



Children's Safety
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Benefit-Cost Considerations in Injury Prevention Programs

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Presenters



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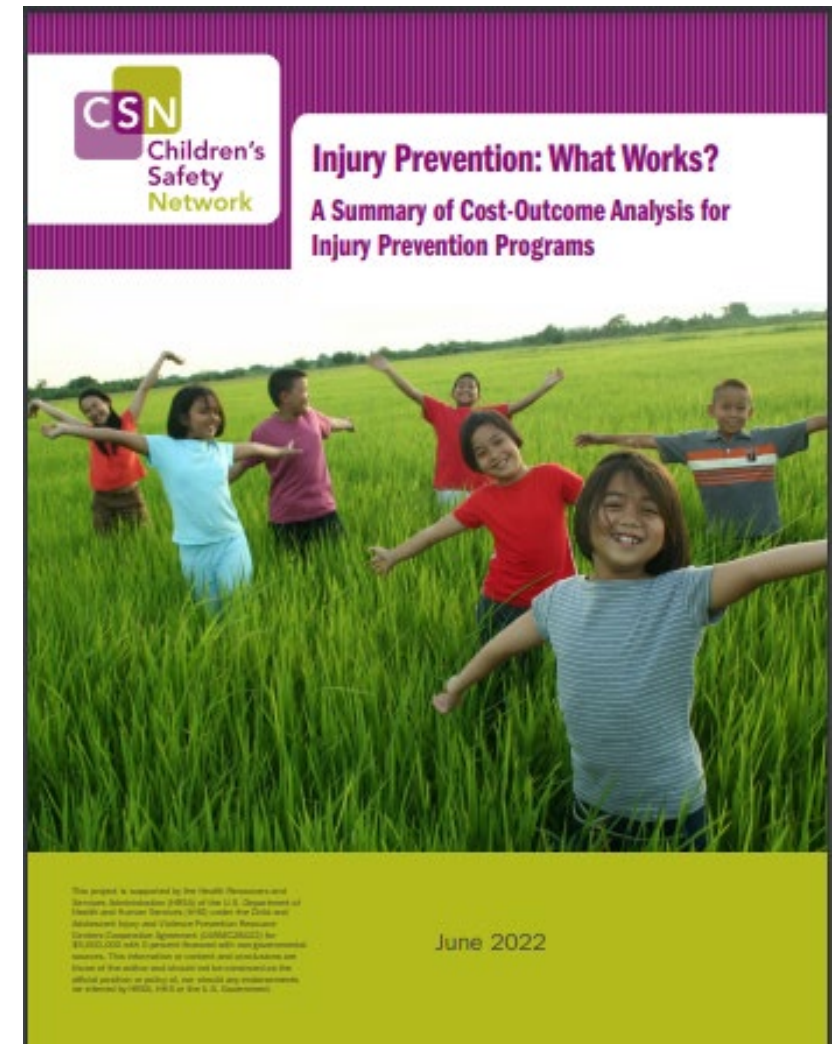
Introduction

Injury & violence are leading killers among all ages, and the number one killer among kids, teens, & adults ages 1-44.

Most injuries and violence can be prevented through education, behavior changes, environmental changes, policy implementation & enforcement, and technology.

Updated Cost-Outcome Fact Sheets about What Works

- CSN’s fact sheet series titled, “Injury Prevention: What Works? A Summary of Cost-Outcome Analysis for Injury Prevention Programs” is available on the CSN website
- It can be used to:
 - Assist with the development of injury prevention plans
 - Seek funding
 - Guide the selection of an intervention
 - Provide technical assistance
 - Assist with resource allocation
 - Promote a particular intervention in educational materials



www.childrenssafetynetwork.org/sites/default/files/InjuryPrevention-WhatWorks.pdf

