CSN Children's Safety Network

PIRE
Pacific Institute for Research and Evaluation

Injury Prevention: What Works? A Summary of Cost-Outcome Analysis for Injury Prevention Programs (2012 Update)

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(Fact Sheets)

FAST FACTS

- How can you convey the cost-effectiveness of the injury intervention that you are considering? Use a fast fact! These can be written for any of the interventions summarized in these fact sheets based on the information in the table. The format of the fast facts is "[*Intervention name*] yields an estimated cost savings of [Total Benefits] for a cost of only [Cost per Unit]". For example, [*Zero Alcohol Tolerance for Drivers Under 21*] yields an estimated cost savings of [$960] for a cost of only [$41 per driver].
- *Midnight Driving Curfew Combined with Provisional Licensing* for teenage drivers yields an estimated cost savings of $680 for a cost of only $88 per driver.
- *Sobriety Checkpoints* yield an estimated cost savings of $82,000 for a cost of only $12,500 per checkpoint.
- *Battery-Operated Smoke Alarms* yield an estimated cost savings of $770 for a cost of only $46 per smoke alarm.
- *Treatment Foster Care* yields an estimated cost savings of $181,000 for a cost of only $2,800 per child.
- A *20% Alcohol Tax* yields an estimated cost savings of $102 for an annual cost of only $11 per drinker.
- *Poison Control Centers* yield an estimated cost savings of $320 for a cost of only $45 per call.
- A *Bicycle Helmet, Ages 3-14,* yields an estimated cost savings of $580 for a cost of only $14 per helmet.
- *Child Safety Seat Distribution, Ages 0-4,* yields an estimated cost savings of $2,200 for a cost of only $55 per seat provided.

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TABLE OF CONTENTS

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1. METHODOLOGY

INTRODUCTION

Injury and violence are among the most serious social, economic, medical, and public health issues. Injuries and violence are a leading killer among all ages, and the number one killer among kids, teens, and young adults ages 1-44. Injuries and violence affect all of us including the families left behind, disabled survivors, and the general public who support our overburdened health care system. However, the majority of injuries and violence can be prevented through education, behavior and environmental changes, policy implementation and enforcement, and technology. But how can you tell if a particular prevention program or intervention is right for you, your family, and/or your community? Figure 1 shows some of the factors that you should consider; the only factor discussed in these fact sheets is costs. Costs are a universal metric that allow you to compare dissimilar interventions on the same scale. Costs can be used to produce cost-outcome analyses (see glossary for definitions of terms in bold) that are useful tools for the evaluation of prevention and intervention programs. This Fact Sheet Series can be used as an advocacy tool, to assist with the development of injury prevention plans, to guide the selection of an intervention, to provide technical assistance, to assist with resource allocation, or to promote a particular intervention in educational materials. Disciplines that are essential or tangential to injury prevention have a need to evaluate programs in terms of costs.

This Fact Sheet Series presents cost-outcome analyses for motor vehicle, impaired driving and pedestrian, open-flame/burn, substance abuse, violence, and other interventions. In a resource-constrained world, decision makers want to know if a program produces desired results less expensively than alternative approaches. For example, cost-outcome analyses allow you to say:

- On average, a $55 child safety seat generates $2,200 in benefits to society, or stated another way, child safety seats yield an estimated cost savings of $2,200 for an average cost of only $52.
- On average, a $36 booster seat generates $2,500 in benefits to society.
- On average, a $13 bicycle helmet for ages 3-14 years generates $580 in benefits to society.
- On average, a $46 battery-operated smoke alarm generates $770 in benefits to society.
- Childproof cigarette lighters cost $0.05 per lighter and generate $4 in benefits to society.

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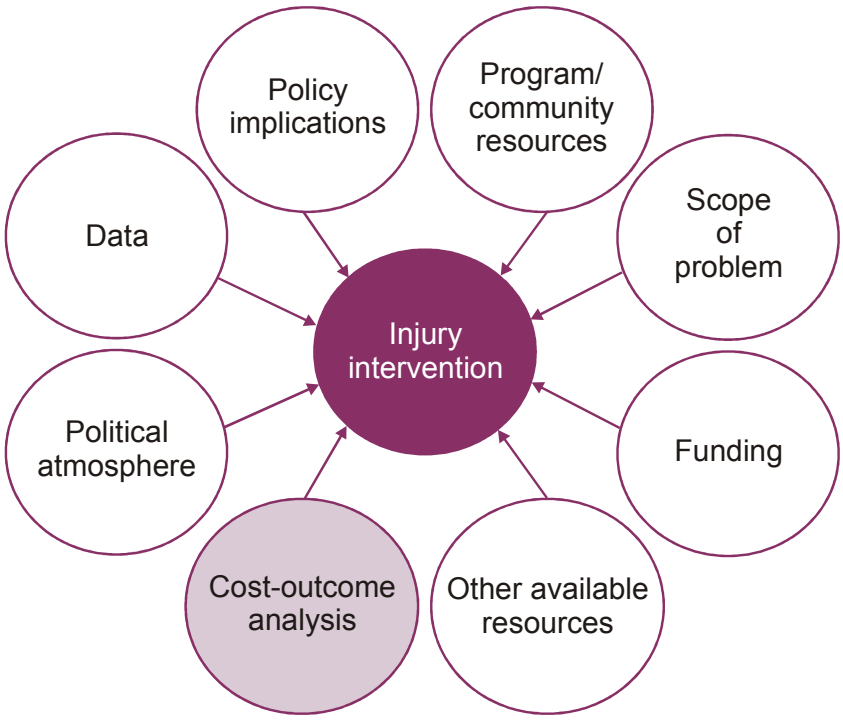
- The average call to a poison control center costs $45 and saves $320 in medical costs. At $45 a call, each $1 spent on poison control center services saves over $7 in medical spending.
- The average admission to a triaged regional trauma system costs $1,900 and saves $5,100.
- On average, injury prevention counseling by pediatricians (TIPP) costs $12 per child ages 0-4 and generates $97 in benefits to society.
- A sobriety check point costs $12,500 and generates an average of $82,000 in benefits to society.
- The Harlem Hospital Safe Communities program costs an average of $78 per child and generates an average of $3,813 in benefits to society.

The majority of the interventions presented reduce injuries, disability, and death. However, these fact sheets are a partial literature summary of available injury interventions with cost outcome analysis results. Children's Safety Network (CSN) is not suggesting that you choose any of the interventions over others. The focus of these fact sheets is on the cost-effectiveness of interventions, but cost effectiveness should **NOT** be the only factor considered when choosing an intervention to replicate or endorse. Interventions should be chosen based on a multitude of factors, including policy implications, program or community resources, funding, political atmosphere, cost implications, scope of problem, data, votes, personal interests, understanding the problem, time, competing priorities/interest groups, feeling of control over the situation, and other available resources (see Figure 1).

Figure 1: Some factors to consider when choosing which injury prevention is right for you.



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METHODS FOR THE COST-OUTCOME ANALYSIS OF INJURY INTERVENTION PROGRAMS

The purpose of this section is to help the user properly use the tables and information provided. Details about suggested values to use in determining the appropriateness of an intervention are NOT meant to solely be used in determining the selection of an intervention. Cost-outcome analyses that show cost-savings are just one of many factors to consider.

The 162 injury-related interventions consist of 60 youth only interventions, 51 adult only interventions, and 51 youth and adult interventions. Estimated cost savings (benefits to society) per injury prevented are from a set of related studies or use compatible values from the U.S. Consumer Product Safety Commission's Injury Cost Model. In several highway safety studies, intervention costs included increased travel time or reduced mobility. We valued travel time at 50% of the wage rate for production workers and valued mobility loss at the average cost of vehicle operation including amortization. All costs take society's viewpoint (everyone's costs and savings count) and use 2011 dollars and a 3% discount rate. Savings from any demonstration programs were reduced by 25%. When demonstration programs are replicated by others, there are usually differences between the replication and the original (demonstration) program, such that the savings are usually lower.

Savings for some interventions would be higher if we looked at the government perspective. For example, the cost of a sobriety checkpoint includes the time spent by drivers stopped at the checkpoints. If this were excluded, the savings would be higher.

The injury interventions presented were selected from U.S. published and unpublished studies from 1987-2010 identified through Medline and internet searches, bibliographic reviews, and federal agencies. Serious study flaws were corrected when possible. However some studies were subjectively excluded based on the rigor of program cost and effectiveness estimates. Analyses of occupational, air, rail, and water transport safety programs were also excluded. In addition, studies which showed reductions in fatalities, but ignored nonfatal injuries were excluded. All excluded studies are not shown in these fact sheets.

