Symposium on the Social Determinants of Health

Influence of Early Life

Dr. Tina Cheng
Dr. Robert Blum
Dean David Andrews
Social Determinants of Health: Influence of Early Life

Tina L. Cheng, MD, MPH
Institute of Medicine Report

• 2003 Evidence-based review by panel of experts
• Offered broad range of recommendations
• Only 5 out of 103 studies addressed child health
Child Health Disparities

Invitational conference 2008 developed a research action agenda

Need for research on biologic, environmental and psychosocial factors

Need for a life course perspective
A Model of Children’s Health & Influences

How the first nine months shape the rest of your life
The new science of fetal origins

BY ANNIE MURPHY PAUL
Adverse Childhood Experiences (ACE) Study
Childhood Experiences Underlie Chronic Depression

http://www.cdc.gov/ace/about.htm
Trajectories: Conceptual Framework Guiding Early Childhood Policy & Practice

Significant Adversity

Healthy Developmental Trajectory

Impaired Health & Development

Supportive Relationships, Stimulating Experiences, Health-Promoting Environments

Center on the Developing Child, Harvard University
Rethinking MCH: The Life Course Model as an Organizing Framework

• “whole-person, whole-family, whole-community systems approach”

• “greater emphasis on early (“upstream”) determinants of health” and critical or sensitive periods

• “developing integrated, multi-sector service systems that become lifelong “pipelines” for healthy development.”

Life Course Theory Translation
Opportunities and Models

• Whole Person, Whole Family, Whole Community: CONTEXT

• Address Upstream Determinants with Earlier Detection of Risks: LONGITUDINAL

• Integrated Multi-sector Service Systems: INTEGRATION
Priorities of Low-Income Urban Residents for Interventions to Address the Socio-Economic Determinants of Health

Marion Danis
Namrata Kotwani
Joanne Garrett
Ivonne Rivera

More

Journal of Health Care for the Poor and Underserved, Volume 21, Number 4, November 2010, pp. 1318-1339 (Article)

- 95% Health insurance
- 82% Housing vouchers
- 82% Dental care
- 72% Job training

➢ Quality child care, education & opportunities for their children
➢ Safe homes & neighborhoods
Harriet Lane Clinic
A Comprehensive Community Clinic

Co-located Medical, Dental, Mental Health, Nutrition Services

Reach Out and Read, Adolescent Literacy Programs

Youth Fitness Circle

Developmental Assessment & Services

Family Needs Screening & Health Leads Family Resource Desk

Educational Support with Tutoring Program

Parent Support & Leadership Institute

Safety Resource Center

Social Work & Child Life Services

Legal Advocacy Services

Specialty Communication and Case Management

Transition Readiness Screening & Planning

Preventive Care

Pediatric Primary Care

Family-Centered Care

Developmental Services

Acute Care

Chronic Care

Education

Healthy Futures Career Counseling

Youth Fitness Circle

Preventive Care

Pediatric Primary Care

Family-Centered Care

Developmental Services

Acute Care

Chronic Care

Education

Healthy Futures Career Counseling
Protective Interventions

Significant Adversity

New Protective Interventions

Healthy Developmental Trajectory

Supportive Relationships, Stimulating Experiences, and Health-Promoting Environments
Life Course Theory Translation Opportunities and Models

- Whole Person, Whole Family, Whole Community: CONTEXT
- Address Upstream Determinants with Earlier Detection of Risks: LONGITUDINAL
- Integrated Multi-sector Service Systems: INTEGRATION
## History of Medical Progress

<table>
<thead>
<tr>
<th>19th Century</th>
<th>20th Century</th>
<th>21st Century</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treat symptoms</td>
<td>Treat diseases</td>
<td>Predictive Preemptive Participatory Personalized</td>
</tr>
</tbody>
</table>

The Future Paradigm: 4 P’s

- Tolerable Intolerable
- Preclinical
- Molecular preemption
- Cost savings
- Symptom management
- Curative treatment

Disease Burden
Tolerable
Cost Savings
Preclinical
Molecular preemption

Time
Cost

### History of Medical Progress: 8 P’s

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<th>21st Century</th>
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<tr>
<td>Treat symptoms</td>
<td>Treat diseases</td>
<td>Predictive Preemptive Participatory Personalized Pediatrics, Prenatal Population Health Policy</td>
</tr>
</tbody>
</table>
National Children’s Study

• Aim: To examine the effects of the environment, as broadly defined to include factors such as air, water, diet, sound, family dynamics, community and cultural influences, and genetics on the growth, development, and health of children across the United States, following them from before birth until 21 years of age.