Objectives

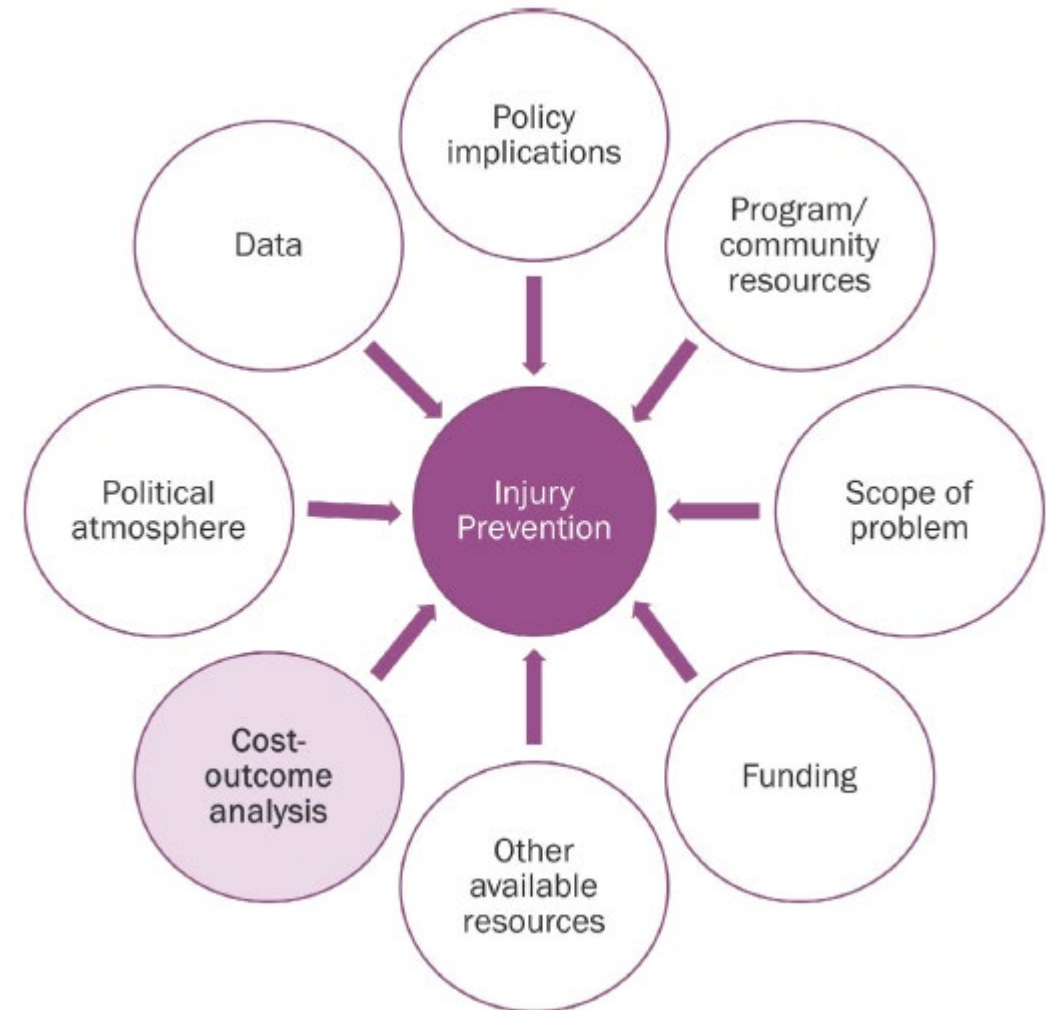
Empower users of the fact sheets

Highlight cost-outcome analyses of selected child injury prevention & control interventions

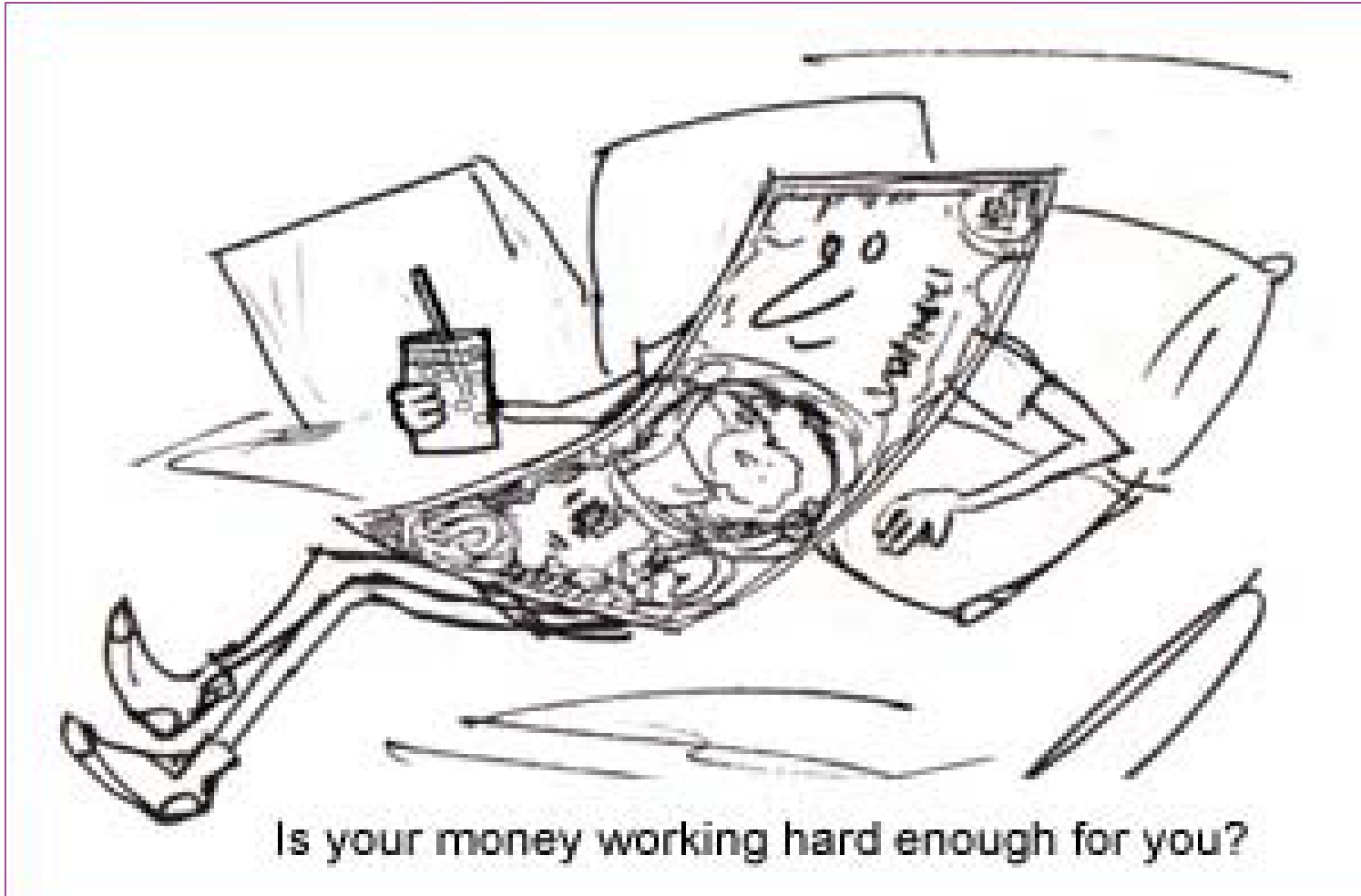
Describe the methods underlying the estimates