There are two cost measures which can be used to compare interventions: benefit-cost ratios and cost per QALY(quality adjusted life years) saved. If the benefit-cost ratio is greater than 1.0, the cost of implementing the intervention is less than the total benefits gained by preventing injuries. The total benefits include the dollar value of medical costs, work loss, and lost quality of life costs. A benefit-cost ratio greater than 1 means the intervention offers a positive return on investment and is cost-effective. Costs per QALY is a more stringent measure because it only includes savings from medical costs and other tangible resources and does not include quality of life savings. If the medical and other resource cost savings generated by the prevented injuries exceed the total cost of the intervention, the intervention is cost-saving and the cost/QALY is "<$0." If the intervention is effective, but the cost of the intervention exceeds the medical and other resource cost-savings, the cost/QALY will be greater the $0. If the intervention is not effective

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at all, the cost/QALY will be infinite (i.e., an infinite number of dollars can be spent on the intervention without improving health outcomes). In summary the best interventions are cost-effective (a BCR > 1) and cost-saving (cost/QALY < $0). In general interventions with a BCR > 2 and a cost/QALY < $100,000 are considered acceptable interventions.

Summary of Number and Types of Cost-Outcome Analysis Interventions

Intervention	Youth	Adult	Youth and Adult	Total
Motor Vehicle and Highway Safety	10	0	28	38
Impaired Driver	1	10	0	11
Open-Flame/Burn	1	0	8	9
Violence	15	17	2	34
Other Injury	6	2	3	11
Alcohol and Substance Abuse	23	5	10	38
Tobacco	4	17	0	21
Total	60	51	51	162

Updated 11/15/10

STUDY SUPPORTERS AND REFERENCES

Development and update of this Fact Sheet Series is supported by contracts from the Health Resources Services Administration Maternal and Child Health Bureau through the Children's Safety Network (CSN). Support for the estimates also came from the Center for Substance Abuse Prevention, National Institute on Alcohol Abuse and Alcoholism, and National Highway Traffic Safety Administration. All cost-outcome analyses presented in these fact sheets were conducted by or compiled by Ted Miller, PhD and others from the CSN Economics and Data Analysis Resource Center at the Pacific Institute for Research and Evaluation (PIRE). Most of the analyses are in the following sources:

- Miller TR, Levy DT. (2000). Cost-outcome analysis in injury prevention and control: Eighty-four recent estimates for the United States. Medical Care 38(6):562–582.
- Zaloshnja E, Miller TR, Galbraith M, Lawrence BA. (2003). Reducing injuries among Native Americans: Five cost-outcome analyses. Accident Analysis and Prevention 35(5):631-639.
- Miller TR. (2001). The effectiveness review trials of Hercules and some economic estimates for the stables. American Journal of Preventive Medicine 21(4S):9-12.
- Miller TR, Hendrie D. (2009). Substance abuse prevention dollars and cents: A cost-benefit analysis, Rockville MD: Substance Abuse and Mental Health Services Administration, DHHS Publication No. (SMA) 07-4298.
- Miller TR, Finkelstein E, Zaloshnja E, Hendrie D. (2012). The cost of child and adolescent injuries and the savings from prevention. In K Liller (ed.), Injury Prevention for Children and Adolescents: Research, Practice, and Advocacy, Second Edition, Washington DC: American Public Health Association, 21-81.

- Miller TR, Hendrie D. (2012). Economic evaluation of injury prevention and control programs. In G Li, S Baker (ed.), Injury Research: Theories, Methods and Approaches, New York: Springer, 641-666.
- Miller TR, Hendrie D. (2012, in press).Economic evaluation of public health laws and their enforcement. In S Burris, A Wagenaar, (ed.), Public Health Law Research: Theory and Methods, Wiley.

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2. MOTOR VEHICLE

COST ANALYSIS OF MOTOR VEHICLE AND PEDESTRIAN SAFETY INTERVENTION PROGRAMS

Motor vehicle collisions are the leading cause of fatal injuries. Motor vehicle collisions often result in medical costs, lost work time, and lost quality of life. The total annual cost of motor vehicle related death and injury is over $240 billion. Interventions to reduce motor vehicle injuries include interventions to improve driver and pedestrian safety, vehicle design, and road design.

Driver and pedestrian safety interventions include broad federal traffic safety programs, speed limits, provisional licenses and curfews for teenage drivers, laws requiring child seats, and distribution of child seats. Vehicle design interventions include installing airbags, seatbelts, and automatic daytime vehicle lights. Road design interventions include bridge end guard rails, median barriers, and post mounted reflectors.

CHILD SEATS

Child seats are an effective way of reducing child injuries in motor vehicle crashes.[1] Three types of child seat programs with cost-benefit analyses are included in these facts sheets: *Pass Child Safety Seat Law – Ages 0-4*, *Child Safety Seat Distribution - Ages 0-4*, and *Child Seat Misuse Reduction & Design Improvement* through education campaigns and check points. *Child Safety Seat Laws* require that children ages 0-4 be appropriately restrained when traveling in passenger vehicles. *Child Safety Seat Distribution (Ages 0-4)* encompasses giving away approved child safety seats to parents and caregivers and a *Child Seat Misuse Reduction & Design Improvement* at a car seat checkpoint involves ensuring that child safety seats are properly installed in vehicles, that children are appropriately fastened in the child seat, and that parents and caregivers have an understanding of procedures. Uniform latches to anchor seats contributed to the effectiveness of this intervention.

DRIVER AND PEDESTRIAN SAFETY PROGRAMS

Of the nineteen driver and pedestrian programs, twelve were cost-saving; for these programs, the medical, property damage, and other resource cost savings exceed the intervention costs. *Child Safety Seats (Ages 0-4)* and *Booster Seats (Ages 4-7)* reduce injuries to children in motor vehicle accidents, and the amount saved by preventing these injuries was more than the costs to implement the program. Other cost-saving interventions are *Safety Belt Laws*, *Child Bicycle Helmets*, and *Motorcycle Helmets*. For communities with limited resources to invest in driver and pedestrian safety programs, these programs also offer the highest return.

[1] Childhood Injury Cost and Prevention Facts. Children's Safety Network Economics and Data Analysis Resource Center fact sheet series (September, 2005).

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The remaining programs produced benefits in injuries prevented, but were less **cost-effective**. *Motorcycle Helmet Laws*, *All Terrain Vehicle Helmets*, and *Willy Whistle (Child) Pedestrian Safety Programs* were all effective in reducing injuries, but had a net cost for every year of perfect health gained.

Benefit-Cost Ratios of Motor-Vehicle Injury and Pedestrian Safety Intervention Programs (2011 dollars)

For information on the research methodology, see Methodology section of this Fact Sheet Series.

		Cost per Unit	Total Benefits	Benefit Cost Ratio	Cost/ QALY
	Driver and Pedestrian Safety Interventions				
1	Pass Child Safety Seat Law, Ages 0-4	$61/new user	$2,200	38	<$0
2	Child Safety Seat Distribution, Ages 0-4	$55/seat provided	$2,200	42	<$0
3	Pass Booster Seat Law, Ages 4-7	$41/new user	$2,500	63	<$0
4	Booster Seat, Ages 4-7	$36/seat	$2,500	71	<$0
5	Pass Safety Belt Law	$360/new user	$6,100	18	<$0
6	Upgrade Secondary Belt Law to Primary	$360/new user	$6,100	18	<$0
7	Enhanced Belt Law Enforcement	$370/new user	$6,100	17	<$0
8	Driver Airbag	$450/bag	$1,900	4.4	$10,400
9	Passenger Airbag	$230/bag	$450	2	$84,000
10	Pass Motorcycle Helmet Law	$2,200/new user	$4,800	3.1	$36,000
11	Voluntarily Wear a Motorcycle Helmet	$100/helmet	$4,800	18	<$0
12	Pass Bicycle Helmet Law, Ages 3-14	$14/new user	$580	44	<$0
13	Pass Bicycle Helmet Law, Ages 15 & Over	$430/new user	$280	2.5	$60,000
14	Bicycle Helmet Distribution, Ages 3-14	$13/helmet	$580	48	<$0
15	Bicycle Helmet, Ages 15 & Over	$20/helmet	$280	15	<$0
16	Voluntarily Wear an ATV Helmet	$55/helmet	$570	3.9	$41,000
17	Install Bridge-End Guardrail	$11,000/bridge	$423,000	38	<$0
18	Install Median Barrier (1-12 foot median)	$240,000/mile	$600,000	2.5	$57,000
19	Install Median Barrier (>13 foot median)	$240,000/mile	$133,000	0.6	$316,000
20	Willy Whistle Pedestrian Safety Program	$1,900/child/year	$16,900	9	$2,100

Note: If the cost/QALY is <$0, the intervention is effective and cost saving. If the cost/QALY is infinite, the intervention is not effective (i.e., an infinite number of dollars can be spent on the intervention without improving health outcomes). Updated 11/15/10.

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VEHICLE DESIGN SAFETY RESEARCH AND REGULATION

Of these seventeen interventions, eleven were cost-saving. Even personal protective equipment with very low average benefits may be worth the cost to some consumers. For example, among this list, Adding Rear Seat Shoulder Belts is the least cost-effective safety equipment, in part because there are no rear seat passengers in many collisions. However, a car purchaser who expects to regularly have passengers in the back seat might find that rear shoulder belts offered a positive return on investment.

