



# How to Use Cost Data Effectively in Child Injury Prevention

**Tuesday, May 8, 2012**  
**2:00 to 3:30 p.m. Eastern Standard Time**

**Presenters:**

**Dr. Ted Miller**

**Moderator:**

**George Bahouth**

**On your telephone please dial:**

**1-866-835-7973**

**The webcast will begin shortly.**

***Your phone lines are currently muted.***



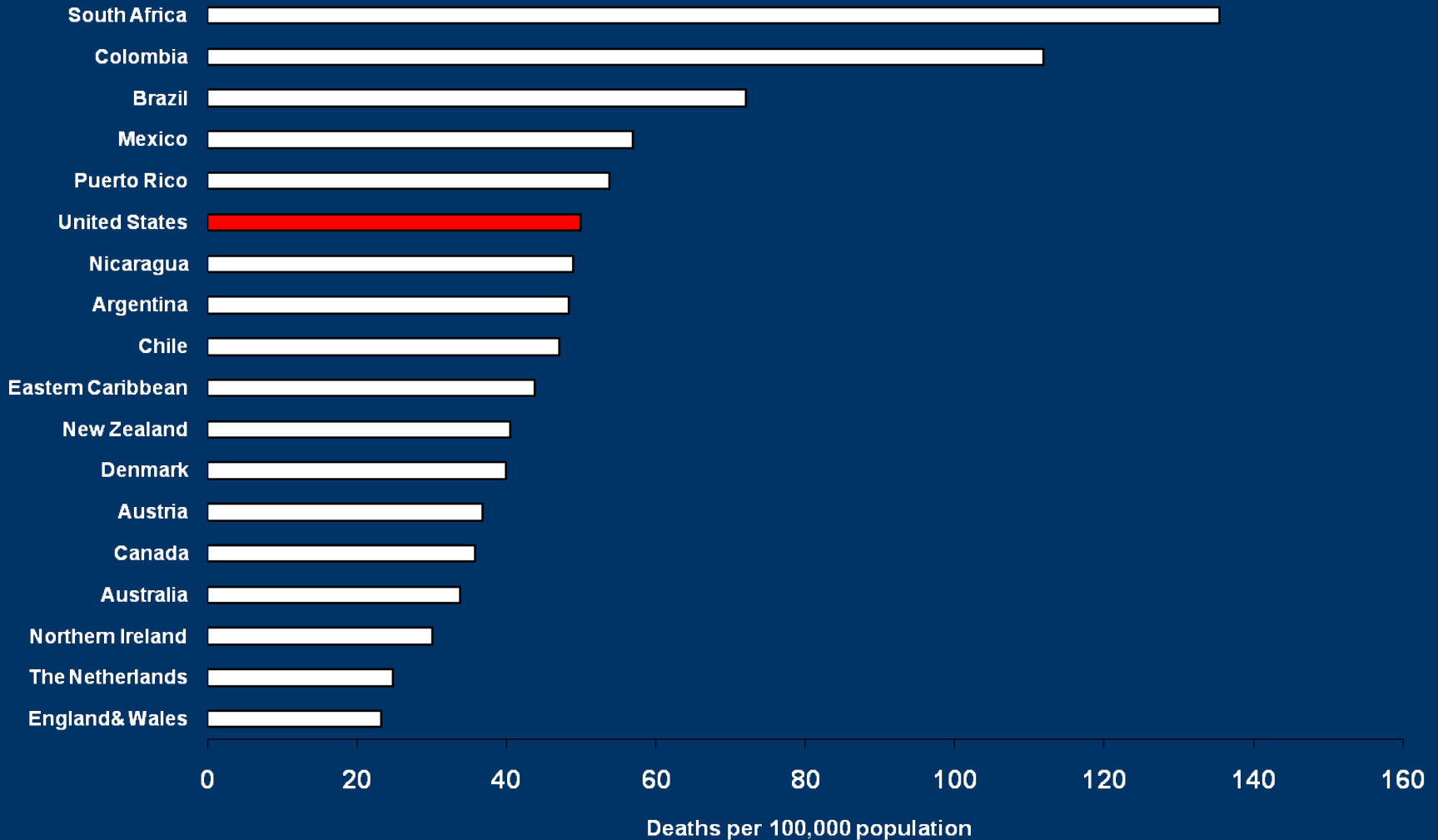
# Meeting Orientation Slide

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# **How to Use Cost Data Effectively in Child Injury Prevention**

**Ted Miller**  
**millier@pire.org**  
**240-441-2890**

# Age-Adjusted Injury Death Rates



Source: Lois Fingerhut, NCHS, based on 2000-2004 data

- **Costs of injury & related substance abuse**
- **Savings from prevention**

# **Why Cost Social Problems? Single Compact Metric**

- **Communication**
- **Problem size & risk assessment**
- **Advocacy**
- **Performance comparison**
- **Priority setting & resource allocation**
- **Program evaluation**

# You are the Governor of PA

- 12.5 M residents in PA
- 125K deaths/year
  
- Can I convince you to continue my \$2M childhood injury prevention program?

- **We did a thorough evaluation. The results are highly significant statistically. Our program reduced deaths and hospital admissions due to injury by**



1% !!!

- **Our program prevented 76 child deaths and 1820 hospital admissions last year.**

- **Our \$2 M program saved PA taxpayers \$106 M in medical payments and work losses last year. That's more than \$8 per PA resident.**

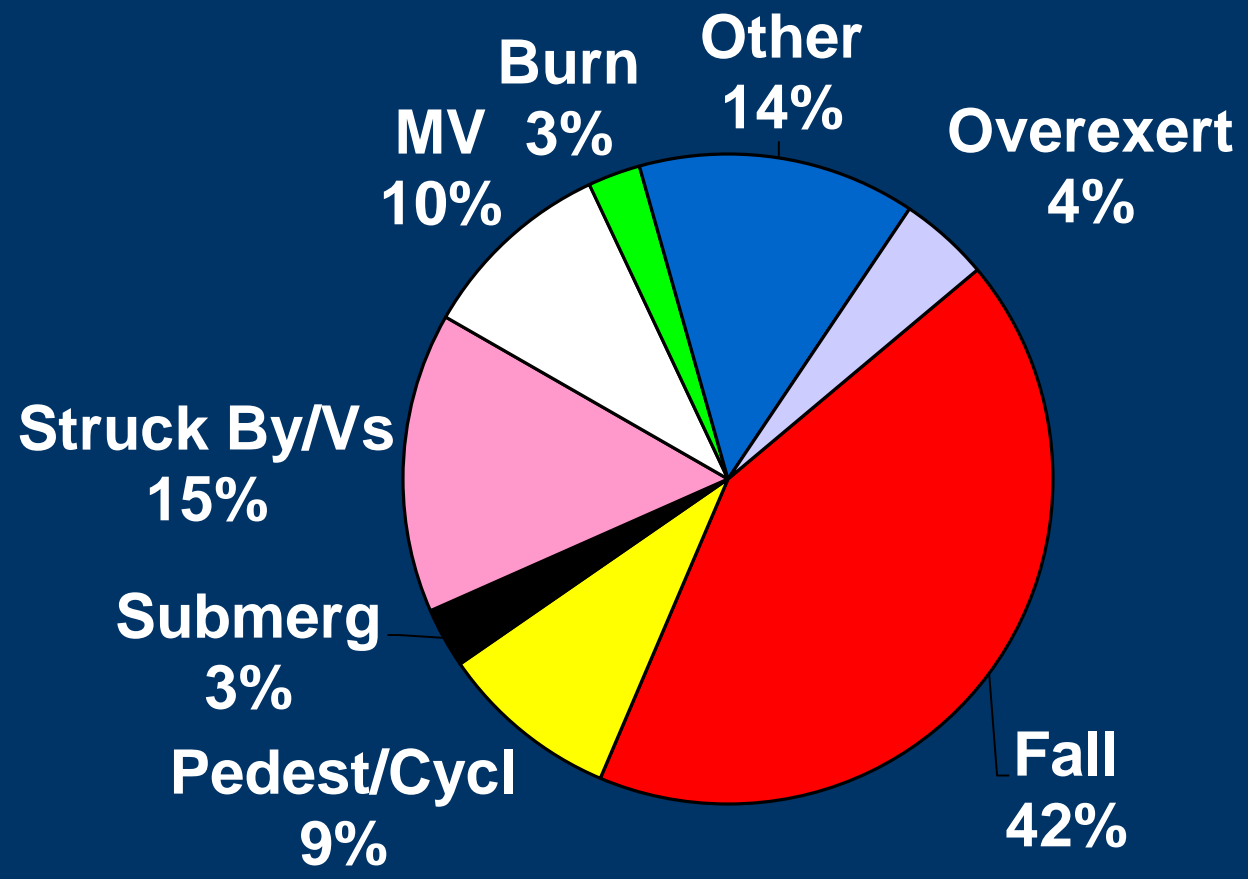
# PROBLEM SIZE

## Annual Spending per U.S. Child, 0-19



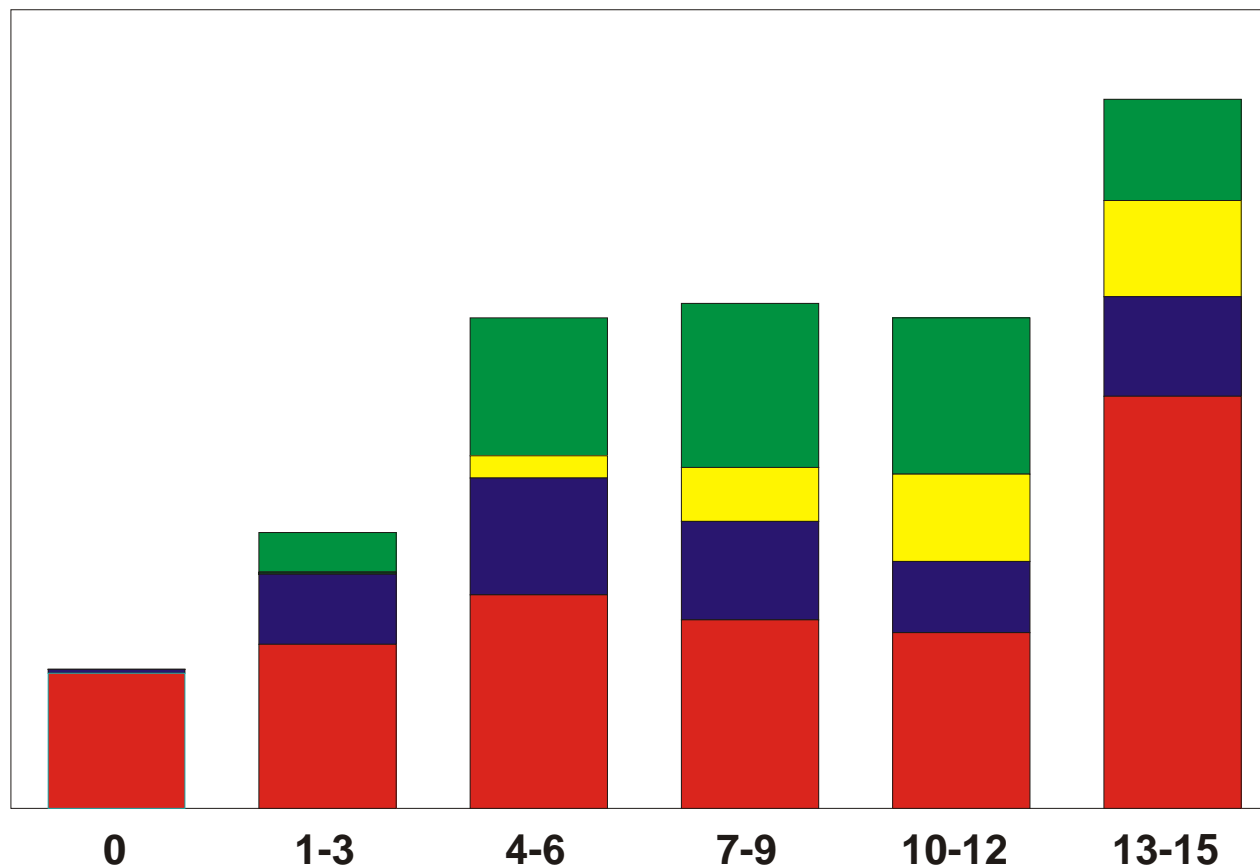
# RISK ASSESSMENT: Unintentional Injury

## Cost \$134 B in 2000, Ages 0-14



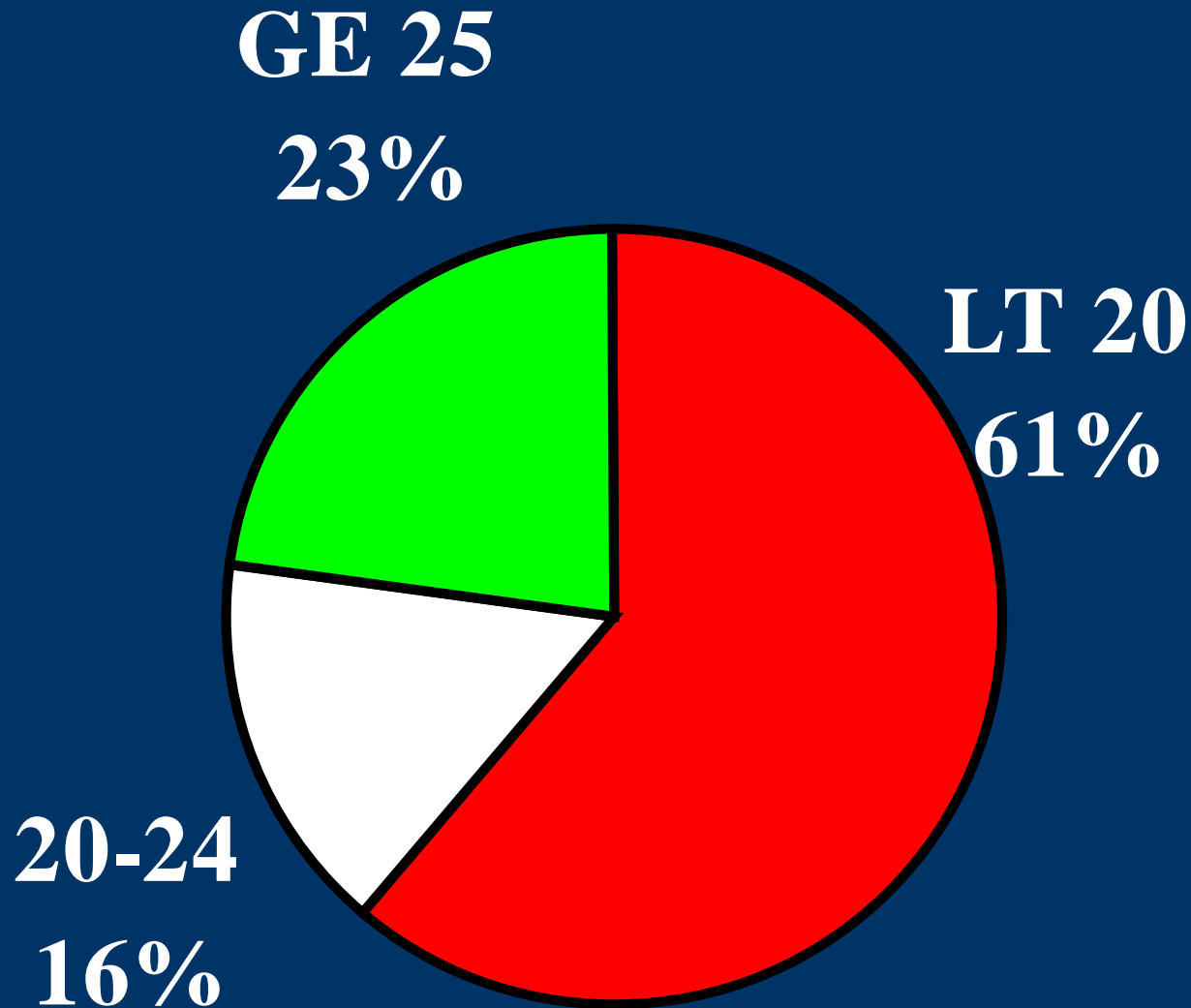
# Vehicular Injury Costs/1000 Kids by Age

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Occupant Other NonOccupant Pedalcycle-MV NonMV Cycle