Choosing Interventions & Prevention Programs

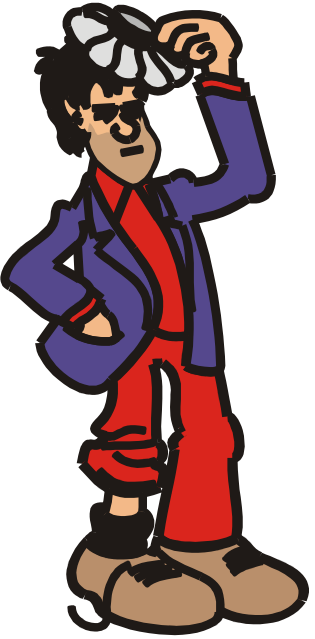
- Costs are a universal metric that allow comparison across injury problems or interventions on the same scale
- Cost-outcome analyses are a useful tool in evaluating intervention & prevention programs
- Cost & cost-effectiveness help guide program selection & implementation planning
- The fact sheet series presents cost-outcome analyses for 180 interventions



Why Consider Cost-Outcomes?



Definitions: Costs & Savings



Cost per Unit: Cost of the intervention for a single person or installation.

Total Benefits: The amount the intervention saved per unit by preventing injuries. These benefits to society include savings in medical costs, other resource costs paid out of pocket, work loss, & quality of life costs.

Benefit-Cost Ratio (BCR): Savings from preventing injuries divided by the cost of the intervention.

Cost-effective: The $BCR > 1.0$. That means the return on investment in the intervention exceeds the amount invested.

Definitions: Cost/QALY

Quality Adjusted Life Years (QALYs) measure quality of life. QALYs are routinely used to evaluate the outcome of clinical trials & preventive health interventions.

A QALY is a health outcome measure that assigns a value of 1 to a year in perfect health, a 0 to death, and some value in between to impaired health (e.g., from injury).

Interventions save fractions of QALYs.

Preventing death saves a lifetime of QALYs.

Cost/QALY is computed as (the intervention costs minus the resource cost savings) divided by the QALYs saved.

If the resource cost savings because injury incidents are prevented or less harmful exceed the cost, the intervention provides Net Cost Savings, meaning the cost/QALY is $< \$0$.

Placing a \$ Value on QALY Loss is Optional

What Works Provides Both Monetized & Unmonetized

- Reasons to monetize
 - Compare health sector w/other investments
 - Get a single comprehensive burden measure
 - Differentiate among cost-saving interventions
 - Victims usually should monetize when educating or advocating
- Reasons not to monetize
 - Value of quality of life is hard to measure and explain
 - Valuing life is distasteful

For each intervention, *What Works* provides both monetized & unmonetized cost-outcome estimates.

Motor Vehicle Safety

	Cost per Unit	Total Benefits	Benefit-Cost Ratio	Cost per QALY
Child Safety Seat Distribution	\$64/seat	\$2,855	45	<\$0
Child Seat Misuse Reduction	\$7/seat checked	\$747	101	<\$0
Booster Seat (Ages 4-7)	\$42/seat	\$3,247	77	<\$0

Translation: At a price of \$42 per seat, investing in booster seats for children ages 4-7 returns an estimated \$77 per \$1 spent. Savings average \$3,247 per seat.

Poll

Which do you think will be more usable with your primary audience?

- Unmonetized cost/QALY saved
- Monetized benefit-cost ratio

How to Monetize

Look at what people pay for safety. For example, suppose people spend an average of \$575 on a safety device that reduces their risk of death by 1 in 10,000.

