Treasure Maps: Using Economic Evidence to Pinpoint Prized Prevention Investments

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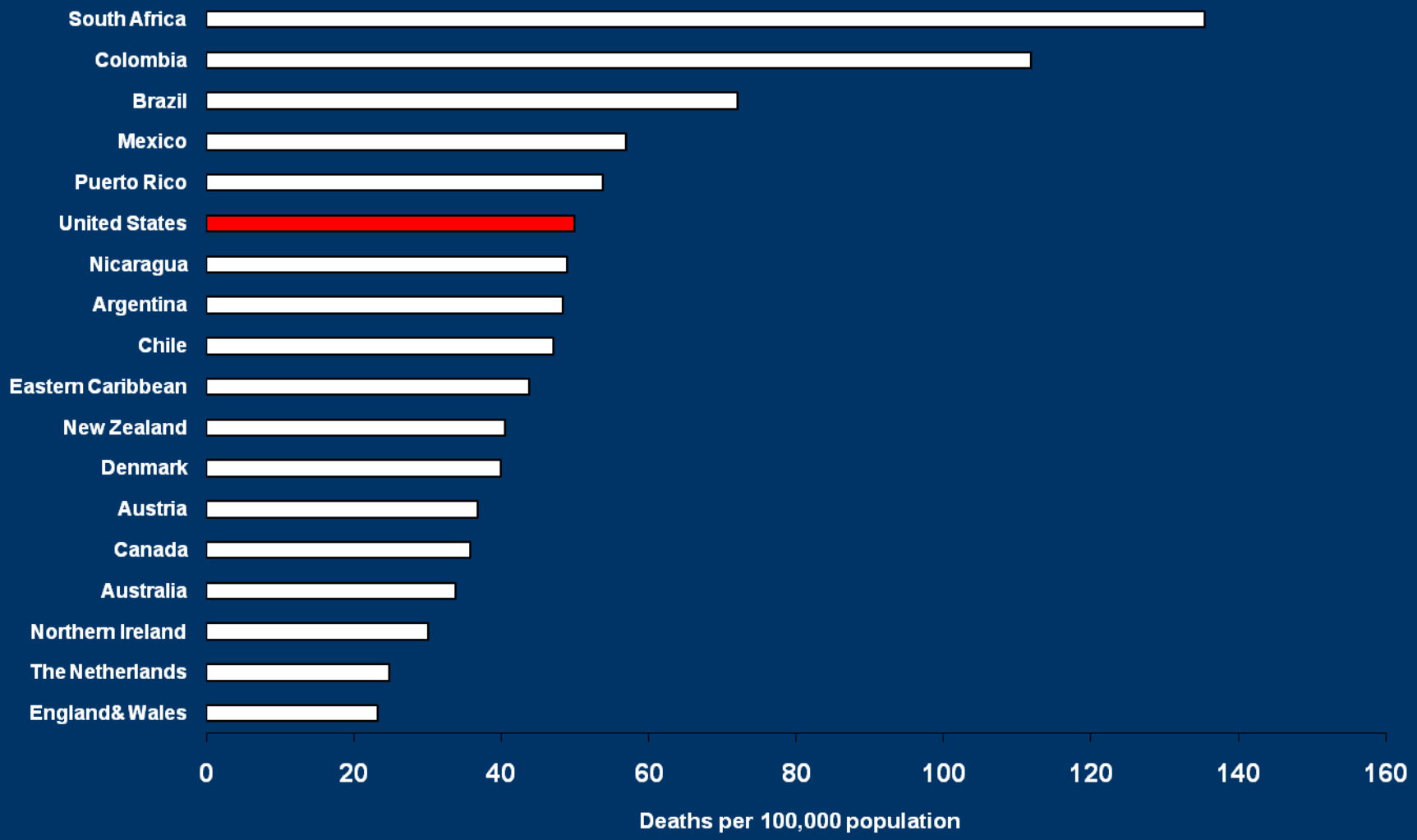
Age-Adjusted Injury Death Rates



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

Annual US Toll

- **190,000 Killed**
- **760,000 Permanently Disabled**

- **13,500 Kids Killed**
- **100,000 Kids Permanently Disabled**

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 NY

- 20 M residents
- 150K deaths/year

- Can I convince you to continue my $2 M 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**

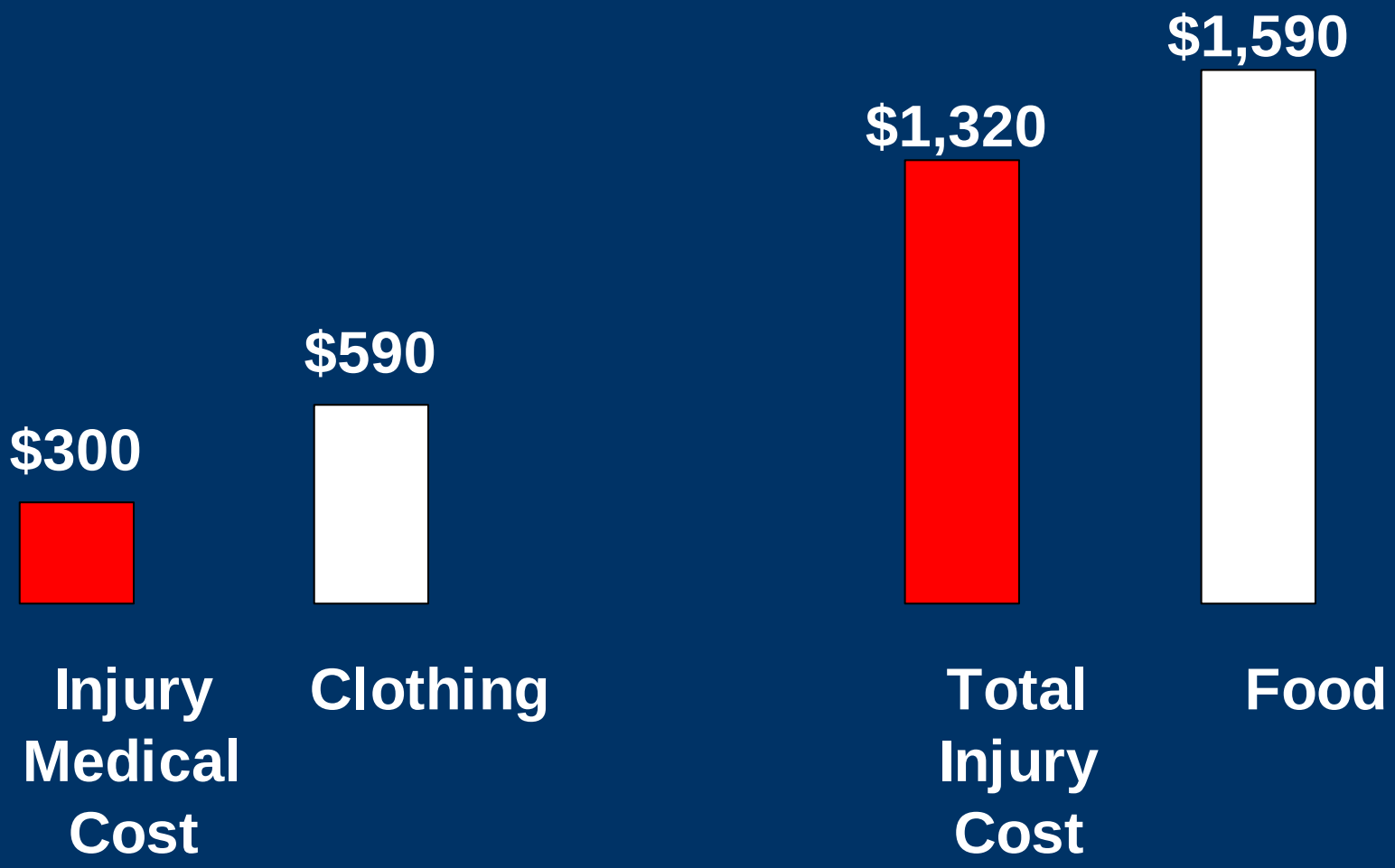
1% !!!!

- **Our program prevented 90 deaths & > 1000 hospital admissions last year**

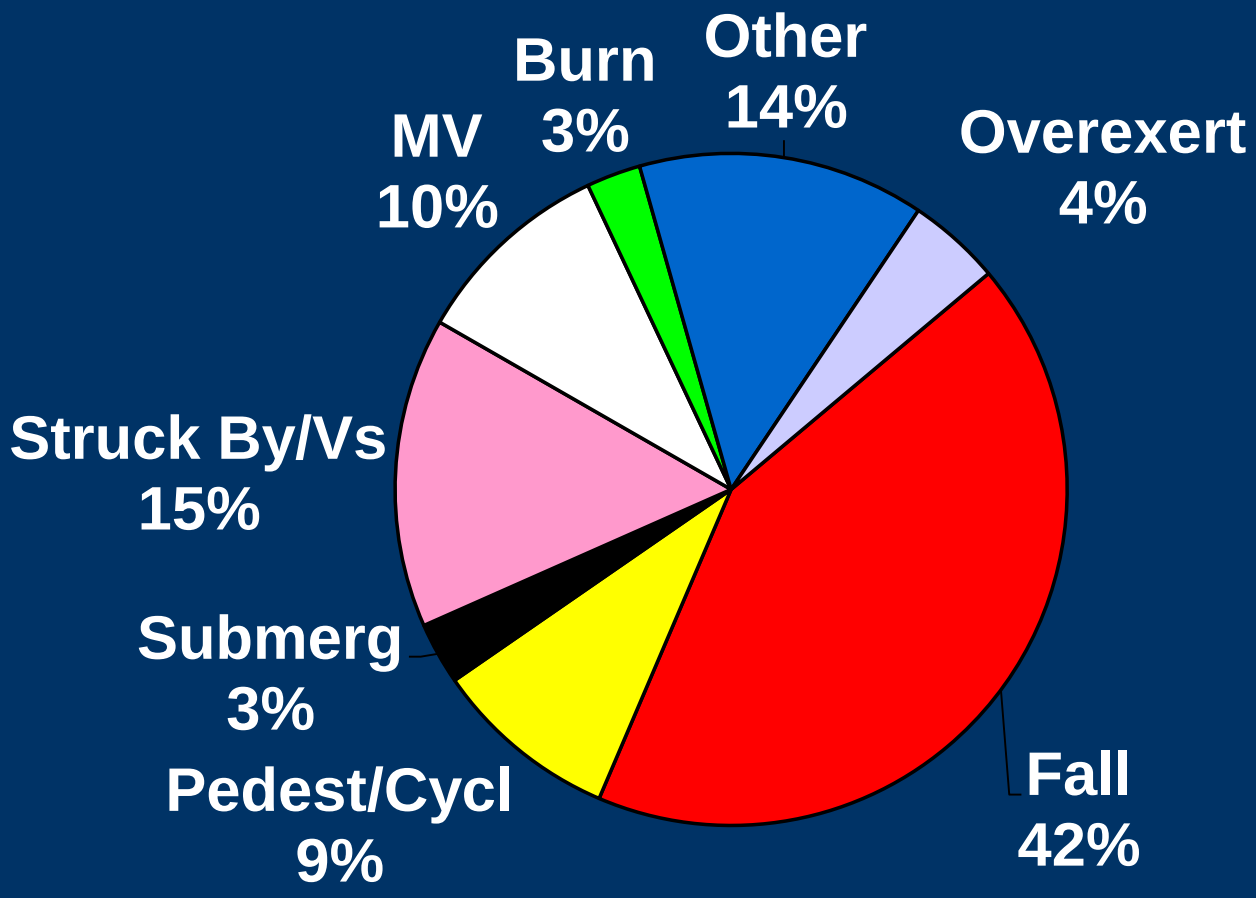
- **Our $2 M program saved NY taxpayers $420 M in medical payments and work losses last year. That’s $20 per NY resident**

Those #s Are In Proportion

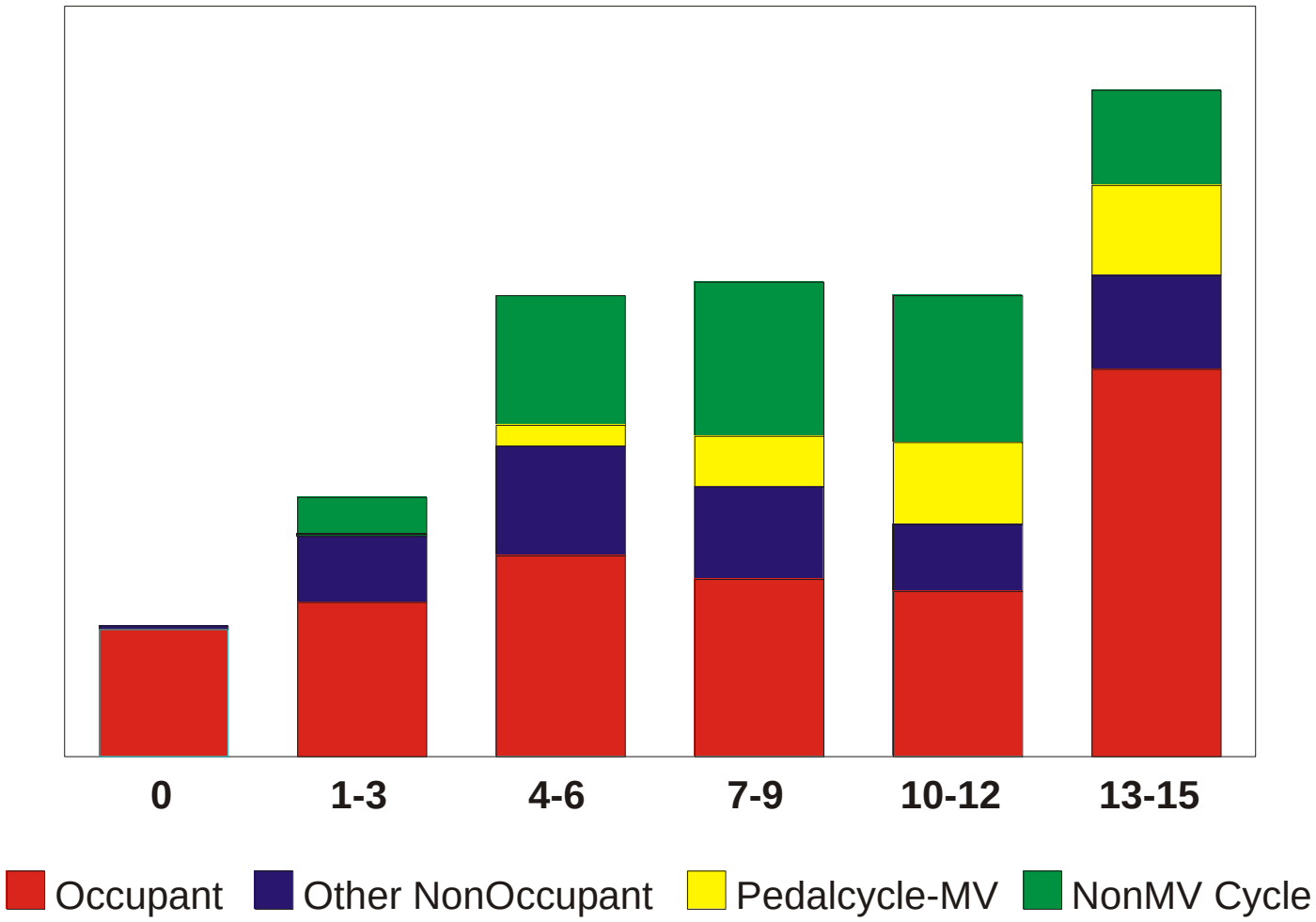
PROBLEM SIZE
Annual Spending per U.S. Child, 0-19