# Driver Age, Crashes w/Injured Teen Passengers



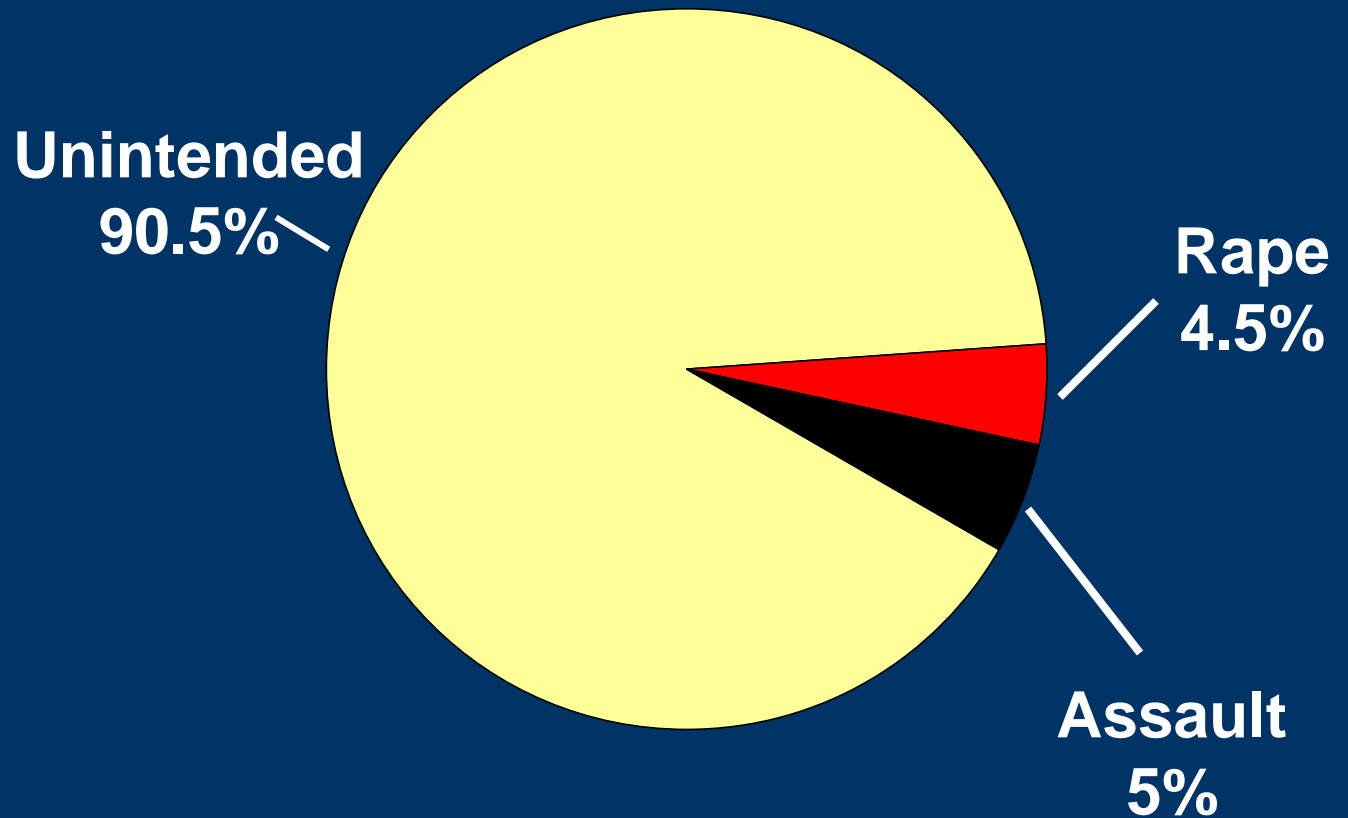
# Annual Poisoning Costs/Child





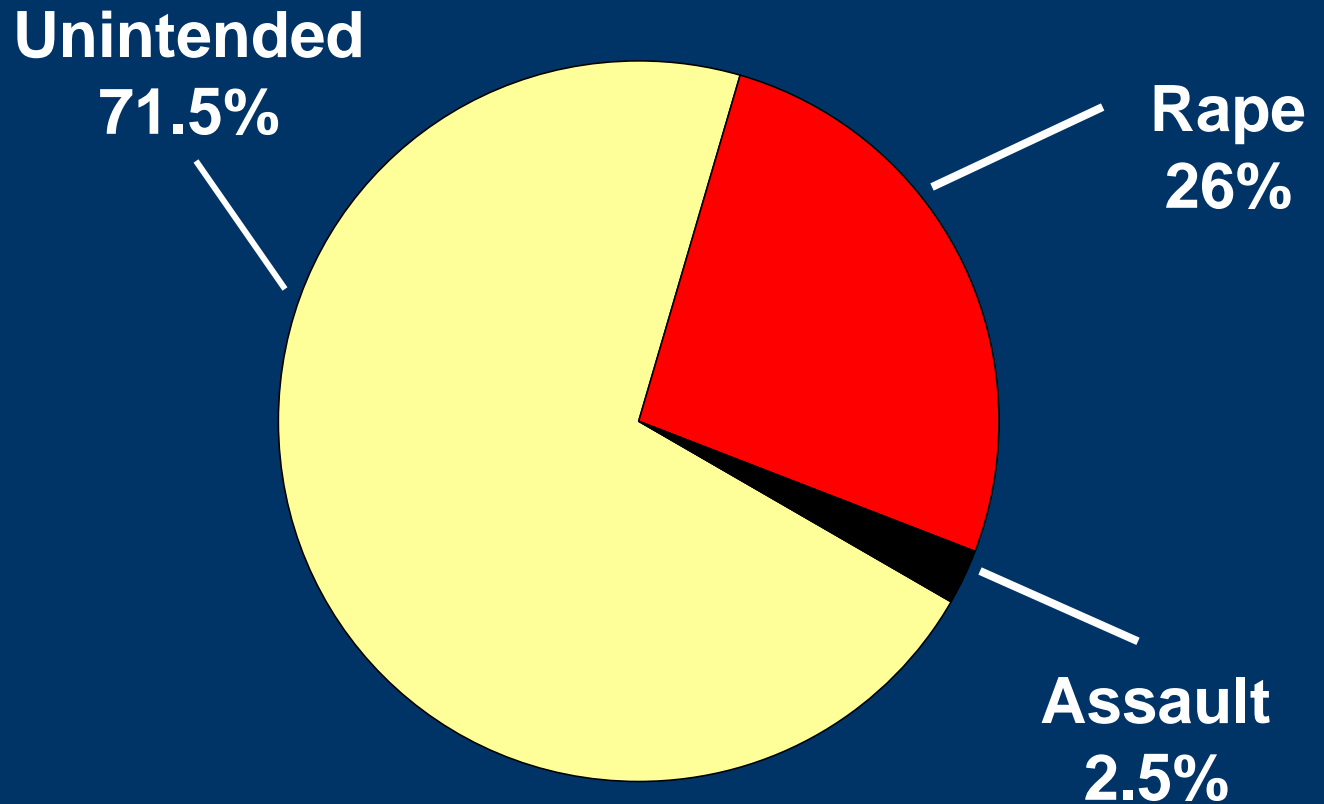
# Cost of Injuries, Ages 0-4

## \$51 B, 2000



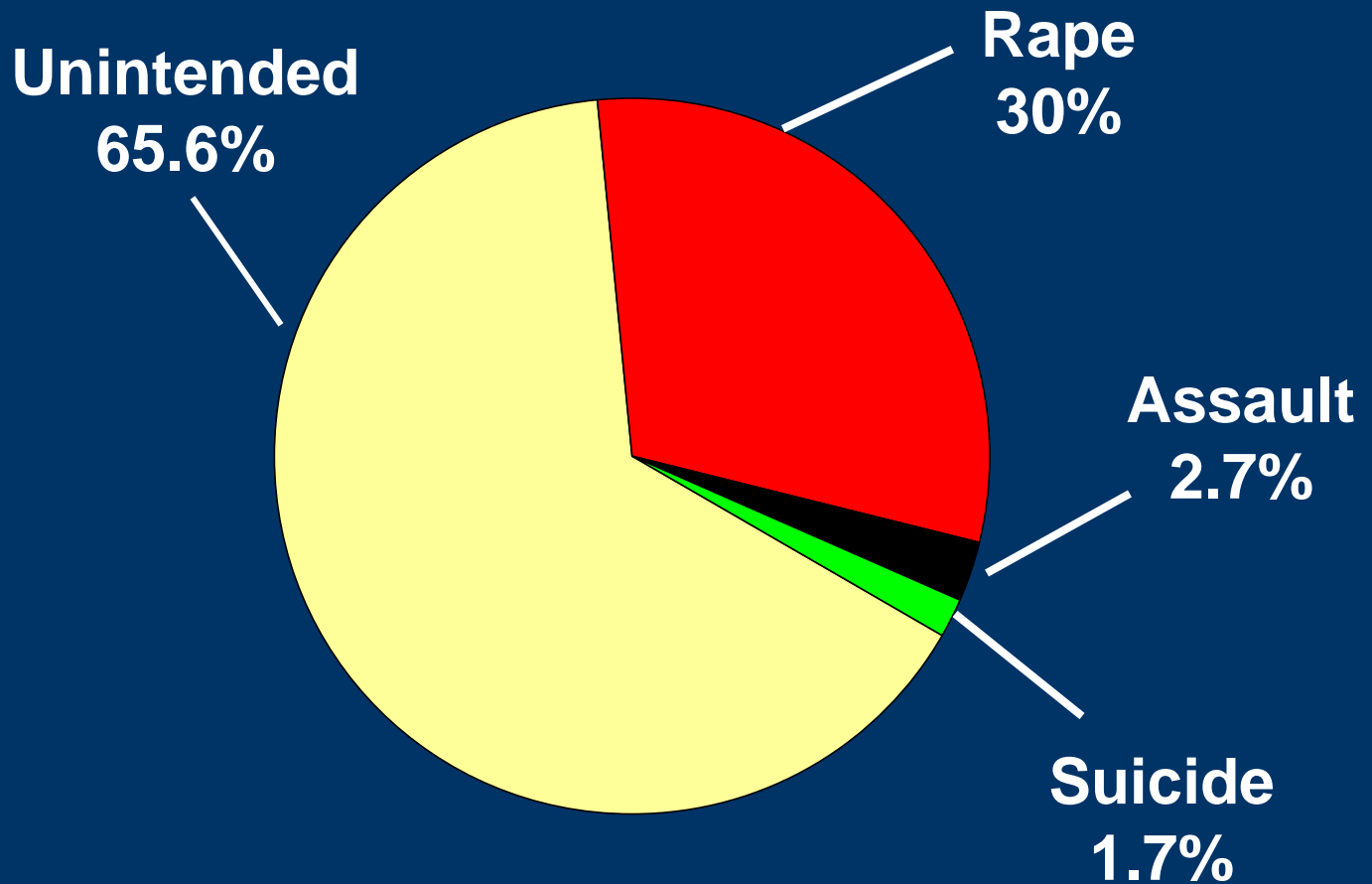
# Cost of Injuries, Ages 5-9

## \$52 B, 2000



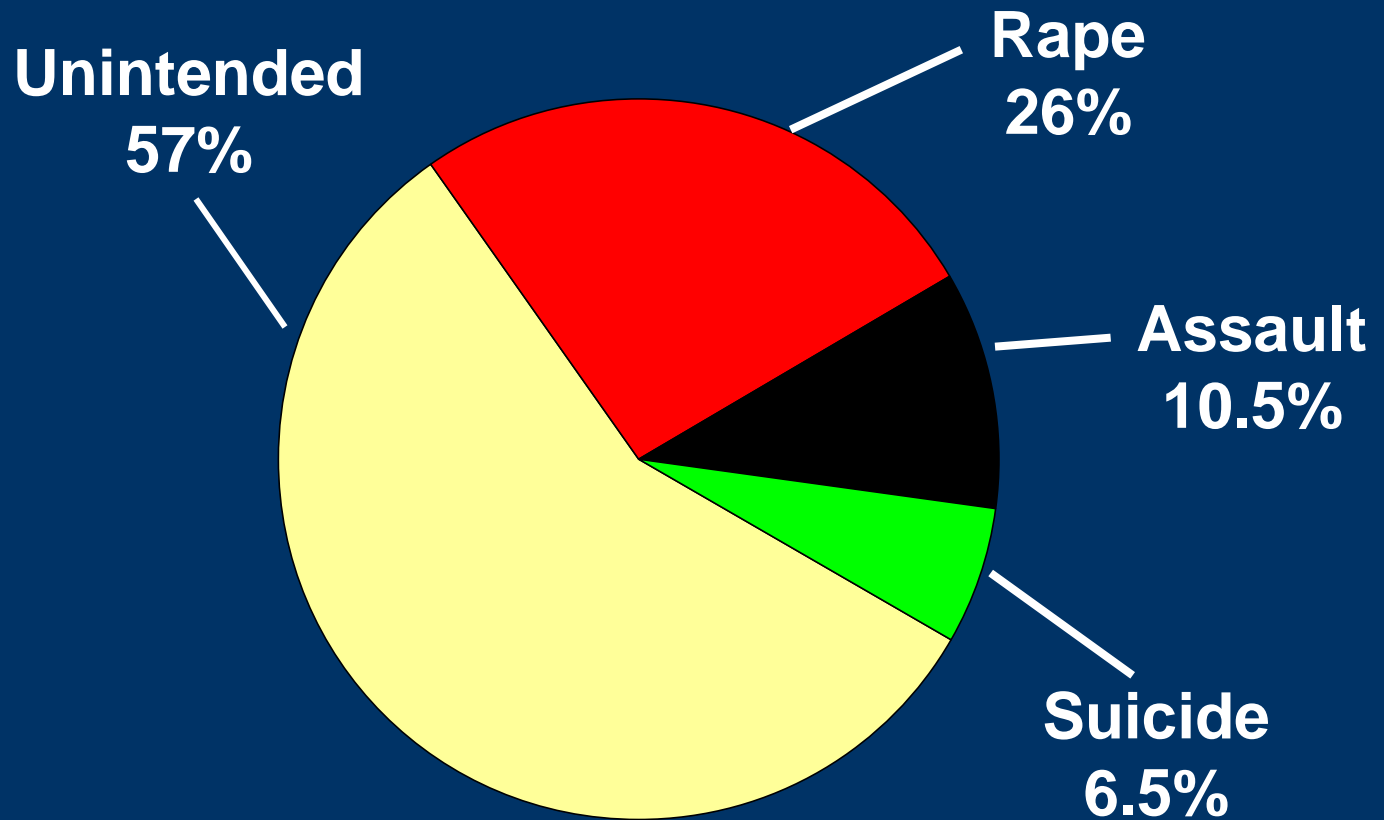
# Cost of Injuries, Ages 10-14

## \$79 B, 2000



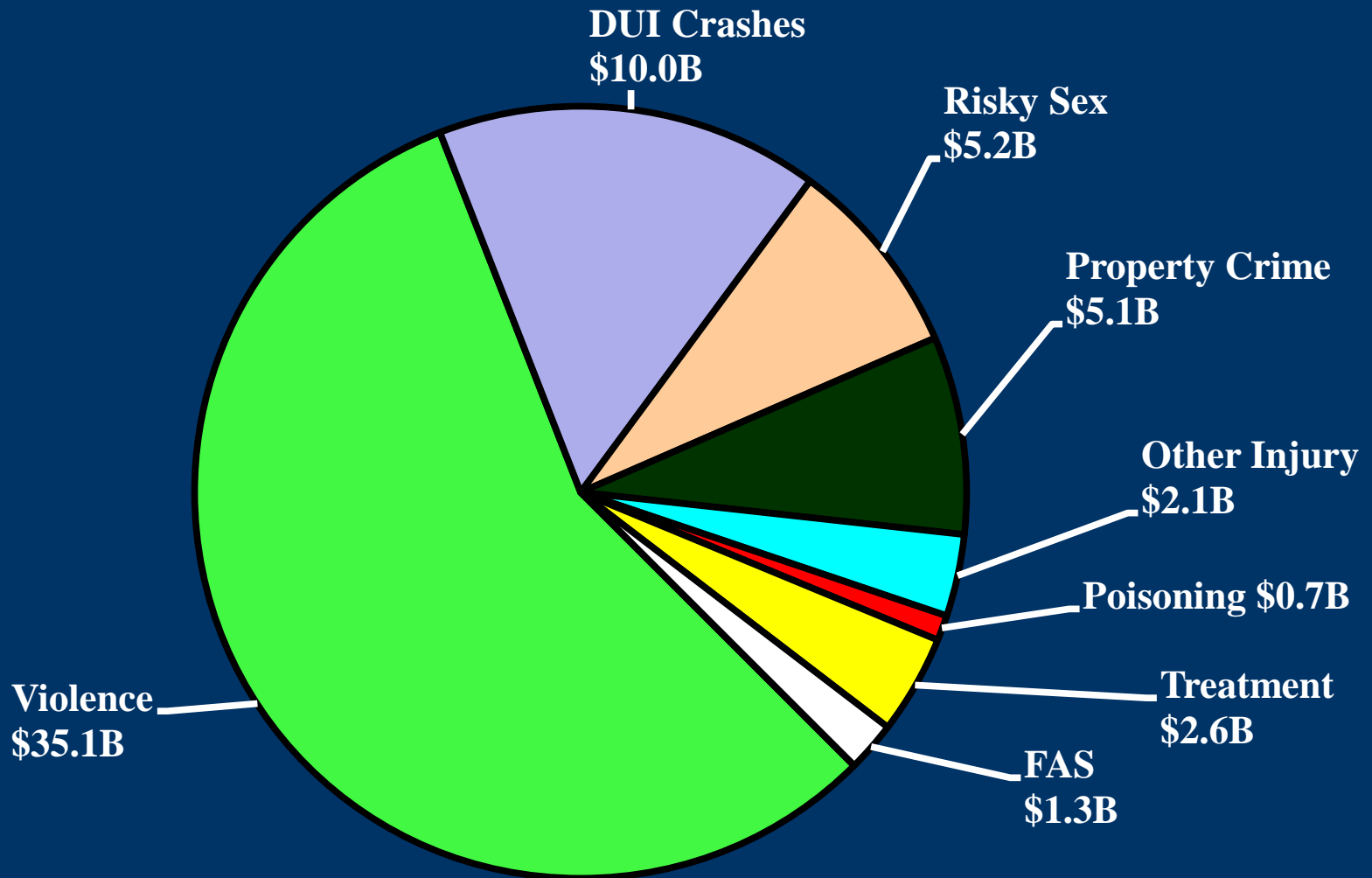
# Cost of Injuries, Ages 15-19

## \$121 B, 2000



# Advocacy

## Underage Drinking Cost \$62 B in 2009



# How Can We Make \$62 B Comprehensible?



Photography

AcclaimImages.com

Photography

# Use a Yardstick



\$62B

Underage drinking

\$70B

US Depts Justice &  
Education

# Nationally, \$23.8 Billion of Booze Was Consumed by Underage Customers in 2009



A bar chart with two bars. The first bar is white and represents 'Underage Booze' with a value of \$23.8B. The second bar is red and represents 'Starbucks' with a value of \$9.8B. The bars are positioned on a dark blue background.

Category	Value
Underage Booze	\$23.8B
Starbucks	\$9.8B

**\$23.8B**

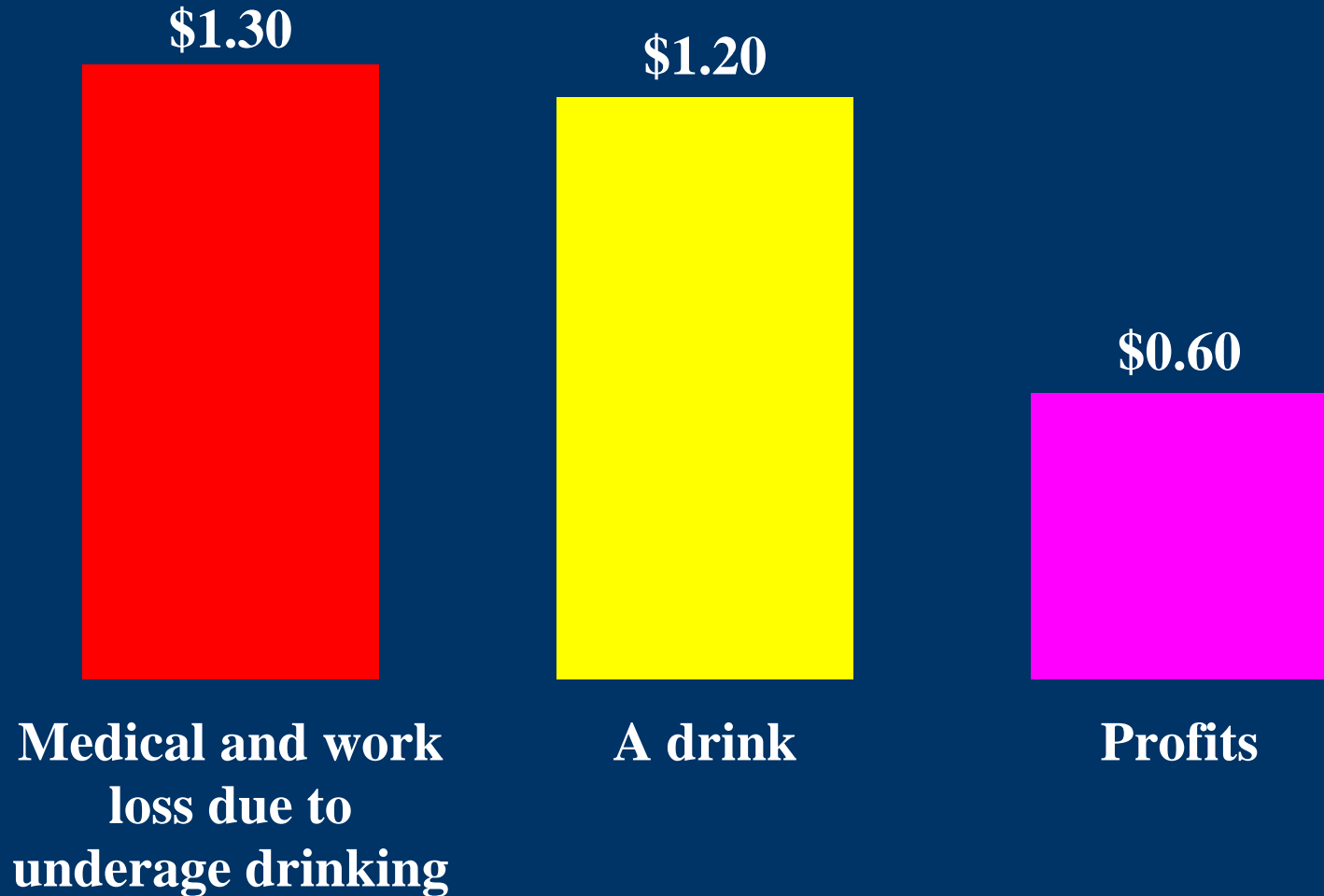
**\$9.8B**

**Underage Booze**

**Starbucks**



# Find a Sensible Exposure Measure To Divide By



# Gunshot Cost Per Resident



Country	Cost Per Resident
US	\$490
Canada	\$180

**\$490**

**US**

**\$180**

**Canada**

# Gunshot Costs Per Gun



A bar chart comparing the cost of a gunshot per gun in the US and Canada. The US bar is shorter and labeled with \$630, while the Canada bar is taller and labeled with \$840. Both bars are white with black outlines.

