

Some Background on CM

- In 2014, CPS received 3.6 million reports of children being abused or neglected
  - 702,000 children classified as being maltreated
  - 1,580 CM deaths

- A national survey reported that 13.7% of U.S. children experienced some form of maltreatment in 2011
Minimum Numbers of Children < 18 Years Experiencing Past-Year Sexual, Severe Physical, or Emotional Violence, 2014

> 1 Billion Children

Violence Damages Body Via Impact on the Brain

- Violence Against Children/Youth
- Toxic Stress
- Risk Behaviors And Conditions
- Premature Aging
- Mental and Physical Health and Cognitive Development

Infancy to Adulthood
Consequences of CM

- There are potential lifelong adverse health, social and economic consequences associated with CM:
  - Behavioral problems
  - Mental health conditions
  - Delinquency, adult criminality and violent behavior
  - Chronic diseases
  - Health-related quality of life
  - Adult economic well-being
Significance of Quantifying Costs

- Given the high prevalence of CM and the many negative consequences, the costs may be substantial

- Important for several reasons
  - Increase awareness of the current severity of CM
  - Place the problem in the context of other public health concerns
  - Can be used in EE of CM interventions

- Economic burden estimates generally take 1 of 2 perspectives
  - prevalence-based or incidence-based
Prevalence-based Approach

- Provide an estimate of the direct and indirect costs incurred in a period (1 year) as a result of the prevalence of CM during this same period, regardless of the onset of CM.

- In a prevalence-based study with a time frame of 1 year, costs associated with all cases of CM (including cases with the onset in or any time before the base year) would be included.

- However, only costs incurred during the 1-year period would be counted.
Incidence-based Approach

• Represent the total lifetime costs resulting from new cases of CM that occur within a set time period (1 year)

• More difficult to estimate because they require data on short- and long-term costs and consequences of CM

• More useful for EE.
  – For example, the lifetime costs avoided could be compared with the costs of preventing 1 case of CM in a benefit-cost analysis of prevention
The economic burden of child maltreatment in the U.S.
Objective

- Estimate the average lifetime cost per CM victim and aggregate lifetime costs for all new cases of CM incurred in 2008 using an incidence-based approach
  - Correct methodological flaws of previous studies
  - Incorporate more recent and comprehensive studies
  - Provide framework for the findings in the literature to estimate the economic burden of CM
Incidence Rate

• 772,000 children were CM victims
  – 75% had no history of prior victimization
  – 579,000 first-time victims

• 3.7 million children investigated
  – assume that 75% were new reports
  – 2,775,000 new victims of CM as an alternative estimate of CM incidence

• National Incidence Study
  – Harm standard, 1.3 million
  – Endangerment, 2.9 million
Cost Categories

• Focus on the following major types of costs:
  – Short-term health care costs
  – Long-term health care costs
  – Productivity loss
  – Child welfare costs
  – Criminal justice costs
  – Special education costs
Criminal Justice Costs – Juvenile Arrest

- Incremental effect
  - 27% of maltreated children have had a juvenile arrest
  - Compared with 17% of non-maltreated children
  - 10% incremental effect

- The criminal justice costs per juvenile arrest are about $20,000 (Reynold et al.)

- $2,000 per CM victim
• Health care costs resulting from a new case of CM that occurred in childhood (from ages 6 to 17)
• Linked a sample of n=1,151 NSCAW children with individual Medicaid claims
• Comparison group of Medicaid children based on propensity score matching
• Annual incremental health care costs is about $3,184
• The present value is about $32,648
Lifetime Costs of Nonfatal CM

- Average lifetime cost per victim of nonfatal child maltreatment to be $210,012 in 2010 dollars
  - $32,648 in childhood health care costs
  - $10,530 in adult medical costs
  - $144,360 in productivity losses
  - $7,728 in child welfare costs
  - $6,747 in criminal justice costs
  - $7,999 in special education costs
- The total lifetime cost approximately $124 billion, about 1% of the national GDP
Comparison with Other Health Problems

- The lifetime cost per victim of non-fatal CM is comparable to or higher than many other high profile public health problems, indicating the impact and seriousness of the issue of CM
  - $210,012 per CM victim
  - The discounted lifetime costs of stroke per person: $159,846
  - The total lifetime costs associated with type 2 diabetes: $181,000 - $253,000 per case
The economic burden of child maltreatment in China
Objective