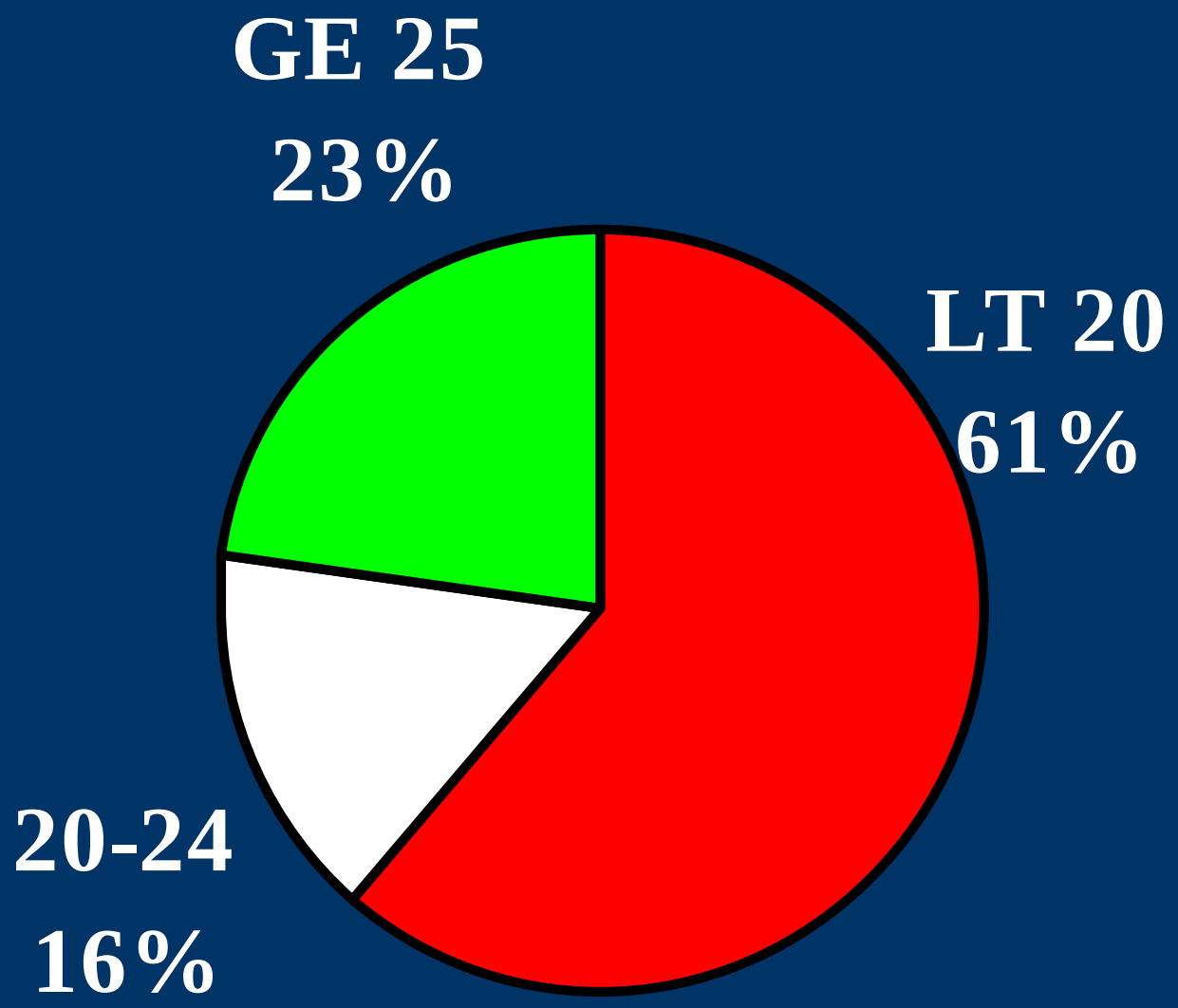
RISK ASSESSMENT: Unintentional Injury
Cost $350 B in 2012, Ages 0-14



