The Research Base for Prevention Science

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Objectives

- Why should we care about prevention?
- What are the key frameworks guiding prevention efforts?
- How have these efforts evolved over the past 40 years?
Global Shift in Mortality from Infectious to Non-communicable Diseases and Conditions

- Behavior problems are implicated in shift (alcohol, tobacco, and other drugs, motor vehicle fatalities, violence, mental health, and risky sex)
- Behavior problems cause harm in adolescence
- Behavior problems established in adolescence cause harm into adulthood
- Preventing these behavior problems during adolescence can reduce mortality and morbidity worldwide
# Leading Causes of Mortality 15-24 Year Olds

<table>
<thead>
<tr>
<th>Rank</th>
<th>Cause</th>
<th>Total deaths (per 100,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Motor Vehicle Crashes</td>
<td>15.9</td>
</tr>
<tr>
<td>2</td>
<td>Accidents</td>
<td>11.5</td>
</tr>
<tr>
<td>3</td>
<td>Intentional self harm (suicide)</td>
<td>10.7</td>
</tr>
<tr>
<td>4</td>
<td>Assault (homicide)</td>
<td>10.3</td>
</tr>
<tr>
<td>5</td>
<td>Malignant neoplasms</td>
<td>3.7</td>
</tr>
<tr>
<td>6</td>
<td>Diseases of heart</td>
<td>2.2</td>
</tr>
<tr>
<td>7</td>
<td>Congenital malformations, deformations and abnormalities</td>
<td>1.0</td>
</tr>
<tr>
<td>8</td>
<td>Influenza and pneumonia</td>
<td>0.5</td>
</tr>
<tr>
<td>9</td>
<td>Cerebrovascular diseases</td>
<td>0.4</td>
</tr>
<tr>
<td>10</td>
<td>Pregnancy, childbirth and the puerperium</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>-- All other causes (Residual)</td>
<td>11.1</td>
</tr>
</tbody>
</table>

48.8/100,000 or 72% of all deaths

Life Course Perspective

Problem behaviors begun in adolescence have implications for morbidity and mortality across the life course, e.g.,

- Preventing tobacco use among young people is critical to ending the tobacco epidemic
- 80% of adult smokers began smoking by 18 years of age
- Adolescents are uniquely susceptible to social and environmental influences

Thomas Frieden quoted in USDHHS Preventing Tobacco Use Among Youth and Young Adults: A report of the Surgeon General, 2012
Prevention Makes Sense!

Calvin: ‘Live for the moment’ is my motto.

Hobbes: You never know how long you’ve got! You could step into the road tomorrow and—wham—you get hit by a cement truck! Then you’d be sorry you put off your pleasures!

Calvin: That’s why I say ‘Live for the moment.’ What’s your motto?

Hobbes: ‘Look down the road.’
Prevention Science Framework

- Define the Problem
- Identify Risk and Protective Factors
- Interventions
- Program Implementation and Evaluation
Preventing Mental, Emotional and Behavioral Disorders Among Young People: Progress and Possibilities

A summary of the progress of prevention science
40 Years of Prevention Science Research Advances

**Etiology/Epidemiology of Problem Behaviors**
- Identify risk and protective factors that predict problem behaviors and describe their distribution in populations.

**Efficacy Trials**
- Design and test preventive interventions to interrupt causal processes that lead to youth problems.

**Prevention Services Research**
- Apply lessons learned about etiology and efficacious interventions in real world settings.
## Risk Factors for Adolescent Problem Behaviors

### Risk Factors

<table>
<thead>
<tr>
<th>Community Risk Factors</th>
<th>Substance Abuse</th>
<th>Delinquency</th>
<th>Teen Pregnancy</th>
<th>School Drop-Out</th>
<th>Violence</th>
<th>Depression &amp; Anxiety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of Drugs</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Availability of Firearms</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community Laws and Norms Favorable Toward Drug Use, Firearms, and Crime</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Media Portrayals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Transitions and Mobility</td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Neighborhood Attachment and Community Disorganization</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extreme Economic Deprivation</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tbody>
</table>
## Risk Factors for Adolescent Problem Behaviors