Country	Cost Per Gun
US	\$630
Canada	\$840

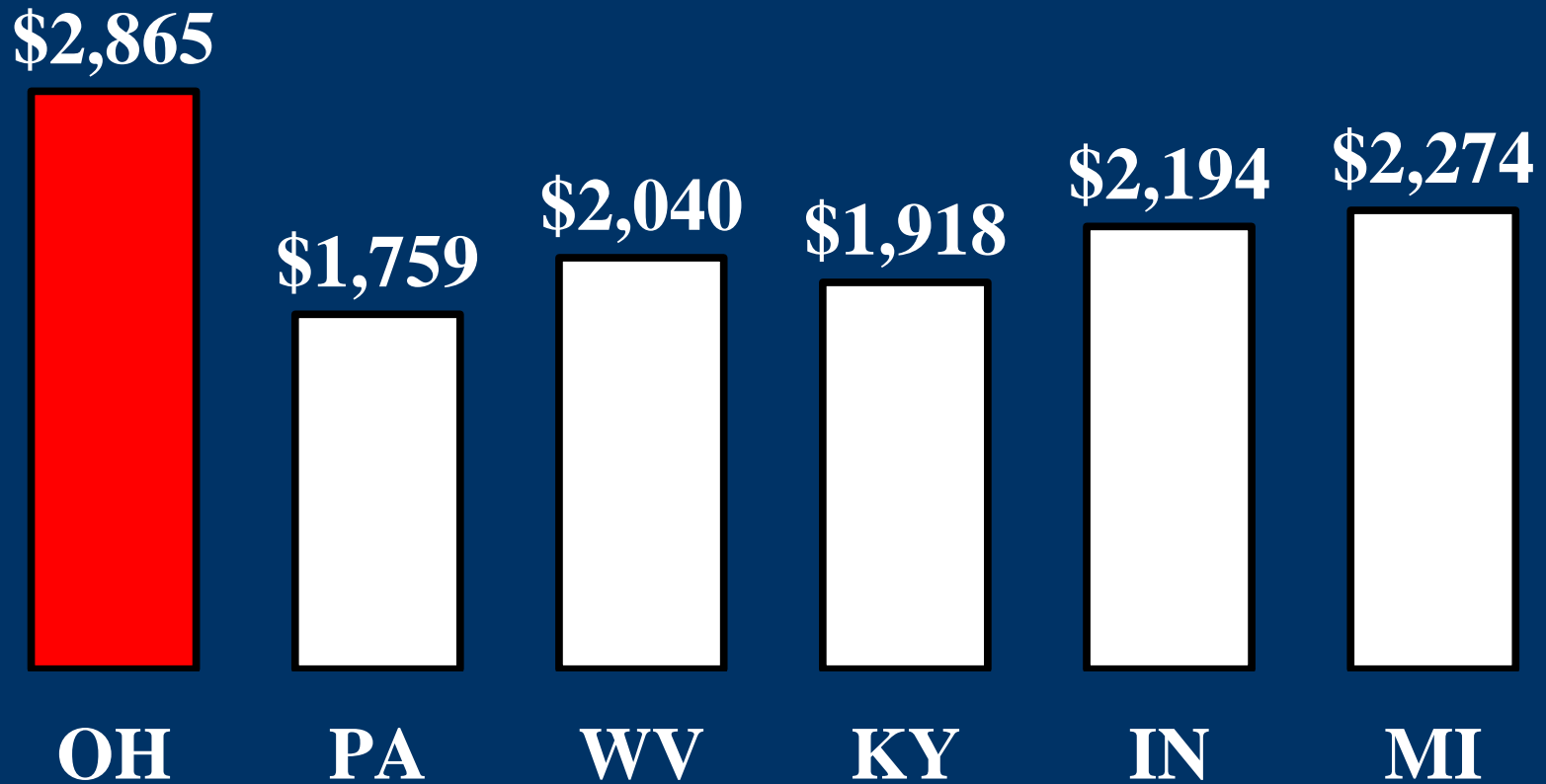
**\$630**

**US**

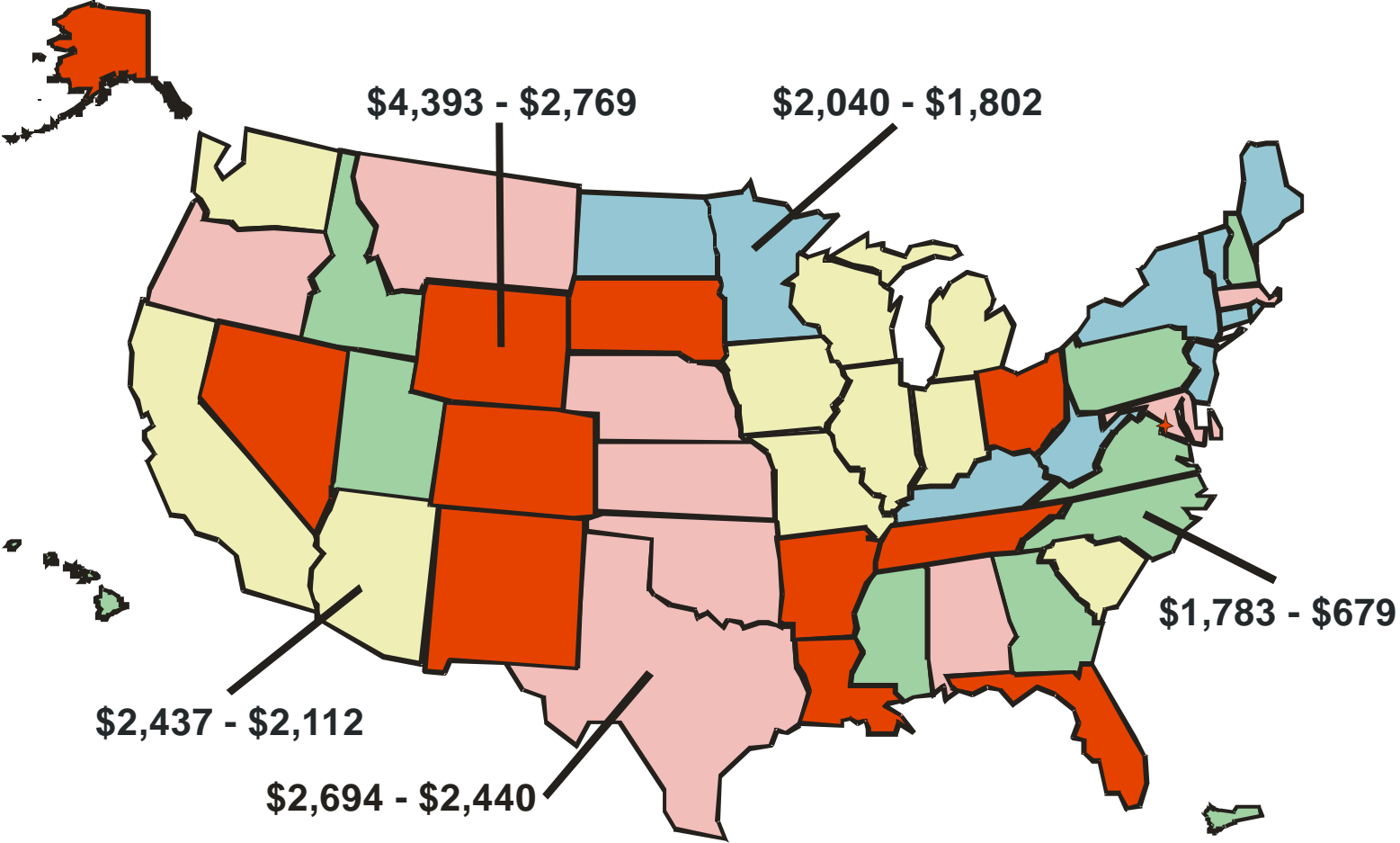
**\$840**

**Canada**

# Performance Comparison: \$/Youth

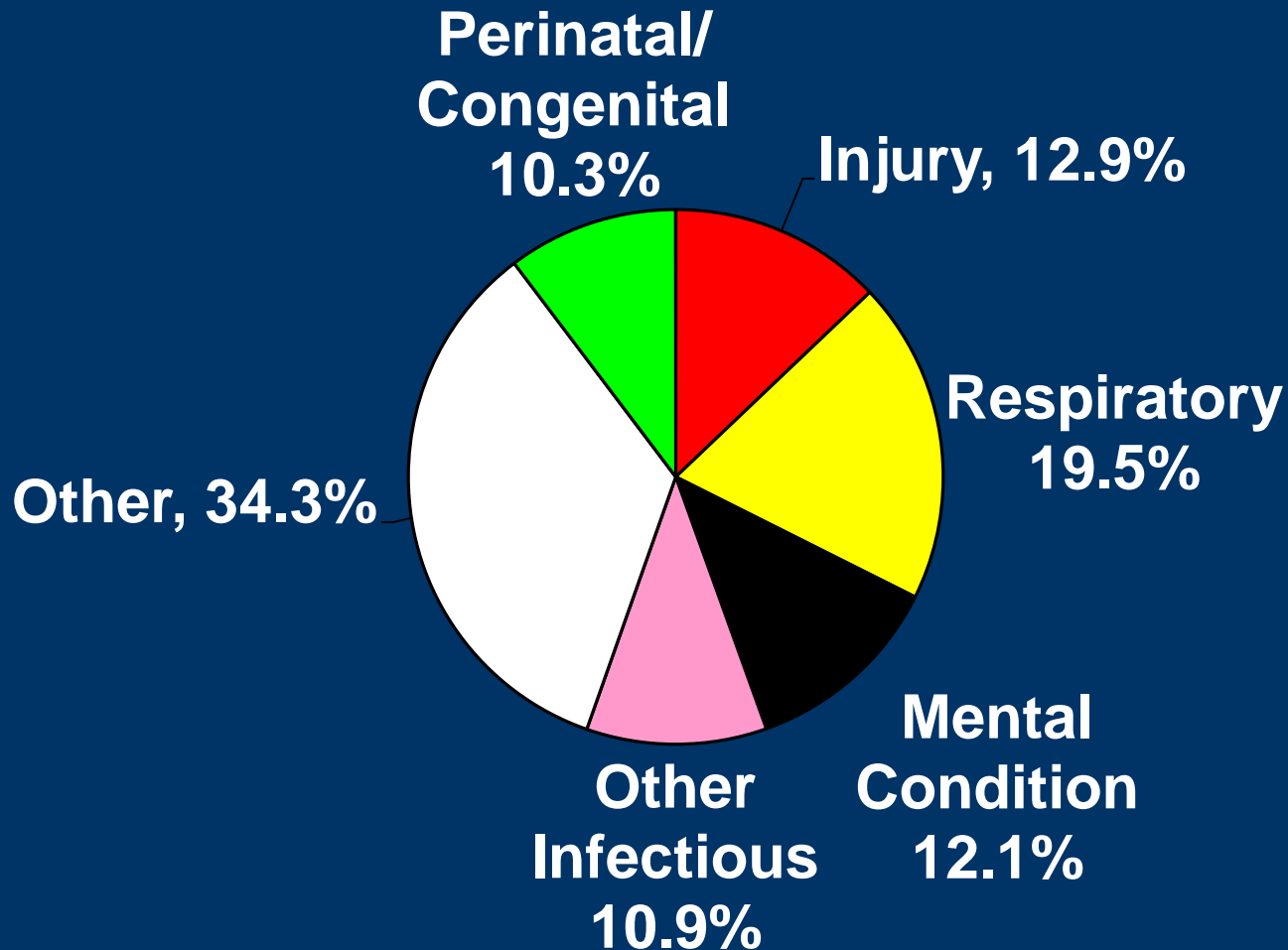


# Costs of Underage Drinking per Youth Ages 14-20



# BROAD PRIORITY SETTING

## Medical Spending, Ages 0-19, 2000



# Resource Allocation

## Leading Consumer products by % of nonfatal injury cost, Age <1, US

Rank	1995-96	%	2009-10	%
1	Stairs or steps	15	Beds (not cribs)	22
2	Beds (not cribs)	11	Floors	14
3	Floors	9	Sofas	7
4	Baby walkers	6	Stairs or steps	6
5	Tables	5	Car Seats	5
6	Baby strollers	4	Tables	3
7	Sofas	4	Chairs	3
8	Car seats	3	Strollers, Cribs, Shopping Carts (tie)	2

# Resource Allocation

## Leading Consumer products by % of nonfatal injury cost, US, 2009-10

Rank	Age 1-4	%	Age 5-9	%
1	Beds	9	Bicycles	8
2	Floors	7	Monkey bars	7
3	Stairs	7	Beds	5
4	Tables	5	Floors	4
5	Chairs	5	Football	3
6	Sofas	4	Trampolines	3
7	Poisoning	4	Stairs	3
8	Doors	4	Doors	3



# Leading Consumer Products by % of Nonfatal Injury Cost, US, 2009-10

<b>Rank</b>	<b>Age 10 – 14</b>	<b>%</b>	<b>Age 15 - 19</b>	<b>%</b>
<b>1</b>	<b>Football</b>	<b>14</b>	<b>Football</b>	<b>13</b>
<b>2</b>	<b>Bicycles</b>	<b>8</b>	<b>Basketball</b>	<b>11</b>
<b>3</b>	<b>Basketball</b>	<b>8</b>	<b>Bicycles</b>	<b>5</b>
<b>4</b>	<b>Soccer</b>	<b>5</b>	<b>Soccer</b>	<b>5</b>
<b>5</b>	<b>Baseball/softball</b>	<b>5</b>	<b>Stairs or steps</b>	<b>4</b>
<b>6</b>	<b>Skateboards</b>	<b>4</b>	<b>Baseball/softball</b>	<b>4</b>
<b>7</b>	<b>Stairs or steps</b>	<b>3</b>	<b>Skateboards</b>	<b>3</b>

# Program Evaluation

## A Poison Control Center Call

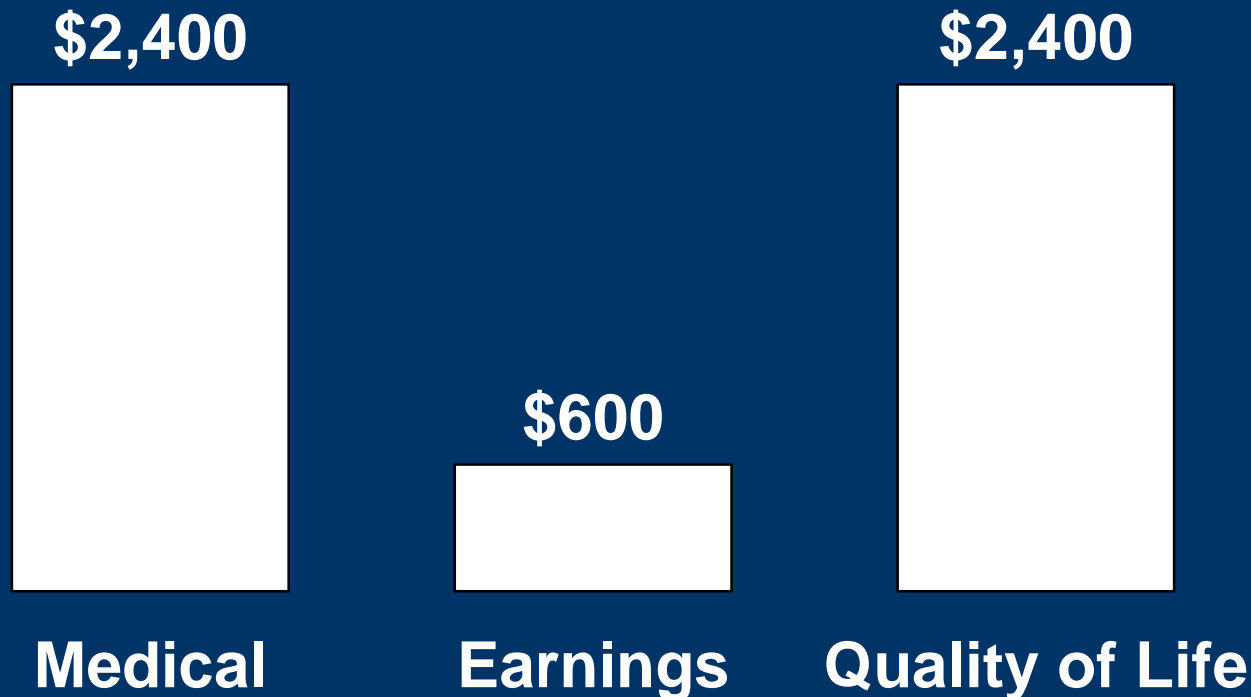
**\$45**

**Costs**

**\$340**

**Medical Care  
Avoided**

# Regional Trauma Care Raises Initial Care Costs by \$2,000/Admission, Saving \$5,400



# The Average Child Seat Saves \$425 in Insurance and Tax Payments

**\$255**



**\$135**



**\$35**



**Auto**

**Health**

**Taxes**

- **Costs are estimated from a perspective**

- **Society**
- **Government**
- **Insurers**
- **Employers**



- **Incidence-based costs**
  - **Lifetime consequences of injuries in one year**
  - **Measure savings from prevention**
  - **Must be discounted to present value**