Vehicular Injury Costs/1000 Kids by Age

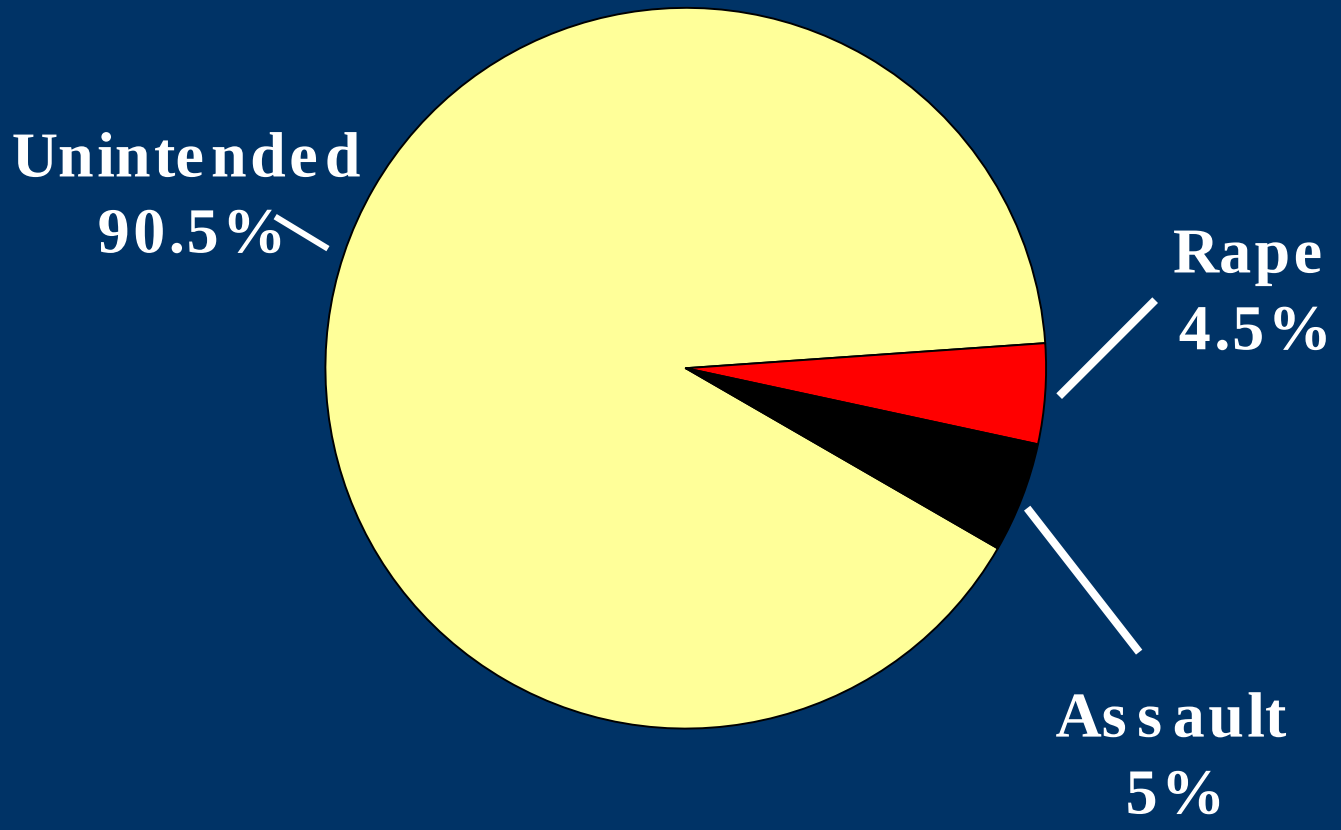


Driver Age, Crashes w/Injured Teen Passengers

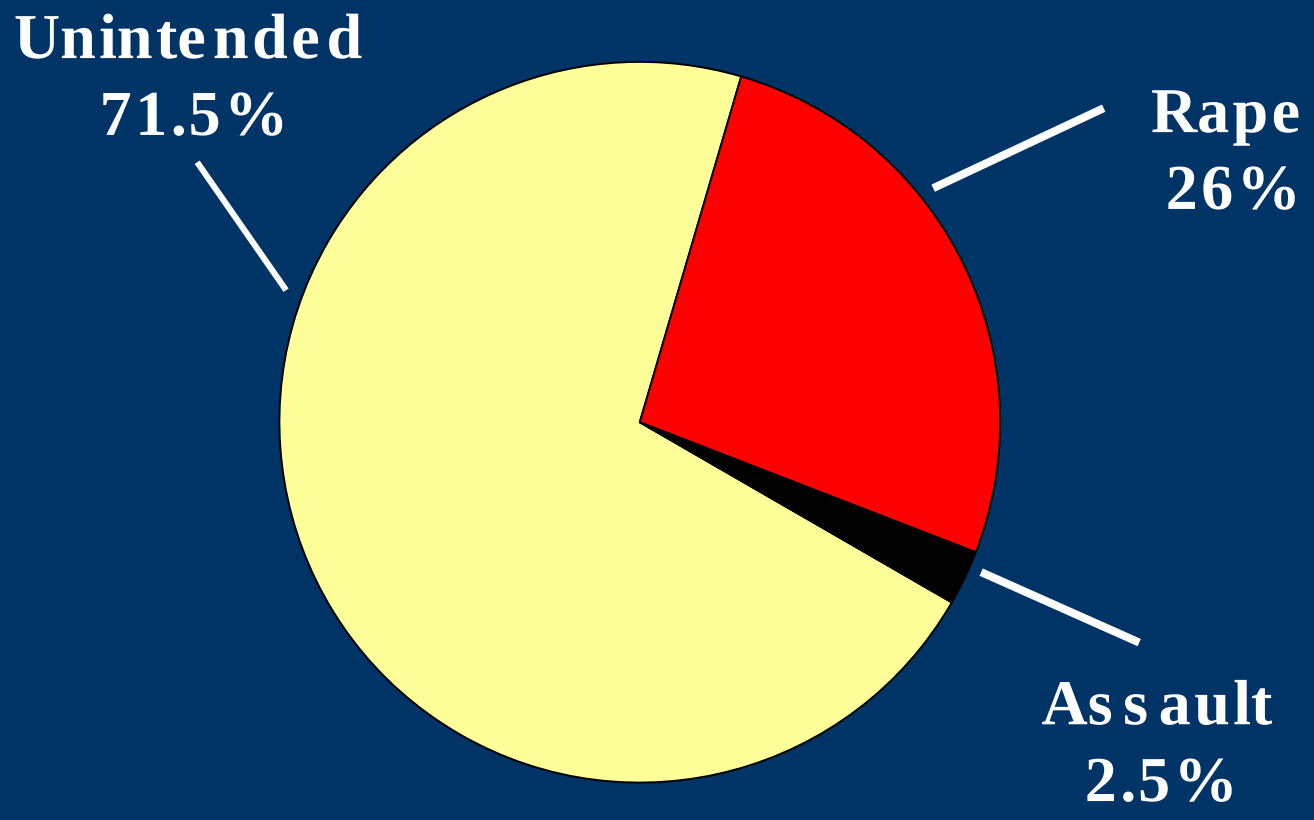


Annual Poisoning Costs/Child

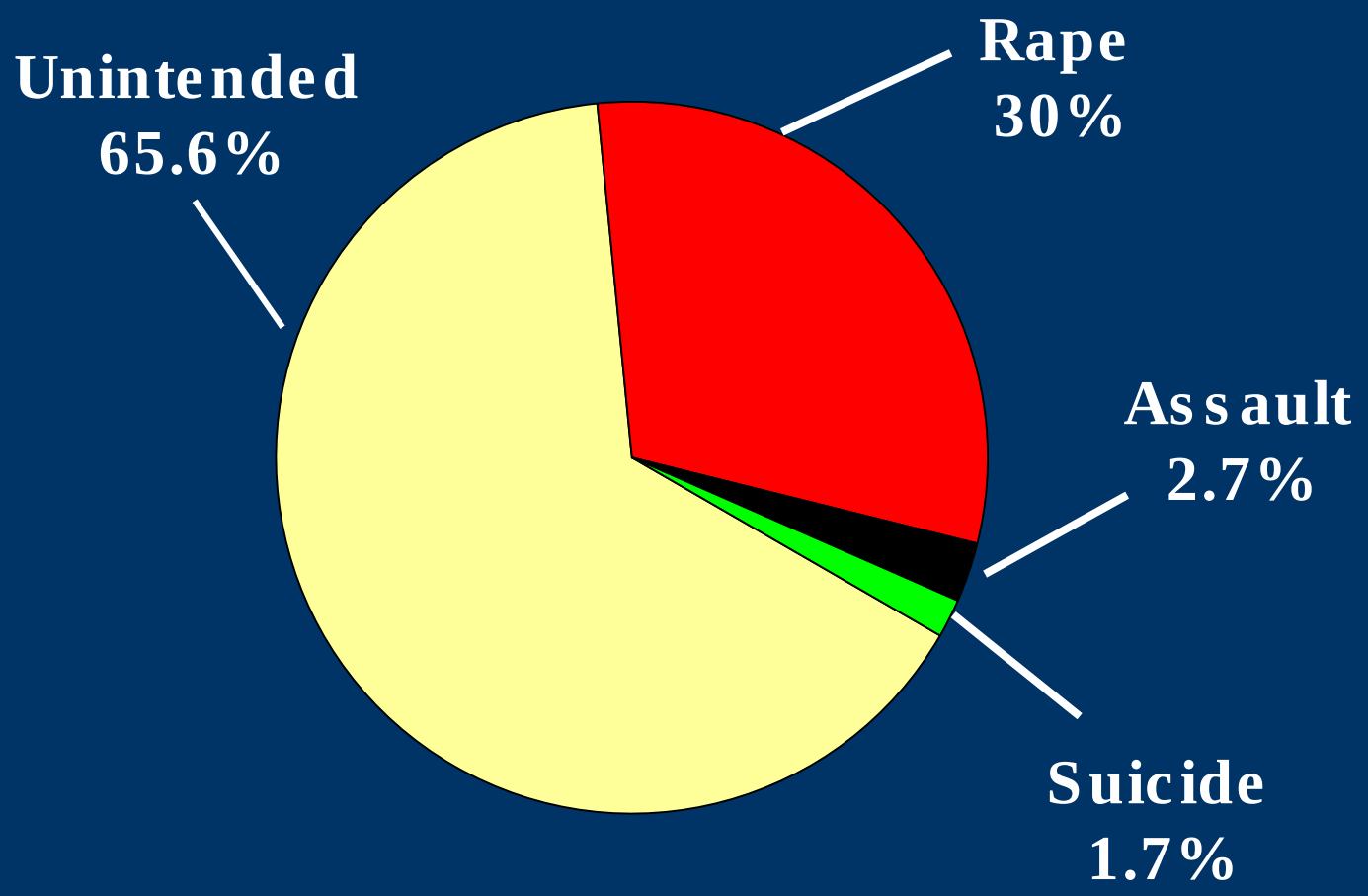
Cost of Injuries, Ages 0-4
$51 B, 2000



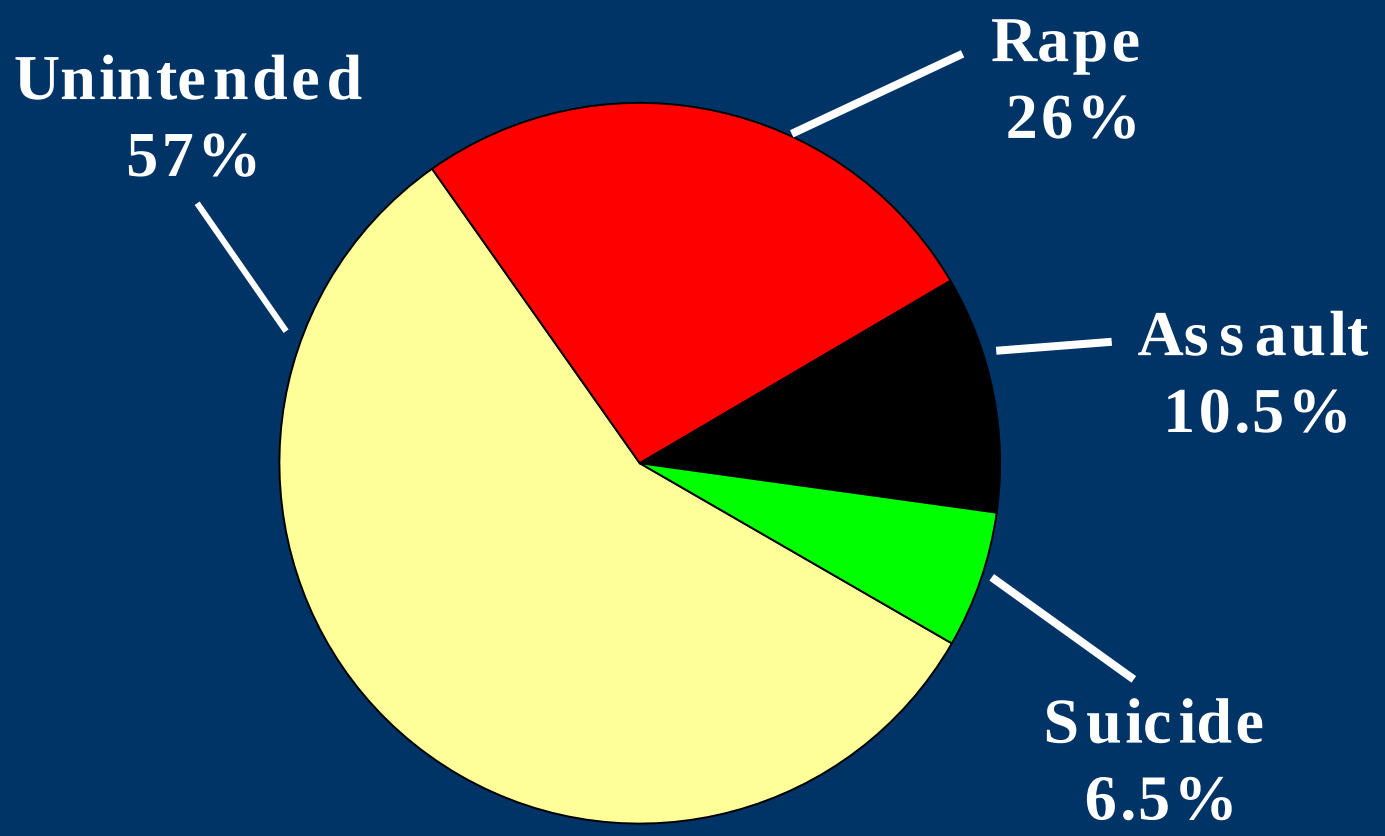
Cost of Injuries, Ages 5-9
$52 B, 2000



Cost of Injuries, Ages 10-14
$79 B, 2000



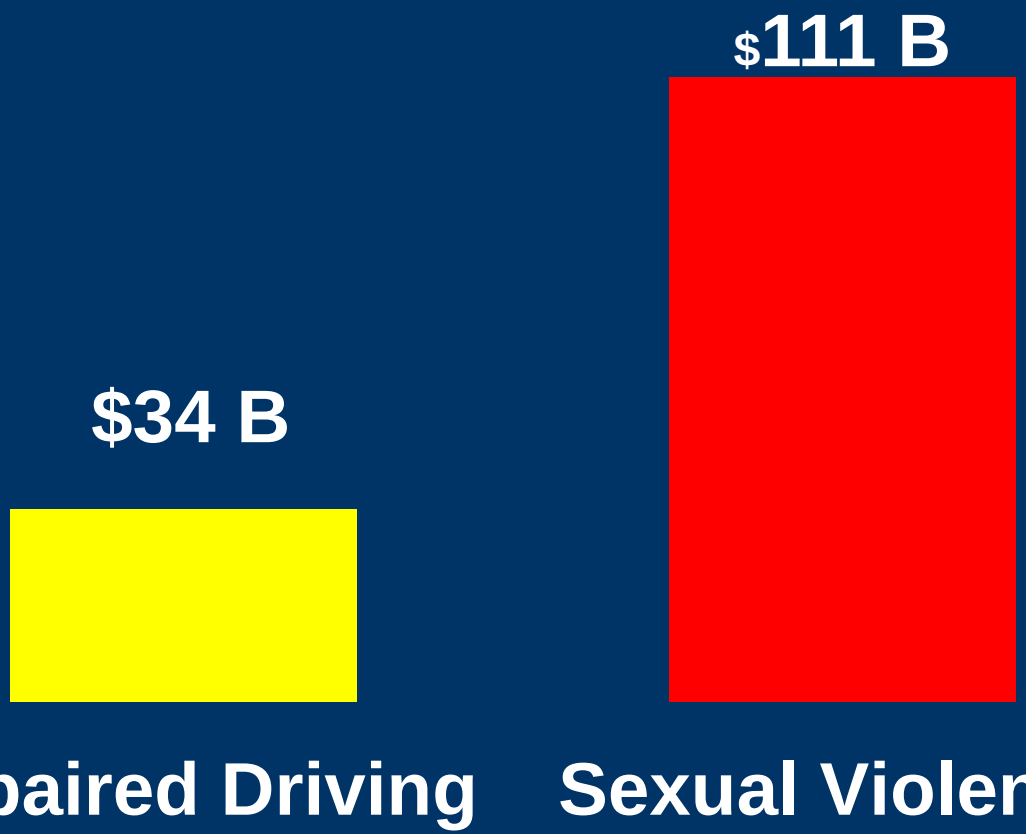
Cost of Injuries, Ages 15-19
$121 B, 2000



Rape/Sexual Assault Cost Omits

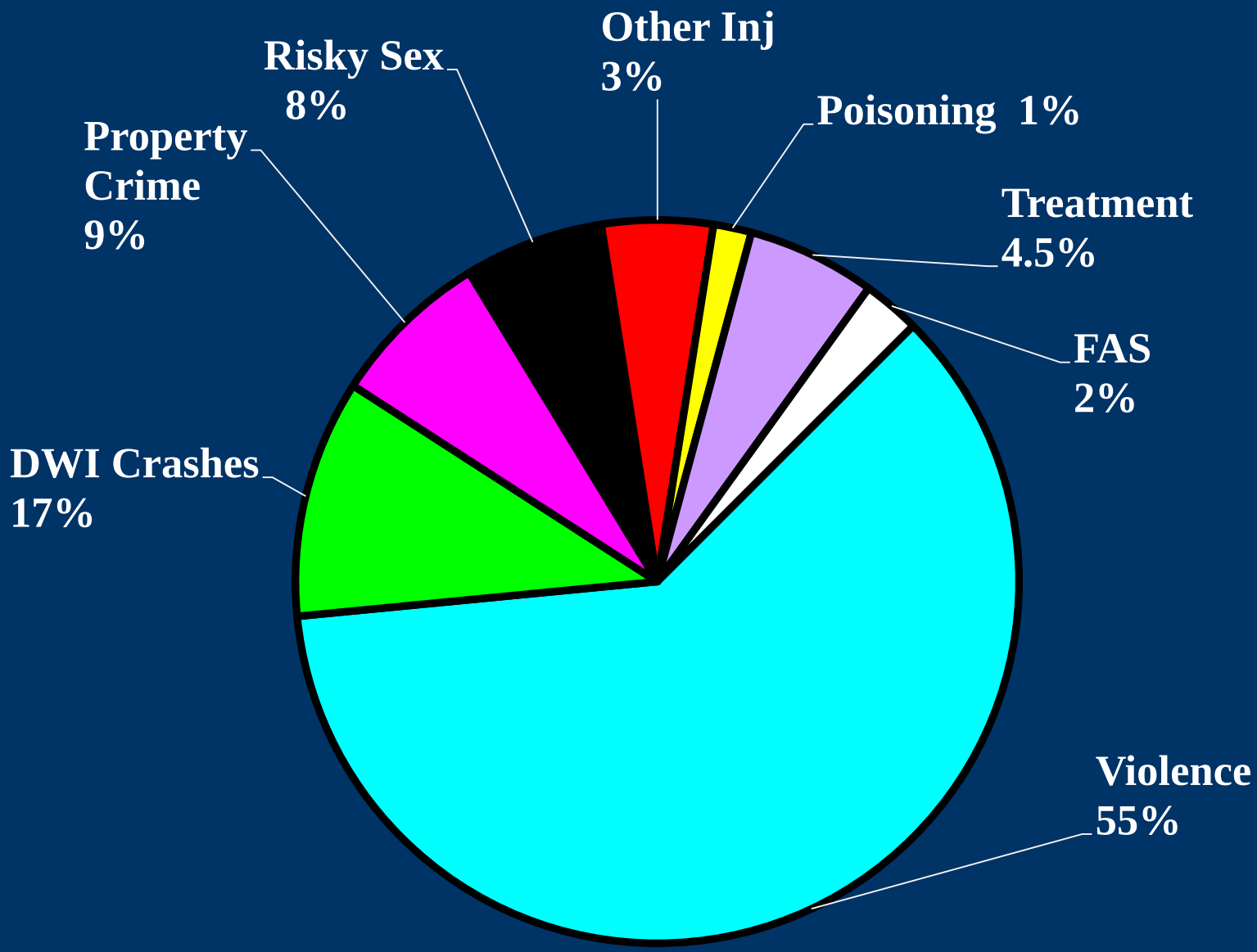
- STDs
- Pregnancy
- LT health effects of ACEs

Sexual violence costs 3.25 times as much as alcohol-impaired driving in California



