam. Mom has no complaints and is in a hurry to get to her next appointment.

- While the patient is getting her vision and hearing tested by the medical assistant, the provider asks mom the ACEs screening questions.

- Mom reveals that the child has witnessed extensive domestic violence (including watching her parents brandish firearms during arguments) and that the police have been called on several occasions. She is having secondary enuresis and behavior problems in school. She has an IEP for “ADHD”.
Multidisciplinary Plan of Care

- Medical: Enuresis alarm, consider medication if warranted. Anticipatory guidance. Referral/introduction to the multidisciplinary team.

- Mental Health: Make sure that the mental health practitioner has expertise in the developmental impacts of trauma. If ADHD is the only diagnosis, ask about the role of trauma. Consider psychiatry consult if patient on medications.

- Case Management: Contract for safety of kids and school attendance.

- Scheduling: Awareness that family is likely to no-show. Consider flagging the chart when mom comes in with a sibling.
Treatments

- Exercise
  - Regulation of HR and BP
  - Regulation of HPA Axis
  - Decrease depression and anxiety
  - Regulation of cerebral neurotransmitters including dopamine and serotonin
  - Endorphin release
  - Opportunity for healthy adult relationships
  - Wide community acceptance
Treatments

- Mindfulness Based Awareness
  - Regulation of HR and BP
  - Anti-inflammatory effects
  - Regulation of HPA Axis
  - Decrease depression and anxiety
  - Decrease in post-traumatic symptoms
Center for Youth Wellness

- Multidisciplinary Approach
  - Trauma informed medical care
  - Psychiatric and psychological services
  - Case Management
  - Educational Advocacy
  - Evaluation of promising evidence-based supplemental therapies:
    - mindfulness based awareness
    - biofeedback
Thank You!
References

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