$\$575 \times 10,000 = \$5.75\text{M} = \text{value of statistical life}$

Value of statistical life = work loss + QALY loss

$\text{QALY loss/lifespan} = \text{cost/QALY} = \$177,085$

Value of a Statistical Life

- **Extra wages for risky work**
- **Highway safety**
 - **Speed choice**
 - **Use of safety devices (belts, helmets)**
- **Demand & price**
 - **Car safety features**
 - **Smoke detectors**
 - **Bicycle helmets**
 - **Cigarettes**
 - **Houses in dangerous/polluted areas**
 - **Surveys**

Comparison of Costs in the Fact Sheets with Costs from CDC's New WISQARS Cost Module (<https://wisqars.cdc.gov/cost/>)

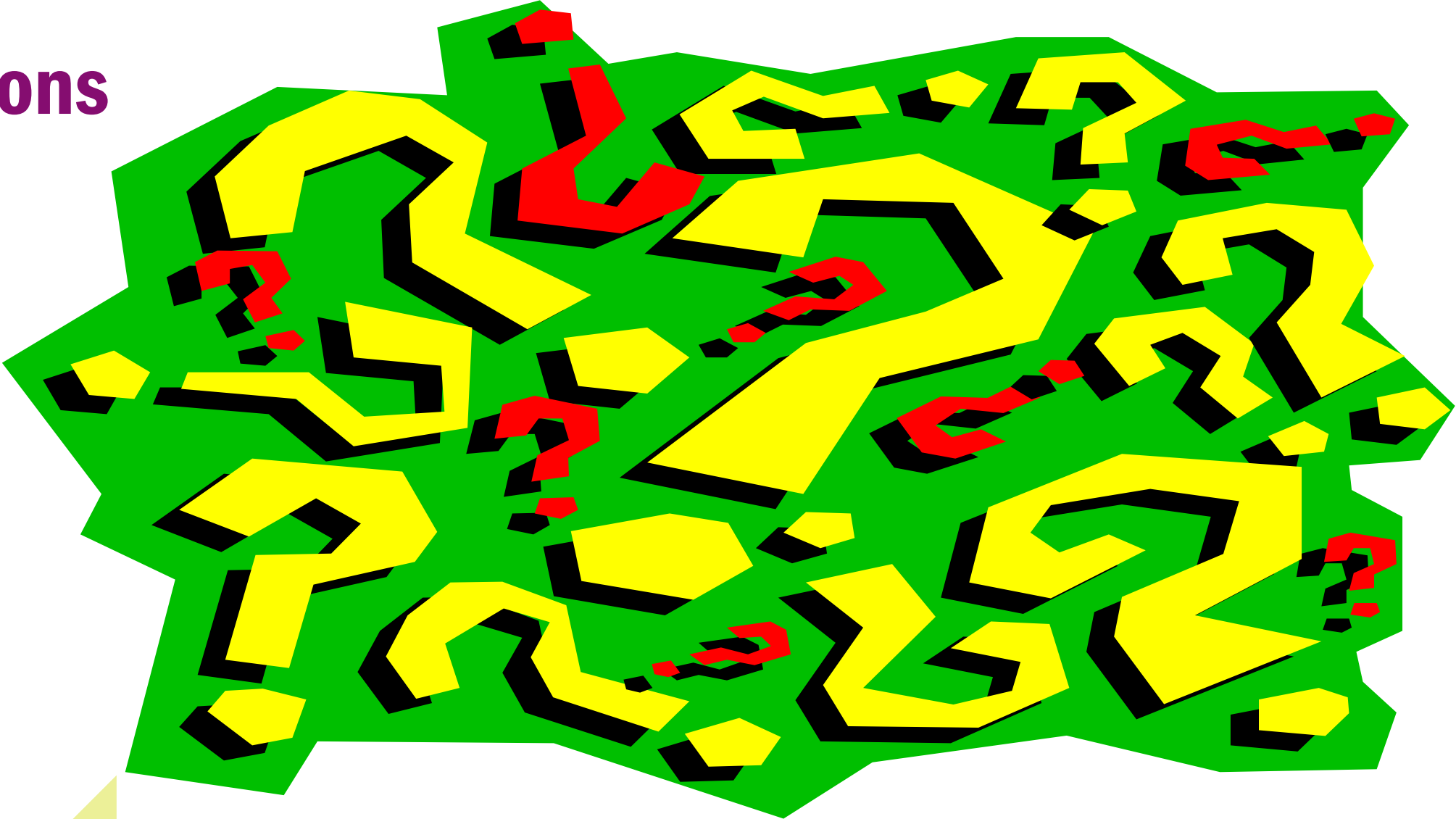
Medical costs are the same.

Work loss costs are largely the same.

CDC uses a VSL averaging \$9.65 million for injury while *What Works* uses \$5.75 million. Using CDC's value would raise the benefit-cost ratios by a multiple of roughly 1.6 but would not change the cost/QALY saved.