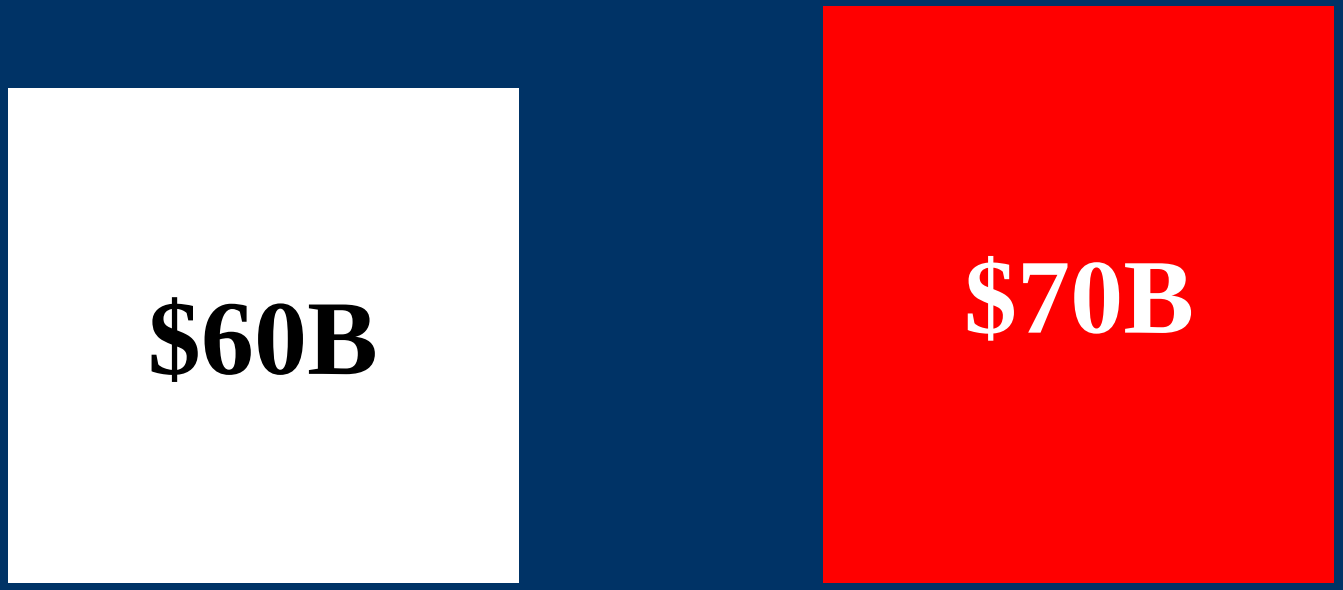
Advocacy

Harm from Underage Drinking in NY Cost $3.1 B in 2013



How Can We Make $3.1 B Comprehensible?

A National Yardstick



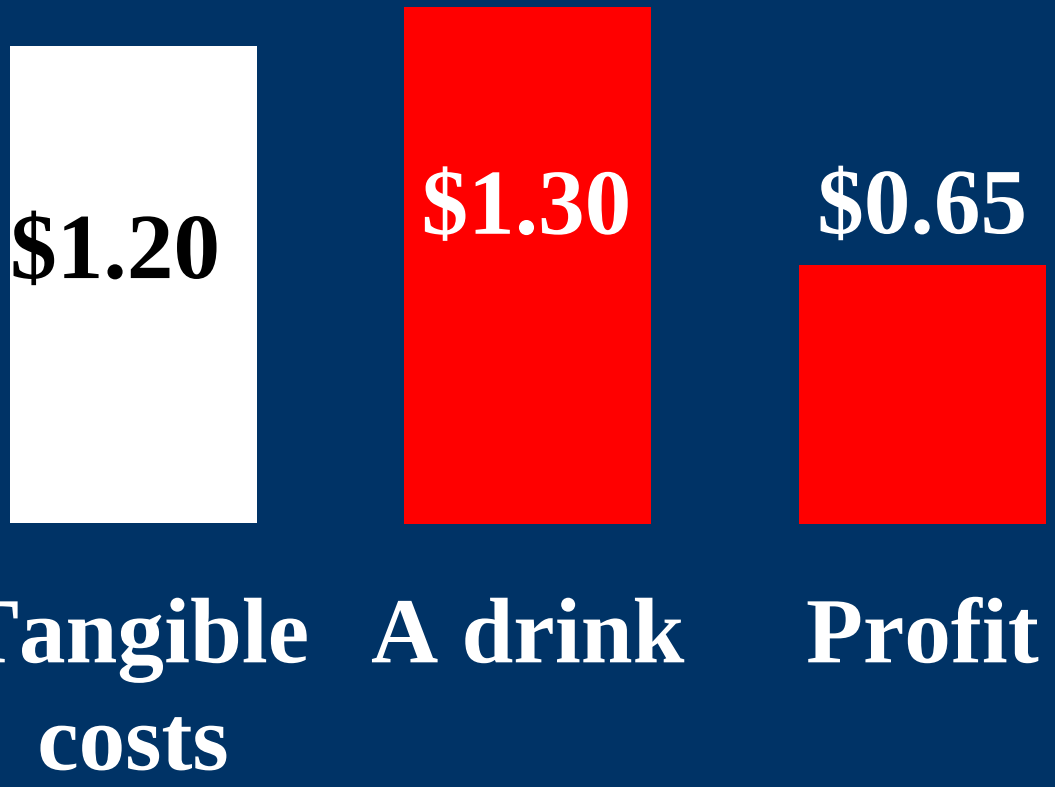
Underage drinking

US Depts Justice & Education

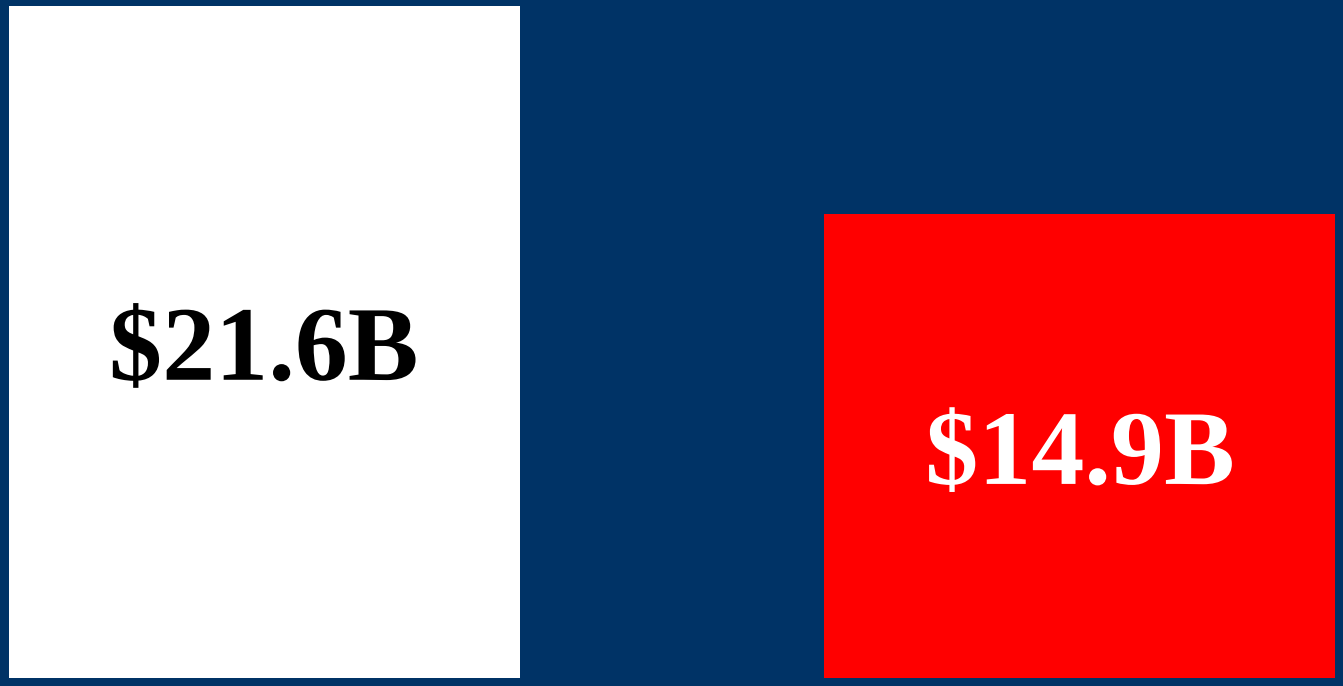
Divide by a Sensible Exposure Measure

- **$4890 Per Underage Customer**
- **$1710 Per Youth Ages 14-20**
- **$3.35 Per Illegal Drink in NY**

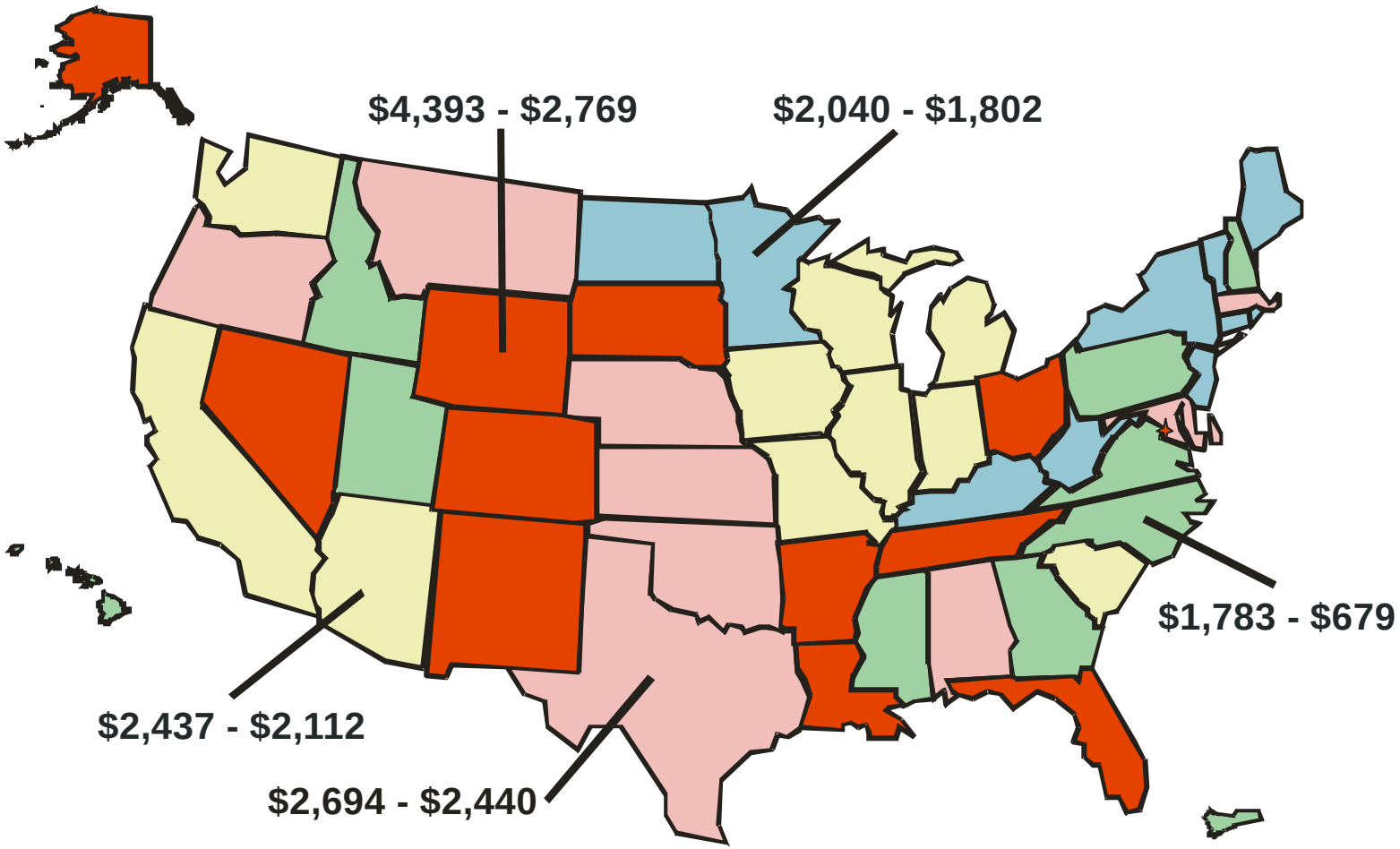
Per Illegal Underage Drink



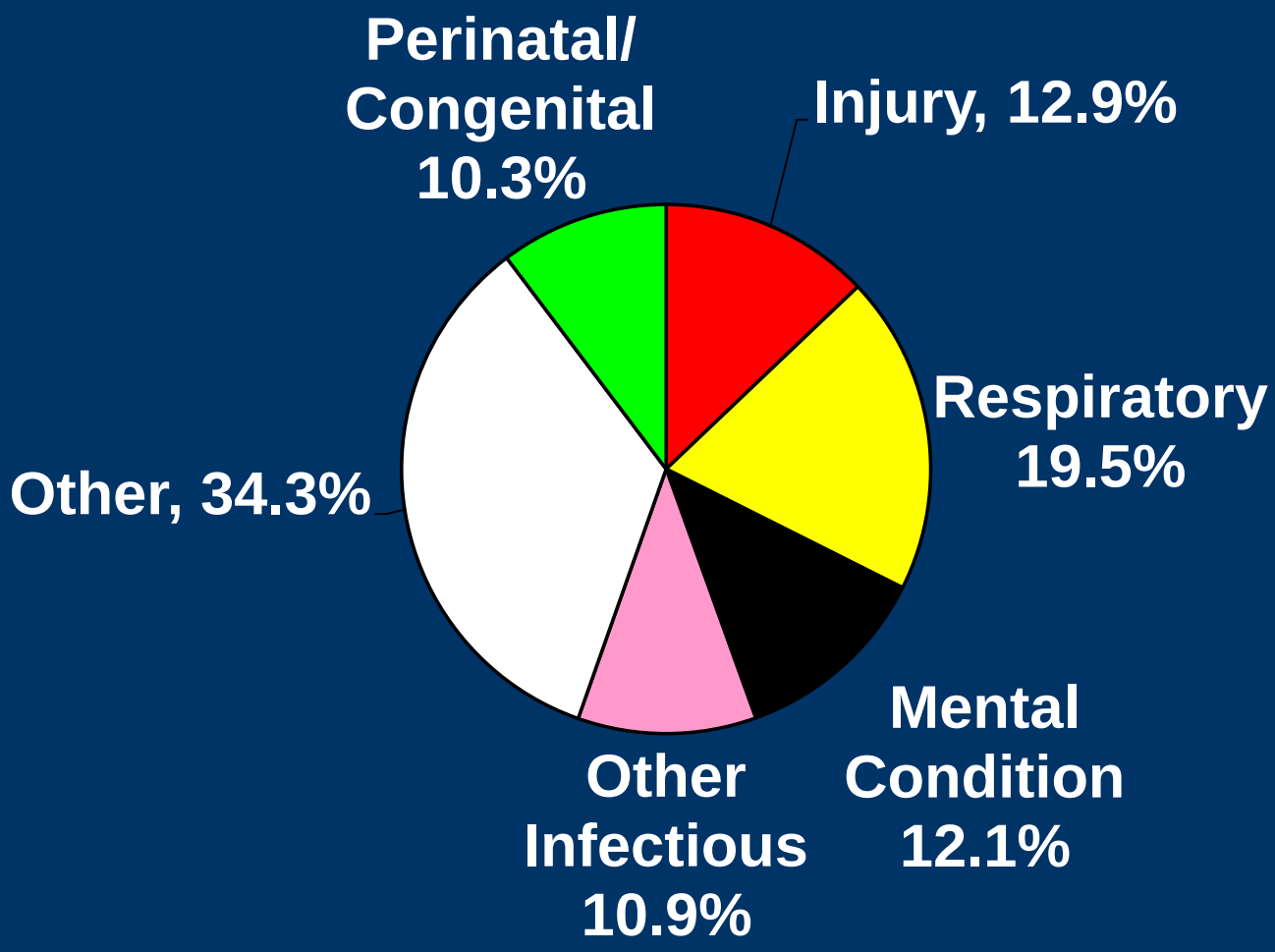
Nationally, $21.6 Billion of Booze Was Consumed by Underage Customers in 2013