### Risk Factors

<table>
<thead>
<tr>
<th>Family</th>
<th>Family History of the Problem Behavior</th>
<th>Family Management Problems</th>
<th>Family Conflict</th>
<th>Favorable Parental Attitudes and Involvement in the Problem Behavior</th>
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<tr>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</table>

- Favorable Parental Attitudes and Involvement in the Problem Behavior: ✓
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<th>Depression &amp; Anxiety</th>
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</thead>
<tbody>
<tr>
<td>Academic Failure Beginning in Late Elementary School</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
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<tr>
<td>Lack of Commitment to School</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Individual/Peer</td>
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<tr>
<td>Early and Persistent Antisocial Behavior</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Rebelliousness</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Friends Who Engage in the Problem Behavior</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Favorable Attitudes Toward the Problem Behavior</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Early Initiation of the Problem Behavior</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Constitutional Factors</td>
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<td>✓</td>
<td></td>
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</tbody>
</table>
The Social Development Strategy

The Goal...

Healthy Behaviors

...for all children and youth

Ensure...

Healthy Beliefs and Clear Standards

...in families, schools, and peer groups

Build...

Bonding

—Attachment
—Commitment

...to families, schools, and peer groups

By providing...

Opportunities Skills Recognition

...in families, schools, and peer groups

Be Aware of...

Individual Characteristics
Prevalence of 30 Day Alcohol Use by Number of Risk and Protective Factors

Six State Student Survey of 6th-12th Graders, Public School Students

Prevalence

Number of Risk Factors

Number of Protective Factors

- 0 to 1
- 2 to 3
- 4 to 5
- 6 to 7
- 8 to 9
- 10+

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Prevalence of 30 Day Marijuana Use
By Number of Risk and Protective Factors

Six State Student Survey of 6th-12th Graders,
Public School Students

Number of Risk Factors

Prevalence

Number of Protective Factors

0 to 1
2 to 3
4 to 5
6 to 7
8 to 9
10+

0 to 1
2 to 3
4 to 5
6 to 7
8 to 9
10+
Prevalence of Any Other Illicit Drug Use (Past 30 Days) By Number of Risk and Protective Factors

Six State Student Survey of 6th - 12th Graders, Public School Students
Prevalence of “Attacked to Hurt” By Number of Risk and Protective Factors
Prevalence of Other Problems by Number of Risk Factors

Bond, Thomas, Toumbourou, Patton, and Catalano, 2000
Number of School Building Level Risk Factors and Probability of Meeting Achievement Test Standard (10th Grade Students)

Arthur et al., 2006
Different neighborhoods have different profiles of risk, protection, and outcomes.
Neighborhoods Vary in Amount of Risk: A Place Based Approach May be Needed
Types of Risk may Vary by Community or School

High School A Risk Profile

- Community
- Family
- School
- Peer-Individual

Percent At Risk

- Low Neighborhood Attachment
- Community Disorganization
- Laws and Norms Favorable to Drug Use
- Perceived Availability of Hardguns
- Poor Family Management
- Family Conflict
- Family History of Antisocial Behavior
- Parental Attitudes Favorable to Antisocial Behavior
- Parental Attitudes Favorable to Drug Use
- Low Commitment & School
- Rebelliousness
- Early Problem Behavior
- Early Initiation of Drug Use
- Low Perceived Risk of Drug Use
- Favorable Attitudes Toward Antisocial Behavior
- Favorable Attitudes Toward Drug Use
- Friends Use of Drugs
- Sensation Seeking
- Overall Risk

Legend:
- School 2002
- District 2002
- Estimated National Value
Types of Risk may Vary by Community or School

High School B Risk Profile

Percentage of Youth at Risk

Community
- Low Neighborhood Attachment
- Community Disorganization
- Laws & Norms Favor Drug Use
- Perceived Availability of Handguns
- Perceived Availability of Drugs
- Poor Family Management
- Family Conflict
- Family History of Antisocial Behavior
- Parent Attitudes Favorable to ASB
- Parent Attitudes Favorable to Drug Use
- Academic Failure
- Low Commitment to School
- Rebelliousness
- Early Initiation of ASB
- Early Initiation of Drug Use
- Attitude Favorable to ASB
- Attitude Favorable to Drug Use
- Perceived Risk of Drug Use
- Interaction with Antisocial Peers
- Friends’ Use of Drugs
- Rewards for ASB
- Depressive Symptoms
- Intentions to Use Drugs
- Gang Involvement
- Total Risk