# Burden Categories

## • ECONOMIC COSTS

- Medical & mental health

- Other resources/  
Tangible

- Emergency services

- Victim services

- Legal/court/prison

- Insur Admin

- Property damage

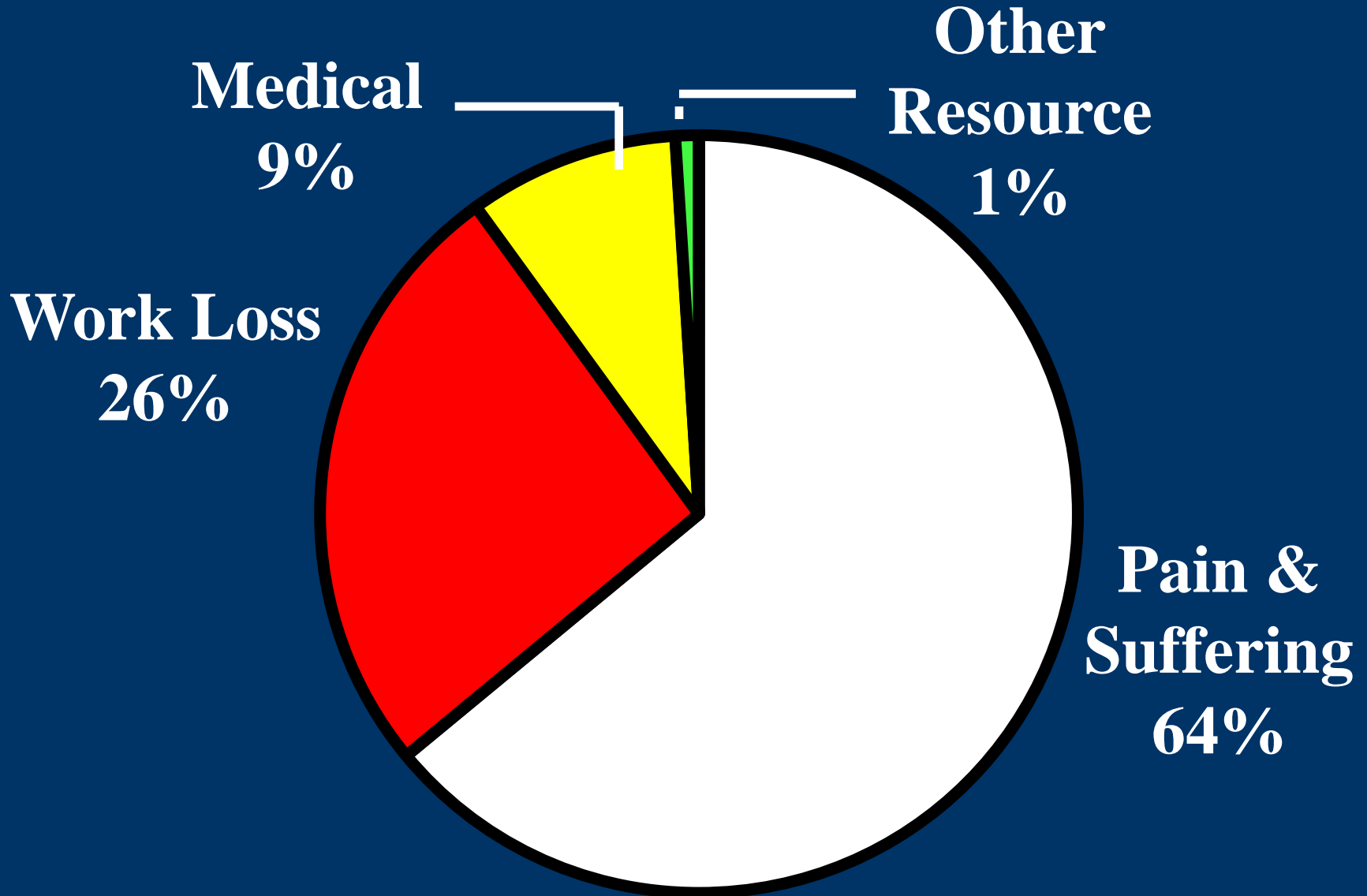
- Work loss  
(productivity)

- Wage work

- Household work

## • QUALITY OF LIFE

# Costs of Injury, ages 0-19, 2009: \$405 B

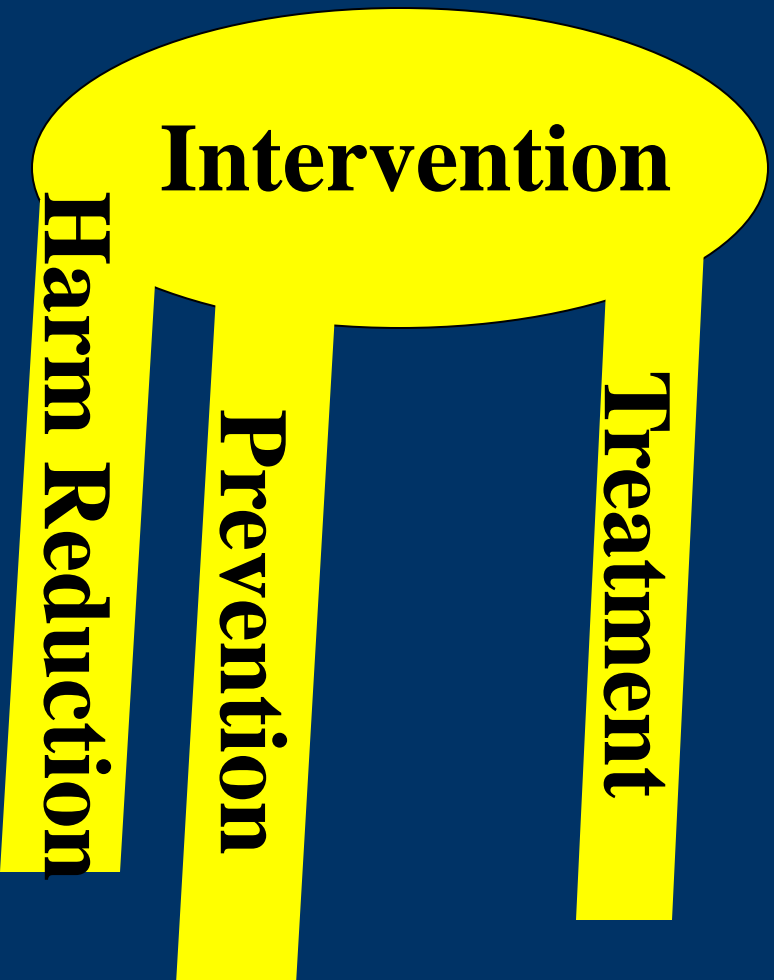




# COST EFFECTIVENESS



Is your money working hard enough for you?



# 163 Interventions

	Youth	Adult	Youth & Adult	Total
<b>Motor Vehicle</b>	<b>10</b>	<b>0</b>	<b>28</b>	<b>38</b>
<b>Impaired Driver</b>	<b>1</b>	<b>10</b>	<b>0</b>	<b>11</b>
<b>Open Flame/Burn</b>	<b>1</b>	<b>0</b>	<b>8</b>	<b>9</b>
<b>Violence</b>	<b>15</b>	<b>17</b>	<b>2</b>	<b>34</b>
<b>Other Injury</b>	<b>6</b>	<b>2</b>	<b>3</b>	<b>11</b>
<b>Substance Abuse</b>	<b>23</b>	<b>6</b>	<b>10</b>	<b>39</b>
<b>Tobacco</b>	<b>4</b>	<b>17</b>	<b>0</b>	<b>21</b>
<b>Total</b>	<b>60</b>	<b>52</b>	<b>51</b>	<b>163</b>

# Data Sources

- **US & some international published and unpublished studies from 1987-2010**
  - **Medline & Internet search**
  - **Bibliographic review**
  - **Contact with Federal agencies**
- **Excluded analyses of occupational, air, rail, & water transport safety programs**

# Methods

- **Costs take society's viewpoint (everyone's costs count)**
- **Costs given in 2011 dollars**
- **Savings from demonstration programs reduced by 25% when scaled up**

# Methods

- **Serious study flaws were corrected when possible**
- **Studies were subjectively graded based on the rigor of program cost and effectiveness estimates**
- **Studies which showed reductions in fatalities, but ignored nonfatal injuries were excluded**

# Definitions: Costs and Savings

- *Cost per Unit*: cost of the intervention for a single individual
- *Total Benefits per Unit*: the amount the intervention saved by preventing injuries & other problems
- **Aggregate Benefit/Unit = Total Benefits - Cost**
- *Benefit Cost Ratio (BCR)*: savings from preventing injuries divided by cost of the intervention
- *Cost-effective*: the  $BCR > 1.0$   
Return on investment in the intervention exceeds amount invested

# Definitions: Costs and Savings

- *Cost per Quality Adjusted Life Year (Cost of intervention – medical & other resource savings)/ QALY*: A QALY is a health outcome measure that assigns a value of 1 to a year of perfect health & 0 to death. The QALY measure captures the work loss & quality of life savings
- *Cost-saving*:  $\text{cost/QALY} < 0$  which means that the cost of the intervention is less than the savings generated in medical and other resource costs



# Choosing Interventions

- **We recommend interventions with a BCR  $< 2$  or cost/QALY  $> \$100,000$  should rarely be implemented**
- **Some interventions with low BCRs may address unique component of injury problem**
- **Laws generally would have lower costs & higher BCRs from a government perspective**

# Notable Newly Added Interventions

	BCR
<b>20-Bed Domestic Violence Shelter</b>	<b>11</b>
<b>Speed Camera</b>	<b>19</b>
<b>Red Light Camera</b>	<b>4</b>
<b>Sprinklers in New Ranch House</b>	<b>6</b>
<b>Sprinklers in New Colonial or Town House</b>	<b>3</b>
<b>Mattress Flammability Standard</b>	<b>3</b>
<b>Baby Walker Redesign - Less Falls Down Stairs</b>	<b>46</b>
<b>Impact-Absorbing Playground Surfacing</b>	<b>2</b>

# Coming Soon

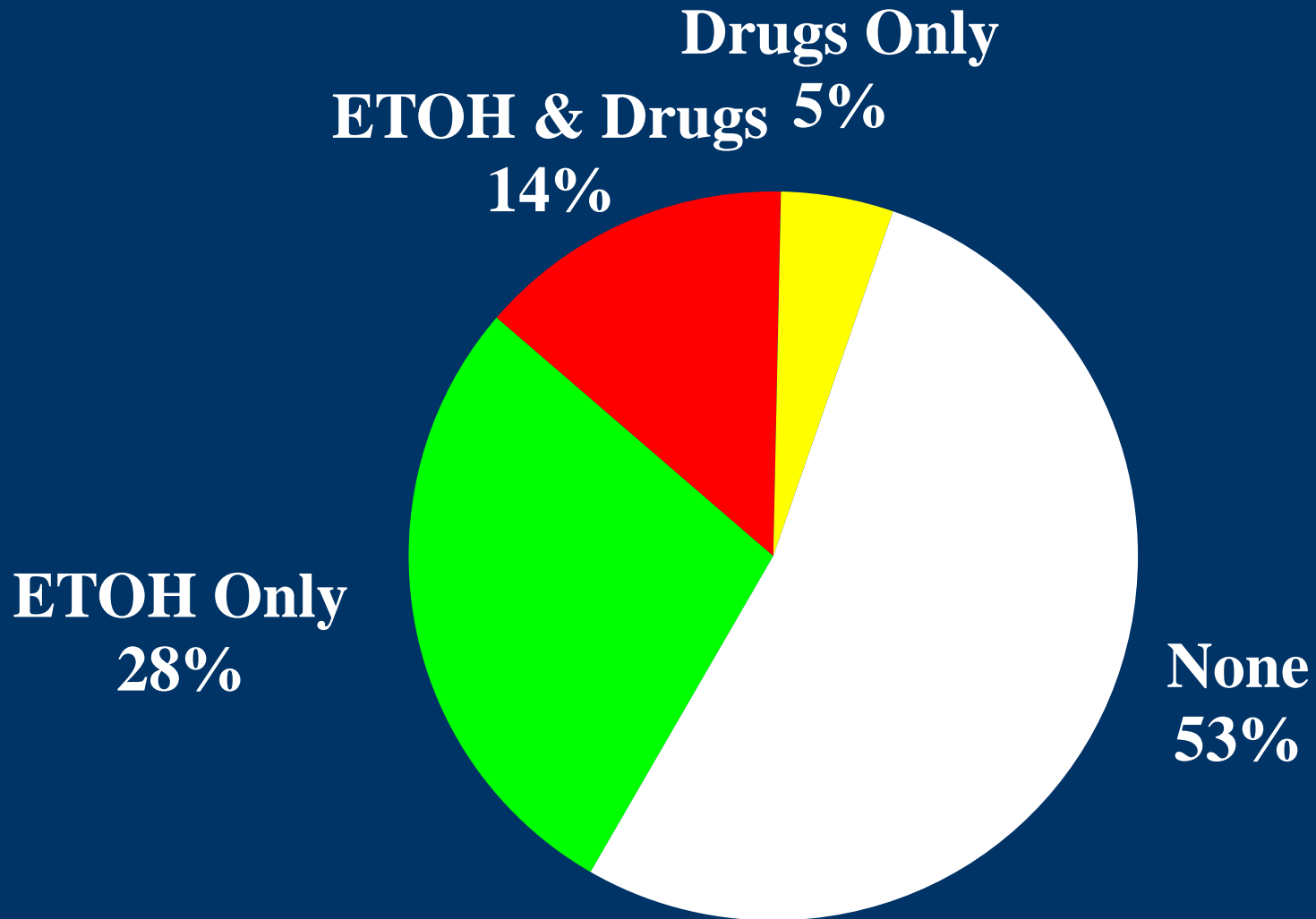
- **More detail on graduated licensing?**
- **Tornado shelters**
- **DWI courts**
- **Triple P child abuse prevention**



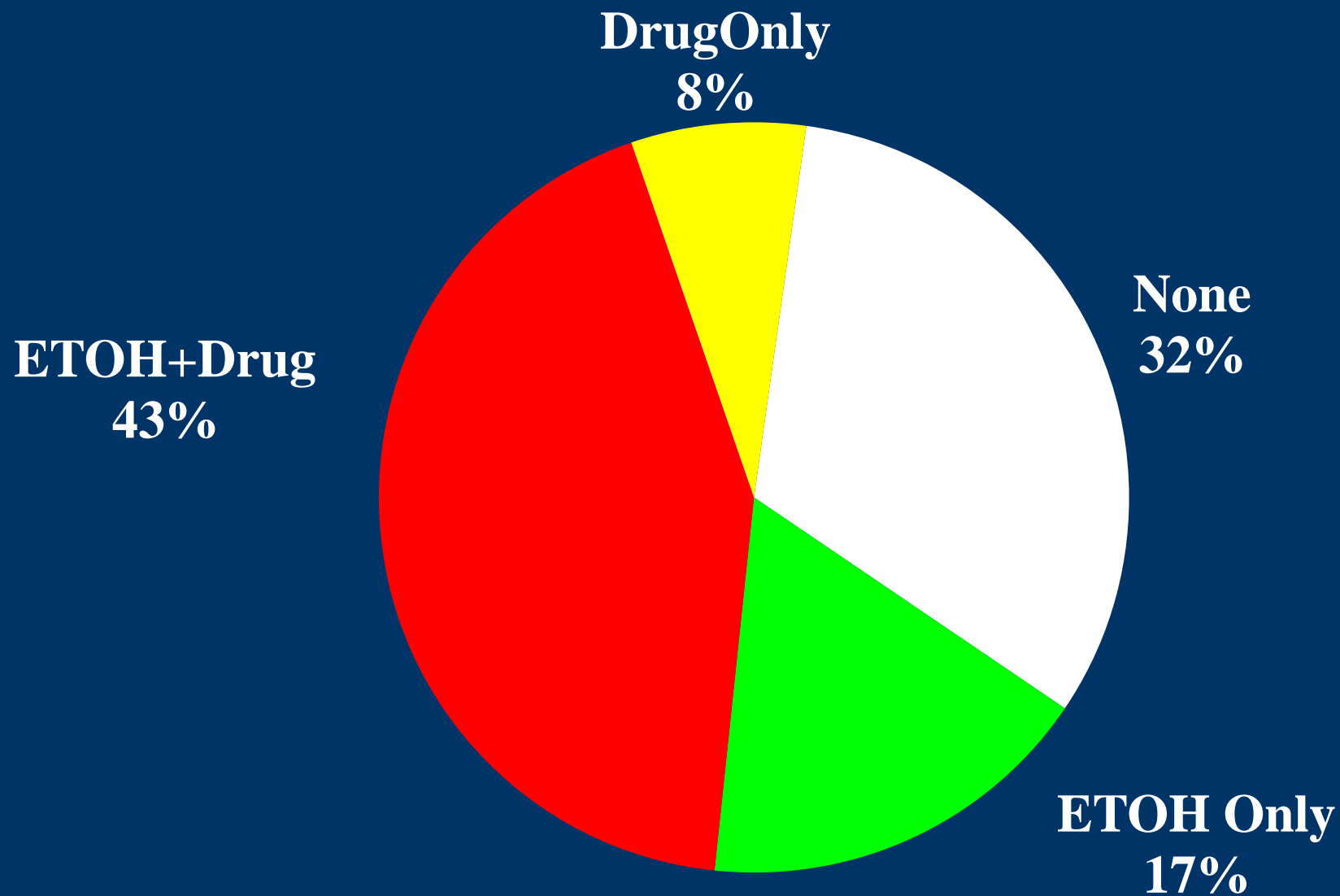
<b>NON-OFFENDER VIOLENCE PREVENTION</b>	<b>Cost/ child</b>	<b>BCR</b>
<b>Nurse-family partnership home visitation to 1<sup>st</sup> born</b>	<b>\$7,100</b>	<b>7.6</b>
<b>Parent-teacher training</b>	<b>\$4,700</b>	<b>3.9</b>
<b>Big brothers-big sisters mentoring</b>	<b>\$4,800</b>	<b>1.8</b>
<b>Head start + 12 home visits</b>	<b>\$20,500</b>	<b>4.9</b>