Performance Comparison: Costs of Underage Drinking per Youth Ages 14-20



BROAD PRIORITY SETTING
Medical Spending, Ages 0-19, 2000



RESOURCE ALLOCATION
U.S. Nonfatal Home & Consumer Product Injury Costs 2009-10

Rank	<1	1-4	5-9	10-14	15-19	20-29	30-69	70-79	>=80
1	Beds	Beds	Bikes	Ftball	Ftball	Stairs	Stairs	Floor	Floor
2	Floor	Floor	Monk Bars	Bikes	Bball	Bball	Floor	Stairs	Beds
3	Sofa	Stairs	Beds	Bball	Bikes	Bikes	Bikes	Beds	Stairs
4	Stairs	Table	Floor	Soccer	Soccer	Floor	Bed 5		
Stairs			# 7	#7	#5		Tub 6	Tub 5	Tub 7

PROGRAM EVALUATION
Baby Walker Redesign Worked

1995-1996

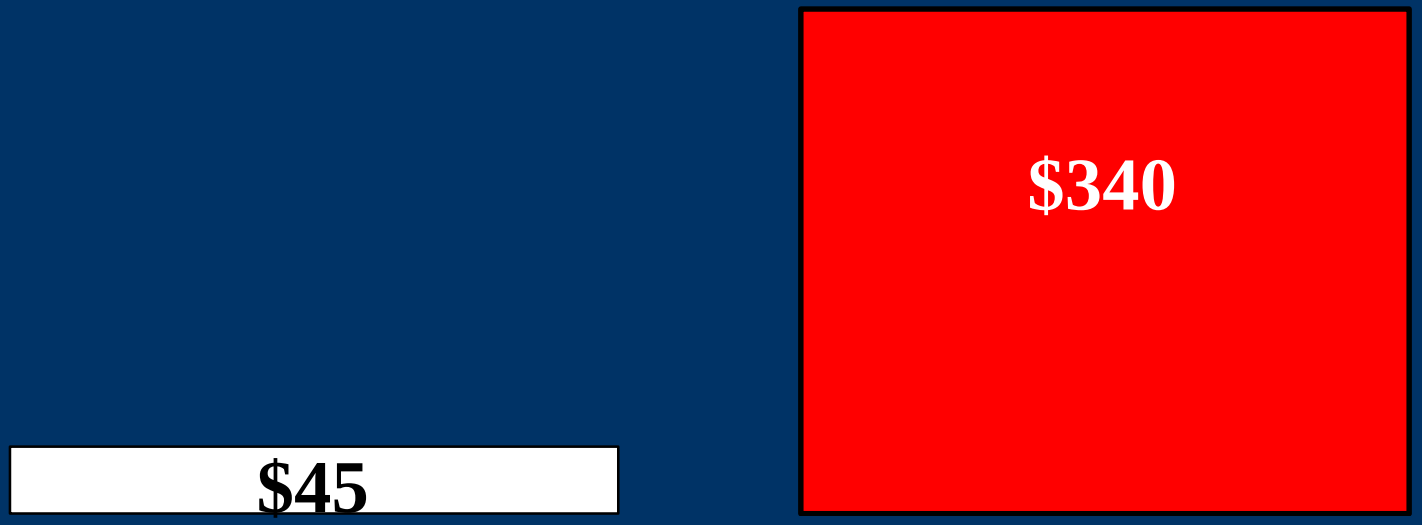
	Age Group				
Rank	**<1**	**1-4**	**5-9**	**10-14**	**15-19**
1	Stairs or steps 15%	Stairs or steps 8%	Bicycles 14%	Bicycles 13%	Basketball 15%
2	Beds (not cribs) 11%	Beds 7%	Monkey bars 6%	Basketball 11%	Football 11%
3	Floors 9%	Floors 6%	Swings 4%	Football 9%	Bicycles (incl. moun-tain) 6%
4	Baby walkers 6%	Tables 6%	Beds 4%	Baseball & softball 6%	Baseball & softball 5%
5	Tables 5%	Doors 5%	Doors 4%	In-line/ rollerskating 5%	Stairs or steps 4%

2009-2010

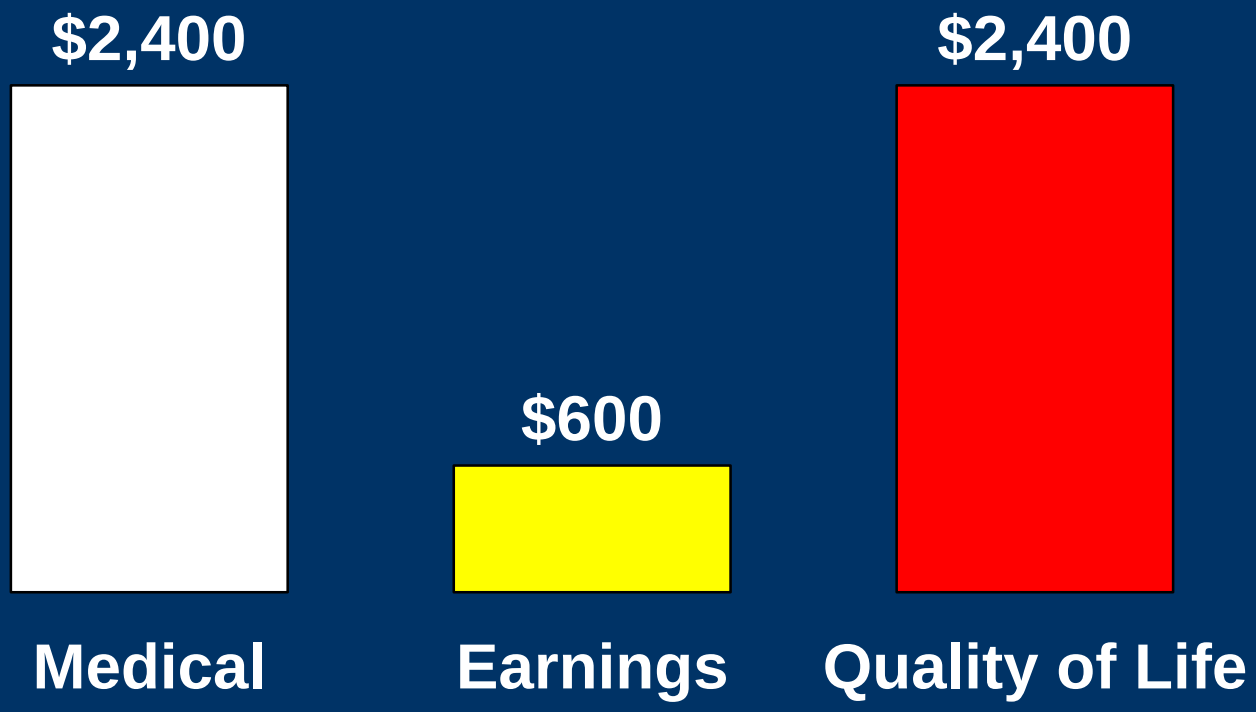
	Age Group				
Rank	**<1**	**1-4**	**5-9**	**10-14**	**15-19**
1	Beds & bedding 22.2%	Beds & bedding 9.1%	Bicycles 7.7%	Football 14.3%	Football 12.8%
2	Floors 13.8%	Floors 7.2%	Monkey bars 6.8%	Bicycles 8.4%	Basketball 11.3%
3	Sofas 6.6%	Stairs 7.1%	Beds & bedding 4.6%	Basketball 8.3%	Bicycles 4.8%
4	Stairs 6.0%	Tables 5.1%	Floors 4.0%	Soccer 4.9%	Soccer 4.7%
5	Car seats 5.1%	Chairs 4.6%	Football 3.4%	Baseball /softball 4.7%	Stairs 4.5%