To estimate minimum costs of child maltreatment in China (prevalence-based):

- Step one: Estimate PAFs for specific outcomes and effects that are linked to child maltreatment by major type of child maltreatment (physical abuse, sexual abuse, emotional abuse, and neglect)
- Step two: Develop a regional costing model to estimate minimum costs of child maltreatment in China based on the PAFs calculated during step one
Methodology: Estimate PAFs

- PAFs were estimated separately for physical abuse, sexual abuse, emotional abuse, and neglect.
- Within these, PAFs were calculated for the selected outcomes: mental disorder, smoking, problem drinking, illicit drug use, and self-harm.
Methodology: Estimate PAFs

- Three steps were applied to estimate PAFs:
  1. Estimate the prevalence of child maltreatment for each type of CM
  2. Estimate child maltreatment – outcomes relationships for each outcome
  3. Use the standard formula to calculate population attributable fractions
Step 1: Methods for estimating the prevalence of CM

- The systematic review identified a total of 68 studies. For prevalence
  - 31 child emotional abuse studies
  - 36 child physical abuse studies
  - 18 child neglect studies
  - 27 child sexual abuse studies
- Correcting for methodological variability within studies
Correcting for Methodological Variability within Studies (1)

- Multiple linear regression conducted to examine the methodological characteristics that influence the variability in prevalence

- The methodological factors include:
  - Type of survey sample
    - Population-based or not
    - Probability sampling or not
    - Household versus school-based
  - Sample site (urban, rural, urban & rural)
  - Type of respondent (parent, adult recall, young adult recall, child)
  - Sample size
### Correcting for Methodological Variability within Studies (2)

- Response rate
- Repeated vs. any abuse
- Whether validated instruments were used
- Whether specific behavioral questions were asked

- The regression coefficients were used to adjust the raw prevalence estimates
- The adjusted estimates were combined using random effects meta-analysis to produce a weighted average
Step 2: Estimating CM – Outcomes Relationships

• The child maltreatment – outcomes relationships were estimated as a whole (not separately by sex) for each type of maltreatment.

• Adjustment for confounders
  – An adjustment factor was calculated using the following formula:

  \[ U = \frac{OR_u}{OR_a} \]

Note: Depending on the # of studies which have both ORu and ORa
Step 2: Estimating CM – Outcomes Relationships (2)

• Approximating RRs from ORs (Zhang and Yu, 1998)

\[ RR = \frac{OR}{[(1-P_0) + (P_0 \times OR)]} \]

\( P_0 \) indicates the incidence of the outcomes of interest in the nonexposed group

• For each type of child maltreatment, RR estimates will be grouped according to outcomes and then combined using random effects meta-analysis
Step 3: Calculating PAFs

• A standard PAF formula was used to estimate PAFs:

\[ PAF = \frac{P_e(RR - 1)}{(P_e(RR - 1) + 1)} \]

where \( P_e \) is the prevalence of CM in the population

• PAFs are used to estimate the proportion of morbidity or mortality attributable to a risk factor
Methodology: Regional Costing Model

- Two steps were used to estimate the economic costs of child maltreatment
  - First, PAFs were multiplied by an appropriate measure of disability-adjusted life-years (DALYs) for mental health outcomes or health risk behaviors to estimate DALYs loss
  - Second, the DALY loss was converted into monetary value by assuming that one DALY is equal to the country’s per-capita GDP
Conclusion

• Child maltreatment causes great losses to Chinese society in terms of both DALYS and finance. According to our calculations

• 27.6 million of the DALYs lost in China in 2010 were attributable to child maltreatment
  – The corresponding estimates for diabetes mellitus – 7.8 million DALYs
  – Ischaemic heart disease – 17.8 million DALYs

• The estimated economic value of DALYs lost to child maltreatment in China in 2010 totaled US $122 billion, accounting for 2.06% of China’s GDP in 2010
Other CM Burden Estimates

• The estimated economic value of DALYs lost to child maltreatment in the EAP region totaled US $194 billion, accounting for 1.88% of the region’s GDP.
• The economic burden of violence against children in Cambodia totaled US$168 million in 2013, accounting for 1.10% of the country’s GDP.
• Peru, South Africa
Conclusion

• This study confirms the importance of prioritizing child maltreatment as a key global health concern