# Violence often is part of a problem complex

## Cost of Violence



# Cost of Youth Crime

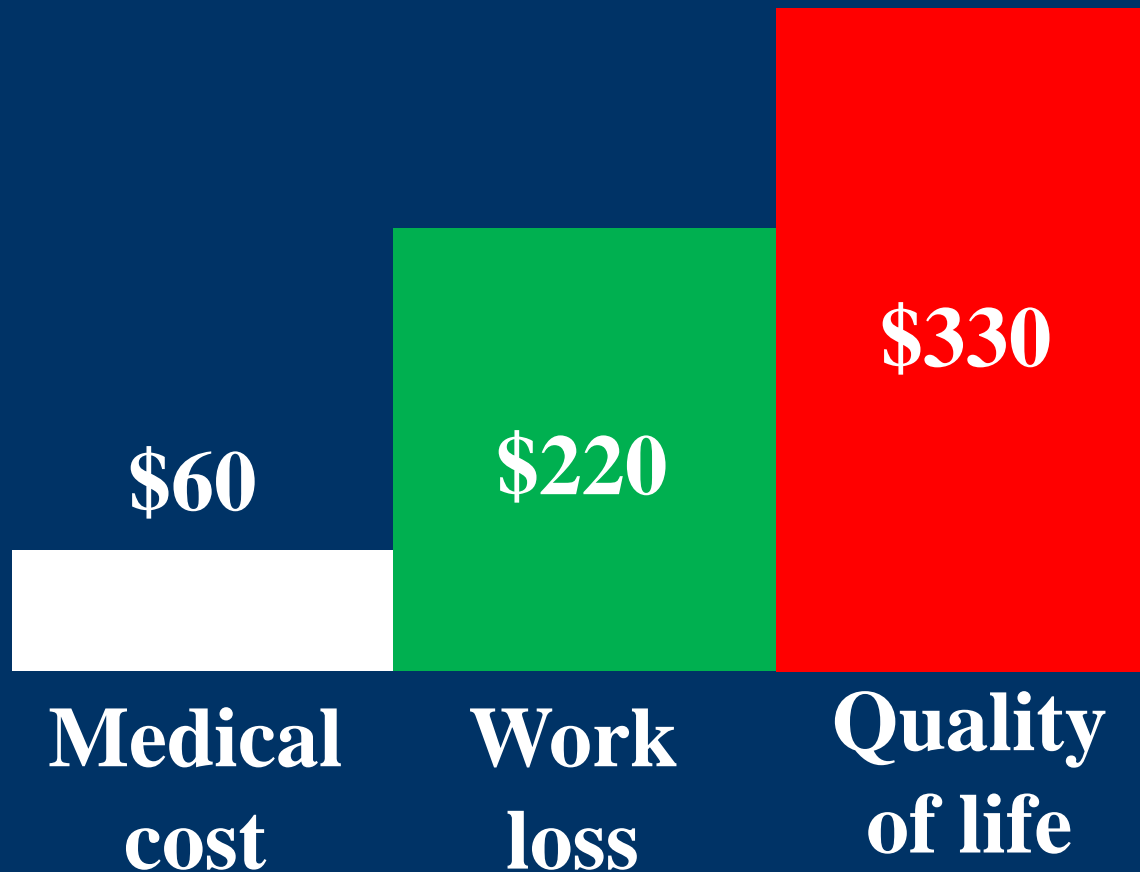


<b>JUVENILE VIOLENCE MEASURES</b>	<b>Other Impact</b>	<b>BCR</b>
<b>Treatment foster care</b>	<b>Y</b>	<b>65</b>
<b>Multisystemic therapy</b>	<b>Y</b>	<b>39</b>
<b>Functional family therapy</b>	<b>Y</b>	<b>32</b>
<b>Aggression replacement training</b>	<b>N</b>	<b>90</b>
<b>Adolescent diversion</b>	<b>N</b>	<b>39</b>
<b>Intensive probation supervision</b>	<b>N</b>	<b>4.4</b>
<b>Boot Camp</b>	<b>N</b>	<b>0</b>
<b>Scared Straight</b>	<b>N</b>	<b>0</b>





# A \$13 Bike Helmet for Kids 0-4 Saves \$610 (BCR 43)



# A \$13 Bike Helmet for Kids 3-14 Saves Insurers \$82

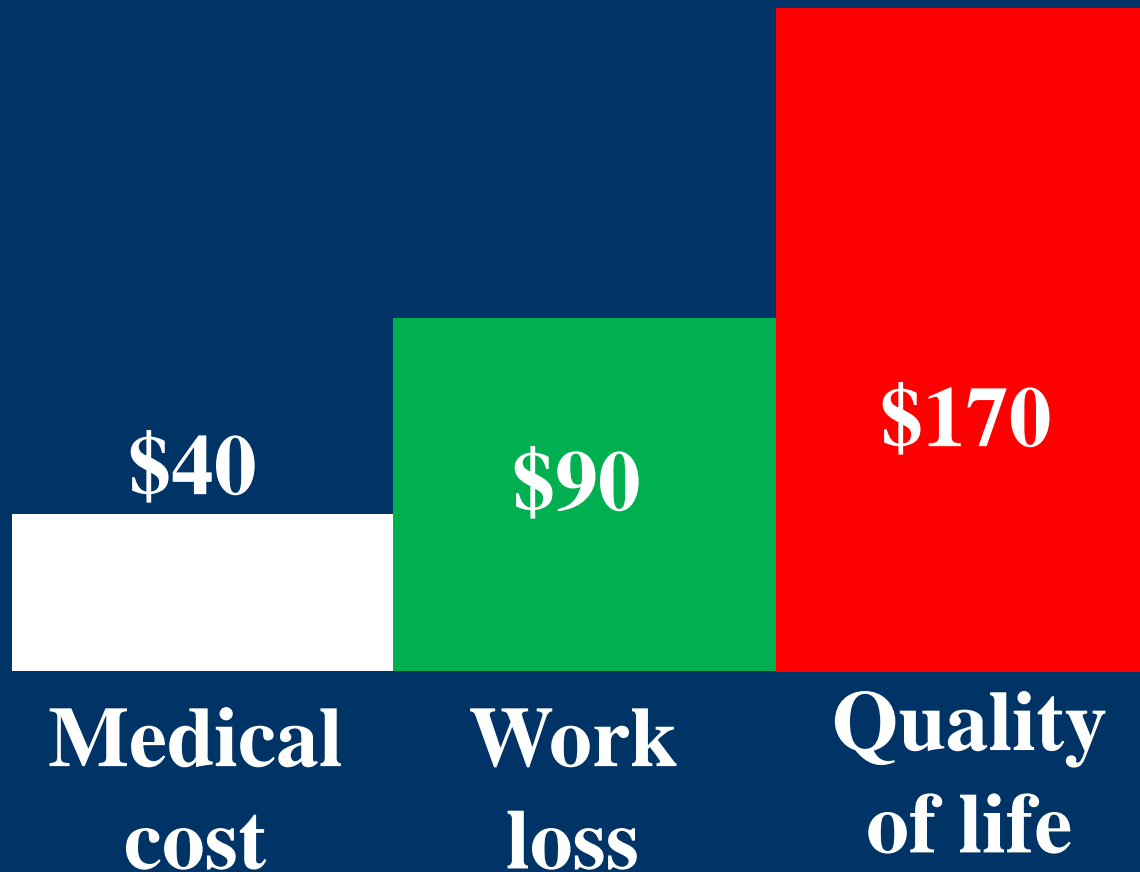


**Auto**

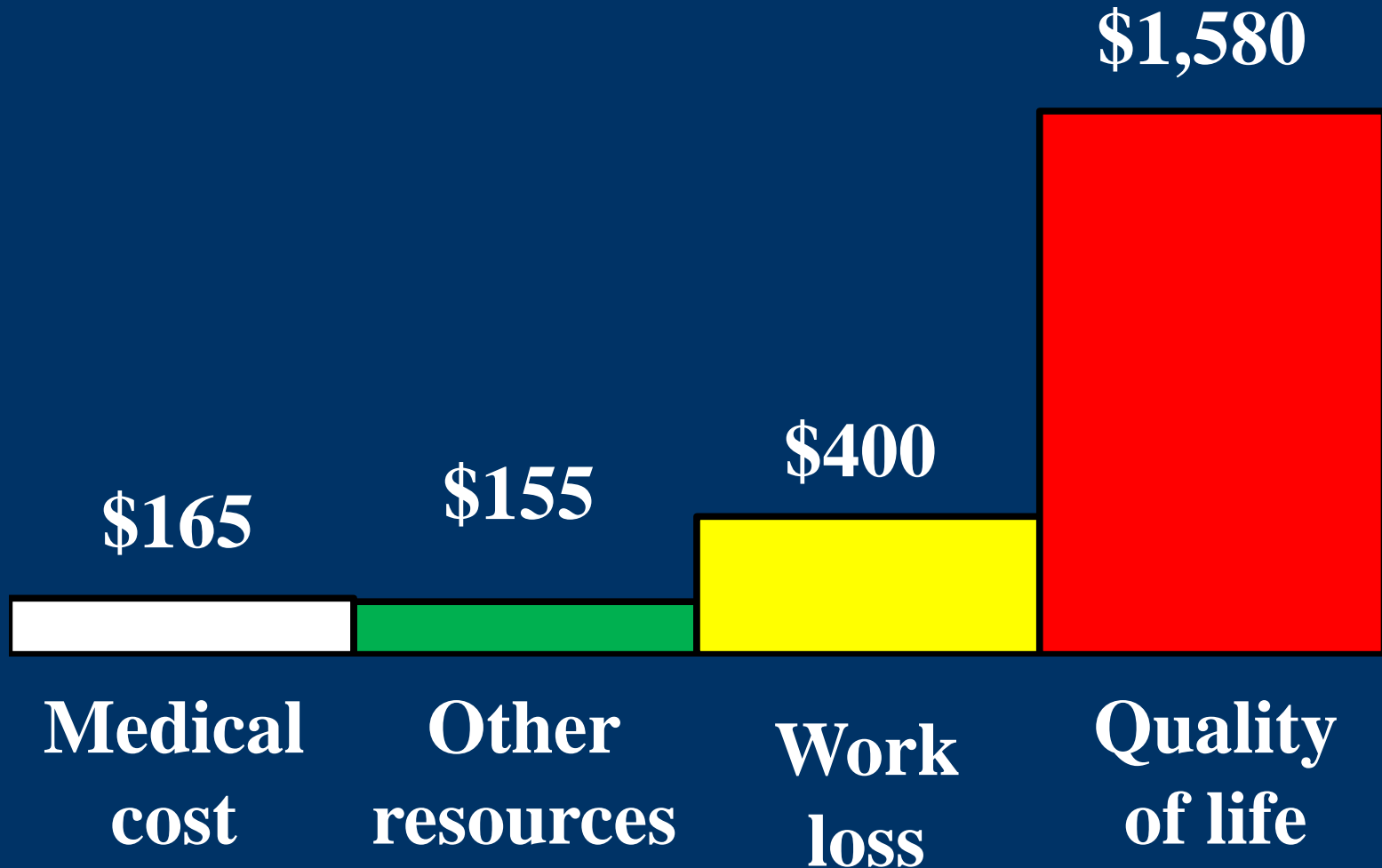


**Health**

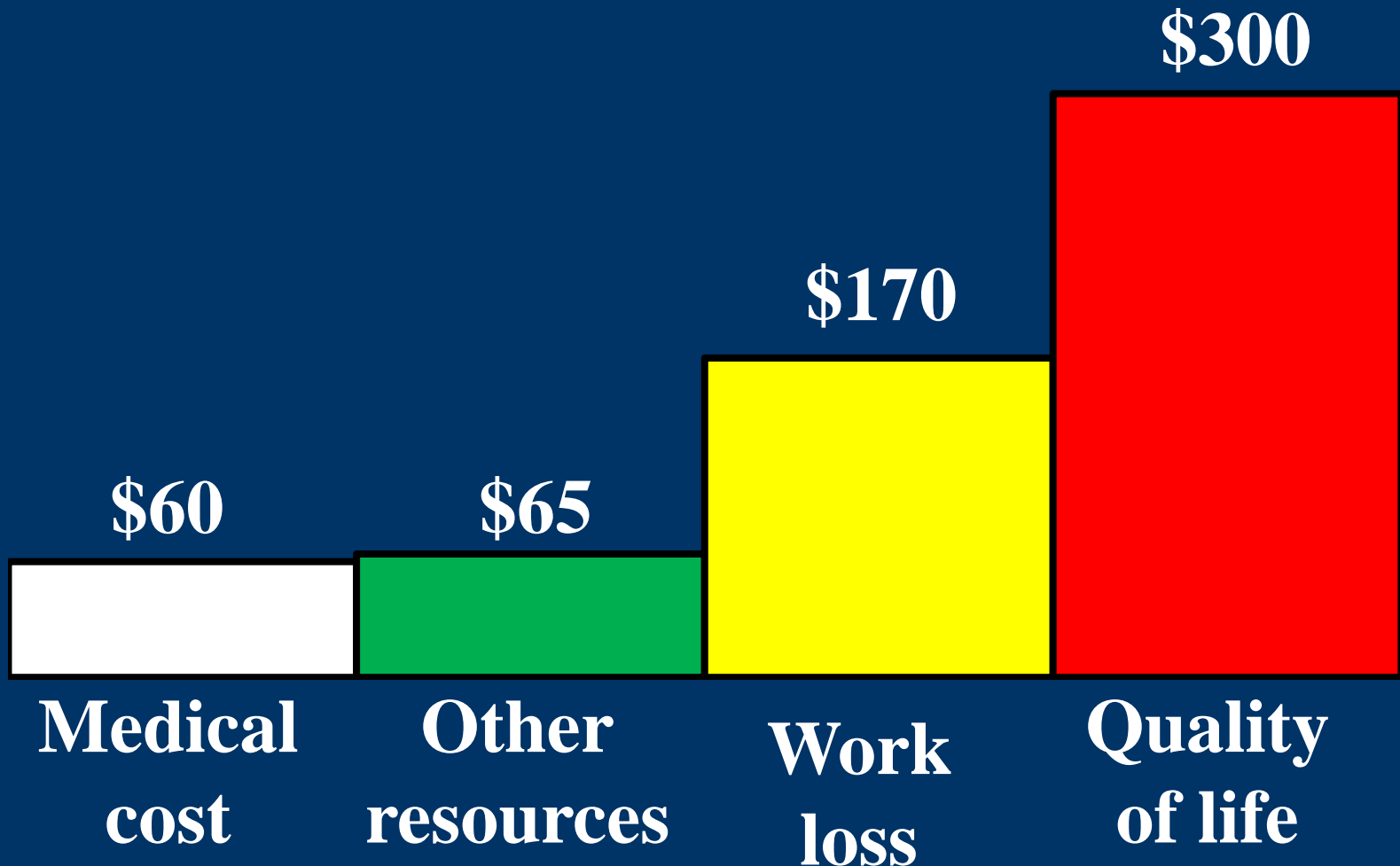
# A \$20 Bike Helmet for Ages 15 & Above Saves \$300 (BCR 15)



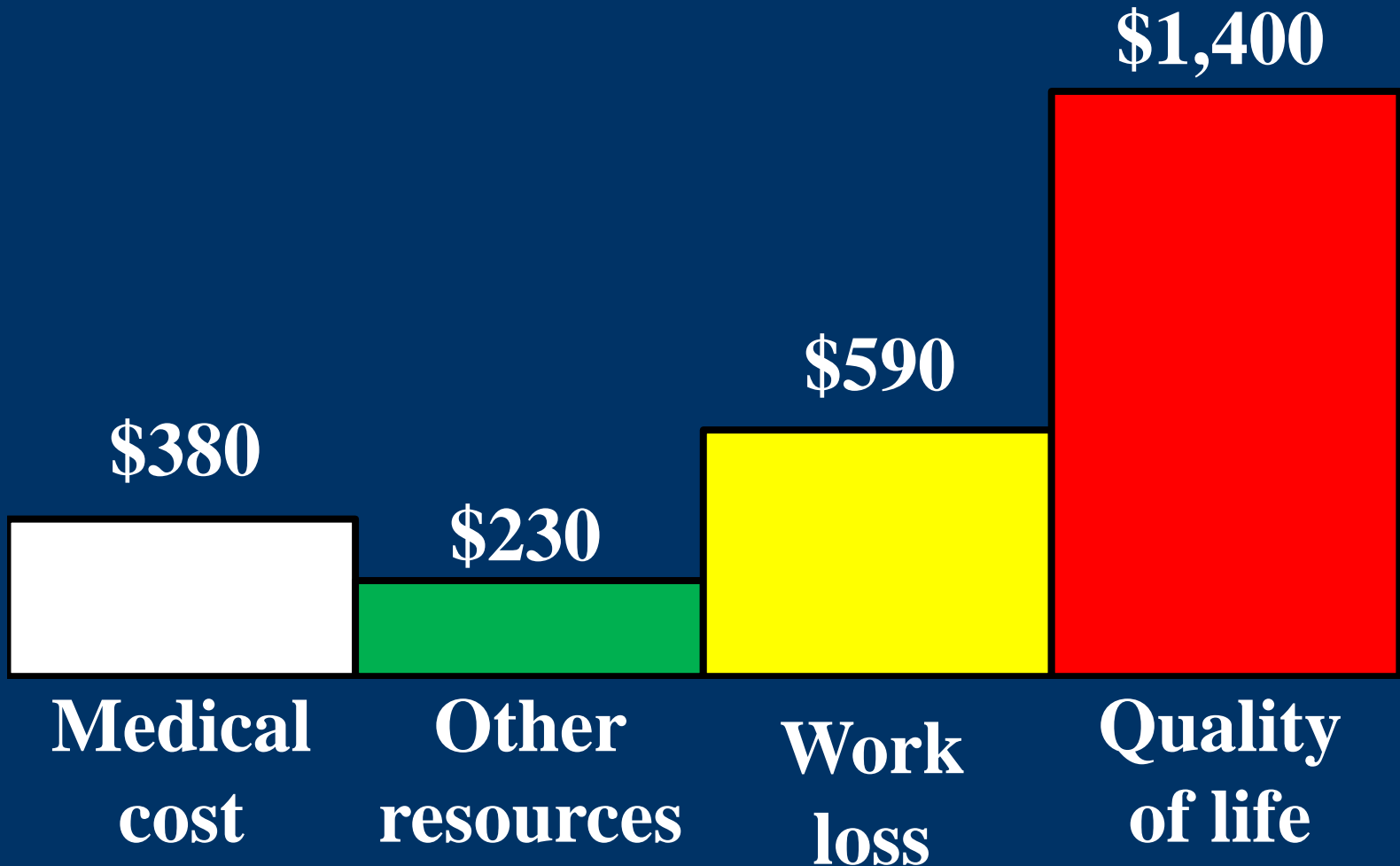
# A \$55 Child Seat Saves \$2,300 (BCR 42)