Family
- Total Risk

School
- Total Risk

Peer-Individual
- Total Risk

Total
- Total Risk
Science Guided Prevention

Prevention interventions should target malleable risk and protective factors

(Coie et al., 1994; Mrazek and Haggerty, 1984; Woolf, 2008; O’Connell, Boat & Warner, 2009)
What We Now Know About Risk and Protective Factors

- Both an individual’s level of risk and level of protection make a difference
- Common risk and protective factors predict diverse problems and academic outcomes
- Risk and protective factors show much consistency in effects across diverse groups
- Different factors affect youth as they develop, some are affected by accumulated early challenges (*Snowball*), others by extended exposure to norms and models of problem behaviors with little protection (*Snowstorm*)
- Different neighborhoods have different levels of risk and protection
Reflect and Share

- What surprises you about the information presented so far?
- How could you use these ideas in your own work whether administration, treatment or prevention?
Etiology/Epidemiology of Problem Behaviors
- Identify risk and protective factors that predict problem behaviors and describe their distribution in populations.

Efficacy Trials
- Design and test preventive interventions to interrupt causal processes that lead to youth problems.

Prevention Services Research
- Apply lessons learned about etiology and efficacious interventions in real world settings.
Adolescent Health
An Executive Summary for The Lancet Series

“Failure to invest in the health of the largest generation of adolescents in the world’s history jeopardises earlier investments in maternal and child health, erodes future quality and length of life, and escalates suffering, inequality, and social instability.”

Worldwide application of the prevention science research base in adolescent health

Adolescent Health
Series Article 3
What is an efficacious intervention?

Evaluation Quality
- At least one randomized controlled trial OR a quasi-experimental trial without design flaws

Intervention Specificity
- Population of focus is clearly defined
- Risk and protective factors that program seeks to change are identifiable

Impact
- Impact on adolescent problem behavior
- Absence of any negative effects

Implementation Tools
- Training materials are available
- Information on the financial and human resources required
- Benefit-cost information desirable
Wide Ranging Approaches Have Been Found To Be Efficacious

<table>
<thead>
<tr>
<th>Prevention Programs/Policies</th>
<th>Violence</th>
<th>Drug Use</th>
<th>HIV STI</th>
<th>Unintended Pregnancy</th>
<th>Vehicle Crash Risk</th>
<th>Obesity</th>
<th>Mental Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Prenatal &amp; Infancy Programs(eg., NFP)</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
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<tr>
<td>2. Early Childhood Education</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
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<tr>
<td>3. Parent Training</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
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<tr>
<td>4. After-school Recreation</td>
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<td></td>
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<td>✓</td>
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<tr>
<td>5. Mentoring with Contingent Reinforcement</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
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<tr>
<td>6. Cognitive Behavior Therapy</td>
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<td></td>
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<td></td>
<td>✓</td>
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<tr>
<td>7. Classroom Organization, Management and Instructional Strategies</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>8. Classroom Curricula</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
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</tbody>
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Wide Ranging Approaches Have Been Found To Be Efficacious

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<tr>
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<th>Vehicle Crashes</th>
<th>Obesity</th>
<th>Mental Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Community Based Skills Training/Motivational Interviewing</td>
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<tr>
<td>10. Cash Transfer for School Fees/Stipend</td>
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<tr>
<td>11. Multicomponent Positive Youth Development</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>12. Policies (eg., MLDA, Access to Contraceptives)</td>
<td>✓</td>
<td>✓</td>
<td></td>
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<tr>
<td>13. Community Mobilization</td>
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<td></td>
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<td>14. Medical Intervention</td>
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<tr>
<td>15. Law Enforcement</td>
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<td></td>
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<tr>
<td>16. Family Planning Clinic</td>
<td></td>
<td></td>
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</tbody>
</table>
Prevention Policy Example
Raising the Minimum Legal Drinking Age