Driving curfews for youth may force them to curtail their drinking and reduce impaired driving and resulting injuries. However curfews have a social cost from lost mobility. A Midnight Driving Curfew Combined with Provisional Licensing offers a higher return than a 10 PM Driving Curfew and is an appropriate intervention for many communities.

		Cost per Unit	Total Benefits	Benefit Cost Ratio	Cost/ QALY
	Vehicle Design Safety Research and Regulation and Road Design and Upgrading				
21	Federal Traffic Safety Programs	$4/driver	$200	68	<$0
22	Federal Vehicle Safety Program	$69/vehicle	$400	5.6	$31,000
23	Federal Road Safety Program	$7/driver	$200	32.4	<$0
24	Mobile Speed Camera	$770,000/camera-year	$14,000,000	19	<$0
25	Red Light Camera	$12,000/camera-year	$49,200	4	<$0
26	Striping / Painting Lines on Roads	$280/mile	$18,000	67.2	<$0
27	Post-mounted Reflectors	$391/reflector	$42,000	112.9	<$0
28	Flatten Crest Vertical Curves	$330,000/curve	$233,000	0.7	$235,000
29	Flashing Beacons on Hazardous Curves	$22,000/beacon	$339,000	16.1	<$0
30	Side Impact Protection	$387/vehicle	$1,100	3	$61,000
31	Automatic Daytime Vehicle Lights	$84/vehicle	$300	3.8	$29,000
32	55MPH speed limit	$9/added travel hour	$33	3.7	$21,000
33	Safety Belts, Front Seat	$80/vehicle	$4,100	53.9	<$0
34	Shoulder Belts, Rear Seat	$29/vehicle	$12	0.4	$492,000
35	Child Seat Misuse Reduction & Design Improvement	$6/seat in use	$600	81.2	<$0
36	Livestock Control, Native American	$9/grate	$16	1.8	<$0
37	Provisional Licensing + Midnight Driving Curfew	$88/driver	$680	8.1	<$0
38	Change Driving Curfew to 10 PM	$170/driver	$410	2.5	$39,000

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3. IMPAIRED DRIVING

COST ANALYSIS OF IMPAIRED DRIVING AND PEDESTRIAN INTERVENTION PROGRAMS

Impaired driving, or driving under the influence of alcohol, is a major source of fatalities and injuries. A person with a blood alcohol concentration (BAC) ≥.08 drove one of every 140 miles driven in the United States in 2004, Police in the United States reported 935,923 crashes involving a driver or pedestrian with a BAC of .01 or more. However, the alcohol involvement of drivers and pedestrians are not always captured in the police report for various reasons. When alcohol involvement is estimated in crashes where this information was not captured by the police, the number of alcohol involved crashes almost doubles to an estimated 1,826,390 crashes. These crashes killed 16,694 and injured an estimated 410,000 people.[3]

STREETLIGHTS AT BARS

In the *Streetlights at Bars* intervention, the Eastern Arizona District of the IHS's Office of Environmental Health and the White Mountain Apache Tribe (population 10,000) installed 28 streetlights along a 1.1-mile section of highway to reduce pedestrian injuries, primarily to intoxicated victims, in Whiteriver, Arizona. The project also involved the State Transportation Department and the local electric utility.[2]

Benefit-Cost Ratios of Impaired Driving Prevention Programs (2011 dollars)

For information on the research methodology, see Methodology section of this Fact Sheet Series.

		Unit Cost	Total Benefits	Benefit Cost Ratio	Cost/ QALY
	Impaired Driving Prevention Programs				
39	.08% Driver Blood Alcohol Limit	$3.80/driver	$55	14	<$0
40	Zero Alcohol Tolerance, Drivers Under 21	$41/driver	$960	25	<$0
41	Sobriety Checkpoints	$12,500/checkpoint	$82,000	6.8	<$0
42	Administrative License Revocation (ALR)	$3,700/ALR	$60,000	17	<$0
43	ALR with Per Se Law	$3,400/ALR	$71,000	21	<$0
44	Alcohol-Testing Ignition Interlock	$1,200/vehicle	$7,800	6.6	<$0
45	DWI Offender Auto Impoundment	$1,000/vehicle	$5,500	5.4	<$0
46	DWI Offender Electronic House Arrest	$1,800/arrestee	$5,900	3.3	<$0
47	DWI Intensive Probation + Treatment	$1,600/arrestee	$6,000	3.8	<$0
48	Australia-Style Anti-DWI Media Campaign	$900/million population	$12,400	14.2	<$0
	Impaired Pedestrian Harm Reduction				

[2] Zaloshnja, E., Miller, T., Galbraith, M., Lawrence, B., DeBruyn, L., Bill, N., Hicks, K., Keiffer, M., & Perkins, R. (2003). Reducing injuries among Native Americans: Five cost-outcome analyses. *Accident Analysis and Prevention, 35*(5), 631-639.
[3] Impaired Driving in the United States 2007, PIRE Fact Sheet.

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49	Streetlights at Bars, Native American	$470/light	$3,800	8.4	<$0

Note: If the cost/QALY is <$0, the intervention is effective and cost saving. If the cost/QALY is infinite, the intervention is not effective (i.e., an infinite number of dollars can be spent on the intervention without improving health outcomes).
Updated 11/15/10.

Impaired driving fatalities and injuries can be prevented by lessening the number of drinking drivers, and the number of times that drinking drivers drive while impaired. Safety measures that improve the survivability of traffic crashes (i.e., proper in-car restraints, airbags, or guardrails) also prevent or improve the outcomes of impaired driving crashes; however, they are listed on the Motor Vehicle Safety section of this Fact Sheet Series.

These interventions all offer excellent returns for the amount invested. All eleven of the measures reported here directly reduce harm from drinking by reducing impaired driving frequency. All of these interventions were cost-saving (cost/QALY < $0) meaning that the medical, property damage, and other resource costs saved by these programs exceeded the costs of the program.

These interventions may avert specific incidents and also have a general deterrence effect. For example, Sobriety Checkpoints avert specific incidents by apprehending impaired drivers who would otherwise have crashed. Sobriety Checkpoints also have a general deterrence effect because some people choose not to drive after drinking to avoid getting caught in checkpoints. Typically this general deterrence effect dominates.

Measures such as Zero Alcohol Tolerance for Drivers Under 21 and .08% Driver Blood Alcohol Limits may have additional benefits such as reducing consumption and associated harms including crime, high-risk sex, and suicide acts. However, only their impact on impaired driving has been evaluated.

Some interventions work well in combination. As a package, automatic Administrative License Revocation invoked when caught driving at a blood alcohol level above a 0.08% or even a 0.10% limit and Zero Alcohol Tolerance for Drivers Under 21 during the first year of driving, and intensive Sobriety Checkpoints have worked well in concert to reduce impaired driving deaths among young drivers.

Interventions that can prevent re-offending include Alcohol-Testing Interlocks that prevent automobile use by impaired drivers, DWI Offender Auto Impoundment, and DWI Offender Electronic House Arrest. Any of these three interventions probably should be coupled with intensive case managed treatment. Auto Impoundment and DWI Offender Electronic House Arrest are also still at demonstration stages. Importantly, their impact on domestic violence has not been evaluated.

Impaired Pedestrian Prevention Measure

One intervention, *Streetlights at Bars*, was designed to protect intoxicated pedestrians. Streetlights were installed on a bar-lined street to increase visibility and reduce the likelihood of drivers hitting impaired pedestrians. It merits replication where similar conditions exist.

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4. OPEN-FLAME/BURNS

COST ANALYSIS OF PREVENTING OPEN-FLAME BURNS

In the year 2007, fire was the seventh leading cause of unintentional injury deaths in the United States. In 2007, 3,375 people were killed and 31,590 were hospitalized for fires or by burns. An open flame is the leading cause of burn injury for adults, while scalding is the leading cause of burn injury for children. Eight inexpensive prevention devices are reviewed here.

Benefit-Cost Ratios of Open-Flame Burn Prevention Programs (2011 dollars)

For information on the research methodology, see Methodology section of this Fact Sheet Series.

		Unit Cost	Total Benefits	Benefit Cost Ratio	Cost/ QALY
50	Childproof Cigarette Lighter*	$0.05/lighter	$4	72	<$0
51	Less Porous Cigarette Paper	$.0001/pack	72$0.07	747	<$0
52	Pass Smoke Alarm Law	$51/new user	$770	16	$12,000
53	Battery-Operated Smoke Alarm	$46/home	$770	18	$10,000
54	Lithium-Battery Smoke Alarm Installation & Fire Education (SAIFE) Program	$320/home	$1,220	4	$49,000
55	Sprinkler System: Colonial	$2,300/home	$6,000	2.5	$81,000
56	Sprinkler System: Townhouse	$2,100/home	$6,000	2.7	$72,000
57	Sprinkler System: Ranch House	$900/home	$6,000	6.2	$21,000
58	Mattress Flammability Standard	$2,500/home	$73	2.8	$75,000

Note: If the cost/QALY is <$0, the intervention is effective and cost saving. If the cost/QALY is infinite, the intervention is not effective (i.e., an infinite number of dollars can be spent on the intervention without improving health outcomes). *Mechanism

RESULTS

FIRE PREVENTION MEASURES

Smoke Alarm Laws and voluntary *Smoke Alarm Purchases* are a proven way to reduce death, injury, and property damage resulting from fires, providing $770 in benefits for as little as $51 per smoke alarm. *Less Porous Cigarette Paper* will self-extinguish if left to smolder, thus reducing the chance of cigarette fires. *Less Porous Cigarette Paper* has a very high return on investment. Although it may only provide benefits of 7 cents per cigarette, the cost of the paper is very low and the number of potential cigarette burns is high. *Child Resistant Cigarette Lighters* reduce unintentional fires and injuries by making it more difficult for young children to operate the lighters. All of these interventions are cost-saving, meaning the medical, property damage, and other resource cost savings exceed the intervention costs.