Program Evaluation

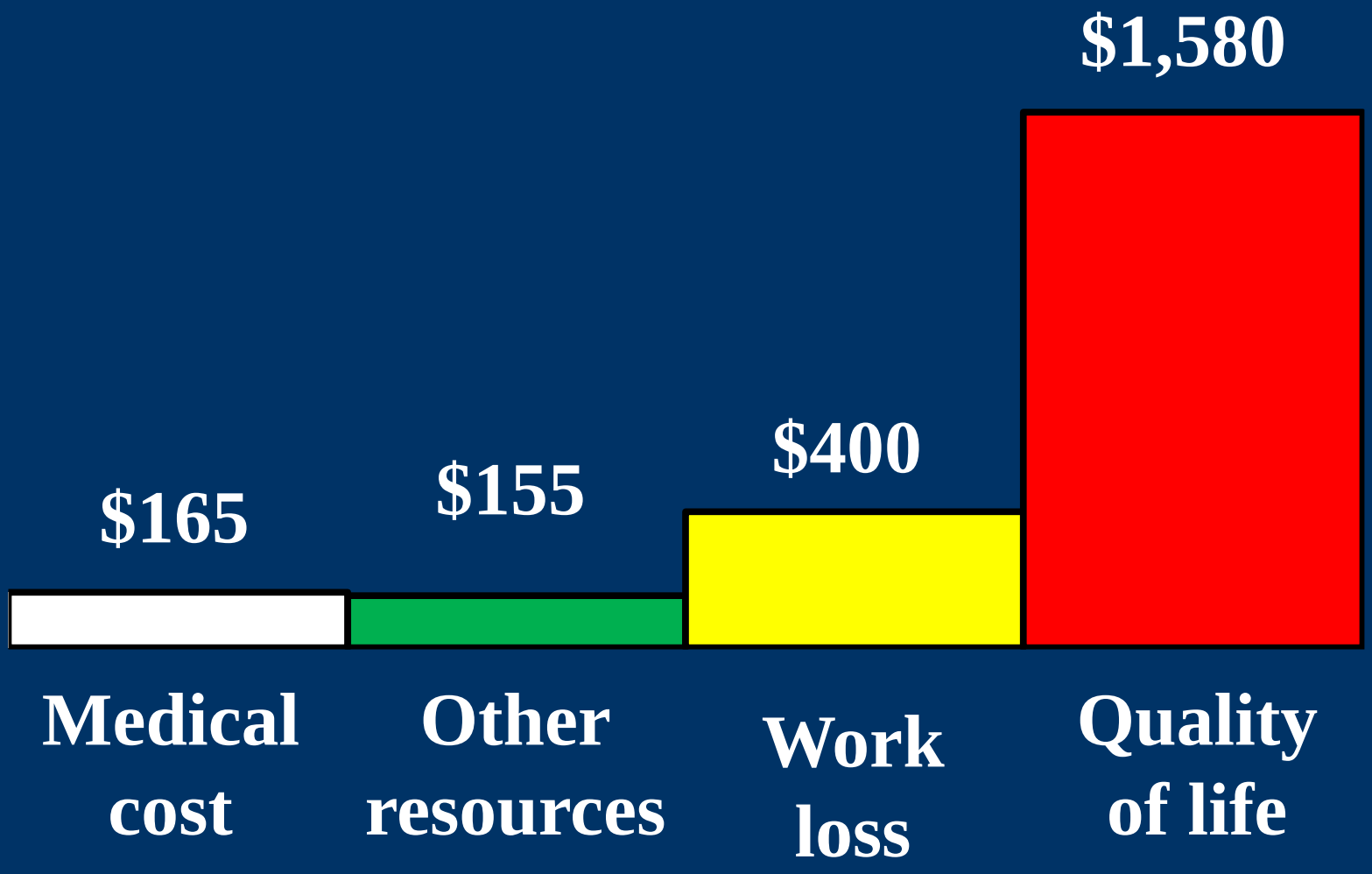
A Poison Control Center Call



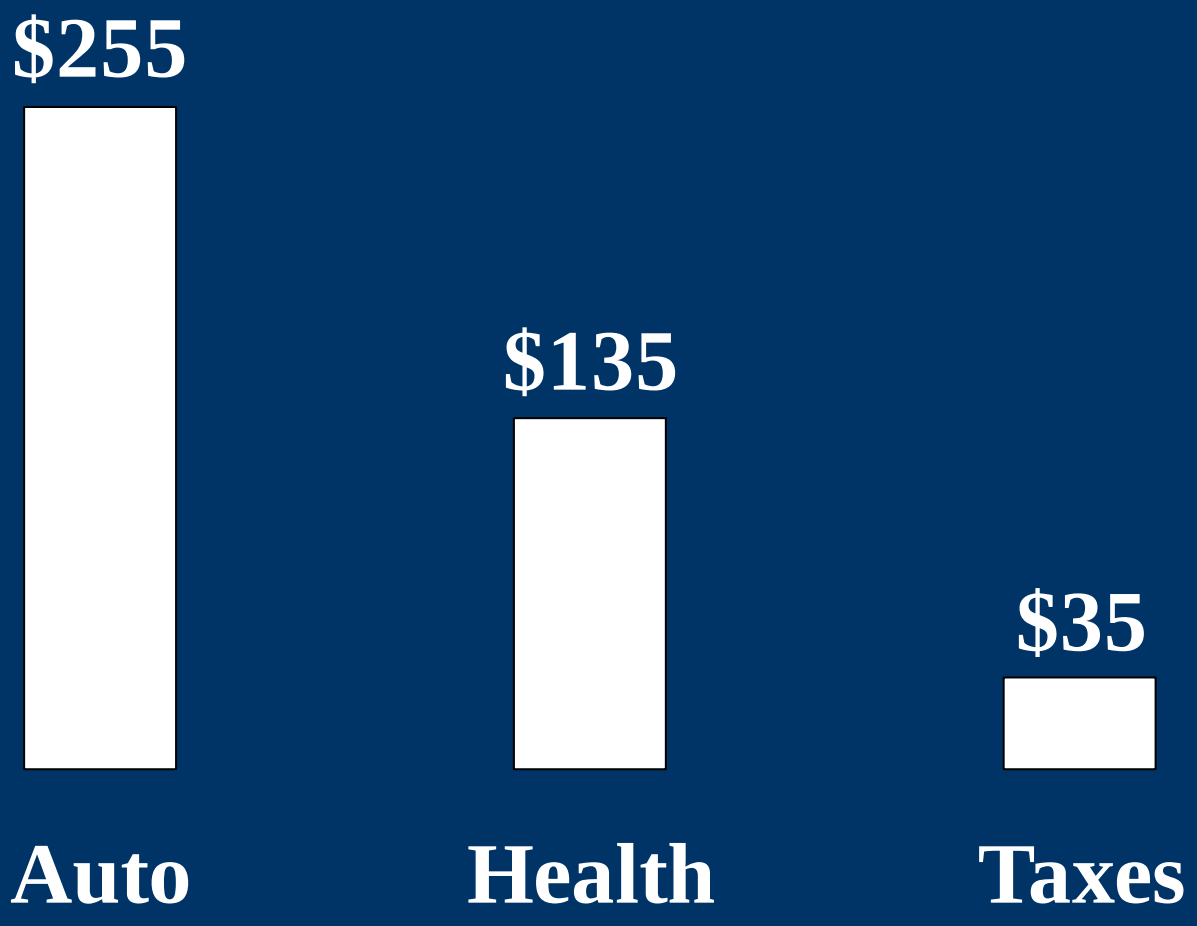
Regional Trauma Care Raises Initial Care Costs by $2,000/Admission, Saving $5,400



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



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



- **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**

- **Discount Rate**
  - **$1 million in 20 years**

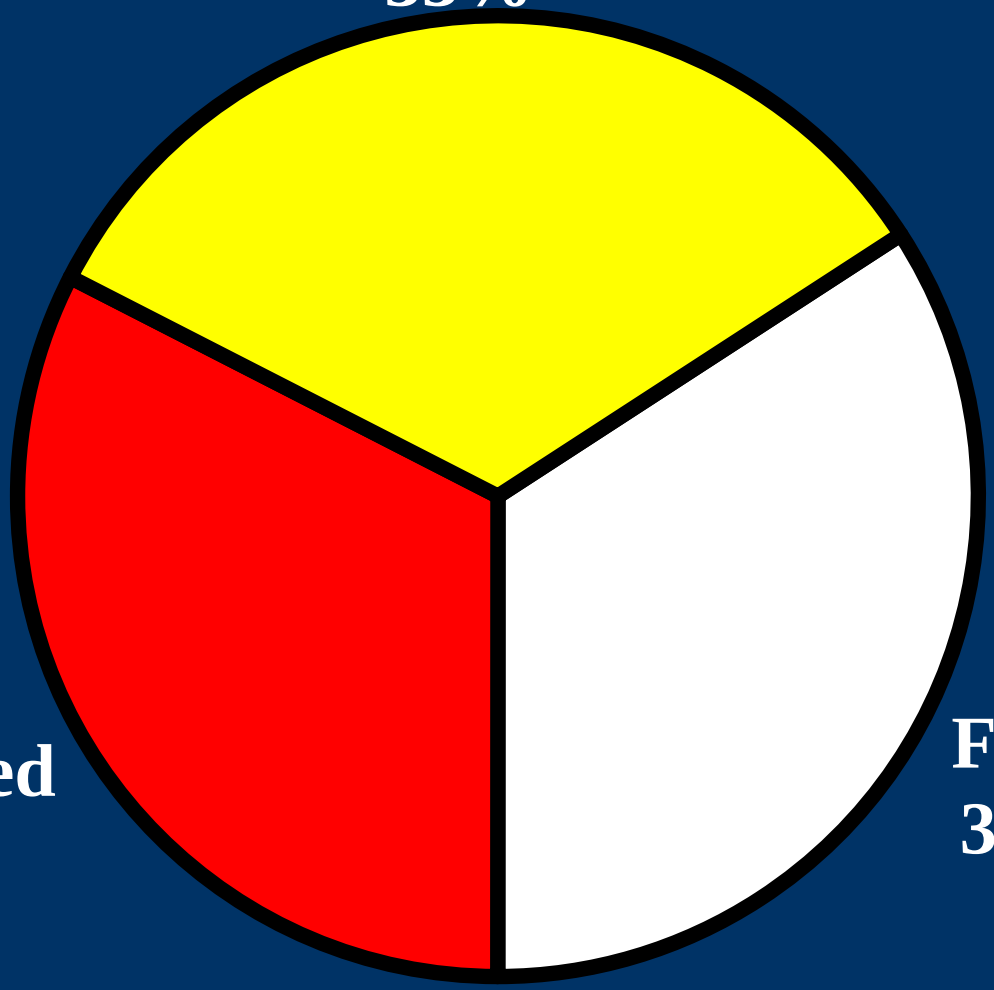
    3% **$570,000**

    7% **$275,000**
  - **How to Discount: Use a 3% rate**

    Next Year **$500/1.03**

    2 Years Hence **$500/(1.03 x 1.03)**

Costs of Injury, United States, 2012: $2.8 T
(Omits MD only)



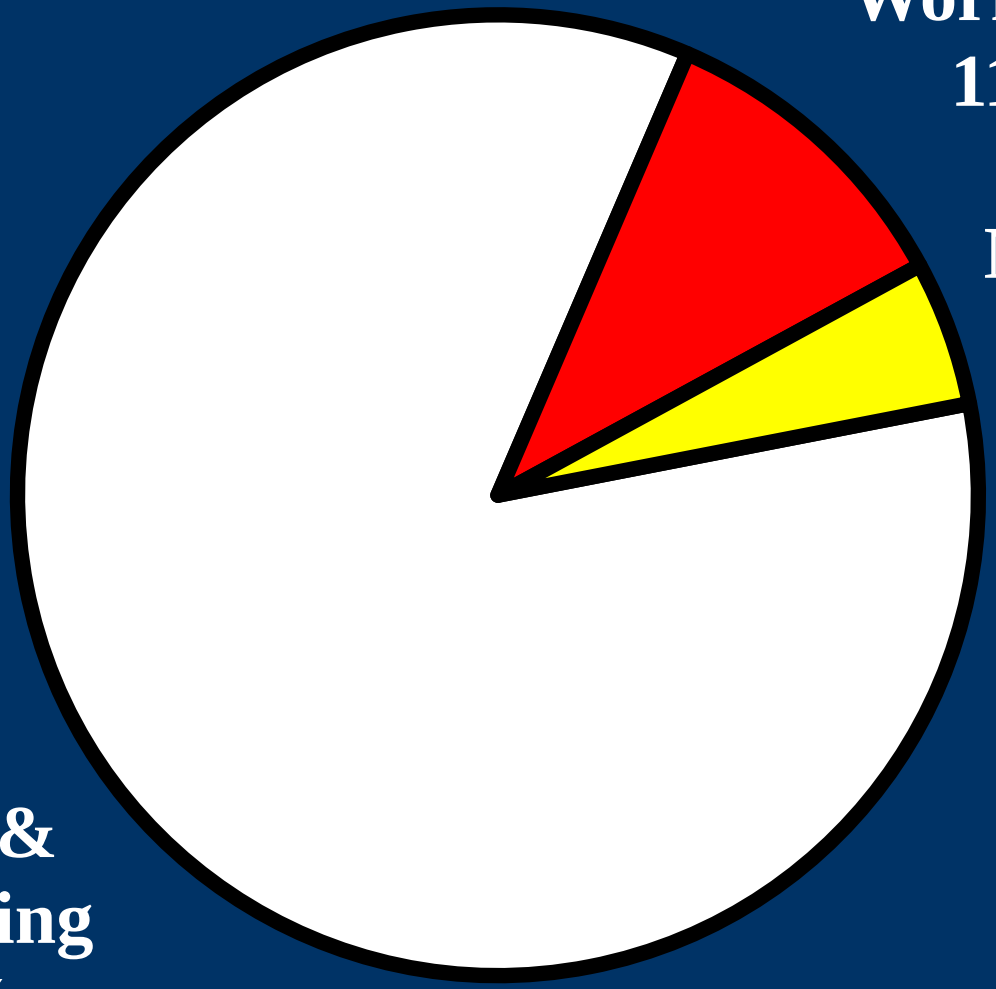
Burden Categories

- **ECONOMIC COSTS**
  - **Medical & mental health**
  - **Other resources/ direct/tangible**
    - **Emergency services**
    - **Insur Admin**
    - **Victim services**
    - **Legal/court/prison**
    - **Property damage**
  - **Work loss (productivity)**
    - **Wage work**
    - **Household work**
- **QUALITY OF LIFE**

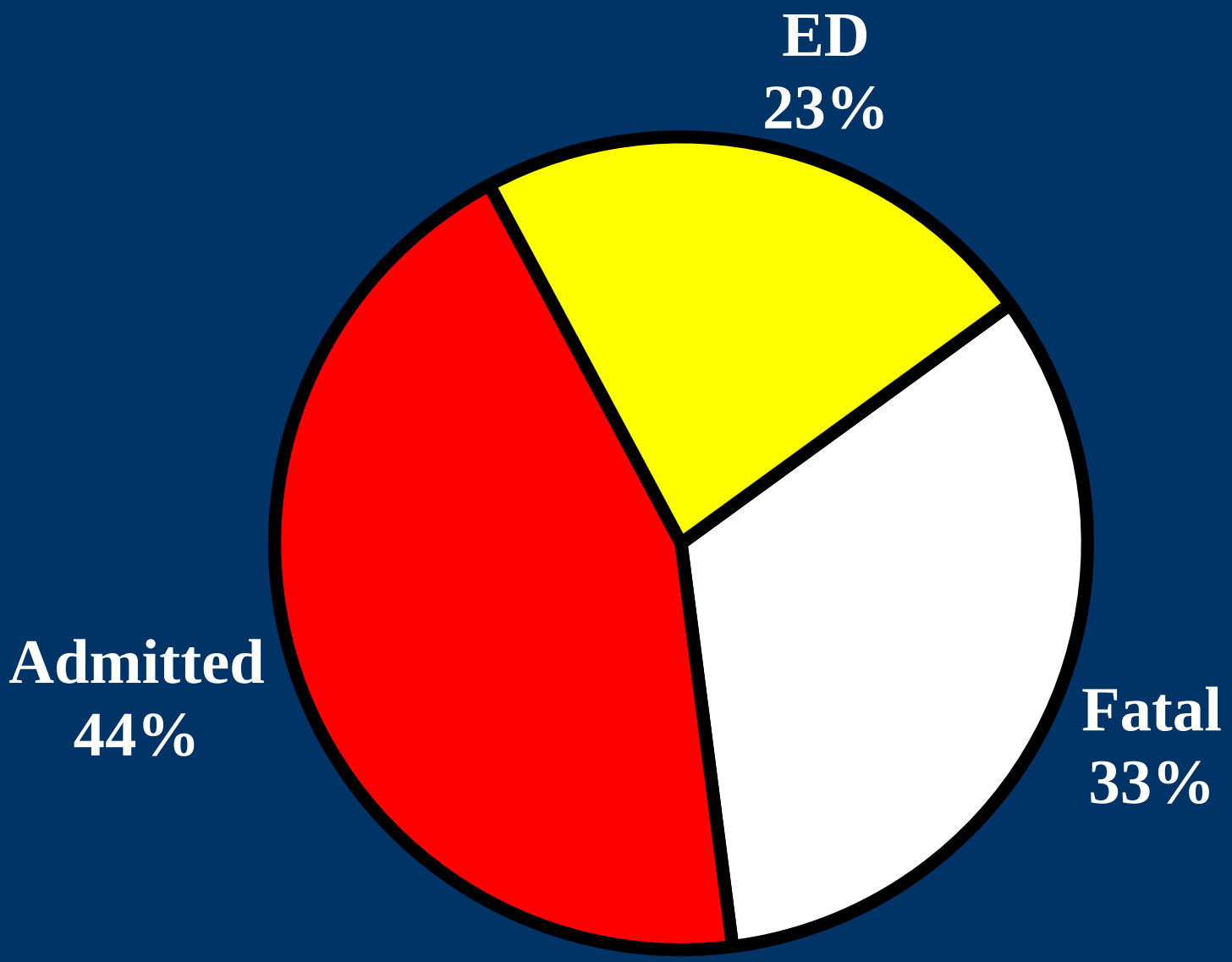
Which Is Largest?