The next update of *What Works* will update to CDC's VSL.

Questions



Please enter your questions using the Q/A button at the bottom of your screen

180 Interventions

Intervention	Youth	Adult	Youth and Adult	Total
Motor Vehicle and Highway Safety	9	0	30	39
Impaired Driver	1	16	0	17
Open-Flame/Burn	1	0	11	12
Violence	15	17	2	34
Other Injury	6	2	3	11
Alcohol and Substance Use	26	8	12	46
Tobacco	4	17	0	21
Total	62	60	58	180

Impaired Driving Prevention

	Cost per Unit	Total Benefits	Benefit-Cost Ratio	Cost/QALY
0.05 Driver Blood Alcohol Limit	\$20/driver	\$121	6	<\$0
Sobriety Checkpoints	\$15,558/checkpoint	\$105,059	7	<\$0
High Visibility Enforcement	\$33,654/10,000 drivers	\$396,851	12	<\$0
Safe Ride Subsidy + Media	\$27/one-way coupon used	\$10	0.4	\$648K

Driver and Pedestrian Safety

	Cost per Unit	Total Benefits	Benefit-Cost Ratio	Cost/QALY
Voluntarily Wear a Motorcycle Helmet	\$119/helmet	\$7,839	66	<\$0
Pass Bicycle Helmet Law, Ages 3-14	\$16/new user	\$751	47	<\$0

Highway Safety

	Cost per Unit	Total Benefits	Benefit-Cost Ratio	Cost/Q ALY
Provisional Licensing + Midnight Driving Curfew	\$102/driver	\$859	8	\$<0
Red Light Camera	\$14,027/ camera-yr	\$63,490	4.5	\$<0
Strengthen Child Safety Seat Law, Ages 0-4	\$71/new user	\$2,855	40	\$<0
Install Bridge-End Guardrail	\$13,658/ bridge	\$544,637	40	\$<0

Open Flame/Burn Prevention

	Cost per Unit	Total Benefits	Benefit-Cost Ratio	Cost/ QALY
Less Porous Cigarette Paper	\$0.0002/ pack	\$0.10	481	<\$0
Require Sprinkler System in New Townhouses	\$2,528/ home	\$7,244	3	\$55,696
Battery-Operated Smoke Alarms	\$54/home	\$1,048	19	<\$0
Lithium Battery SAIFE Program	\$375/ home	\$1,950	5	<\$0

Violence Prevention

	Cost per Unit	Total Benefits	Benefit-Cost Ratio	Cost/ QALY
Nurse-Family Partnership 2-Year Home Visits	\$13,825/ child	\$67,063	5	<\$0
Domestic Violence Shelter	\$21,786/ bed	\$257,394	12	<\$0
Functional Family Therapy	\$3,979/ client	\$121,990	31	<\$0

Shaken Baby Syndrome

Annually 5000 U.S. children 0-4 die or are medically treated for abusive head trauma.

“Survivors” of severe shaking rarely live to age 21.

Average nonfatal case costs \$3.2M.

Cost \$17B/year : \$4,100/live birth.

Hospital-based education costs \$5/newborn.

Break even on out-of-pocket costs if prevent 1.8% of cases
One of 2 major trials of Period of Purple Crying met this criterion.

Self-Inflicted Violence Prevention

	Cost per Unit	Total Benefits	Benefit-Cost Ratio	Cost/QALY
Youth Suicide Prevention, Native American	\$277/ youth	\$9,799	35	\$4,202

Alcohol-Related Interventions

	Cost per Unit	Total Benefits	Benefit-Cost Ratio	Cost/Q ALY
20% Alcohol Tax	\$13/drinker /year	\$132	10	\$<0
Enforce Underage Drinking Law	\$3/youth	\$48	19	\$<0
10% Outlet Density Reduction	\$1,919/M population	\$18,117	8	\$<0

Alcohol and Substance Use Prevention

	Cost per Unit	Total Benefits	Benefit-Cost Ratio	Cost/QALY
Good Behavior Game	\$89/pupil	\$3,041	34	\$3,410
All Stars	\$207/pupil	\$10,146	49	<\$0
Family Matters	\$232/family	\$8,013	34	<\$0
Positive Action, Grades 3-8	\$1,725/pupil	\$38,698	22	<\$0
Strengthening Families Age 10-14	\$1,295/ family	\$29,630	23	<\$0

Other Interventions

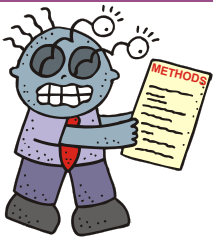
	Cost per Unit	Total Benefits	Benefit-Cost Ratio	Cost/QALY
Pediatrician Injury Prevention Counseling for Children Ages 0-4	\$15/child	\$126	8	\$8,145
Harlem Hospital Safe Communities	\$96/child	\$4,939	52	<\$0
Poison Control Center Services	\$55/call	\$440	8	<\$0

Choosing Interventions

Interventions with a BCR > 2 and a cost/QALY $< \$100,000$ are considered acceptable interventions.