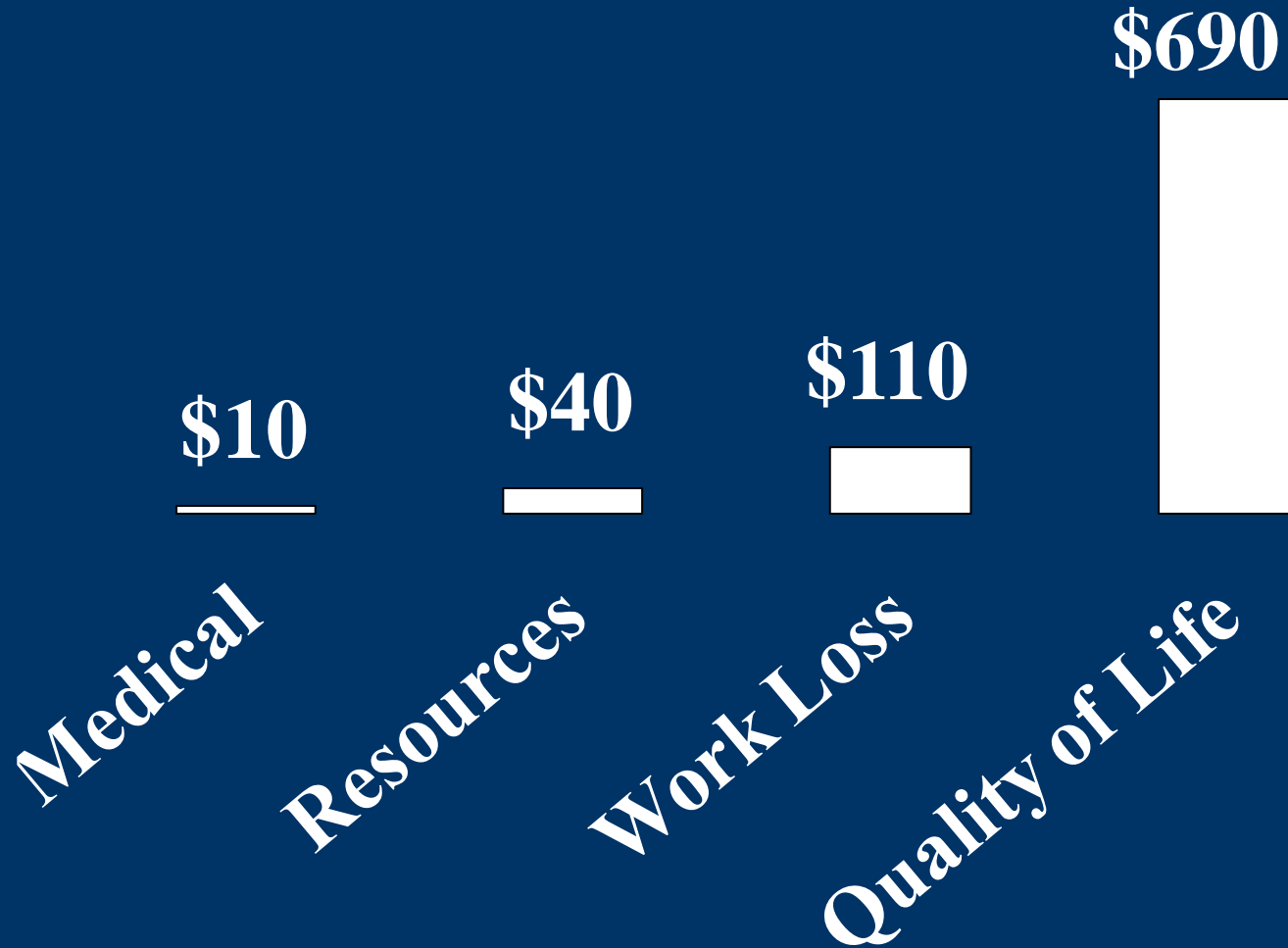
# Misuse Reduction (latch system + installation checks) Costs \$6/Seat & Saves \$600 (BCR 94)



# A Booster Seat with Back Costs \$35 and Saves \$2,600 (BCR = 72)



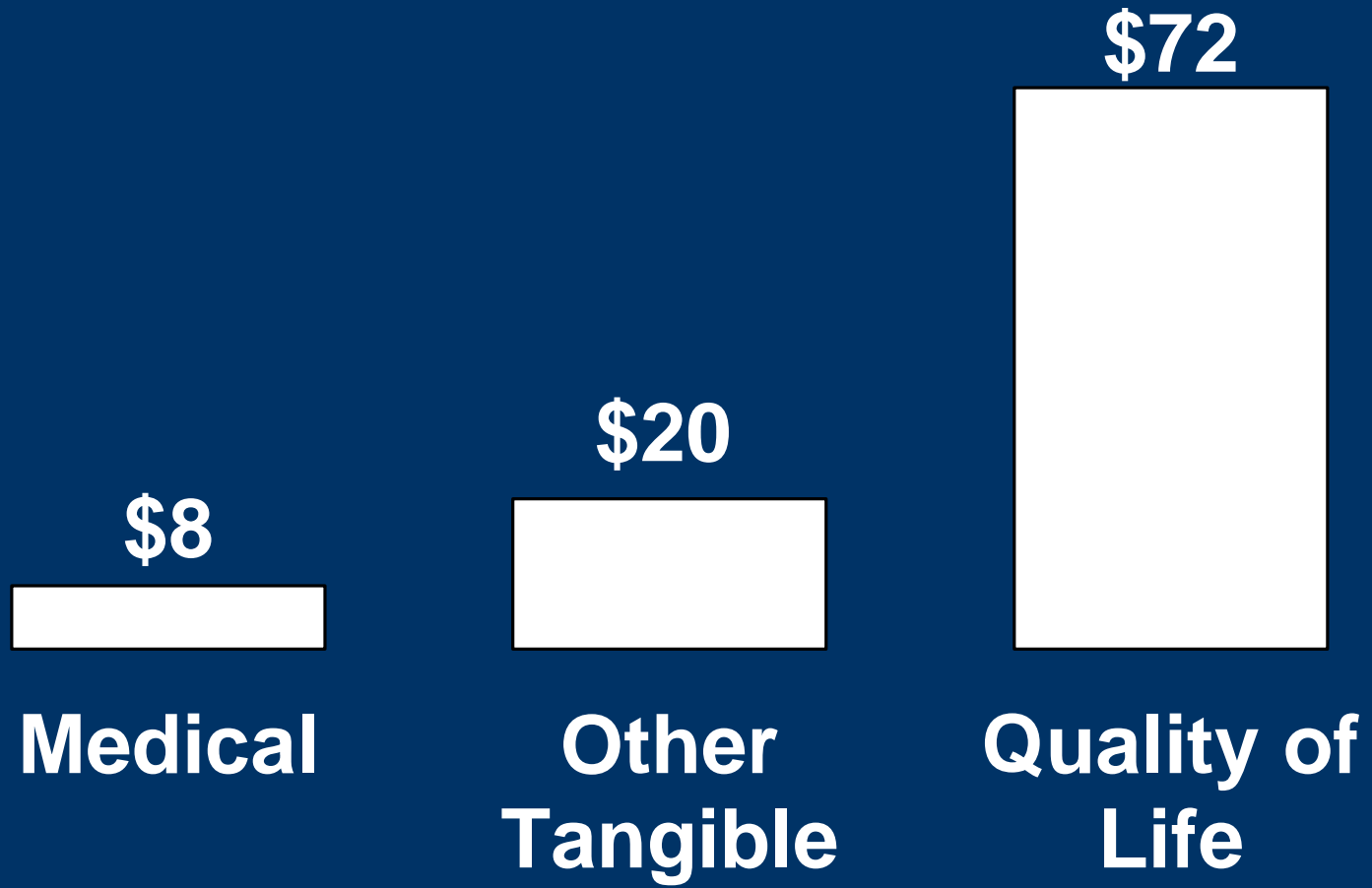
# Equipping A Home with Smoke Alarms + Maintenance Costs \$45 & Saves \$850 (BCR 18)



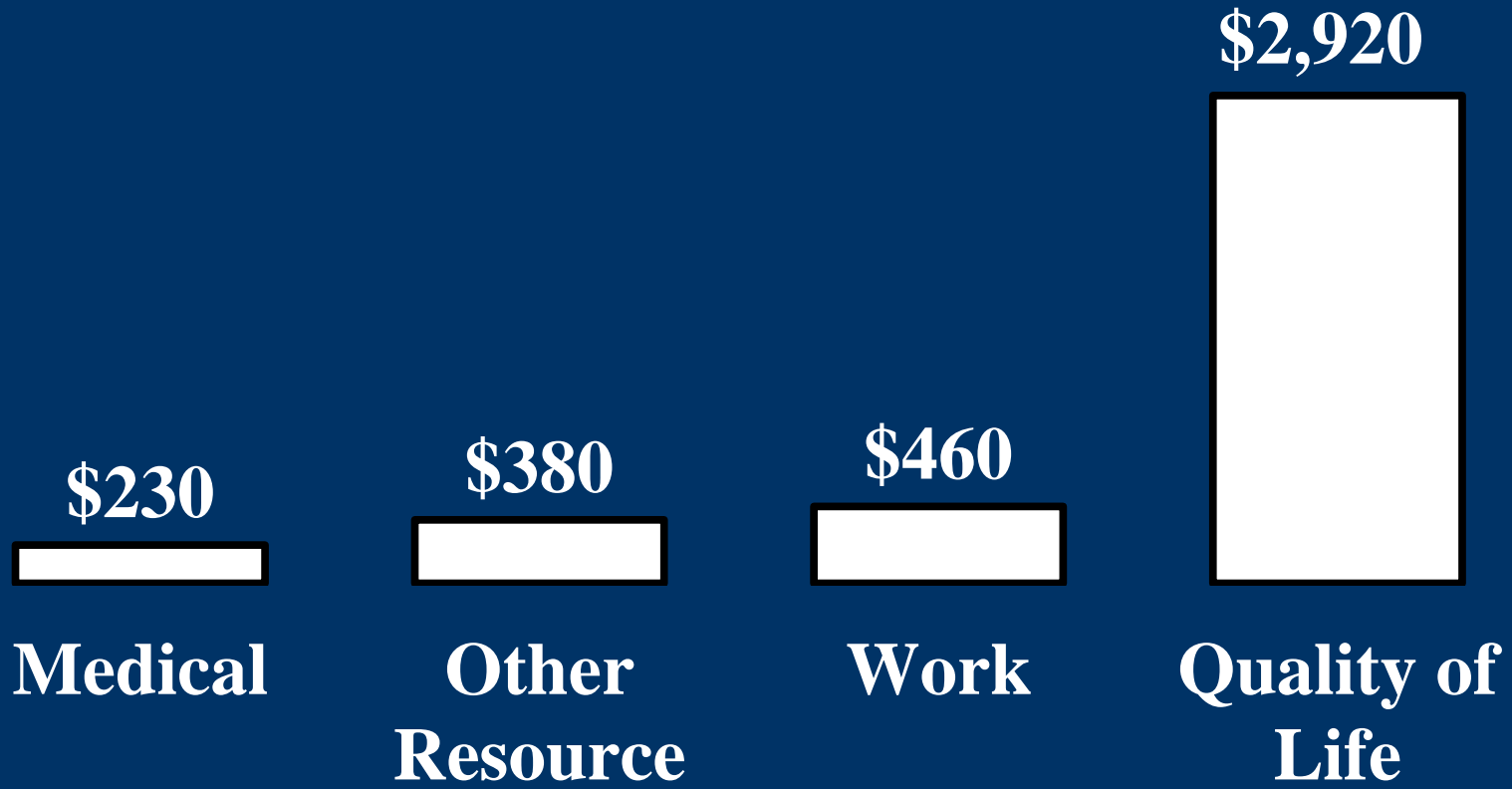


# American Academy of Pediatrics TIPP Sheet

## Counseling for Ages 0-4 Costs \$12/Visit & Saves \$100/Visit (BCR 8.5)



# Harlem Hospital Safe Communities Program Costs \$75/Child/Year & Saves \$4,000 (BCR 51)



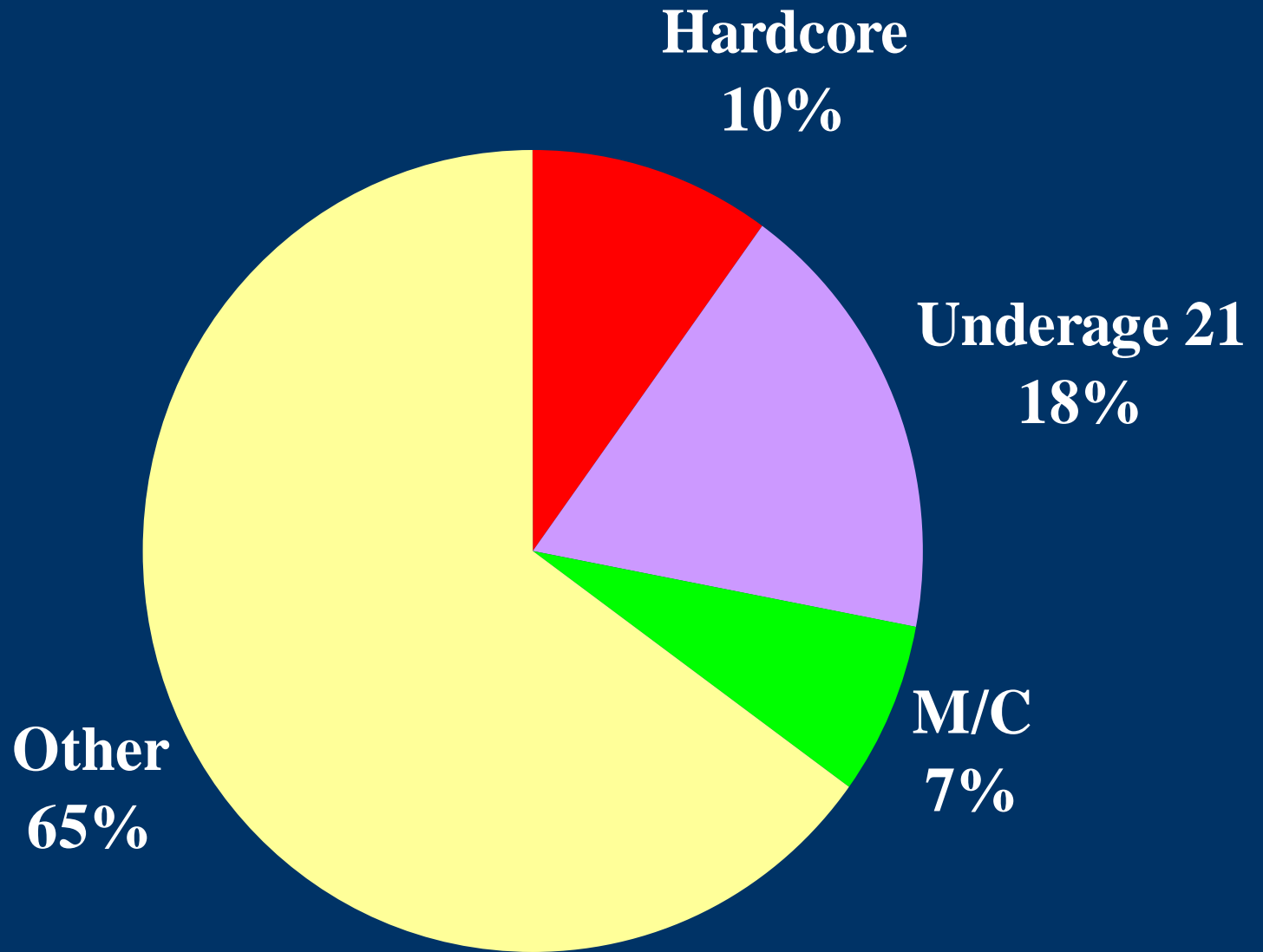


DONT'T DRINK  
AND DRIVE

# Program Selection

- **No one intervention will reduce most problems more than 10%-15%**
- **Need a package of complementary interventions**

# DWI Deaths



	<b>% Redux</b>	<b>BCR</b>
<b>ALL DRIVERS</b>	<b>DWI Deaths</b>	
<b>Enforce SIP Laws</b>	<b>11%</b>	<b>71</b>
<b>Admin License Revoc</b>	<b>6.5%</b>	<b>21</b>
<b>.08 Max Driver BAC</b>	<b>7%</b>	<b>14</b>
<b>Intensive Breath Tests</b>	<b>15%</b>	<b>7</b>
<b>Server Training</b>	<b>17%</b>	<b>3.3</b>
<b>YOUTH</b>		
<b>0-Tolerance LT 21</b>	<b>4% (20%)</b>	<b>24</b>
<b>Grad License/Curfew</b>	<b>2% (5%)</b>	<b>8</b>
<b>21 MLDA</b>	<b>4% (19%)</b>	<b>3.5</b>



The Sausage That Keeps It Out Of The Park

Oscar Mayer

	<b>% Redux DWI Deaths</b>	<b>BCR/ ROI</b>
<b>RECIDIVISTS</b>		
<b>Ignition Interlock</b>	<b>7%</b>	<b>7</b>
<b>Impoundment</b>	<b>4%</b>	<b>5</b>
<b>Intensively Supervised Treatment</b>	<b>4%</b>	<b>4</b>
<b>House Arrest</b>	<b>3%</b>	<b>3</b>
<b>BROADER IMPACT</b>		
<b>Child Seat Law</b>	<b>LT 1%</b>	<b>38</b>
<b>M/C Helmet Law</b>	<b>2.5%</b>	<b>3</b>
<b>Primary Belt Law</b>	<b>10%</b>	<b>18</b>