• Largest long-term study of children’s health and development ever to be conducted in the U.S.

• Longitudinal study of 100,000 children, their families, and their environment
Life Course Theory Translation
Opportunities and Models

• Whole Person, Whole Family, Whole Community: CONTEXT

• Address Upstream Determinants with Earlier Detection of Risks: LONGITUDINAL

• Integrated Multi-sector Service Systems: INTEGRATION
Community-Based System of Services for Children and Youth

Figure 2: Trajectory Optimizing Service Linkage Pathway

PED = Pediatric medical home
FRC = Family resource center
NHV = Nurse home visiting program
ROR = Reach Out and Read early literacy program
SR = School readiness program
Health Settings Across the Life Course

Relative Magnitude of Influence

- Day Care
- School
- Community
- Workplace
- Family
- Individual

Age (years)

Neal Halfon, adapted from Nordio S. Riviste Italiana di Pediatria 1978;4:3-20
The Social Determinants of Adolescent Health

Social Determinants of Health Conference

Johns Hopkins University

9 May 2012
The Shifting Realities

- A generation ago AIDS was unknown; today it is the second leading cause of mortality in the second decade.
- More than a generation ago infectious diseases were the major killers of youth; today, except for HIV, social, behavioral and environmental factors predominate.
- A generation ago many more young people lived in rural areas, fewer went to school, and most married earlier than today.
Demographic Trends

- Today, 27% of the world’s population is between the ages of 10-24 years;
- 86% of all youth live in developing countries;
- In many developing countries young people make up 25-30% of the population – double that of many industrialized countries.
<table>
<thead>
<tr>
<th>Rank</th>
<th>Leading Cause of Death</th>
<th>% total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Road traffic accidents</td>
<td>10.0</td>
</tr>
<tr>
<td>2</td>
<td>Self-inflicted injuries</td>
<td>6.3</td>
</tr>
<tr>
<td>3</td>
<td>Violence</td>
<td>6.0</td>
</tr>
<tr>
<td>4</td>
<td>Lower respiratory infections</td>
<td>5.9</td>
</tr>
<tr>
<td>5</td>
<td>Tuberculosis</td>
<td>5.5</td>
</tr>
<tr>
<td>6</td>
<td>HIV/AIDS</td>
<td>5.5</td>
</tr>
<tr>
<td>7</td>
<td>Drownings</td>
<td>4.1</td>
</tr>
<tr>
<td>8</td>
<td>Fires</td>
<td>2.6</td>
</tr>
<tr>
<td>9</td>
<td>Meningitis</td>
<td>2.0</td>
</tr>
<tr>
<td>10</td>
<td>War</td>
<td>1.8</td>
</tr>
</tbody>
</table>
How do Disparities Arise?

- Differences in life opportunities, exposures, and stresses that result in differences in underlying health status
- Differences in access to and/or quality of services
Social Determinants of Adolescent Health
Macro
National Wealth
Income Inequality
Racism/Discrimination
War/Conflict
**ADOLESCENT HEALTH RISK OUTCOMES AND PARENT/FAMILY CONNECTEDNESS**

*(parameter estimates, p < .001)*

<table>
<thead>
<tr>
<th></th>
<th>Younger teen (7th-8th grade)</th>
<th>Older teen (9th-12th grade)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional distress</td>
<td>- .37</td>
<td>- .33</td>
</tr>
<tr>
<td>Suicidality</td>
<td>- .17</td>
<td>- .24</td>
</tr>
<tr>
<td>Violence</td>
<td>- .21</td>
<td>- .13</td>
</tr>
<tr>
<td>Cigarette use</td>
<td>- .19</td>
<td>- .13</td>
</tr>
<tr>
<td>Alcohol use</td>
<td>- .24</td>
<td>- .14</td>
</tr>
<tr>
<td>Marihuana use</td>
<td>- .18</td>
<td>- .19</td>
</tr>
<tr>
<td>Sexual Intercourse</td>
<td>RR = 0.85</td>
<td>-</td>
</tr>
</tbody>
</table>

Resnick, Bearman, Blum et. al., 1997
## Positive Family Relations: Brazil

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Smoking</td>
<td>79</td>
<td>9.8</td>
</tr>
<tr>
<td>Drug use</td>
<td>64</td>
<td>7.9</td>
</tr>
<tr>
<td>Age at 1st sex &lt;15 yr</td>
<td>300</td>
<td>38.4</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>13</td>
<td>1.9</td>
</tr>
<tr>
<td>Suicidal</td>
<td>164</td>
<td>20.3</td>
</tr>
<tr>
<td>Suicide attempt</td>
<td>54</td>
<td>6.6</td>
</tr>
</tbody>
</table>

