Social and Cultural Determinants of Developmental Disabilities

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Disclaimer

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Social Determinants of Health

• The social determinants of health are the circumstances in which people
  – are born, grow up, live, work, and age, &
  – the systems in place to deal with illness.

• These circumstances are, in turn, shaped by a wider set of forces:
  – economics, social policies, and politics
Hughes Spalding
Cerebral Palsy Clinic

- The Inner City Population of Atlanta in the 1990’s was low income, predominantly minority and decidedly underserved

- In 1998 we started an interdisciplinary clinic for children with Cerebral Palsy
Hughes Spalding
Cerebral Palsy Clinic

• In 2002 we surveyed the records of 260 children who had attended the clinic since its inception

• We found a complex set of medical, developmental and social complications
Demographic and Etiological Findings

- A high rate of mothers using substances during pregnancy particularly in the lower birth weights and gestational age

- Most children live in single parent families with Mother
Percentage of Patients Whose Mothers Used Substances during Pregnancy, per Gestational Age Group

<table>
<thead>
<tr>
<th>Gestational Age in Weeks</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;28</td>
<td>25.58%</td>
</tr>
<tr>
<td>28-32</td>
<td>19.64%</td>
</tr>
<tr>
<td>33-35</td>
<td>18.18%</td>
</tr>
<tr>
<td>36-40</td>
<td>14.29%</td>
</tr>
<tr>
<td>41+</td>
<td>8.89%</td>
</tr>
</tbody>
</table>
The Child lives with...

- Mother: 64 weeks
- Grandparent(s): 58 weeks
- Foster/Adopt...: 18 weeks
- Both biologic.: 13 weeks
- Father: 17 weeks
- <28-35 Weeks: 3 weeks
- 36-41+ Weeks: 2 weeks
Poverty Disparities

• **Race:**
  – 12.3% of white children
  – 31.9% of Hispanic children
  – 37.1% of black children

• **Education:**
  – some college education, 13% are poor
  – less than a high school degree, 57% are poor

• **Employment:**
  – 1 parent works full-time, 9% are poor
  – no parent works full-time, 48% are poor

Mediators of Child Poverty Pascoe et al Pediatrics April 2016
Childhood Disability: Maternal Age and Education

Percent of children with a cognitive disability ages 5-11: by birth mother’s age and education

- Mother has less than BA
- Mother has BA or higher

CDC
Poverty Disparities

• The absence of fathers in the home is associated with a fourfold risk of poverty.
  – 42% of single female-headed families are poor
  – 12% for 2-parent families

• Children of single mothers are at greater risk for:
  – infant mortality
  – child maltreatment
  – failure to graduate from high school
  – incarceration

Mediators of Child Poverty Pascoe et al Pediatrics April 2016
A growing income gap in infant mortality

Cumulative probability of infant death per 1,000 live births, by infant age, in U.S.

- Disadvantaged mothers
- Wealthy mothers

Source: Alice Chen, Emily Oster and Heidi Williams
Built Environment in Poor Communities

• Unsafe Neighborhoods due to: Traffic, Crime, Litter & Trash, Food Desert, Limited Green Space
  – 61% more likely to be Obese

• Older Houses in Poor Condition
  – 3.5x more likely to have lead toxicity

• Older Schools in Poor Condition
  – 50% less likely to graduate high school
  – 2x more likely to be unemployed
Poverty Effects on Cognitive and Educational Function

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Children Who Are Poor</th>
<th>Children Who Are Not Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developmental delay</td>
<td>5.00%</td>
<td>3.80%</td>
</tr>
<tr>
<td>Learning disability</td>
<td>8.30%</td>
<td>6.10%</td>
</tr>
<tr>
<td>Grade retention</td>
<td>28.80%</td>
<td>14.10%</td>
</tr>
<tr>
<td>Ever expelled or suspended</td>
<td>12.10%</td>
<td>6.10%</td>
</tr>
<tr>
<td>High school dropout rate in 1994</td>
<td>21.00%</td>
<td>9.60%</td>
</tr>
<tr>
<td>Not employed or in school at age 24</td>
<td>15.90%</td>
<td>8.30%</td>
</tr>
</tbody>
</table>

David Wood Pediatrics 2003;112:707–711;
Smoking Prevalence and Education

- 5.6 percent with a graduate degree
- 9.1 percent with a college education
- 24.2 percent who do not graduate from high school