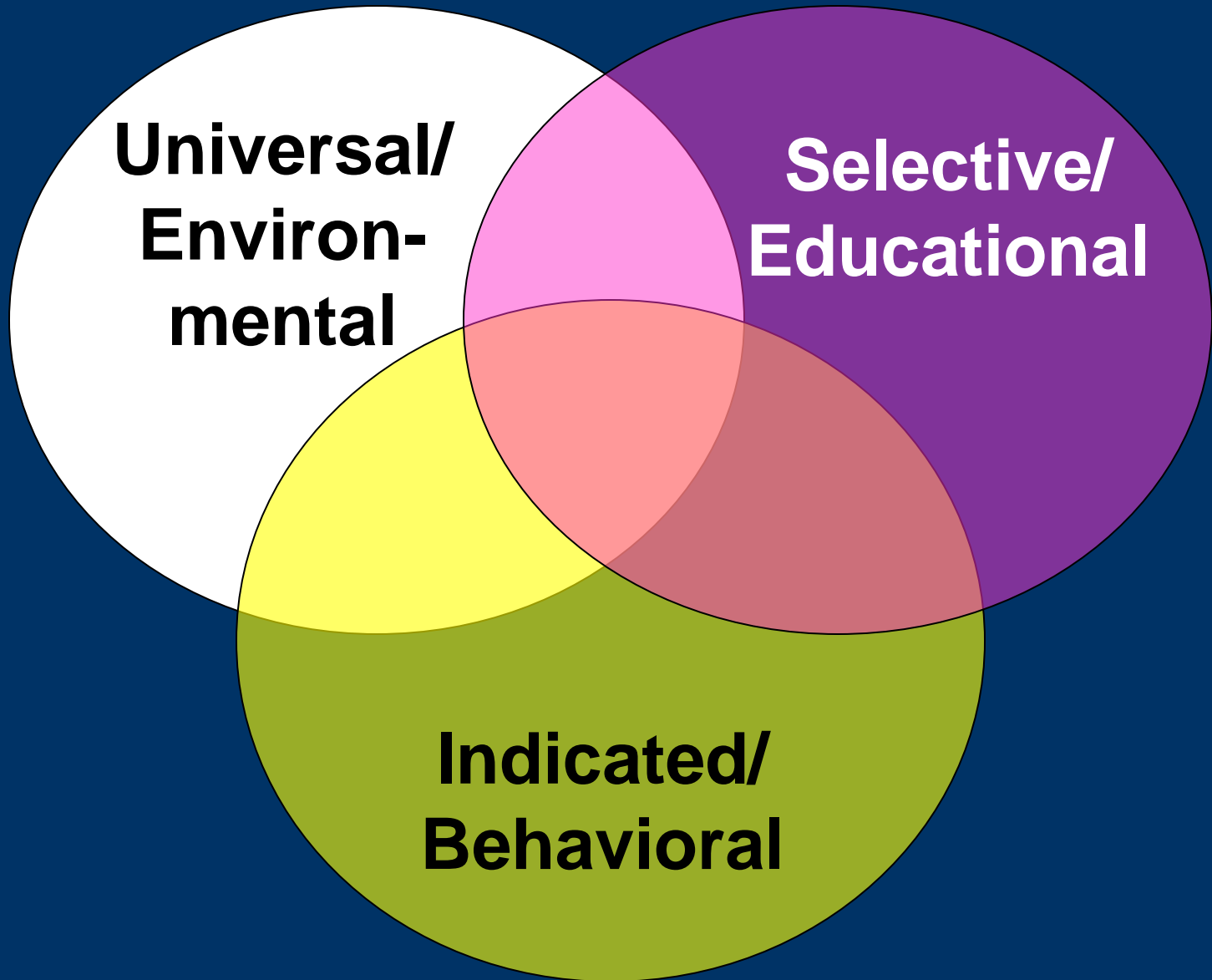
<b>BROADER MEASURES</b>	<b>% Redux DWI Deaths</b>	<b>BCR/ ROI</b>
<b>Regional Trauma System</b>	<b>14%</b>	<b>2.7</b>
<b>Brief ETOH Intervention</b>	<b>6%</b>	<b>31</b>
<b>20% Tax on ETOH</b>	<b>4%</b>	<b>10</b>
<b>30% Tax on ETOH</b>	<b>6%</b>	<b>6</b>



NEED CASH  
FOR ALCOHOL  
RESEARCH



# Prevention Typology



# BCRs for School-Based Programs

(T=tobacco, V=Violence)

<b>PROGRAM</b>	<b>Cost/ Kid</b>	<b>MJ redux</b>	<b>Alc redux</b>	<b>BCR</b>
<b>All Stars T</b>	<b>\$170</b>	<b>6%</b>	<b>7%</b>	<b>37</b>
<b>Keepin' It Real T</b>	<b>\$160</b>	<b>5%</b>	<b>11%</b>	<b>29</b>
<b>Life Skills Training T</b>	<b>\$280</b>	<b>3%</b>	<b>1%</b>	<b>25</b>
<b>Project Northland T</b>	<b>\$500</b>	<b>7%</b>	<b>7%</b>	<b>21</b>
<b>Project Star Midwest Prev Pgm T</b>	<b>\$500</b>	<b>7%</b>	<b>3%</b>	<b>13</b>
<b>Project Alert</b>	<b>\$140</b>	<b>4%</b>	<b>0%</b>	<b>9</b>

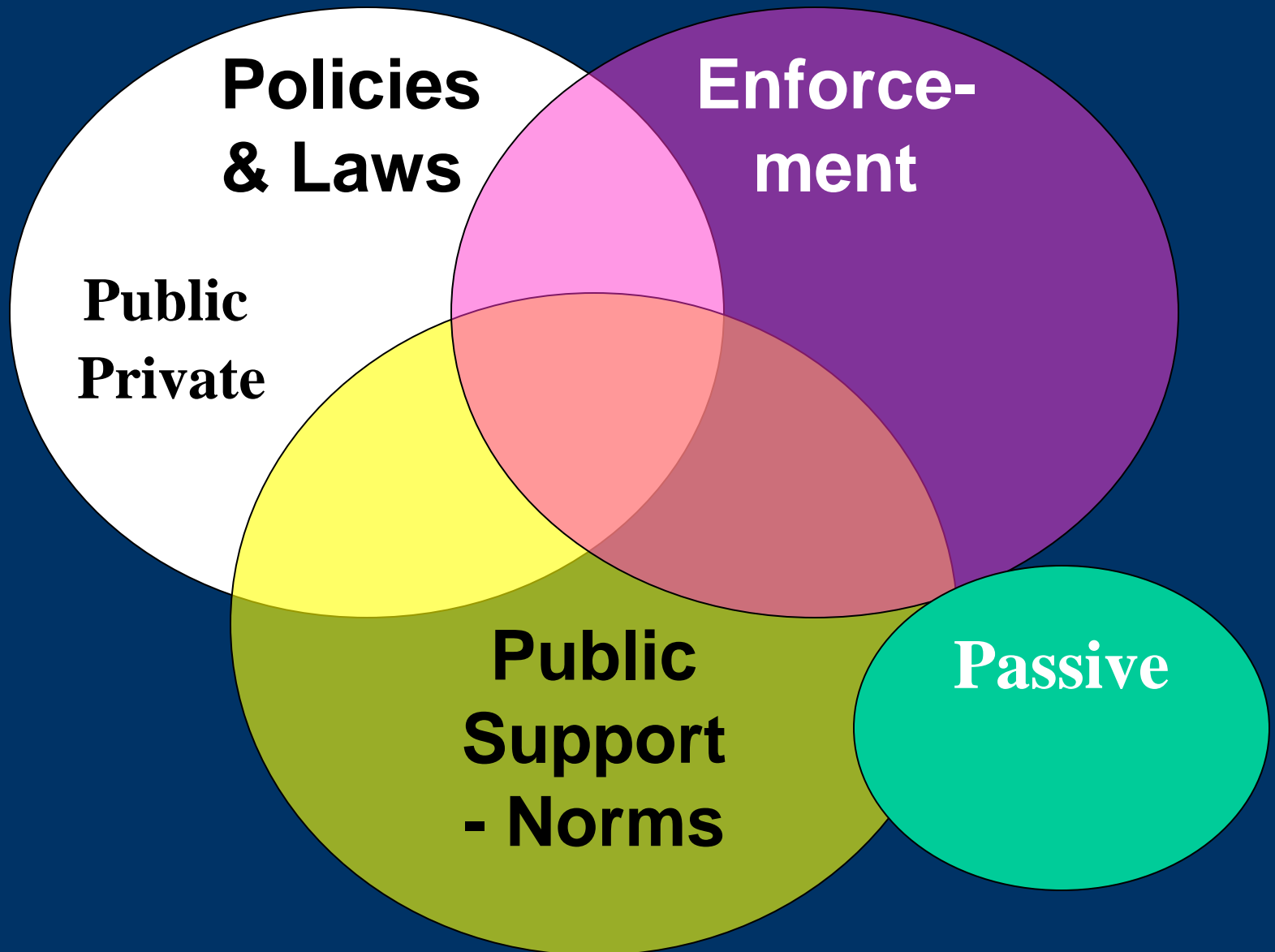
# BCRs for Youth Development Programs

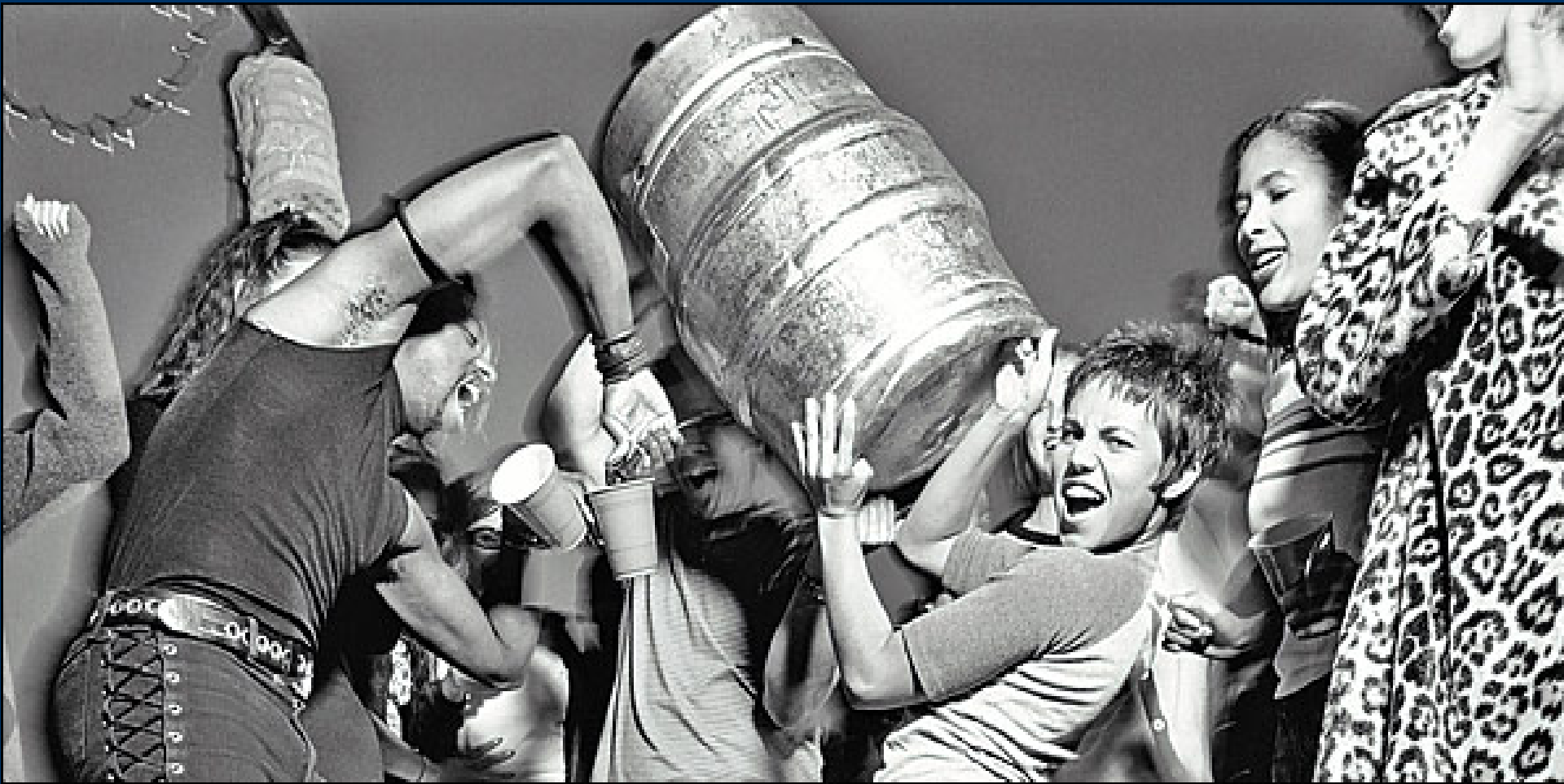
<b>PROGRAM</b>	<b>Cost/ Kid</b>	<b>MJ redux</b>	<b>Alc redux</b>	<b>BCR</b>
<b>Family Matters T</b>	<b>\$200</b>	<b>?</b>	<b>7%</b>	<b>16</b>
<b>FamilyStrengtheningT</b>	<b>\$1100</b>	<b>15%</b>	<b>18%</b>	<b>13</b>
<b>SocialCompetncPromo</b>	<b>\$440</b>	<b>?</b>	<b>11%</b>	<b>9</b>
<b>AdolescentTransitionsT</b>	<b>\$1500</b>	<b>?</b>	<b>14%</b>	<b>8</b>
<b>Child Development Pjt</b>	<b>\$290</b>	<b>4%</b>	<b>4.5%</b>	<b>8</b>
<b>Guiding Good Choices (Prep f/Drug-FreeYrs) V</b>	<b>\$880</b>	<b>9% (0%)</b>	<b>8%</b>	<b>6</b>

# Program Selection Criteria

- **Return on investment**
- **Aggregate benefits**
- **Affordability**
- **Local priorities & problems**
- **Appropriateness for the target population**
- **Political feasibility**
- **Government savings**
- **Immediacy of the impacts (weeks versus years)**
- **Intervention overlap**
- **Unevaluated spillover effects**

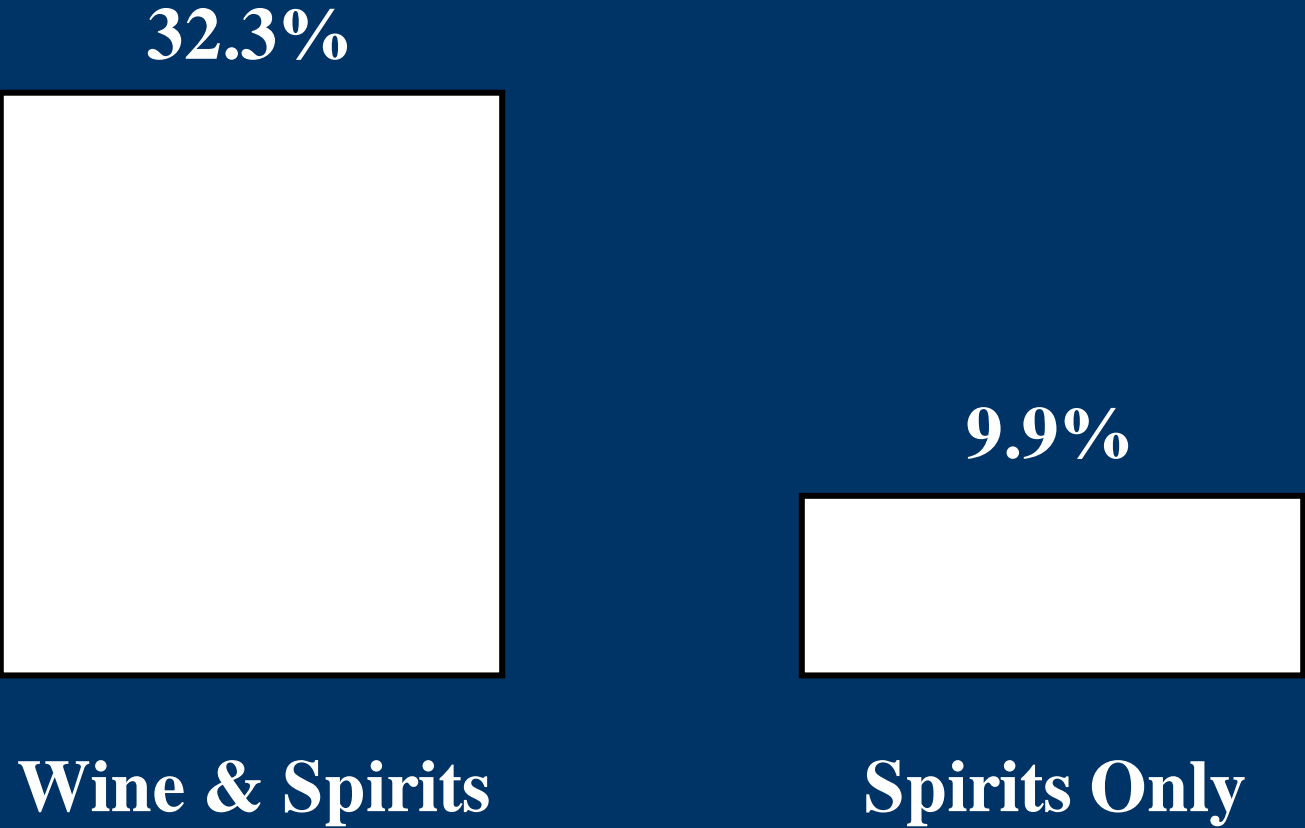
# Environmental Prevention







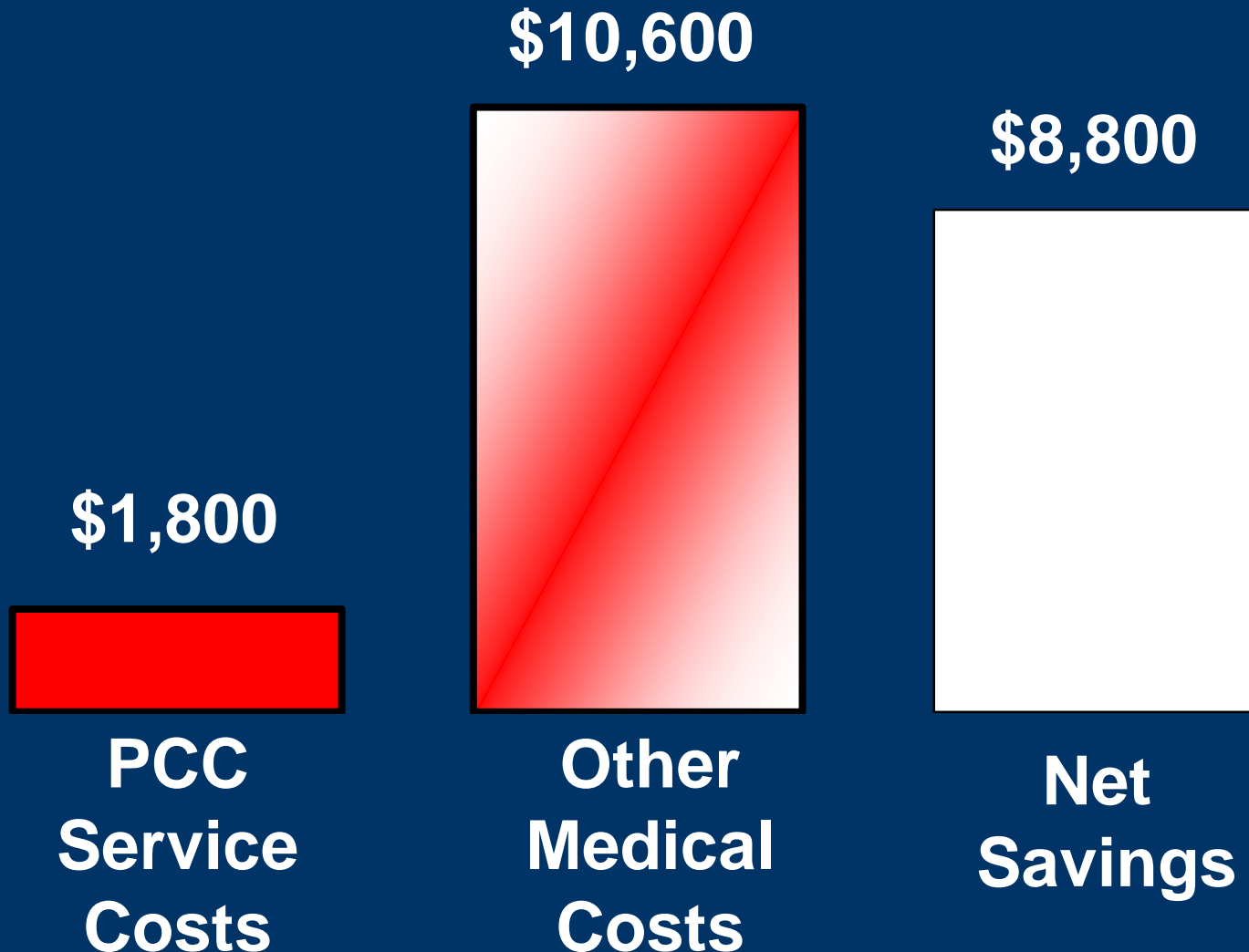
# Retail Alcohol Monopolies (State Stores) Reduce Underage Drinking