(Anteghini, Blum et al 2001)
School / Peers

Teachers supports or expectations

Academic Performance

Pro-social peer network

Macro
- National Wealth
- Income Inequality
- Racism/Discrimination
- War/Conflict

Community
- Racism/Discrimination
- Minority Status
- Education Opportunities
- Employment Opportunities
- Poverty
- Social Disruption
- Violence/Incarceration
- Residential Instability
- Urban/Rural
- Built/ Environment
- Social Cohesion

Family
- Behaviors
- Conflict/Violence
- Monitoring
- Communications
- Financial & Social Capital
- Family Mobility
- Birth Spacing
- Expectations
### The Protective Role of School Connectedness Among Caribbean Youth

<table>
<thead>
<tr>
<th>Risk Behavior</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low*</td>
<td>High*</td>
</tr>
<tr>
<td>Sexual debut</td>
<td>79.0</td>
<td>49.2</td>
</tr>
<tr>
<td>Violence</td>
<td>68.1</td>
<td>39.9</td>
</tr>
<tr>
<td>Regular alcohol use</td>
<td>62.1</td>
<td>8.6</td>
</tr>
<tr>
<td>Smoke cigarettes</td>
<td>51.3</td>
<td>9.1</td>
</tr>
</tbody>
</table>

* Net of any other protective factors and holding risk factors constant

- Blum, Ireland, 2004
Students who feel connected to school are less likely to become pregnant.
How do the Social Determinants of Health Get Under the Skin
Epigenetics is the missing link between environment and the development of diseases. Genetics explain only a small fraction of human disease at any age.
Epigenetic Control of Gene Expression

- DNA methylation
- Histone methylation and acetylation

Diagram showing different states of chromatin (inactive, active, enhancer) and their associated epigenetic modifications.
Folate and B12 have transgenerational effect on decreased expression of the gene that controls skin color and weight.

Waterland and Jirtle. Mol Cell Biol 2003; 23:5293
Contexts Matter in the lives of Young People
Community Matters—
geography is destiny

- Growing up in low resource communities is associated with every negative youth outcome— independent of national resources
- Consequences of behaviors are often environmentally influenced
- Poor communities are associated with: more social disorganization, less communal efficacy, more discrimination, less social and financial capital.
Positive Communities create...

♦ Safety and structure;
♦ Belonging and group membership;
♦ Personal empowerment;
♦ Control over one’s life;
♦ Competence;
♦ Closeness with peers and nurturing adults.

Kirby & Coyle
Positive Parenting Matters

- Globally, family has been shown to be the most protective factor in the lives of young people.
- Elements of positive parenting: connectedness, emotional availability and responsiveness, high behavioral and educational expectations, behavioral monitoring.
School Matters

- Feeling part of the school
- Experiencing school as safe: emotionally, physically and academically
- Perceiving teachers as supportive and caring
- Experiencing high expectations
- Believing rules and discipline are fair
People: An adult who cares, who is connected; a network of adults who are involved in the life of the adolescent

Place: A place for youth to congregate, to recreate with adult supervision, to develop friendships.

Adolescent

Activities: School and community activities that develop a sense of connection/belonging and skills

Contributions: The opportunities to contribute to family, neighborhood, community, youth involvement

PCAP: A Model for Promoting Youth Health and Development
Early Trajectories and Complex Webs in the Social Determination in Health

David W. Andrews
Generalizations on Developmental Trajectories

- Those who start behind fall further behind.
- Those who fall behind early need more, but get less.
Trajectories and Outcome Gaps
(Those who start behind fall further behind)

[Graph showing trajectories for Hayden and Keyshawn through Infancy, Early Childhood, Adolescence, and Adulthood]
Understanding Complexity
(webs of social determination)

- Poverty shapes multiple social determinants as factors beget factors
- Multiple influences are cumulative at best, often multiplicative
Webs of Complexity

Interrelated Disparities in the Web
- More Exposure
  - Violence
  - Drugs, Alcohol, Tobacco
  - Environmental Risks
  - Deviant Peers
  - Dysfunctional Adults
- Less Access
  - Housing
  - Nutrition
  - Education
  - Health Care
  - Pro-social Peers
  - Supportive Adults
Implications for Prevention and Intervention

- START EARLY!
- Plan and implement holistically across developmental domains
  - Social-emotional
  - Cognitive
  - Health
- Multi-systemic
  - Family
  - School
  - Community