CDC, MMWR, 63(No. 47):1108-1112, November 28, 2014
Mother - 1st generation
Fetus - 2nd generation
Reproductive cells - 3rd generation
Long-Term Consequences of Fetal and Neonatal Nicotine Exposure

- Studies suggest that nicotine may be a key chemical responsible for many long-term effects associated with maternal cigarette smoking on the offspring, such as
  - hypertension
  - type 2 diabetes, obesity
  - respiratory dysfunction
  - neurobehavioral defects
  - impaired fertility

Bruin et al. Toxicological Sciences 116: 364-374 2010
Children at most risk for adverse health and developmental outcomes

- Poverty
- Lead & other toxins
- Exposure to Tobacco Smoke
- Unsafe neighborhood
- Stressed Single Mother
- Experiencing Violence
- Insecurity & Anxiety
- Limited Access to Healthcare

Health Equity and Children's Rights *Pediatrics*; March 29, 2010;
• The Lifelong Effects of Early Childhood Adversity and Toxic Stress

• Volume 129, Number 1, January 2012
Toxic Stress

• Strong, frequent, or prolonged activation of the body’s stress response systems
• In the absence of the buffering protection of a supportive, adult relationship.
• Which results in persistently elevated levels of stress hormones
• Which can disrupt its developing brain architecture.
Toxic Stress Outcomes

- Disorders of learning, memory and executive function
- Impaired decision-making
- Behavioral self-regulation
- Mood and impulse control
- Risk-taking behaviors
Long Term Outcomes

• School failure
• Unemployment
• Poverty
• Homelessness
• Substance abuse
• Gang membership
• Violent crime
• Incarceration
• Being single parents
Poor Health Outcomes

- Alterations in immune function and measurable increases in inflammatory markers, increasing risk for:
  - obesity
  - diabetes
  - hypertension
  - stroke
  - early death
Cycle of Disadvantage and Disability

Potential Outcomes
- Health concerns
- Neurodevelopmental disabilities
- Child neglect and abuse
- Foster care placement

Environment
- Poverty
- Poor community support
- Poor health services
- Poor education

Risk Factors
- Infant with increased needs
  - Medical needs
  - Developmental needs
  - Increased irritability
- Mother under stress
  - Increased demands
  - Lack of supports
  - Substance abuse

Self Worth
- Despair
- Substance abuse
- Promiscuity

Pregnancy
- Limited prenatal care
- Tobacco, alcohol & drug use
- Risk of STD's/HIV

Newborn Infant
- Prematurity
- Low birth weight
- Fetal Alcohol Syndrome
Can we make a Difference?

• Absolutely!!!!!!

• Positively!!!!!!!
a Low licking and grooming

b High licking and grooming

NGFI-A

M

Nr3c1

↓ GR expression

High corticosterone levels
High anxiety
Low licking or grooming

↑ GR expression

Low corticosterone levels
Low anxiety
High licking or grooming

Next Generation

• The *high LG mother* rats had daughters that went on to lick and groom their own litters more frequently than the daughters of *low LG mothers*

• But interestingly, when the offspring of a *low LG mother* is raised by the *high LG mother*, the rat adopts the high-licking behavior when it has babies of its own!
Home-Based Early Intervention

- Impact of EI on children of high resource (HR) & low resource (LR) families
- LR children displayed greater improvement with EI than HR children
- LR children receiving EI did not differ significantly from HR children

Early Intervention and Cognitive Development PEDIATRICS 137:4, April 2016
The Perry Preschool Program

• Poor children with low IQ
• Beginning at age 3 and lasting 2 years:
  – 2.5-hour preschool program weekdays during the school year,
  – supplemented by weekly home visits by teachers
• Follow-up at ages 15, 19, 27, and 40

The Perry Preschool Program

A. Data from the Perry Program collected when the individuals were 27 years old (High/Scope). >10th percentile achievement indicates children who scored above the lowest 10% on the California Achievement Test (1970) at age 14; HS Grad indicates number of children who graduated High School on time.

Skill Formation and the Economics of Investing in Disadvantaged Children
James J. Heckman in: Science June 30, 2006 VOL 312 page 1900
Economists from Harvard and Columbia Universities.....

- ........... argue for early and sustained investments in early care and education programs,
- particularly for children whose parents have limited education and low income,
- on the basis of persuasive evidence from cost-benefit analyses that reveal the costs of incarceration and diminished economic productivity associated with educational failure

• If you save the life of a single child it is as if you are saving the entire world!

Adapted from: Talmud, Sanhedrin 37a