Problem
Traffic Crashes
Risky Alcohol Use

Response
Raise Min. Legal Drinking Age
Drink Driving

Reduced Alcohol Consumption, Reduced Crashes Crash Injury, and Fatalities

Wagenaar and Toomey, 2002
Prevention Program Example
Nurse Family Partnership

Problem

Poor Birth And Early Childhood Outcomes
Risk: Poor Diet And Drug Use
Prot.: Parenting Competence And Bonding

Protocol for Nurse Visits During Pregnancy And 2 yrs. Post Birth

Response

Olds et al., 2002

Mom: Less welfare
More employment,
Fewer arrests and subsequent births,
problems with drug use

Child: Less child
abuse/neglect, Less
arrests at 15
Criteria for Selection of Illustrative Programs

- Randomized or quasi-experimental designs
- Statistically significant effect on problem behaviors during adolescence at least one year post intervention
- Operate during childhood or adolescence
- Examples address both snowball and snowstorm risk patterns
- Some diversity in global context
## Risks and Developmental Period for Illustrative Preventive Policies

<table>
<thead>
<tr>
<th>AGE</th>
<th>11-13</th>
<th>14-21</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PREVENTION POLICIES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Address Structural Risks</td>
<td>Access to contraceptives Increased tax on alcohol</td>
<td>Graduated driving 21 legal drinking age</td>
</tr>
</tbody>
</table>
## Risk/Protection Domain for Illustrative Preventive Interventions

<table>
<thead>
<tr>
<th>AGE</th>
<th>Preadolescent</th>
<th>11-13</th>
<th>14-21</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Risk/Protection Domain</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| **Family / Individual** | • Nurse Family Partnership (0-2)  
  • Early childhood education (3-5)  
  • New Beginnings (9-12) | • Functional Family Therapy  
  • Strengthening Families Program (10-14) | • Functional Family Therapy  
  • Nurse Family Partnership (adolescent mother impact) |
| **School / Individual** | • Seattle Social Development Project (6-11)  
  • Promoting Alternative Thinking Strategies (6-11) | • Gatehouse Project | • Conditional cash-transfer programs |
| **Peer / Individual** | • Computer-based intervention (10-12) | • Unplugged  
  • Life Skills Training  
  • Positive Training Through Holistic Social Programs | • Stepping Stones  
  • Sistering, Informing, Healing, Loving Empowering |
<table>
<thead>
<tr>
<th>Program</th>
<th>Benefit</th>
<th>Cost¹</th>
<th>Benefit Minus Cost</th>
<th>Benefit per Dollar Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse-Family Partnership</td>
<td>$30,325</td>
<td>$9,421</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicago Child-Parent Centers</td>
<td>$39,160</td>
<td>$8,124</td>
<td></td>
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<tr>
<td>Seattle Social Development Project</td>
<td>$6,237</td>
<td>$2,959</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strengthening Families Program 10-14</td>
<td>$6,656</td>
<td>$851</td>
<td></td>
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<tr>
<td>Life Skills Training</td>
<td>$1,415</td>
<td>$34</td>
<td></td>
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<tr>
<td>Functional Family Therapy</td>
<td>$37,739</td>
<td>$3,190</td>
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</tr>
</tbody>
</table>

¹Cost estimates are per participant, based on 2003 U.S. dollars for SFP 10-14;¹⁹ 2007 U.S. dollars for the Chicago Child-Parent Centers;¹¹⁵ and 2010 U.S. dollars for all other interventions¹¹⁴
## Cost-Benefit of Selected Programs

*Steve Aos, Associate Director, Washington State Institute for Public Policy www.wa.gov/ wsipp

<table>
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<tr>
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<td>$31,036</td>
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</tbody>
</table>

¹Cost estimates are per participant, based on 2003 U.S. dollars for SFP 10-14;¹⁹ 2007 U.S. dollars for the Chicago Child-Parent Centers;¹¹⁵ and 2010 U.S. dollars for all other interventions¹¹⁴
40 Years of Prevention Science Research Advances

Etiology/Epidemiology of Problem Behaviors
- Identify risk and protective factors that predict problem behaviors and describe their distribution in populations.

Efficacy Trials
- Design and test preventive interventions to interrupt causal processes that lead to substance abuse and other problems.