Some interventions with low BCRs may address unique component of injury problem.

Some of legislative interventions would have higher BCRs if looked at governmental perspective only.



Methods

Analyses take society's viewpoint (everyone's costs and savings count).

Cost savings (benefits to society) per injury prevented were estimated using compatible values from PIRE's Injury Cost Model, DoT's motor vehicle crash costs, the U.S. Consumer Product Safety Commission's Injury Cost Model.

Costs stated in 2020 dollars.

Savings from demonstration programs reduced by 25%.

Benefit-cost ratios & costs per QALY saved can be compared between interventions.

Burden Categories

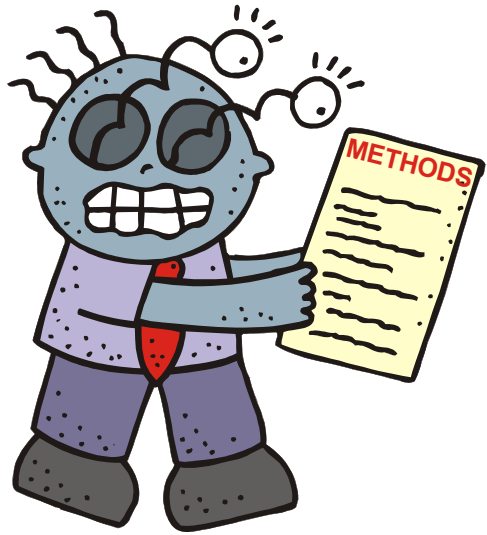
- **ECONOMIC COSTS**

- Lifetime medical (& mental health)
- Other resources/direct/tangible
 - Emergency services
 - Victim services
 - Legal/court/prison
 - Insurance administration
 - Property damage or loss

- Lifetime work loss (productivity)

- Wage work
- Household work

- **QUALITY OF LIFE**



Definition: Discount Rate

A discount rate is used because money earns interest.

E.g., If you have to pay \$10 five years from now, you could put less money in the bank today & have \$10 in the bank when the bill comes due.

The discount rate essentially is the inflation-free interest rate.

With it, we calculate the present value of future costs & benefit.

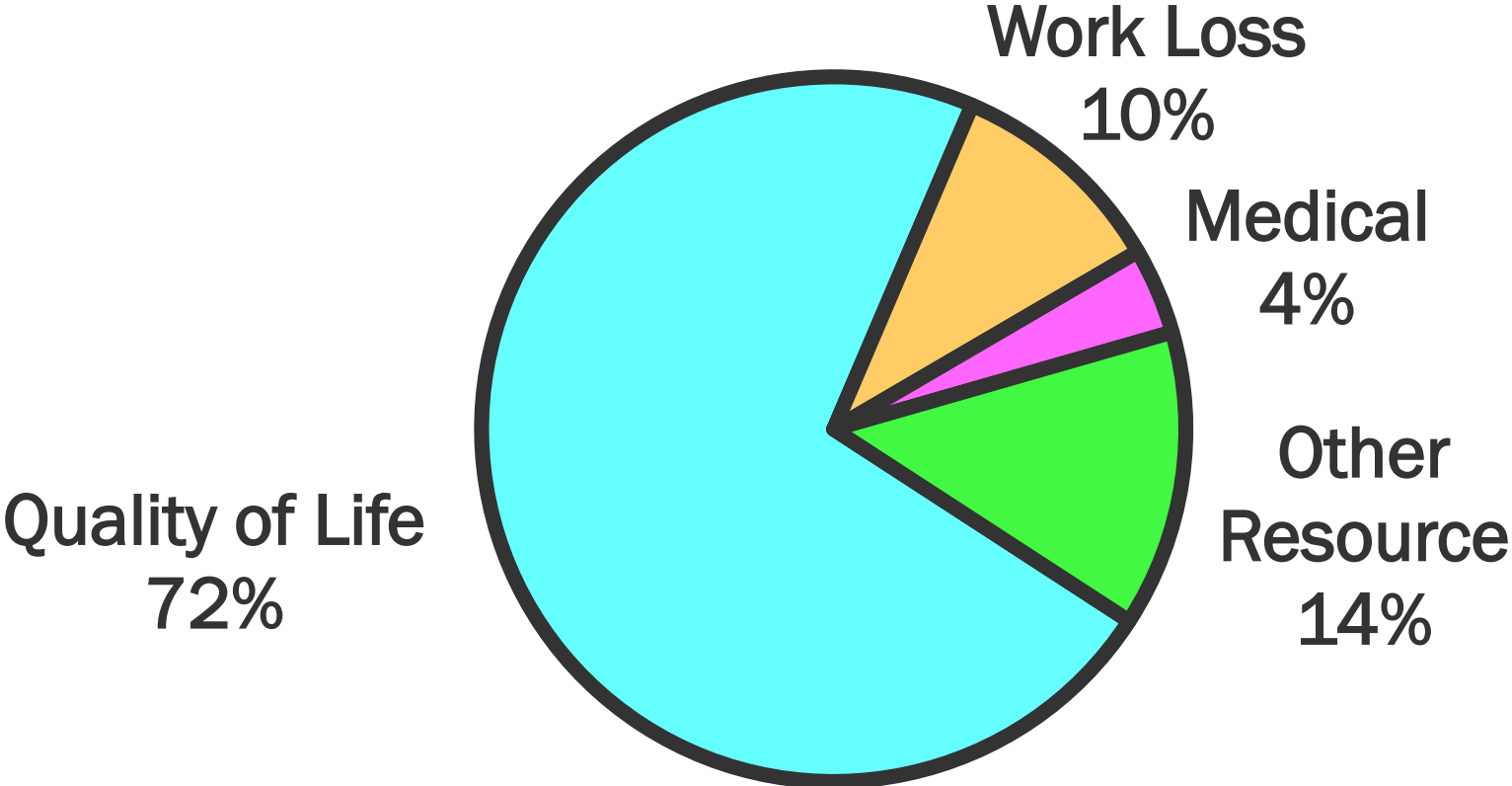
For comparability across programs, we used a 3% discount rate.