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What Is "Less Porous" Cigarette Paper?

Various methods for slowing the burn rate of a cigarette by making the paper less porous are currently in use. Some new paper has rings of ultra-thin paper that are applied on top of traditional cigarette paper during the paper-making process. These rings act as "speed bumps" to slow down the rate at which the cigarette burns as the lit end crosses over them. Some brands use a "double wrap" around the tobacco column. This has the effect of making the cigarette paper less porous, thereby decreasing the flow of oxygen to support combustion.

Child Resistant Safety Lighters

In 1994, the U.S. Consumer Product Safety Commission (CPSC) set a Safety Standard for Cigarette Lighters that required outfitting disposable and novelty cigarette lighters with a child-resistant mechanism making the lighter difficult for children under the age of 5 to operate. This has resulted in an estimated savings of $72 for every dollar spent.

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5. VIOLENCE

COST ANALYSIS OF VIOLENCE PREVENTION PROGRAMS

Interpersonal violence accounts for approximately one-eighth of medical care spending on injury in the United States. Nationally, homicide is the fifth leading cause of death for people from 1 to 45 years of age (2007). In 2001 dollars, the measurable total costs to society for rape are estimated at $208 billion; robbery $10 billion; aggravated assault $100 billion; and murder at $69 billion. The resource costs include medical costs, mental health costs, property damage, police costs, victim services, and adjudication and sanctioning costs (e.g., incarceration and probation). Added to these costs are the value of lost work and quality of life.[4]

PERRY PRESCHOOL AND HOME VISITS PROGRAM

The *Perry Preschool and Home Visits Program* provides early education to children ages 3 and 4 from families with low socioeconomic status. The preschool lasts 2 years and is designed to offer high-quality early childhood education and promote young children's intellectual, social, and physical development. In addition, this intervention provides weekly home visits by teachers and referrals for social services, when needed. For more information, see:

http://www.highscope.org/Content.asp?ContentId=219

RESULTS

NONOFFENDER PROGRAMS

Two of the nonoffender programs, the Perry Pre-School and Home Visits Program and the Nurse-Family Partnership 2-Yr Home Visits, were cost-saving, meaning that the medical, property damage, and other resource costs saved by these programs exceeded the costs to implement the program. Intensive home visitation programs can reduce infant/toddler abuse and other problems as the targeted low-income toddlers reach adolescence and adulthood. However, the return on these costly investments takes decades and is not always obtained. Other programs such as Parent Training (Child Behavior Monitoring) and Big Brothers/Big Sisters Mentoring do not produce as many benefits, but may be appropriate when resources are limited.

Benefit-Cost Ratios of Violence / Crime Prevention Programs (2011 dollars)

For information on the research methodology, see Methodology section of this Fact Sheet Series.

		Unit Cost	Total Benefits	Benefit Cost Ratio	Cost/ QALY
	Nonoffender Programs				
59	Perry Preschool Program (includes home visitation)	$20,500/child	$98,000	4.9	<$0
60	Nurse-Family Partnership 2-Yr Home Visits	$11,000/child	$52,000	4.8	<$0
61	Syracuse Family Development Research Program (includes 5-Yr home visitation)	$68,000/child	$60,000	0.91	$158,000

[4] Cohen, A., Miller, T., and Rossman, S. (1994). The costs and consequences of violent behavior in the United States. In A. Reiss and J. Roth (Eds.) *Understanding and Preventing Violence Vol. 4*. National Academy Press: Washington DC.

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		Unit Cost	Total Benefits	Benefit Cost Ratio	Cost/ QALY
62	Parent Training (child behavior monitoring)	$4,800/child	$18,000	3.9	$28,000
63	Big Brothers/Big Sisters Mentoring Cost	$5,000/child	$8,500	1.8	$25,000
64	Financial graduation incentives & intensive counseling for disadvantaged youth	$25,000/child	$11,900	0.5	$331,000

Note: If the cost/QALY is <$0, the intervention is effective and cost saving. If the cost/QALY is infinite, the intervention is not effective (i.e., an infinite number of dollars can be spent on the intervention without improving health outcomes). Updated 11/15/10.

Youth Offender Programs

The four youth offender programs focus on intensively treating troubled youth ages 12–17 and three of them are cost-saving. These interventions address the causes of delinquency and seek to improve family and school/community functioning. Multi-Systemic Therapy costs more per youth than the other three cost-effective interventions but also has a greater impact on problem behaviors. Multi-Systemic Therapy is very effective if resources are available, but Functional Family Therapy also is a credible choice. Treatment Foster Care produces considerable benefits but may be limited by the number of trained, dedicated foster parents; therefore this approach is best offered as a complement to one of the other two programs and primarily for extreme, abusive, or neglectful situations where the child should be removed from the home.

Adult Offender Programs

Nine of the fifteen adult offender programs were cost-saving. Measures that are strong candidates for adoption are Drug Courts that case-manage substance abuse treatment, In-Prison Vocational and Adult Basic Education, Job Search Counseling at Release to help offenders transition back into society, and cognitive-behavioral Moral Reconation Therapy to raise moral development and treat moral reasoning disorders of treatment-resistant populations. Subsidized Jobs produced benefits only for individuals older than 27 years. These six adult offender programs address different aspects of violent crime and should yield large returns when used in concert with each other.

Narrowly Targeted Crime Prevention Measures

Eight measures are intended exclusively to reduce crime. Three of these measures are cost-saving, Youth Offender Aggression Replacement Training, Diversion of low-risk first offenders from juvenile court to a service-oriented system, and Intensive Probation Supervision of Youth. However, Intensive Probation Supervision for young offenders yields net cost-savings primarily because it is less expensive than incarceration, not because it improves outcomes. Young Offender Boot Camp was less expensive per client than incarceration, but this program produced negative benefits: those who were exposed to it significantly increased their criminal behavior compared to a control group of offenders.

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Benefit-Cost Ratios of Violence / Crime Prevention Programs (2011 dollars) con't.

		Unit Cost	Total Benefits	Benefit Cost Ratio	Cost/QALY
	Youth Offender Programs				
65	Multi-Systemic Therapy	$6,800/client	$253,000	39	<$0
66	Functional Family Therapy	$3,000/client	$94,000	32	<$0
67	Multidimensional Treatment Foster Care	$2,800/client	$181,000	65	<$0
68	Delinquency Supervision	$16,000/child	$28,800	1.9	$74,000
	Adult Offender Programs				
69	Drug Courts	$3,000/client	$11,800	4.1	<$0
70	In-Prison Substance Abuse Therapy	$8,200/client	$23,000	2.9	<$0
71	Post-release Substance Abuse Treatment	$3,200/client	$0	Infinite	Infinite
72	Optimized Sentencing	$17,000/crime	$36,000	2.2	$63,000
73	3 Strikes & You're Out	$23,000/crime	$36,000	1.6	$87,000
74	Job Search/Counseling @Release	$800/client	$8,300	11	<$0
75	Financial Assistance @ Release	$3,700/client	$11,300	3.2	<$0
76	Subsidized Jobs, Age < 27	$13,800/client	$0	Infinite	Infinite
77	Subsidized Jobs, Age >+27	$13,800/client	$37,000	2.8	<$0
78	Work-Release Programs	more than $0/client	$0	Infinite	Infinite
79	In-Prison Vocational Education	$2,800/client	$23,400	8.6	<$0
80	In-Prison Adult Basic Education	$2,800/client	$17,000	6.4	<$0
81	In-Prison Life Skills Programs	$1,200/client	$0	Infinite	Infinite
82	Moral Reconation Therapy	$430/client	$13,000	31	<$0
83	Reasoning & Rehabilitation	$446/client	$4,000	9.4	<$0
	Crime Prevention, Narrowly Targeted				
84	20-Bed Domestic Violence Shelter	$18,000/bed	$199,500	11.1	<$0
85	Monitored Burglar and Fire Alarms	$960/home/year	$970	1.1	$122,000
86	Aggression Replacement Training (Youth Offender)	$600/client	$53,000	90	<$0
87	Lansing Adolescent Diversion	$2,200/client	$85,000	39	<$0
88	Intensive Probation Supervision, Youth	$2,200/client	$9,600	4.4	<$0
89	Intensive Probation Supervision, Adult	$5,000/client	$6,500	1.4	$48,000
90	Scared Straight Type Programs (Young Offenders)	>$0	$0	Infinite	Infinite
91	Young Offender Boot Camp	$2,900/client	-$31,000	-0.09	Infinite
92	Cognitive-Behavioral Sex Offender Treatment	$9,700/client	$19,000	2.1	$28,000

Note: If the cost/QALY is <$0, the intervention is effective and cost saving. If the cost/QALY is infinite, the intervention is not effective (i.e., an infinite number of dollars can be spent on the intervention without improving health outcomes). Updated 11/15/10.