Prevention Services Research
- Apply lessons learned about etiology and efficacious interventions in real world settings.
Keys to Diffusion of Innovation

- Effective Program that makes a difference
- Capacity to disseminate with fidelity
- Market demand-funders, practitioners and consumers must want it.

Orleans, Gruman, and Anderson (1999)
Implementation Fidelity is Required if Efficacious Programs are to be Effective in Community Settings
What Boosts Implementation Fidelity?

- Published material including manuals, guides, curricula.
- Certification of trainers.
- High quality, readily available technical assistance.
- Dissemination organization committed to distribution and delivery of tested program.
- Data monitoring system to provide feedback on implementation fidelity and outcomes.
With these elements in Place Implementation Fidelity Can Be Achieved (Elliott & Mihalic - Blueprints Project)
Ok, so it’s possible to implement evidence based prevention programs with fidelity, but can we afford it?
Example: One urban neighborhood invests nearly $55 million annually on children and families.
A small percent--1–2% ($549K-1.1M)-- of this investment can have a major impact

<table>
<thead>
<tr>
<th>Age Group</th>
<th># Youth</th>
<th>Target Group and Outcomes</th>
<th>Program</th>
<th>Unit Cost</th>
<th>Total Investment (per year)</th>
<th>Return on Investment (per dollar spent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-4 years</td>
<td>864</td>
<td>All children at risk of behavior problems c. 30% = 250</td>
<td>Incredible Years BASIC</td>
<td>$2,022</td>
<td>$127,386</td>
<td>$4.20</td>
</tr>
<tr>
<td>5-10 years</td>
<td>1,360</td>
<td>ALL Improved behavior, academics, emotional regulation</td>
<td>Promoting Alternative Thinking Strategies</td>
<td>$112</td>
<td>$50,773 (for 3 years)</td>
<td>$13.04</td>
</tr>
<tr>
<td>10-14 years</td>
<td>840</td>
<td>ALL Reduced substance abuse, violence, risky driving</td>
<td>Life Skills Training</td>
<td>$34</td>
<td>$14,280</td>
<td>$42.13</td>
</tr>
<tr>
<td>10-16 years</td>
<td>1,100</td>
<td>Young people at risk of detention = 100</td>
<td>Functional Family Therapy (FFT)</td>
<td>$3,190</td>
<td>$287,100</td>
<td>$11.86</td>
</tr>
<tr>
<td>14-19 years</td>
<td>650</td>
<td>Pregnant girls and young women = 25</td>
<td>Nurse Family Partnership (NFP)</td>
<td>$9,42</td>
<td>$103,631 (for 2 years)</td>
<td>$3.23</td>
</tr>
</tbody>
</table>

$583K
Concern…

Prevention approaches that do not work or have not been evaluated are more widely used than those shown to be effective.

(Ringwalt, Vincus et al., 2009)
The Challenge

How can we build prevention infrastructure to increase use of tested and effective prevention policies and programs with fidelity and impact at scale...

while recognizing that communities are different from one another and need to decide locally what policies and programs they use?
Recommendations to Build Prevention Infrastructure in States

• Educate agencies, professionals and the public about the research base for prevention science
  ▪ Use surveys to assess and prioritize local risk, protection, and behavior problems
  ▪ Use database of efficacious prevention policies and programs to match with local priorities
  ▪ Shift 2-5% of funds spent on children and youth to efficacious prevention policies and programs

• Increase translational research on adaptation and fidelity, going to scale, and sustainability
Recommendations to Build Prevention Infrastructure at the Community Level

Use tested, effective prevention operating systems to build community capacity to:

- Build prevention coalitions
- Assess and prioritize risk, protection, and behavior problems
- Match priorities to efficacious preventive interventions
- Support/sustain quality implementation of efficacious preventive interventions to all those targeted
Conclusions

- Behavior problems are significant causes of adolescent morbidity and mortality
- Risk and protective factors that predict behavior problems are potential targets for intervention
- There is sufficient evidence from controlled trials that policies and programs can prevent adolescent behavior problems
- Community based prevention should include a combination of locally prioritized and chosen efficacious preventive policies and programs in the first two decades of life
The Research Base for Prevention Science

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