Poll

Which Injury Cost Component Is Largest?

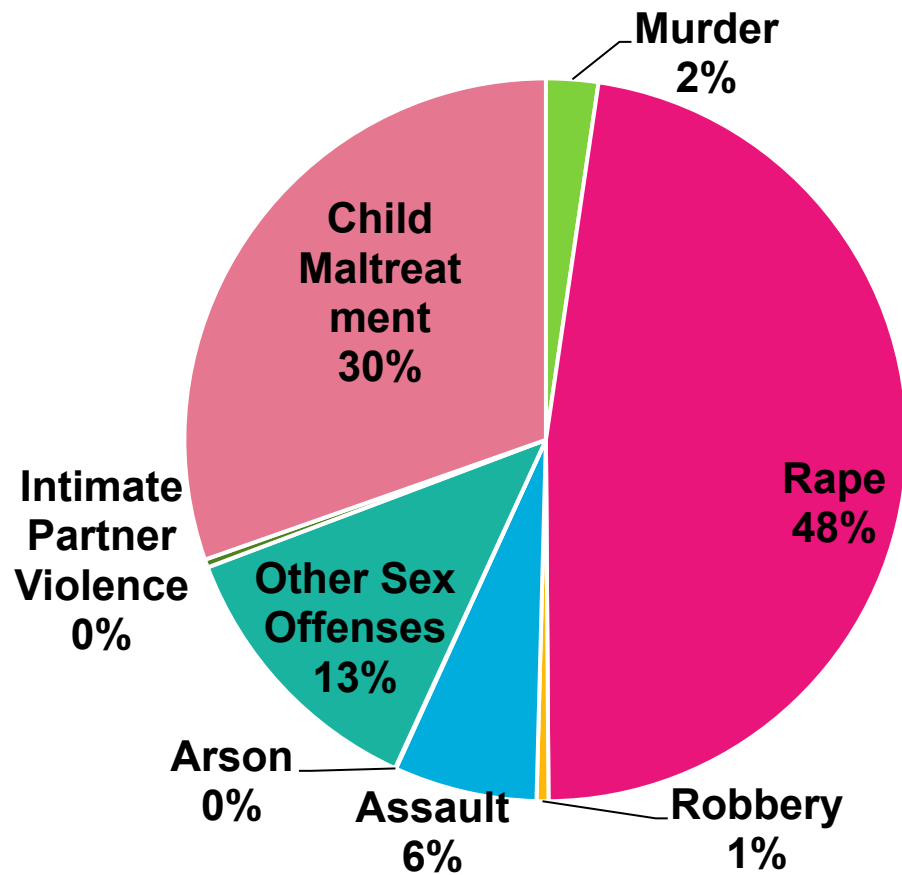
- Medical
- Other Resource Costs (Criminal Justice, Property Damage)
- Work Loss
- Quality of Life Loss

Injury at Ages 0-19 Cost \$731 Billion in 2014



The Costs on the Previous Slide Exclude \$415 Billion in Child Sexual Assault Costs, Which Are 95% Quality of Life Loss

Other Child Maltreatment Costs Also Are Largely Excluded



Crime Category	Youth Victimization (cost in millions)
Murder	\$16,133
Rape	\$329,319
Robbery	\$3,673
Assault	\$44,270
Arson	\$331
Other Sex Offenses	\$85,893
Intimate Partner Violence	\$2,506
Child Maltreatment	\$210,370
Total costs	\$692,495



Methods : Study Selection

Interventions presented were selected from published and unpublished studies from 1987-2020 identified through:

- Medline and internet searches
- Bibliographic reviews
- Federal agencies

Serious study flaws were corrected when possible.