- Medical
- Other Resources
- Work
- Quality of Life

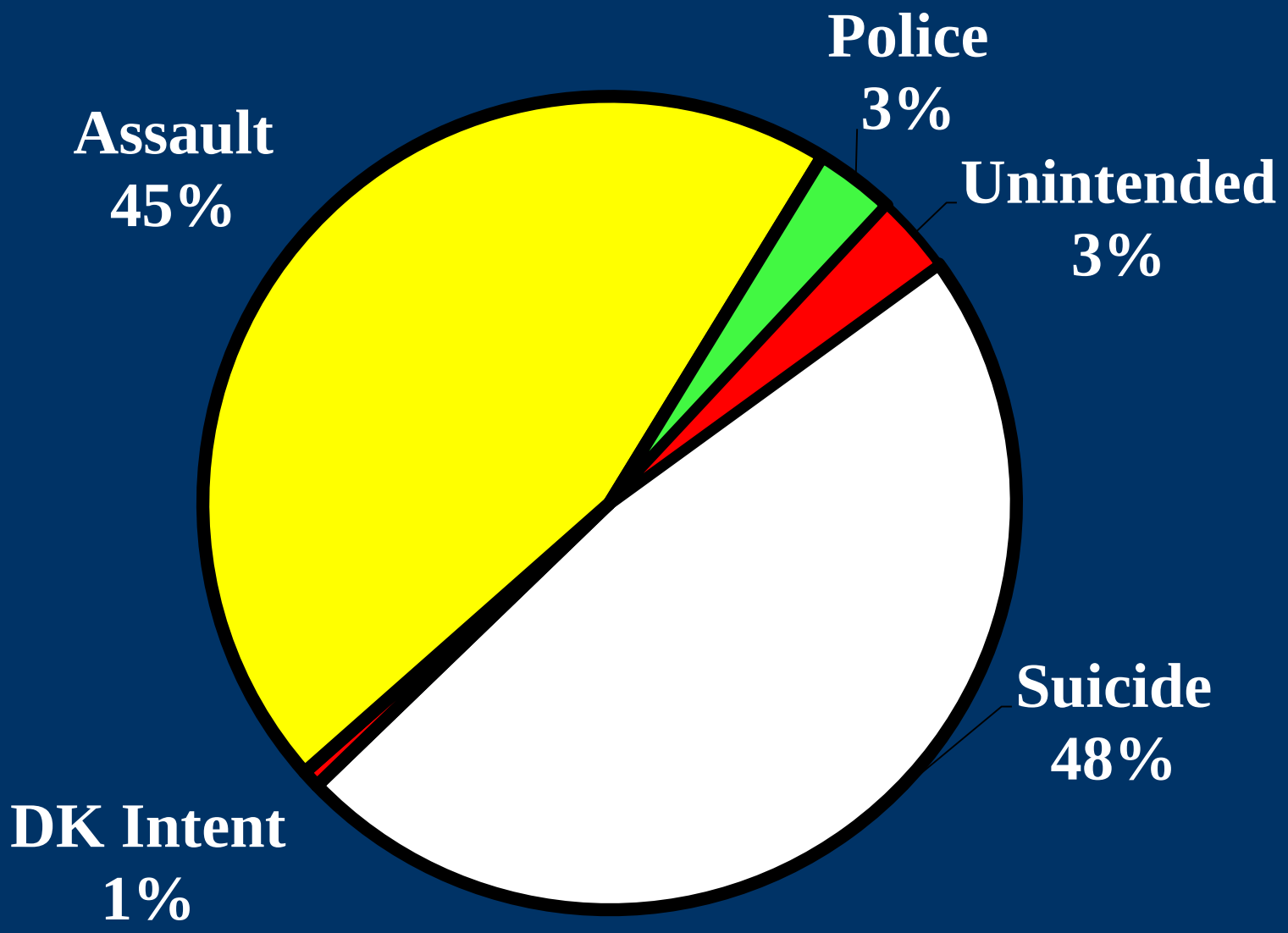
Costs of Injury, ages 0-20, 2012: $593 B



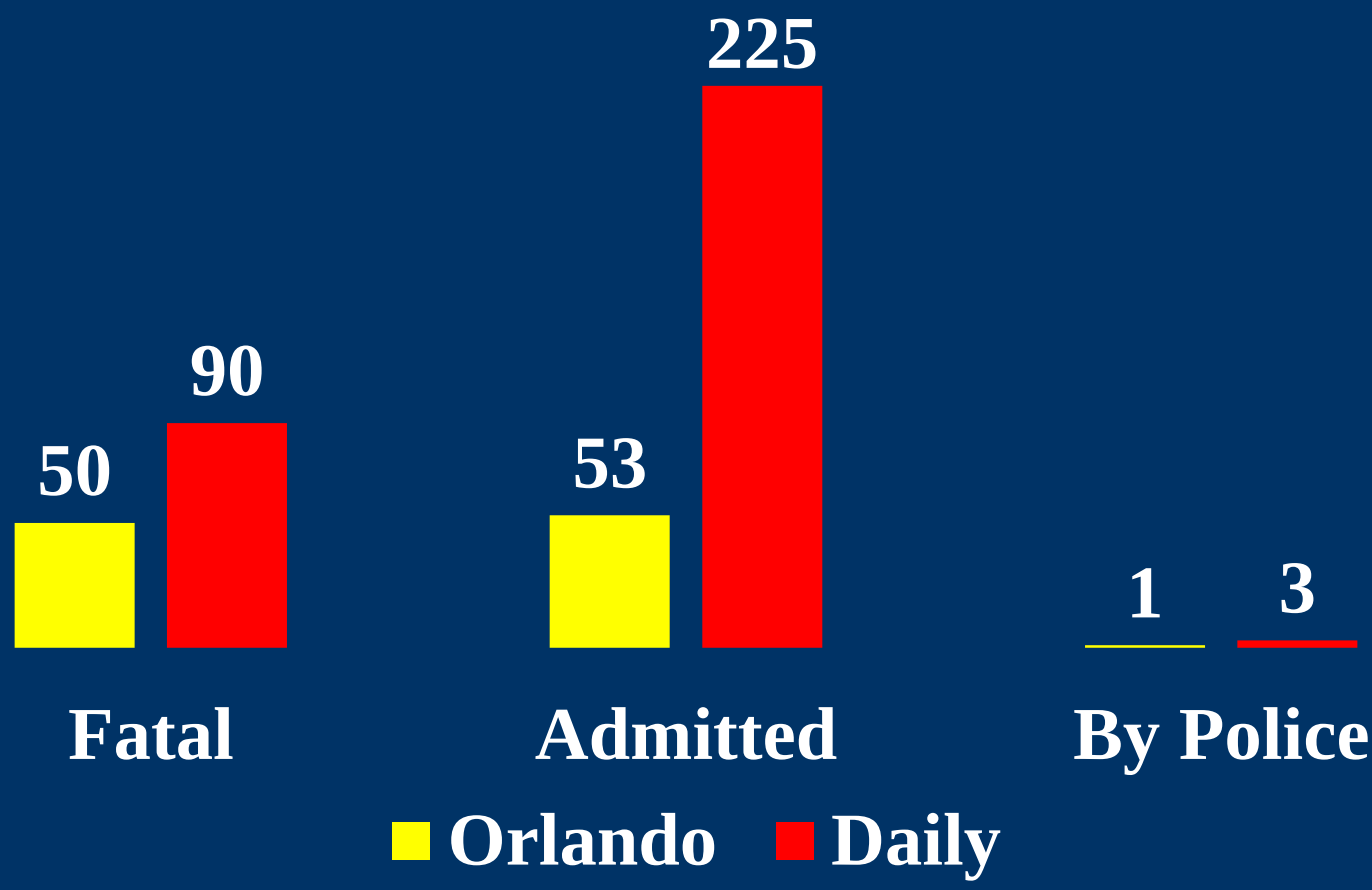
Costs of TBI, United States, 2012: $758 B



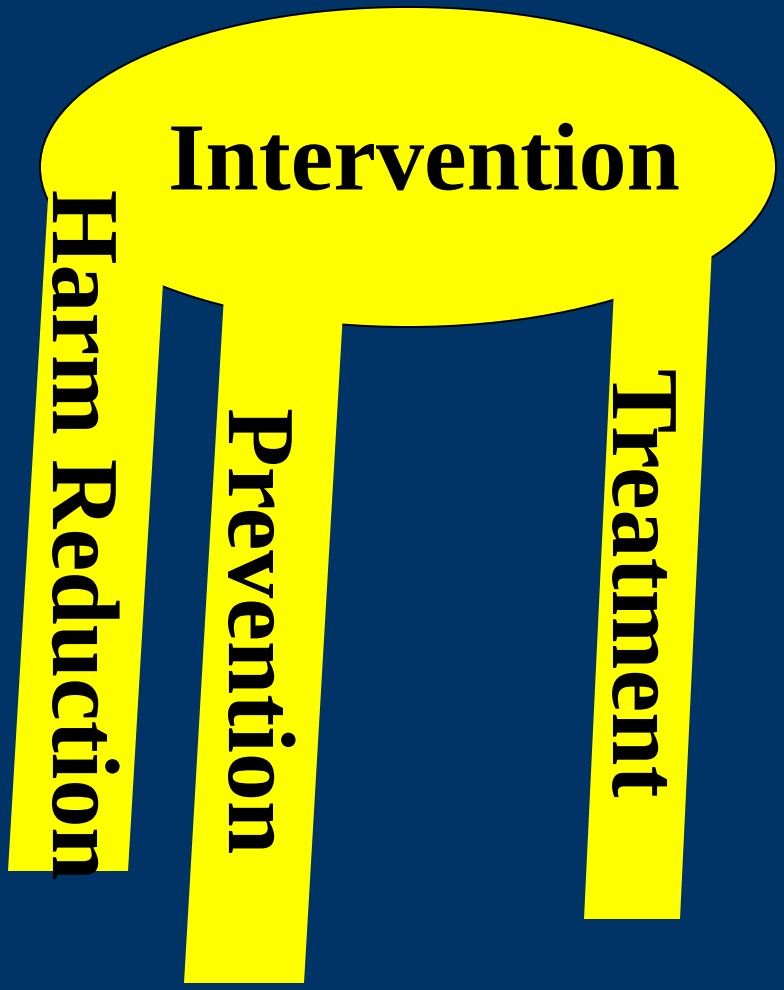
Costs of Firearm Injury, US, 2014: $238 B



$695/Gun



COST EFFECTIVENESS


Intervention
Harm Reduction
Prevention
Treatment

163 Interventions: CSN Fact Sheets

	Youth	Adult	Youth & Adult	Total
Motor Vehicle	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
Substance Abuse	23	6	10	39
Tobacco	4	17	0	21
Total	60	52	51	163

To Perform a Benefit-Cost Analysis

- What the program cost
- Deaths & injuries prevented

Annually, 1 in 54 Americans Is Medically Treated for a Home Stairway or Bathroom Fall

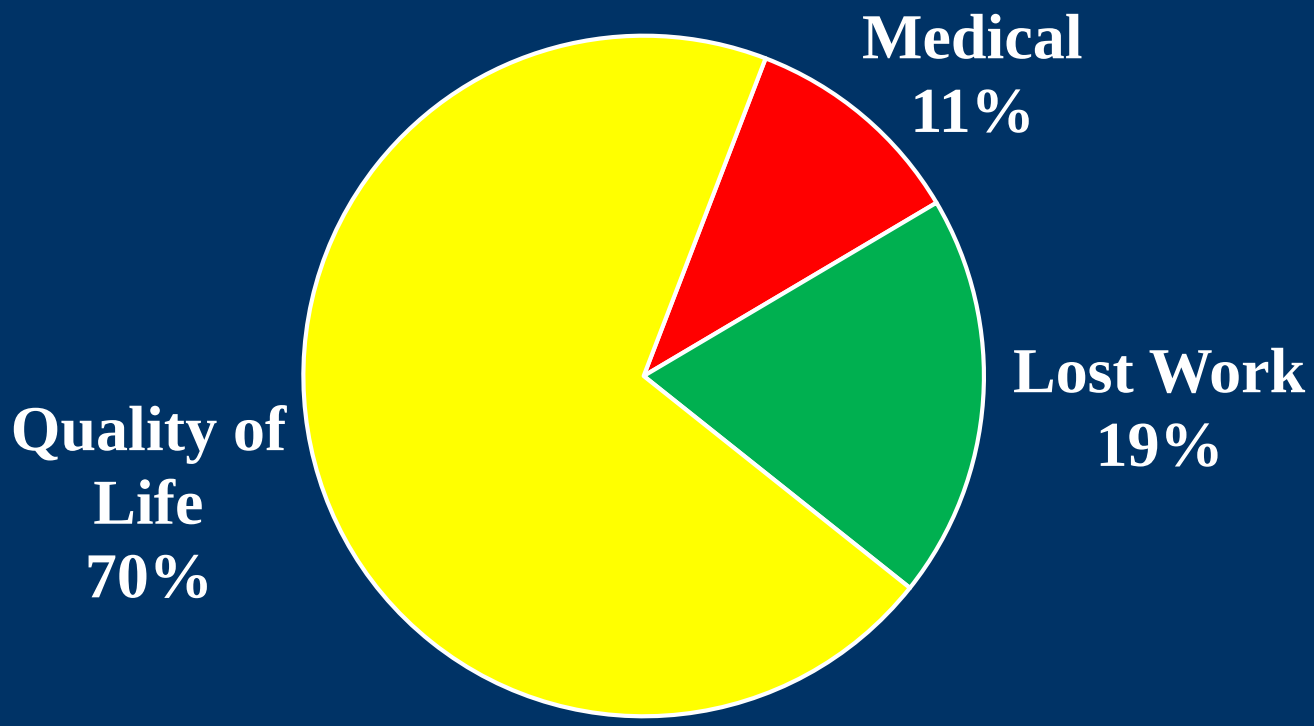
5.7 Million Medically-Treated Fall Injuries per Year in Home Stairways & Baths, USA