• Underscoring the need to steer resources towards prevention and to strengthening the knowledge base regarding the scale and consequences of child maltreatment at a global level
VAC & Economic Development

- Health
- Human capital
- Economic growth & development
- Education
- Violence against children
• South Africa
  – PV and EV reduces victim monthly earnings by 11.7% and 9.2%
  – ZAR25.2 (0.63% of GDP) and ZAR9.6 billion (0.24% of GDP)

• U.S.
  – CM reduces victim annual earnings by 27%
  – $83.6 billion (0.7% of GDP)
Future Research

• What can you offer?
• Do the programs work?
• How much will it cost to implement them to large scale?
• What are the return-on-investments for these programs?
“One of the most powerful ways to change the world is to make it better for kids.”

Jack P. Shonkoff
National Scientific Council for the Developing Child
“An all-around moderately prosperous society cannot be achieved without the people’s all-around health.”

“So prevention should be more important than treatment.”

“Health for young children and young students in the country's less-developed areas should be emphasized alongside the need to provide proper nutrition for their growth. “

Xi Jinping, President
National Meeting on Health attended by all members of the standing committee of the Political Bureau of the Communist Party of China Central Committee, August 2016
Thank You
• Existing HRQOL measures have been developed primarily for adults and do not include many of the domains identified as being important in capturing changes in quality of life for CM

• Developing a new, seven-item measure of HRQOL capturing domains specific to child maltreatment
  – anger, risky choices, depression, emotions, relationships, illness and injuries, and pain
<table>
<thead>
<tr>
<th>Short name</th>
<th>Full description</th>
<th>Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anger</td>
<td>Are so angry that you feel like throwing things, screaming at someone, or picking a fight</td>
<td>Never, rarely, sometimes, or often</td>
</tr>
<tr>
<td>Risky Choices</td>
<td>Make risky choices (such as unsafe sex, getting drunk, or taking drugs) that interfere with daily activities</td>
<td>Never, rarely, sometimes, or often</td>
</tr>
<tr>
<td>Depression</td>
<td>Feel depressed, afraid, or worthless</td>
<td>Never, rarely, sometimes, or often</td>
</tr>
<tr>
<td>Emotions</td>
<td>Feel like emotions are out of control</td>
<td>Never, rarely, sometimes, or often</td>
</tr>
<tr>
<td>Relationships</td>
<td>Cannot trust or maintain healthy relationships with other people</td>
<td>Never, rarely, sometimes, or often</td>
</tr>
<tr>
<td>Illness &amp; Injuries</td>
<td>Injuries, illness, or accidents interfere with daily activities</td>
<td>Never, rarely, sometimes, or often</td>
</tr>
<tr>
<td>Pain</td>
<td>Feel limited by pain, discomfort, or physical ability</td>
<td>Never, rarely, sometimes, or often</td>
</tr>
</tbody>
</table>
Compare the following two new health profiles that you could have had as a teenager (ages 12-17). Please choose which you prefer.

<table>
<thead>
<tr>
<th>Aspects</th>
<th>Profile A</th>
<th>Profile B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make risky choices (such as unsafe sex, getting drunk, or taking drugs) that interfere with daily activities</td>
<td>Rarely</td>
<td></td>
</tr>
<tr>
<td>Cannot trust or maintain healthy relationships with other people</td>
<td>Never</td>
<td></td>
</tr>
<tr>
<td>Feel like emotions are out of control</td>
<td>Sometimes</td>
<td></td>
</tr>
<tr>
<td>Are so angry that you feel like throwing things, screaming at someone, or picking a fight</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
<tr>
<td>Illness, injuries, or accidents interfere with daily activities</td>
<td>Often</td>
<td>Rarely</td>
</tr>
<tr>
<td>Feel limited by pain, discomfort, or physical ability</td>
<td>Rarely</td>
<td>Never</td>
</tr>
<tr>
<td>Feel depressed, afraid, or worthless</td>
<td>Sometimes</td>
<td>Often</td>
</tr>
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</table>

Which would you prefer?

Suppose that your choice limited the number of years you live from today, and that you have no health problems for the rest of your life. Does this change which profile you prefer?

<table>
<thead>
<tr>
<th>Remaining years of your life</th>
<th>9 years and 6 months (6 months less)</th>
<th>10 years</th>
</tr>
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Which would you prefer?