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6. SUBSTANCE ABUSE

COST ANALYSIS OF SUBSTANCE ABUSE INTERVENTION PROGRAMS

Alcohol abuse in the U.S. costs an estimated $501 billion and drug abuse cost $181 billion in 2002. Of the alcohol costs, 10% is medical care cost, 6% is property damage and other resource costs, 15% is work loss, and the remaining 69% is the value of pain, suffering, and lost quality of life.

STRENGTHENING FAMILIES PROGRAM

The *Strengthening Families Program* (SFP) is a 7-week intervention aimed to reduce substance use among 10-14 year-olds and improve the parent-child relationship by teaching various communication, problem-solving, and perspective-taking skills to parents and adolescents. For more information see the SFP website at http://www.extension.iastate.edu/sfp/

Most harm caused by substance abuse is crime or injury. Crime accounted for 19% of alcohol abuse costs and 20% of drug abuse costs. Impaired driving accounted for another 19% of alcohol costs; other injuries—notably pedal-cyclist injuries, falls of people under age 65, burns, drownings, and suicides—accounted for 26%.

RESULTS

These fort-seven interventions target reducing consumption or over-the-limit consumption of alcohol, drug use, underage drinking, and youth tobacco use.

The first set of fifteen interventions reduces substance abuse in various ways, including raising the price by increasing taxes (20% Alcohol Tax and 30% Alcohol Tax, inducing servers to discontinue service for the intoxicated (Enforce Serving Intoxicated Patron Law), combining peer pressure with random testing for illicit drugs or alcohol in a workplace (Workplace Peer Support and Drug Testing, and Workplace Peer Support and Alcohol Testing), and medical interventions (Brief Medical Alcohol Intervention). Twelve of these fifteen interventions are cost-saving (cost/QALY < $0), meaning the cost of implementing the programs is less than the medical and other resource cost savings they yield. Among the interventions listed, several warrant widespread implementation: the 20% Alcohol Tax, Substance Abuse Treatment, and Brief Medical Alcohol Intervention (physician lecture to heavy drinkers). In workplaces coupling a peer support and workplace culture change program, management support for substance abuser rehabilitation, and drug and alcohol testing is quite promising (Workplace Peer Support and Drug Testing, Workplace Peer Support and Alcohol Testing) and merits broader evaluation. Enforcing Laws Against Serving Intoxicated Pa*trons* seems very promising but needs wider evaluation before moving to national implementation.

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Benefit-Cost Ratios of Substance Use/Abuse Interventions (2011 dollars)

		Unit Cost	Total Benefits	Benefit Cost Ratio	Cost/QALY
	Substance Use/Abuse Interventions				
93	20% Alcohol Tax	$11/drinker/year	$102	9.3	<$0
94	30% Alcohol Tax	$22/drinker/year	$130	6.3	$8,400
95	21 Minimum Legal Drinking Age	$210/youth 18-20	$730	3.6	$23,000
96	Mandatory Server Training	$60/driver	$197	3.4	$20,000
97	Enforce Serving Intoxicated Patron Law	$0.50/driver	$31	71	<$0
98	TV Alcohol Advertising Ban	$6,450/M population	$56,000	9.1	<$0
99	10% Outlet Density Reduction	$1,600/M population	$14,000	8.9	<$0
100	10 Fewer Sales Hours/Week	$4,000/M population	$35,000	9	<$0
101	Retain PA's State Run Wine & Spirits Retail Store Monopoly	$0.47/drink forgone	$6	12.2	<$0
102	Communities That Care	$700/youth	$12,100	17.4	<$0
103	Team Awareness, Retail Workers	$210/participant	$1,700	8.4	<$0
104	Team Resilience, Restaurant Workers under Age 26	$170/participant	$2,490	14.7	<$0
105	Prime Life	$13/participant	$280	21.7	<$0
106	PREVENT for Young Workers	$370/participant	$19,300	51.6	<$0
107	Workplace Peer Support + Drug Testing*	$80/employee	$1,800	24	<$0
108	*Add Alcohol Testing to Peer Support	$13/employee	$770	31	<$0
109	Brief Alcohol Intervention	$126/lecture	$3,600	31	<$0
110	Substance Abuse Treatment	$16,000/abuser	$737,000	49	<$0
	Youth Development Programs				
111	Across Ages	$2,170/pupil	$2,600	1.2	$119,000
112	Adolescent Transitions	$1,500/pupil	$12,300	8.2	$10,100
113	CASASTART (National Center on Addiction and Substance Abuse, Striving Together to Achieve Rewarding Tomorrow)	$7,000/pupil	$4,400	0.6	$261,000
114	Child Development Project	$287/pupil	$1,500	5.2	<$0
115	Good Behavior Game	$76/pupil	$3,100	41	$1,300
116	Guiding Good Choices (formerly Preparing for the Drug Free Years)	$880/family	$2,800	3.2	$18,000
117	Project PATHE	$1,000/pupil	$0	0	infinite
118	Seattle Social Development Program-Parent-Teacher Training/SOAR (Skills Opportunity and Recognition)	$3,900/child	$23,000	6.4	<$0
119	Social Competence Promotion	$440/pupil	$2,700	6.3	$2,000
120	Strengthening Families	$1,100/family	$11,700	11	<$0
					Youth Substance Abuse Prevention Programs
121	All Stars	$170/pupil	$6,300	36.3	<$0
122	Family Matters	$190/family	$6,200	32.3	<$0
123	Keepin' It Real	$160/pupil	$4,400	28	<$0
124	Life Skills Training	$270/pupil	$6,100	22.4	$1,300
125	Project ALERT (Adolescent Learning Experience in Resistance Training)	$140/pupil	$600	4.4	<$0
126	Project Northland	$500/pupil	$9,100	18.6	$0
127	Project STAR (Students Taught Awareness and Resistance, Midwest Prevention Program) aka MPP	$500/pupil	$5,100	10.5	$4,400

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		Unit Cost	Total Benefits	Benefit Cost Ratio	Cost/QALY
128	Project Toward No Drugs (TND)	$220/pupil	$590	2.7	$40,000
129	STARS for Families	$150/family	$660	4.4	<$0
130	Other Social Influence/Skills Building	$190/pupil	$2,400	13.1	$4,500
131	Other Risk & Protective Factors	$500/pupil	$9,300	18.9	$1,000
	Youth Tobacco Programs				
132	Know Your Body (smoking)	$177/pupil	$8,300	47.4	$800
133	MN Smoking Prevention Program	$120/pupil	$7,700	66.7	$0
134	Project Toward No Tobacco (TNT)	$220/pupil	$4,100	18.6	$5,500
135	Youth Anti-smoking Mass Media Campaign	$460/pupil	$4,700	10.6	$11,000
	Tobacco Cessation Programs				
136	Stop Smoking Mass Media Campaign	$1,300/quitter	$86,000	68	<$0
137	Reduce Cessation Program Prices	$270/quitter	$86,000	329.3	<$0
138	Minimal Tobacco Counseling	$8,200/quitter	$86,000	11	$11,000
139	Add Nicotine Patch	$5,600/quitter	$86,000	15.8	$6,900
140	Instead Add Nicotine Gum	$10,700/quitter	$86,000	8.4	$15,000
141	Brief Tobacco Counseling	$7,000/quitter	$86,000	12.9	$9,000
142	Add Nicotine Patch	$5,000/quitter	$86,000	17.9	$5,800
143	Instead Add Nicotine Gum	$8,800/quitter	$86,000	10.2	$12,000
144	Full Tobacco Counseling	$3,400/quitter	$86,000	25.9	$3,300
145	Add Nicotine Patch	$3,200/quitter	$86,000	27.4	$3,000
146	Instead Add Nicotine Gum	$5,100/quitter	$86,000	17.5	$6,000
147	Individual Intensive Tobacco Counseling	$4,200/quitter	$86,000	21.2	$4,600
148	Add Nicotine Patch	$3,400/quitter	$86,000	25.8	$3,300
149	Instead Add Nicotine Gum	$4,300/quitter	$86,000	20.7	$4,700
150	Group Intensive Tobacco Counseling	$2,400/quitter	$86,000	36.1	$1,700
151	Add Nicotine Patch	$2,700/quitter	$86,000	32.3	$2,200
152	Instead Add Nicotine Gum	$5,300/quitter	$86,000	16.8	$6,400

For information on the research methodology, see Methodology section of this Fact Sheet Series.
Note: If the cost/QALY is <$0, the intervention is effective and cost saving. If the cost/QALY is infinite, the intervention is not effective (i.e., an infinite number of dollars can be spent on the intervention without improving health outcomes). Updated 11/15/10.