Studies which showed reductions in fatalities, but ignored nonfatal injuries were excluded.

Some studies were excluded based on the rigor of program cost & effectiveness estimates.

A Bike Helmet Use Mandate for Kids 3-14 Costs \$14 per New User & Saves \$750 (BCR 36) Including \$80 in Medical Spending

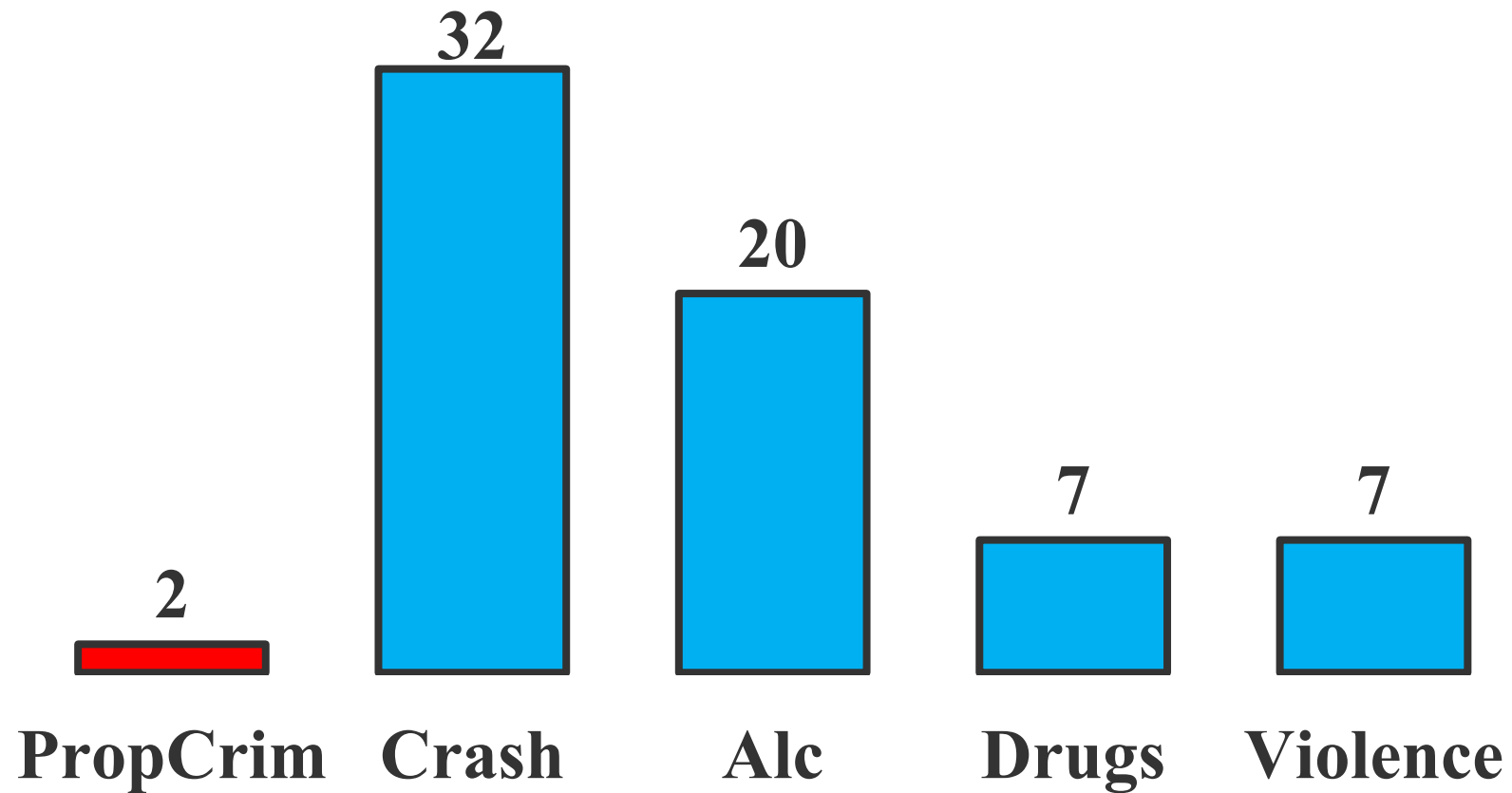


Breakdowns of the benefits by cost category are available upon request.

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BCR for State to break even on its investment



- Laws that interfere with personal freedom would have much higher BCRs if looked at governmental perspective only
- The job of the State is to protect and enhance the welfare of its citizens
- Like medical care, preventive health & safety efforts are designed to save lives & increase quality of life
- Savings to citizens & employers count

- It's best to pair the cost savings information with a story about & preferably from someone who the intervention protected



Questions?



Please enter your questions using the Q/A button at the bottom of your screen

Thank you!

Please fill out our evaluation: www.surveymonkey.com/r/KXNJCMC



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