# **BCRs for Environmental Interventions (costs & benefits computed comparably)**

	<b>BCR</b>
<b>Retain State Retail Sales Monopolies</b>	<b>12</b>
<b>20% Alcohol Tax</b>	<b>10</b>
<b>30% Alcohol Tax</b>	<b>6</b>
<b>Reduce Outlet Density by 10%</b>	<b>9</b>
<b>Restrict Alcohol Sales Hours/Days</b>	<b>9</b>
<b>TV Alcohol Advertising Ban</b>	<b>9</b>
<b>21-Minimum Drinking Age</b>	<b>4</b>
<b>Enforce Serving Intoxicated Patrons Law</b>	<b>71</b>
<b>Mandatory Server Training</b>	<b>3</b>

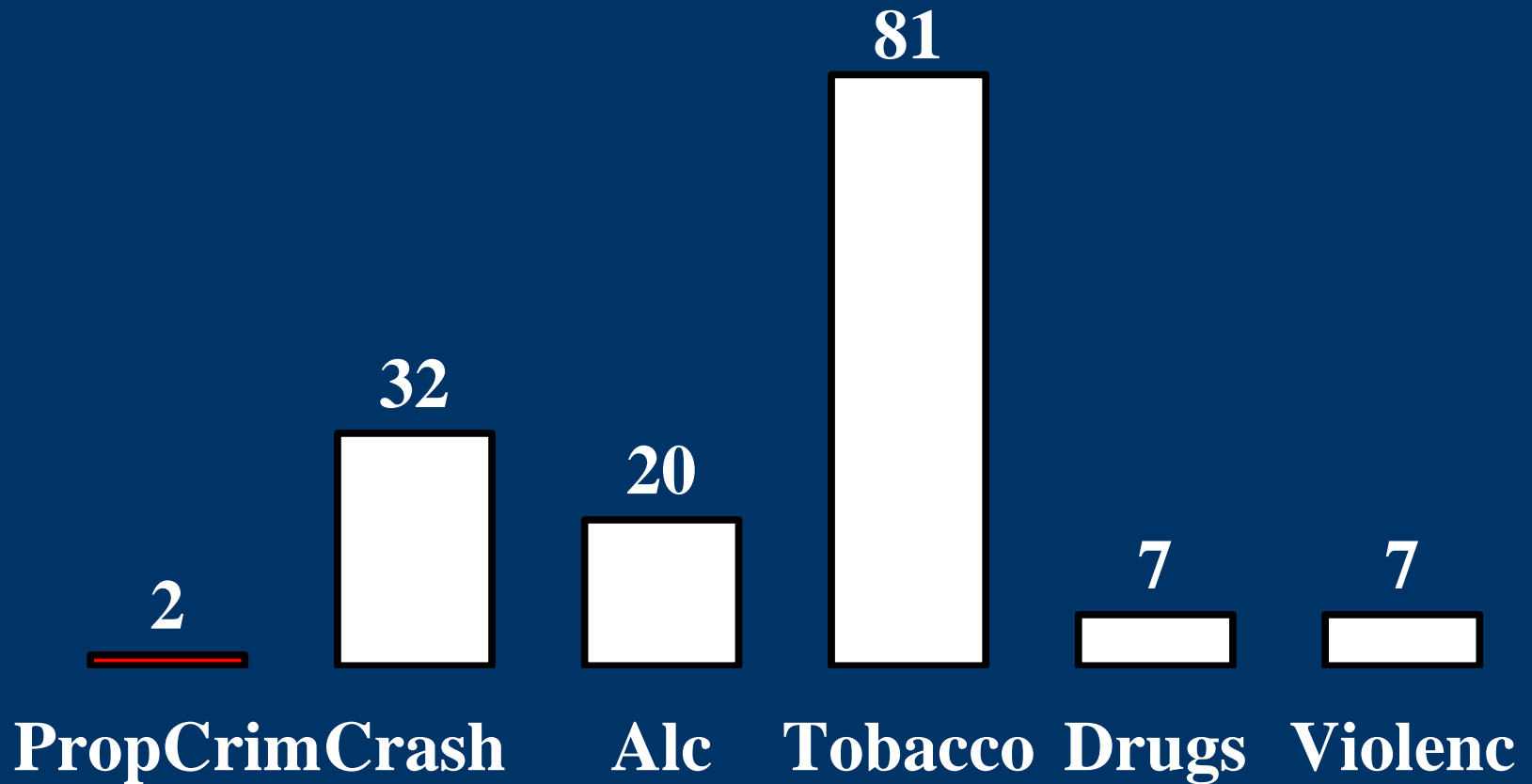
**43 human exposure calls from rural areas prevent one hospital admission (Medical ROI 5.9)**



# **If target intervention to Medicaid recipients**

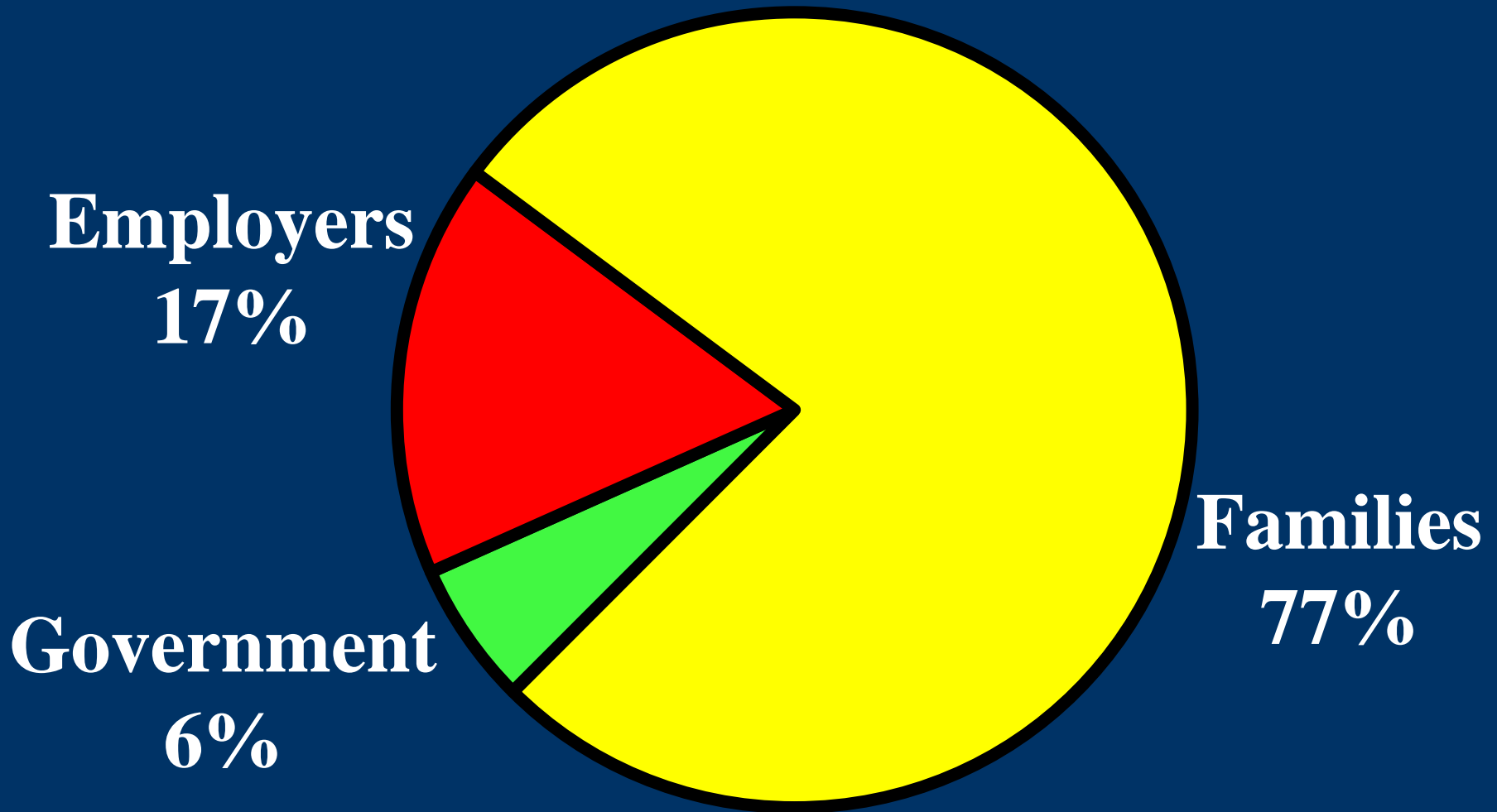
- **25%-50% of medical care savings go  
to the state**

# BCR for State to break even on its investment



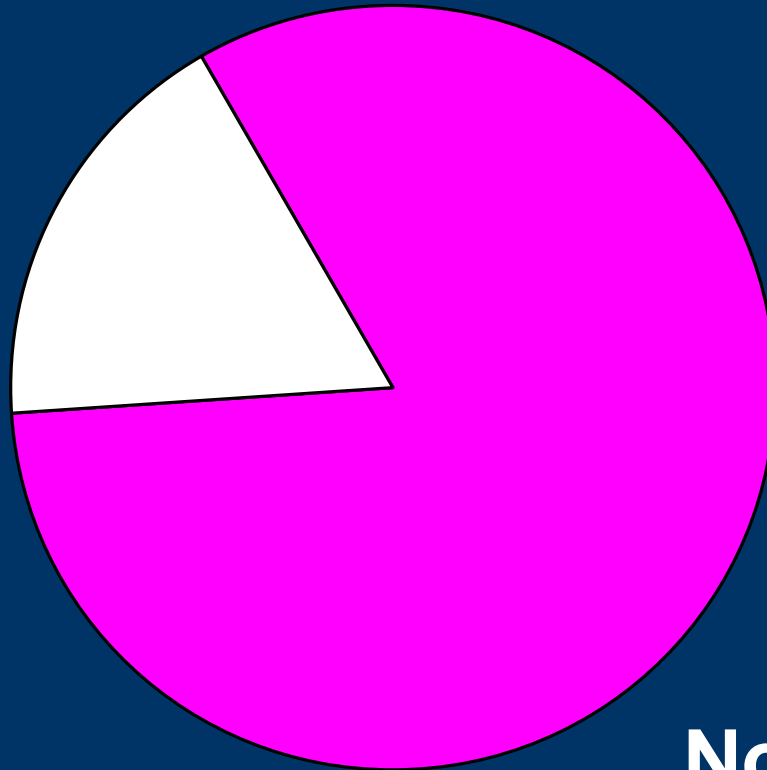
- **Laws that interfere with personal freedom would have much higher BCRs if looked at governmental perspective only**
- **The job of the State is to protect and enhance the welfare of its citizens**
- **Like medical care, preventive health & safety efforts are designed to save lives & increase quality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

# Who pays the annual \$500B crash bill?



# Fringe Benefit Payments

**MV at  
Work  
18%**

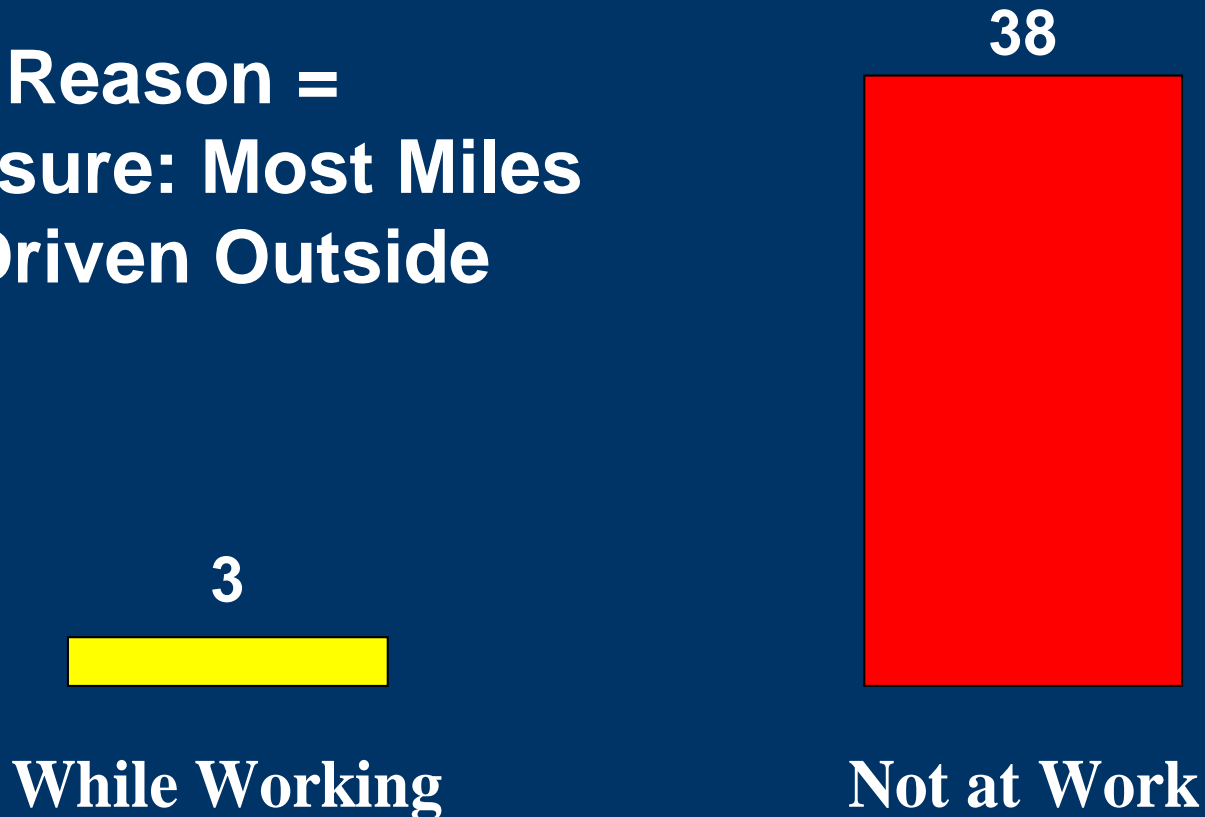


**MV  
Nonwork  
82%**



# Crash Injuries/1000 Working Adults/Year (Including Dependents)

Main Reason =  
Exposure: Most Miles  
Are Driven Outside  
Work



# 21 Minimum Drinking Age



# **21 Minimum Drinking Age**

- **Reduces % of youth who drink & binge**
- **Raises age of initiation which lowers the risk of alcoholism in adulthood**
- **Reduces youth DWI deaths by 19%**
- **Reduces alcohol-involved youth suicides by 27%**

- **Confuses college presidents**

# **If Sell Off Retail Spirits Monopolies in VA or WA**

- **Spirits consumption rises 21%**
- **Total consumption rises 6-7%**
- **State loses \$200-300M/year in revenue net of taxes on added sales**
- **The real price is a crime wave**
- **State pays \$50 million/year for added harm; 225 residents die/year**
- **Industry's slides are bogus; label 6 states w/o retail monopolies as control states**

# Online Resources

- **ROI fact sheets, costs of child abuse & neglect by state at [http://www.childrenssafetynetwork.org/publications\\_resources/showPubByTopic.asp?pkTopicID=10](http://www.childrenssafetynetwork.org/publications_resources/showPubByTopic.asp?pkTopicID=10)**
- **Underage drinking by state – [www.udetc.org/factsheets](http://www.udetc.org/factsheets)**
- **Hospitalized injury by cause & age group in 38 states, 2007; impaired driving in 50 + DC – [www.hsc.wvu.edu/icrc/AHRQFORM.asp](http://www.hsc.wvu.edu/icrc/AHRQFORM.asp)**
- **Crime costs by state, total or alcohol & drug involved : e-mail [taylor@pire.org](mailto:taylor@pire.org) (also use that address for problems or free technical assistance. Dexter Taylor, PhD, 301-755-2796)**
- **WISQARS cost module – injury deaths by state & cause**
- **Report on SA prevention ROI – <http://store.samhsa.gov/shin/content/SMA07-4298/SMA07-4298.pdf>**
- **Economic evaluation of public health laws & enforcement – [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2012618](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2012618)**

# References: Injury Costs & Prevention Savings

- **The Cost of Child and Adolescent Injuries and The Savings from Prevention, T Miller, E Finkelstein, E Zaloshnja, D Hendrie. In K Liller (ed.), *Injury Prevention for Children and Adolescents: Research, Practice, and Advocacy*, Second Edition, Washington DC: American Public Health Association, 21-82, 2012.**
- **Economic Evaluation of Injury Prevention and Control Programs, T Miller, D Hendrie. In G Li, S Baker. *Injury Research: Theories, Methods and Approaches*, New York: Springer, 641-666, 2012.**
- **Incidence and Economic Burden of Injuries in the United States, 2000, with E Finkelstein, P Corso, T Miller, I Fiebelkorn, E Zaloshnja, B Lawrence. New York City: Oxford University Press, 2006.**
- **Cost-Outcome Analysis in Injury Prevention and Control: 84 Estimates for the United States, T Miller, D Levy, *Medical Care*, 38:6, 562-582, 2000.**

# SUMMARY

- **Injury is the leading child health risk**
- **Prevention yields large savings for taxpayers**
- **Often unrealistic to expect State gov't savings unless we target to Medicaid population**
- **Laws & enforcement often save the State \$**
- **People do not understand big numbers**
- **Select costs to suit the audience**
- **You cannot spend some savings**
- **Put a face with the \$**





# Questions?

## Contact Information:

Ted Miller: [miller@pire.org](mailto:miller@pire.org)

George Bahouth: [gbahouth@pire.org](mailto:gbahouth@pire.org)

[www.ChildrensSafetyNetwork.org](http://www.ChildrensSafetyNetwork.org)

*Thank you for attending today's session!*