The remaining thirty-two programs focus on general youth development, strengthening families, substance abuse prevention in youth specifically, and youth tobacco use. Eleven of these programs are cost-saving (cost/QALY < $0). Some of these programs are family centered interventions with a school component such as the Strengthening Families Program, Seattle Social Development Program (Parent – Teacher Training), Family Matters, and STARS for Families. Other programs are school-based life skills training programs such as The Child Development Project, All Stars, Keepin' It Real, and Life Skills Training which focus on students. A broader family program like the Strengthening Families Program can be more costly than school-based life skills training but may also offer larger returns. School based programs also offer solid returns. With a limited budget, they will let a school system reach the most children, but the same money may yield greater benefits if spent targeting the broader family-centered programs.

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7. HEALTH SERVICES AND MISCELLANEOUS

COST ANALYSIS OF HEATH SERVICES AND MISCELLANEOUS INJURY PREVENTION PROGRAMS

The total cost of hospitalized and fatal injuries in the US in 2000 was $1.1 trillion including $86.3 billion in medical costs, $242.3 billion in work loss, and $785.3 billion in quality of life costs. Poisoning hospital injuries account for $2.3 billion of the medical costs and $1.5 billion of the work loss cost. Poisoning fatalities account for $397 million in medical costs, $48.2 billion in work loss costs, and $102 billion in quality of life costs. Drowning injuries cost over $16 billion.

SAFE COMMUNITIES

The *Harlem Hospital Safe Communities* program is designed to reduce injury to community children by making changes in community social and physical environment, raising local awareness of problems, and improving individual safety knowledge through education and training. This program is involved in a wide range of community activities including traffic safety education, renovating area public parks, community gardening projects, rebuilding playgrounds for elementary schools, and establishing dance and art programs at the hospital. For more information see:

http://www.nhtsa.gov/Driving+Safety/Safe+Communities/Success+Stories+1996-2005

Health services interventions to prevent injury and improve injury outcomes include poison control centers, triaged regional trauma systems, and pediatrician injury prevention counseling. Miscellaneous injury prevention programs in Native American settings include a youth suicide prevention program and a winter coats that float to reduce drowning. Other injury prevention programs include the Harlem Hospital Safe Communities child safety program and a fall prevention program for the elderly.

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Benefit-Cost Ratios of Health Services Interventions and Miscellaneous Injury Prevention Programs (2011 dollars)

For information on the research methodology, see Methodology section of this Fact Sheet Series.

		Unit Cost	Total Benefits	Benefit Cost Ratio	Cost/ QALY
	Health Services Interventions				
153	Pediatrician Injury Prevention Counseling for Children Ages 0-4 (TIPP)	$12/child	$97	8.9	$3,400
154	Poison Control Center Services	$45/call	$320	7.4	<$0
155	Regional Trauma System Services	$1,900/admit	$5,100	2.7	<$0
156	Tetanus-Diphtheria-Pertussis Vaccination, Ages 0-6	$96/child	$2,300	25.1	<$0
	Miscellaneous Injury Prevention Programs				
157	Youth Suicide Prevention, Native America	$220/youth	$7,600	35	$1,030
158	Baby Walker Redesign to Prevent Stairway Falls	$3.80/walker	$190	46	<$0
159	Impact-Absorbing Playground Surfacing	$15,000/playground	$28,380	2	$28,900
160	Winter Coats that Float Drowning Prevention, Native Alaska	$0.12/person	$250	2088	<$0
161	Harlem Hospital Injury Prev. Program	$78/child	$3,813	50.8	<$0
162	Fall Prevention: Hi Risk Elderly	$1,400/person	$12,000	8.5	<$0
163	Fall Prevention: Low Risk Elderly	$1,200/person	$700	0.6	$274,000

Note: If the cost/QALY is <$0, the intervention is effective and cost saving. If the cost/QALY is infinite, the intervention is not effective (i.e., an infinite number of dollars can be spent on the intervention without improving health outcomes).
Updated 11/15/10.

HEALTH SERVICES INTERVENTIONS

The four health services interventions reduce the cost of injuries. Three of these programs were cost-saving (cost/QALY < $0) which means that the medical costs and other tangible resources saved by these programs exceeded the costs to implement the program.

Health services improve outcomes of trauma cases including injuries associated with alcohol and violence. Establishing regional hospital specialties in trauma care, then triaging serious injuries to these hospitals (Triaged Regional Trauma System Services), raises the costs of initial treatment but ultimately improves outcomes and reduces the medical care costs required to achieve maximum medical recovery. A regional or national phone-in poison control center (Poison Control Center) consults 24-hours a day on intentional and unintentional poisonings including drug overdose, food poisoning, suicide, and children accidentally taking medications. The centers greatly reduce poisoning treatment costs and probably improve outcomes by advising on whether treatment is needed, supervising home treatment of minor poisonings without more costly medical intervention, more quickly linking serious cases to appropriate treatment, and providing toxicological consultation to hospital staff. Both measures will reduce the harm from injury and warrant implementation.

Pediatrician Injury Prevention Counseling for Children Ages 0-4 is part of The Injury Prevention Program (TIPP). TIPP is a national program that provides pediatricians with age-appropriate topics for counseling parents about ways to reduce child injuries (e.g., car seats). While this program did reduce injuries, the costs of

prevention counseling by pediatricians exceeded the medical and other resource cost savings from the prevented injuries.

Miscellaneous Injury Prevention Programs

Two of the miscellaneous interventions have only been tried in Native American settings and need further evaluation prior to widespread implementation. One is a Youth Suicide Prevention program that combines counseling, peer support and prevention of alcohol abuse, child abuse, and domestic violence. The second, Winter Coats that Float Drowning Prevention, located winter coats that float and convinced local residents who use small boats to buy them, thus aiding boaters who fall overboard this intervention is demonstrates cost-savings (cost/QALY < $0).

The Fall Prevention program was a comprehensive community-based fall prevention demonstration targeting the elderly. Benefits were analyzed separately for elderly participants who were at high risk for fall injuries and participants who were at low risk. There was a net cost-saving for high-risk elderly, but its costs exceeded its benefits for low risk elderly.

The Harlem Hospital Safe Communities program is a comprehensive community based child safety program. It also demonstrated cost-savings.

GLOSSARY OF DEFINITIONS

Benefit-cost ratios express the total benefits in saved medical and other costs compared to the costs of the program. A benefit cost ratio is calculated for each intervention by dividing the total savings, including the value of preserving quality of life and preventing pain and suffering, by the unit cost of the intervention. The benefit-cost ratio describes the return on investment in the intervention.

Cost-effective means the benefit-cost ratio is greater than 1.0 and the cost of implementing the intervention is less than the total benefits gained by preventing injuries. The total benefits include medical costs, other resource costs, work loss, and quality of life costs. A cost-effective intervention offers a positive return on investment.

Cost-outcome analysis is the calculation of the economic benefits and costs associated with an intervention so that the intervention can be compared to other interventions.

Cost per quality-adjusted life year (cost/QALY) is the cost of the intervention minus the medical and other tangible resource savings divided by the number of QALYs saved. It does not include quality of life savings.

Cost-saving means the expected resource cost savings (not including quality of life savings) exceed the cost of the intervention. The **cost/QALY** <0.

Discount rates are used because money earns interest. If you have to pay $10 five years from now, you could put less money in the bank today and have $10 when the bill comes due. The discount rate essentially is the inflation-free interest rate. With the discount rate, we calculate the present value of future costs. A 2.5% to 3% discount rate is recommended for health policy.

Medical costs include averted emergency medical care, acute care (in hospital, clinic, and office settings), rehabilitation, follow-up care (including physician, allied health, and mental health care), long-term medical and institutional care, prescriptions, ancillary expenses, coroner services, and the costs of health insurance claims processing.

Other resource costs include direct nonmedical costs for police, fire services, criminal adjudication and sanctioning, property damage or loss, and travel delay.

QALY stands for quality adjusted life years. QALYs are a health outcome measure that assigns a value of 1 to a year a perfect health, a 0 to death, and some value in between to impaired health (e.g., from injury). Preventing injuries saves fractions of QALYs and preventing a death saves a lifetime of QALYs. QALYs for different injuries were calculated based on physician ratings of loss of function for victims of injury, probability of permanent work-related disability, and values from surveys of the general population for different functional losses. QALYs are routinely used to evaluate the outcomes of clinical trials and preventive health interventions.

Quality of life costs place a dollar value on the pain, suffering, and lost quality of life that children and their families experience due to death and injury.

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Resource costs include medical and mental health, property damage, police and fire services, victim assistance, insurance claims processing, litigation, incarceration and other sanctioning, and other out of pocket costs resulting from injury.

Total benefits reported in this Fact Sheet Series are the amount these interventions saved by preventing injuries. These benefits to society include medical costs, other resource costs, work loss, and quality of life costs.

Unit cost is the cost of the intervention for a single individual.

Work Loss (productivity) includes wages, fringe benefits and household work for adults. It includes short-term work loss and the present value of a lifetime's worth of wage and household work that a child or adult will be unable if he or she is killed or permanently disabled.

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Benefit-Cost Ratios of Motor-Vehicle Injury and Pedestrian Safety Intervention Programs (2011 dollars)

		Cost per Unit	Total Benefits	Benefit Cost Ratio	Cost/ QALY
	Driver and Pedestrian Safety Interventions				
1	Pass Child Safety Seat Law, Ages 0-4	$61/new user	$2,200	38	<$0
2	Child Safety Seat Distribution, Ages 0-4	$55/seat provided	$2,200	42	<$0
3	Pass Booster Seat Law, Ages 4-7	$41/new user	$2,500	63	<$0
4	Booster Seat, Ages 4-7	$36/seat	$2,500	71	<$0
5	Pass Safety Belt Law	$360/new user	$6,100	18	<$0
6	Upgrade Secondary Belt Law to Primary	$360/new user	$6,100	18	<$0
7	Enhanced Belt Law Enforcement	$370/new user	$6,100	17	<$0
8	Driver Airbag	$450/bag	$1,900	4.4	$10,400
9	Passenger Airbag	$230/bag	$450	2	$84,000
10	Pass Motorcycle Helmet Law	$2,200/new user	$4,800	3.1	$36,000
11	Voluntarily Wear a Motorcycle Helmet	$100/helmet	$4,800	18	<$0
12	Pass Bicycle Helmet Law, Ages 3-14	$14/new user	$580	44	<$0
13	Pass Bicycle Helmet Law, Ages 15 & Over	$430/new user	$280	2.5	$60,000
14	Bicycle Helmet Distribution, Ages 3-14	$13/helmet	$580	48	<$0
15	Bicycle Helmet, Ages 15 & Over	$20/helmet	$280	15	<$0
16	Voluntarily Wear an ATV Helmet	$55/helmet	$570	3.9	$41,000
17	Install Bridge-End Guardrail	$11,000/bridge	$423,000	38	<$0
18	Install Median Barrier (1-12 foot median)	$240,000/mile	$600,000	2.5	$57,000
19	Install Median Barrier (>13 foot median)	$240,000/mile	$133,000	0.6	$316,000
20	Willy Whistle Pedestrian Safety Program	$1,900/child/year	$16,900	9	$2,100
	Vehicle Design Safety Research and Regulation and Road Design and Upgrading				
21	Federal Traffic Safety Programs	$4/driver	$200	68	<$0
22	Federal Vehicle Safety Program	$69/vehicle	$400	5.6	$31,000
23	Federal Road Safety Program	$7/driver	$200	32.4	<$0
24	Mobile Speed Camera	$770,000/camera-year	$14,000,000	19	<$0
25	Red Light Camera	$12,000/camera-year	$49,200	4	<$0
26	Striping / Painting Lines on Roads	$280/mile	$18,000	67.2	<$0
27	Post-mounted Reflectors	$391/reflector	$42,000	112.9	<$0
28	Flatten Crest Vertical Curves	$330,000/curve	$233,000	0.7	$235,000
29	Flashing Beacons on Hazardous Curves	$22,000/beacon	$339,000	16.1	<$0
30	Side Impact Protection	$387/vehicle	$1,100	3	$61,000
31	Automatic Daytime Vehicle Lights	$84/vehicle	$300	3.8	$29,000
32	55MPH speed limit	$9/added travel hour	$33	3.7	$21,000
33	Safety Belts, Front Seat	$80/vehicle	$4,100	53.9	<$0
34	Shoulder Belts, Rear Seat	$29/vehicle	$12	0.4	$492,000
35	Child Seat Misuse Reduction & Design Improvement	$6/seat in use	$600	81.2	<$0
36	Livestock Control, Native American	$9/grate	$16	1.8	<$0
37	Provisional Licensing + Midnight Driving Curfew	$88/driver	$680	8.1	<$0
38	Change Driving Curfew to 10 PM	$170/driver	$410	2.5	$39,000

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Benefit-Cost Ratios of Impaired Driving Prevention Programs (2011 dollars)

		Cost per Unit	Total Benefits	Benefit Cost Ratio	Cost/ QALY
	Impaired Driving Prevention Programs				
39	.08% Driver Blood Alcohol Limit	$3.80/driver	$55	14	<$0
40	Zero Alcohol Tolerance, Drivers Under 21	$41/driver	$960	25	<$0
41	Sobriety Checkpoints	$12,500/checkpoint	$82,000	6.8	<$0
42	Administrative License Revocation (ALR)	$3,700/ALR	$60,000	17	<$0
43	ALR with Per Se Law	$3,400/ALR	$71,000	21	<$0
44	Alcohol-Testing Ignition Interlock	$1,200/vehicle	$7,800	6.6	<$0
45	DWI Offender Auto Impoundment	$1,000/vehicle	$5,500	5.4	<$0
46	DWI Offender Electronic House Arrest	$1,800/arrestee	$5,900	3.3	<$0
47	DWI Intensive Probation + Treatment	$1,600/arrestee	$6,000	3.8	<$0
48	Australia-Style Anti-DWI Media Campaign	$900/million population	$12,400	14.2	<$0
	Impaired Pedestrian Harm Reduction				
49	Streetlights at Bars, Native American	$470/light	$3,800	8.4	<$0

Benefit-Cost Ratios of Open-Flame Burn Prevention Programs (2011 dollars)

		Unit Cost	Total Benefits	Benefit Cost Ratio	Cost/ QALY
50	Childproof Cigarette Lighter	$0.05/lighter	$4	72	<$0
51	Less Porous Cigarette Paper	$.0001/pack	$0.07	747	<$0
52	Pass Smoke Alarm Law	$51/new user	$770	16	$12,000
53	Battery-Operated Smoke Alarm	$46/home	$770	18	$10,000
54	Lithium-Battery Smoke Alarm Installation & Fire Education (SAIFE) Program	$320/home	$1,220	4	$49,000
55	Sprinkler System: Colonial	$2,300/home	$6,000	2.5	$81,000
56	Sprinkler System: Townhouse	$2,100/home	$6,000	2.7	$72,000
57	Sprinkler System: Ranch House	$900/home	$6,000	6.2	$21,000
58	Mattress Flammability Standard	$2,500/home	$73	2.8	$75,000

Benefit-Cost Ratios of Violence / Crime Prevention Programs (2011 dollars)

		Unit Cost	Total Benefits	Benefit Cost Ratio	Cost/QALY
	Nonoffender Programs				
59	Perry Preschool Program (includes home visitation)	$20,500/child	$98,000	4.9	<$0
60	Nurse-Family Partnership 2-Yr Home Visits	$11,000/child	$52,000	4.8	<$0
61	Syracuse Family Development Research Program (includes 5-Yr home visitation)	$68,000/child	$60,000	0.91	$158,000
62	Parent Training (child behavior monitoring)	$4,800/child	$18,000	3.9	$28,000
63	Big Brothers/Big Sisters Mentoring Cost	$5,000/child	$8,500	1.8	$25,000
64	Financial graduation incentives & intensive counseling for disadvantaged youth	$25,000/child	$11,900	0.5	$331,000

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	Youth Offender Programs				
65	Multi-Systemic Therapy	$6,800/client	$253,000	39	<$0
66	Functional Family Therapy	$3,000/client	$94,000	32	<$0
67	Multidimensional Treatment Foster Care	$2,800/client	$181,000	65	<$0
68	Delinquency Supervision	$16,000/child	$28,800	1.9	$74,000
	Adult Offender Programs				
69	Drug Courts	$3,000/client	$11,800	4.1	<$0
70	In-Prison Substance Abuse Therapy	$8,200/client	$23,000	2.9	<$0
71	Post-release Substance Abuse Treatment	$3,200/client	$0	Infinite	Infinite
72	Optimized Sentencing	$17,000/crime	$36,000	2.2	$63,000
73	3 Strikes & You're Out	$23,000/crime	$36,000	1.6	$87,000
74	Job Search/Counseling @Release	$800/client	$8,300	11	<$0
75	Financial Assistance @ Release	$3,700/client	$11,300	3.2	<$0
76	Subsidized Jobs, Age < 27	$13,800/client	$0	Infinite	Infinite
77	Subsidized Jobs, Age >+27	$13,800/client	$37,000	2.8	<$0
78	Work-Release Programs	more than $0/client	$0	Infinite	Infinite
79	In-Prison Vocational Education	$2,800/client	$23,400	8.6	<$0
80	In-Prison Adult Basic Education	$2,800/client	$17,000	6.4	<$0
81	In-Prison Life Skills Programs	$1,200/client	$0	Infinite	Infinite
82	Moral Reconation Therapy	$430/client	$13,000	31	<$0
83	Reasoning & Rehabilitation	$446/client	$4,000	9.4	<$0
	Crime Prevention, Narrowly Targeted				
84	20-Bed Domestic Violence Shelter	$18,000/bed	$199,500	11.1	<$0
85	Monitored Burglar and Fire Alarms	$960/home/year	$970	1.1	$122,000
86	Aggression Replacement Training (Youth Offender)	$600/client	$53,000	90	<$0
87	Lansing Adolescent Diversion	$2,200/client	$85,000	39	<$0
88	Intensive Probation Supervision, Youth	$2,200/client	$9,600	4.4	<$0
89	Intensive Probation Supervision, Adult	$5,000/client	$6,500	1.4	$48,000
90	Scared Straight Type Programs (Young Offenders)	>$0	$0	Infinite	Infinite
91	Young Offender Boot Camp	$2,900/client	-$31,000	-0.09	Infinite
92	Cognitive-Behavioral Sex Offender Treatment	$9,700/client	$19,000	2.1	$28,000

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Benefit-Cost Ratios of Substance Use/Abuse Interventions (2011 dollars)

		Unit Cost	Total Benefits	Benefit Cost Ratio	Cost/QALY
	Substance Use/Abuse Interventions				
93	20% Alcohol Tax	$11/drinker/year	$102	9.3	<$0
94	30% Alcohol Tax	$22/drinker/year	$130	6.3	$8,400
95	21 Minimum Legal Drinking Age	$210/youth 18-20	$730	3.6	$23,000
96	Mandatory Server Training	$60/driver	$197	3.4	$20,000
97	Enforce Serving Intoxicated Patron Law	$0.50/driver	$31	71	<$0
98	TV Alcohol Advertising Ban	$6,450/M population	$56,000	9.1	<$0
99	10% Outlet Density Reduction	$1,600/M population	$14,000	8.9	<$0
100	10 Fewer Sales Hours/Week	$4,000/M population	$35,000	9	<$0
101	Retain PA's State Run Wine & Spirits Retail Store Monopoly	$0.47/drink forgone	$6	12.2	<$0
102	Communities That Care	$700/youth	$12,100	17.4	<$0
103	Team Awareness, Retail Workers	$700/youth	$1,700	8.4	<$0
104	Team Resilience, Restaurant Workers under Age 26	$210/participant	$2,490	14.7	<$0
105	Prime Life	$170/participant	$280	21.7	<$0
106	PREVENT for Young Workers	$370/participant	$19,300	51.6	<$0
107	Workplace Peer Support + Drug Testing*	$13/participant	$1,800	24	<$0
108	*Add Alcohol Testing to Peer Support	$374/participant	$770	31	<$0
109	Brief Alcohol Intervention	$80/employee	$3,600	31	<$0
110	Substance Abuse Treatment	$13/employee	$737,000	49	<$0
	Youth Development Programs				
111	Across Ages	$2,170/pupil	$2,600	1.2	$119,000
112	Adolescent Transitions	$1,500/pupil	$12,300	8.2	$10,100
113	CASASTART (National Center on Addiction and Substance Abuse, Striving Together to Achieve Rewarding Tomorrow)	$7000/pupil	$4,400	0.6	$261,000
114	Child Development Project	$287/pupil	$1,500	5.2	<$0
115	Good Behavior Game	$76/pupil	$3,100	41	$1,300
116	Guiding Good Choices (formerly Preparing for the Drug Free Years)	$880/family	$2,800	3.2	$18,000
117	Project PATHE	$1,000/pupil	$0	0	infinite
118	Seattle Social Development Program-Parent-Teacher Training/SOAR (Skills Opportunity and Recognition)	$3,900/child	$23,000	6.4	<$0
119	Social Competence Promotion	$440/pupil	$2,700	6.3	$2,000
120	Strengthening Families	$1,100/family	$11,700	11	<$0
	Youth Substance Abuse Prevention Programs				
121	All Stars	$170/pupil	$6,300	36.3	<$0
122	Family Matters	$190/family	$6,200	32.3	<$0
123	Keepin' It Real	$160/pupil	$4,400	28	<$0
124	Life Skills Training	$270/pupil	$6,100	22.4	$1,300
125	Project ALERT (Adolescent Learning Experience in Resistance Training)	$140/pupil	$600	4.4	<$0
126	Project Northland	$500/pupil	$9,100	18.6	$0
127	Project STAR (Students Taught Awareness and Resistance, Midwest Prevention	$500/pupil	$5,100	10.5	$4,400

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		Unit Cost	Total Benefits	Benefit Cost Ratio	Cost/QALY
	Program) aka MPP				
128	Project Toward No Drugs (TND)	$220/pupil	$590	2.7	$40,000
129	STARS for Families	$150/family	$660	4.4	<$0
130	Other Social Influence/Skills Building	$190/pupil	$2,400	13.1	$4,500
131	Other Risk & Protective Factors	$500/pupil	$9,300	18.9	$1,000
	Youth Tobacco Programs				
132	Know Your Body (smoking)	$177/pupil	$8,300	47.4	$800
133 3	MN Smoking Prevention Program	$120/pupil	$7,700	66.7	$0
134	Project Toward No Tobacco (TNT)	$220/pupil	$4,100	18.6	$5,500
135	Youth Anti-smoking Mass Media Campaign	$460/pupil	$4,700	10.6	$11,000
	Tobacco Cessation Programs				
136	Stop Smoking Mass Media Campaign	$1,300/quitter	$86,000	68	<$0
137	Reduce Cessation Program Prices	$270/quitter	$86,000	329.3	<$0
138	Minimal Tobacco Counseling	$8,200/quitter	$86,000	11	$11,000
139	Add Nicotine Patch	$5,600/quitter	$86,000	15.8	$6,900
140	Instead Add Nicotine Gum	$10,700/quitter	$86,000	8.4	$15,000
141	Brief Tobacco Counseling	$7,000/quitter	$86,000	12.9	$9,000
142	Add Nicotine Patch	$5,000/quitter	$86,000	17.9	$5,800
143	Instead Add Nicotine Gum	$8,800/quitter	$86,000	10.2	$12,000
144	Full Tobacco Counseling	$3,400/quitter	$86,000	25.9	$3,300
145	Add Nicotine Patch	$3,200/quitter	$86,000	27.4	$3,000
146	Instead Add Nicotine Gum	$5,100/quitter	$86,000	17.5	$6,000
147	Individual Intensive Tobacco Counseling	$4,200/quitter	$86,000	21.2	$4,600
148	Add Nicotine Patch	$3,400/quitter	$86,000	25.8	$3,300
149	Instead Add Nicotine Gum	$4,300/quitter	$86,000	20.7	$4,700
150	Group Intensive Tobacco Counseling	$2,400/quitter	$86,000	36.1	$1,700
151	Add Nicotine Patch	$2,700/quitter	$86,000	32.3	$2,200
152	Instead Add Nicotine Gum	$5,300/quitter	$86,000	16.8	$6,400

Benefit-Cost Ratios of Health Services Interventions and Miscellaneous Injury Prevention Programs (2011 dollars)

		Unit Cost	Total Benefits	Benefit Cost Ratio	Cost/ QALY
	Health Services Interventions				
153	Pediatrician Injury Prevention Counseling for Children Ages 0-4 (TIPP)	$12/child	$97	8.9	$3,400
154	Poison Control Center Services	$1,900/admit	$320	7.4	<$0
155	Regional Trauma System Services	$96/child	$5,100	2.7	<$0
156	Tetanus-Diphtheria-Pertussis Vaccination, Ages 0-6	$45/call	$2,300	25.1	<$0
	Miscellaneous Injury Prevention Programs				
157	Youth Suicide Prevention, Native America	$220/youth	$7,600	35	$1,030
158	Baby Walker Redesign to Prevent Stairway Falls	$3.80/walker	$190	46	<$0
159	Impact-Absorbing Playground Surfacing	$15,000/playground	$28,380	2	$28,900
160	Winter Coats that Float Drowning Prevention, Native Alaska	$0.12/person	$250	2088	<$0

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		Unit Cost	Total Benefits	Benefit Cost Ratio	Cost/ QALY
161	Harlem Hospital Injury Prev. Program	$78/child	$3,813	50.8	<$0
162	Fall Prevention: Hi Risk Elderly	$1,400/person	$12,000	8.5	<$0
163	Fall Prevention: Low Risk Elderly	$1,200/person	$700	0.6	$274,000

Note: If the cost/QALY is <$0, the intervention is effective and cost saving. If the cost/QALY is infinite, the intervention is not effective (i.e., an infinite number of dollars can be spent on the intervention without improving health outcomes),

Questions about methods and data in this Fact Sheet Series should be referred to:

Children's Safety Network Economics and Data Analysis Resource Center
(www.ChildrensSafetyNetwork.org)
Phone: 301-755-2796
E-mail: taylor@pire.org

Pacific Institute for Research and Evaluation
11720 Beltsville Drive, Suite 900, Calverton, MD 20705

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