200,000 Hospital-Admitted Fall Injuries per Year in Home Stairways & Baths, USA

Cost per Hospital-Treated Injury

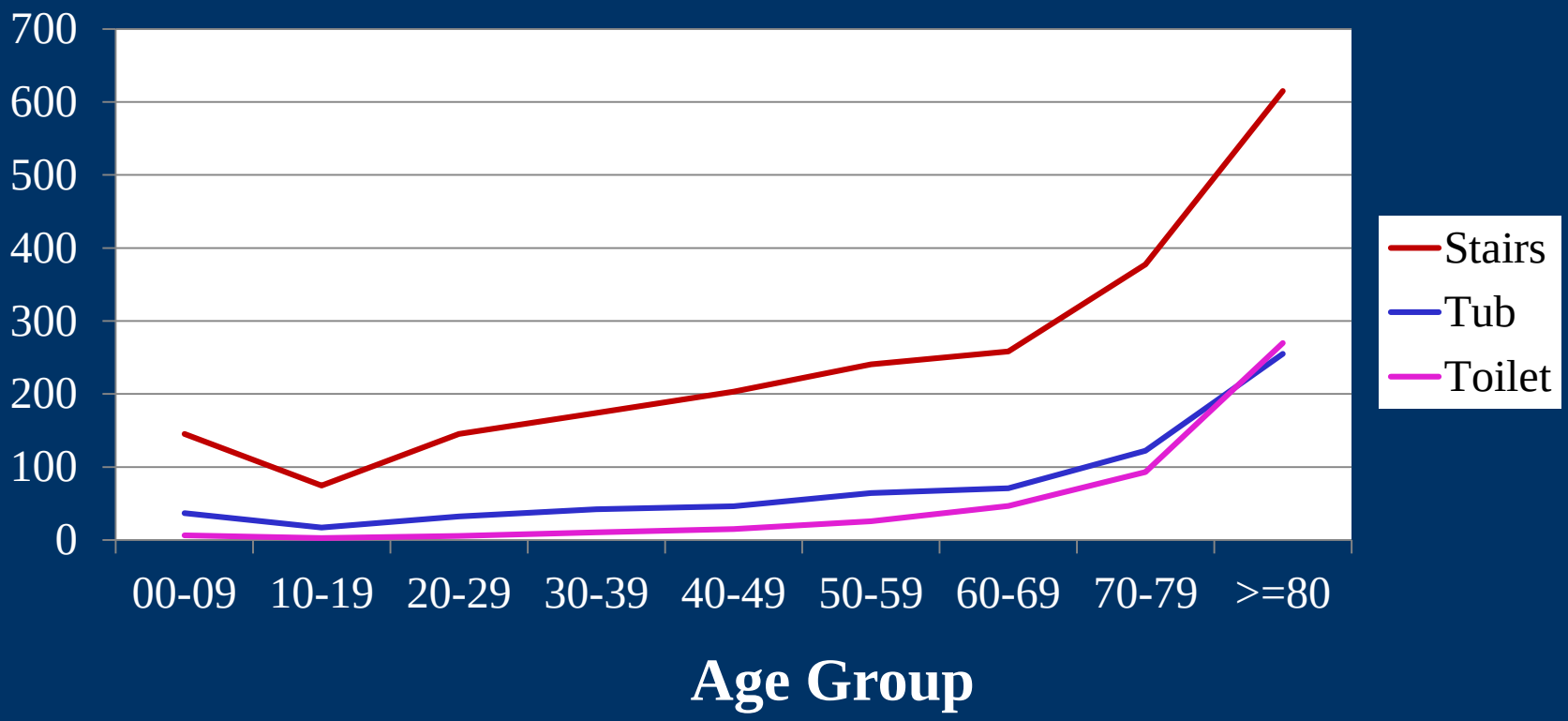
Annual Costs Total US$86.5 Billion

What's in Those Costs

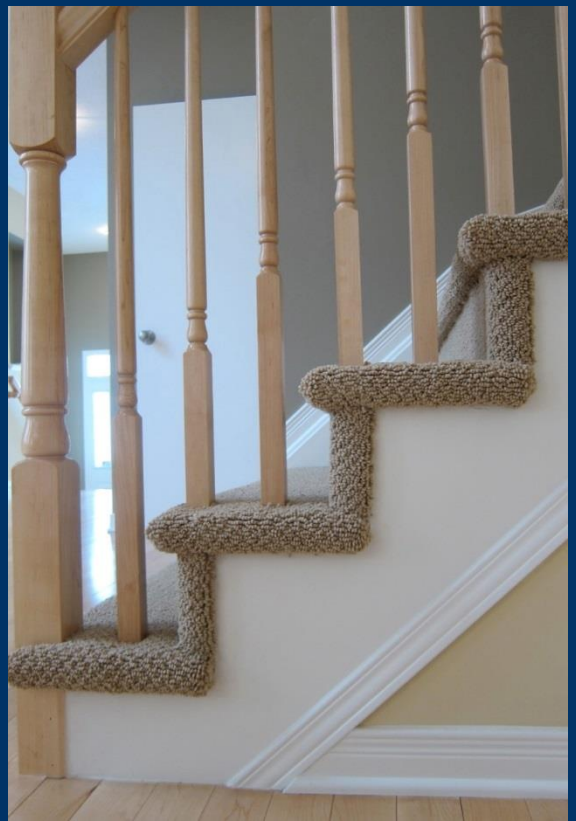


Excludes Rx Opioids to Control the Pain

Annual Fall Costs per Person Rise with Age



Will Building Code Changes to Prevent Falls in Home Stairways and Bathrooms Save More Than They Cost?



Benefits = Reduced Injury Costs

Societal viewpoint: everyone's benefits count

- Residents avoid injury
- Visitors avoid injury
- Workers in the home avoid injury
- Residents & builders avoid liability
- Property value may rise

Some Rough Calculations

- Assume useful lives of
  - 20 years for bathroom modifications (15.1 years of present value)
  - 75 years for stairs (30.1 years of present value)

Annual Cost per Household

Breakeven Cost If Prevent 67%

- 2 Stairs: US$540 * 30.1 *.67 = $10,900
  - 50 year life = $9,450
- 2 Tubs/Showers: US$135 * 15.1 * .67 = $1,365
- 3 Toilets: US$75 * 15.1 * .67 = $760

- If lose usable space, that is a cost

Limitations

- **Did not count floors, struck against**
- **Have not used available cost data**

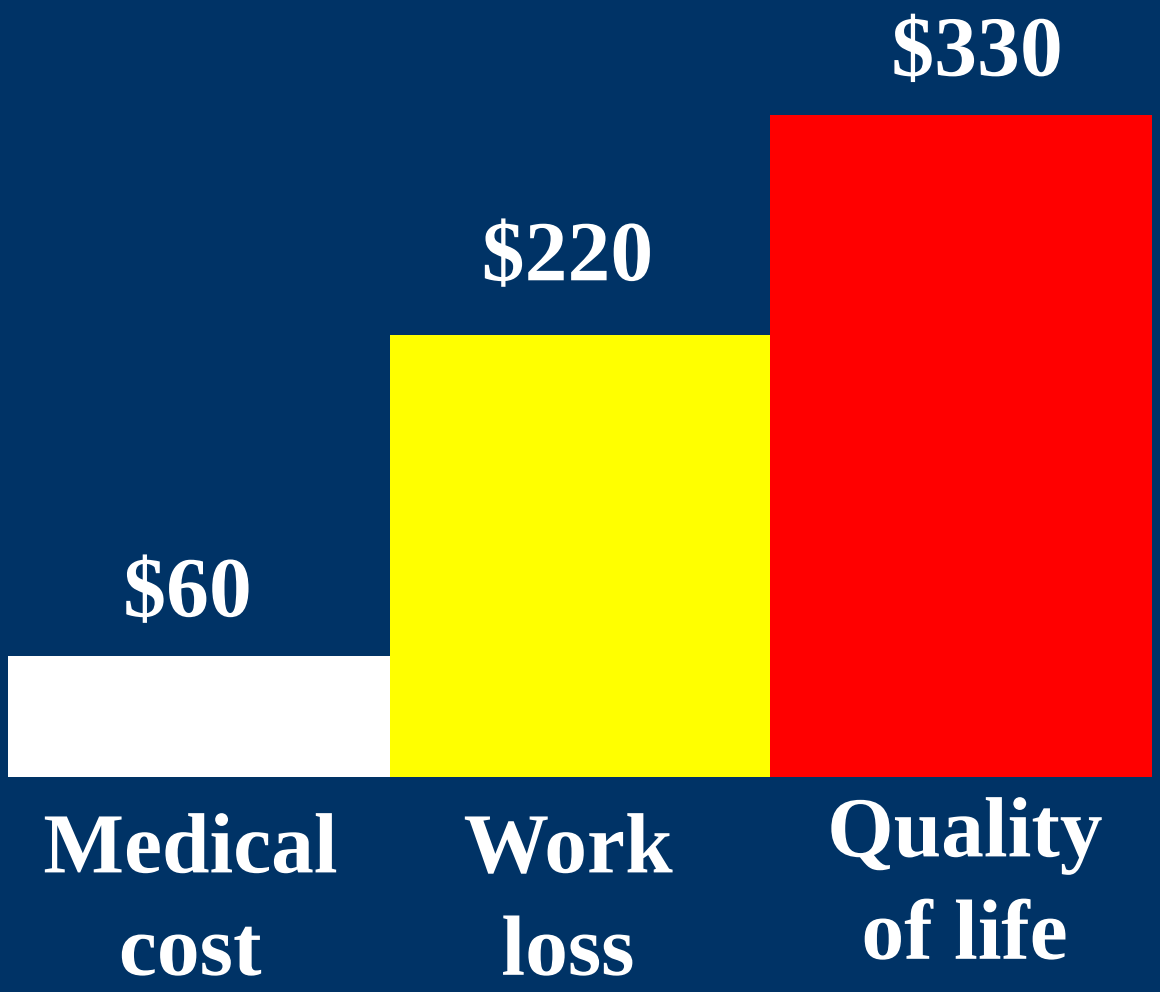
Must Count Quality of Life Saved

- U.S. Office of Management & Budget (1989)
- Panel on Cost-Effectiveness in Health & Medicine (1996)
- National Academy of Sciences (2016)

- Not necessarily in $

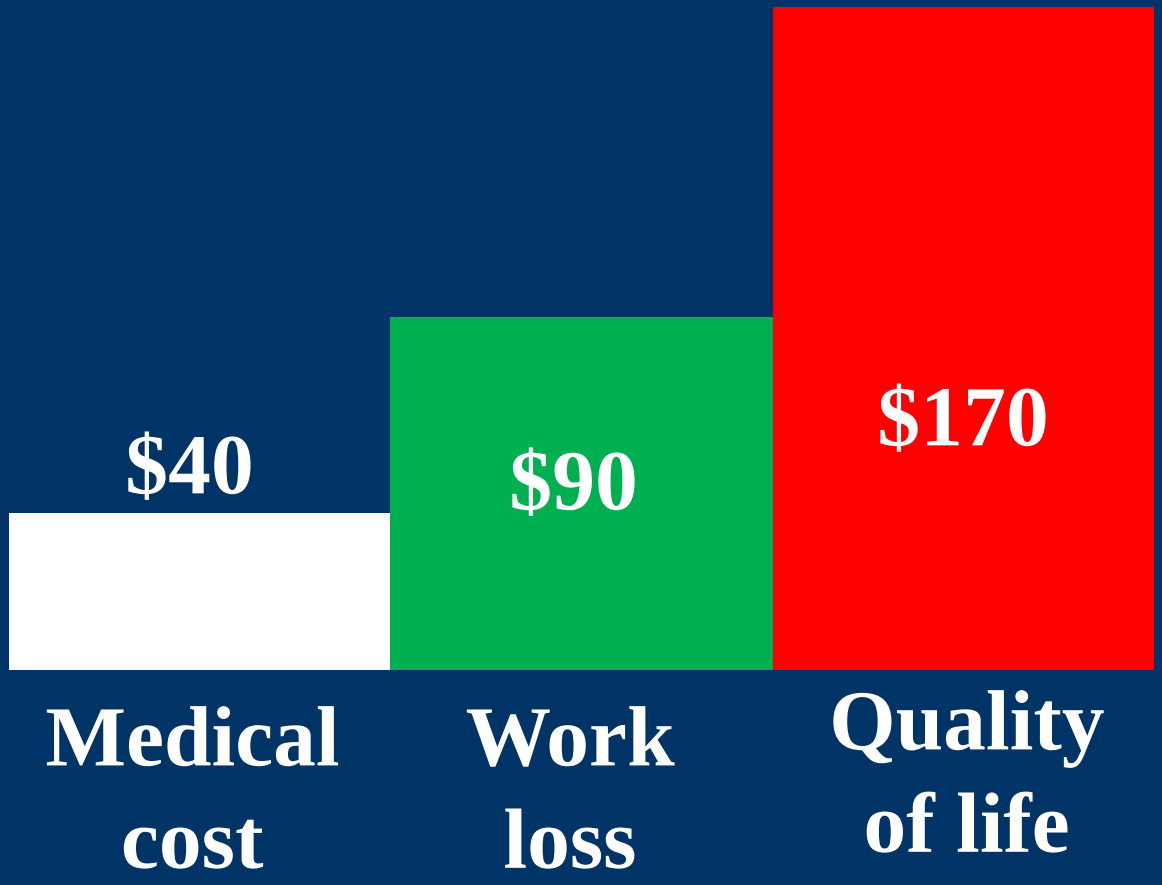
Equipping A Home with Smoke Alarms + Maintenance Costs $45 & Saves $850 (BCR 18)

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

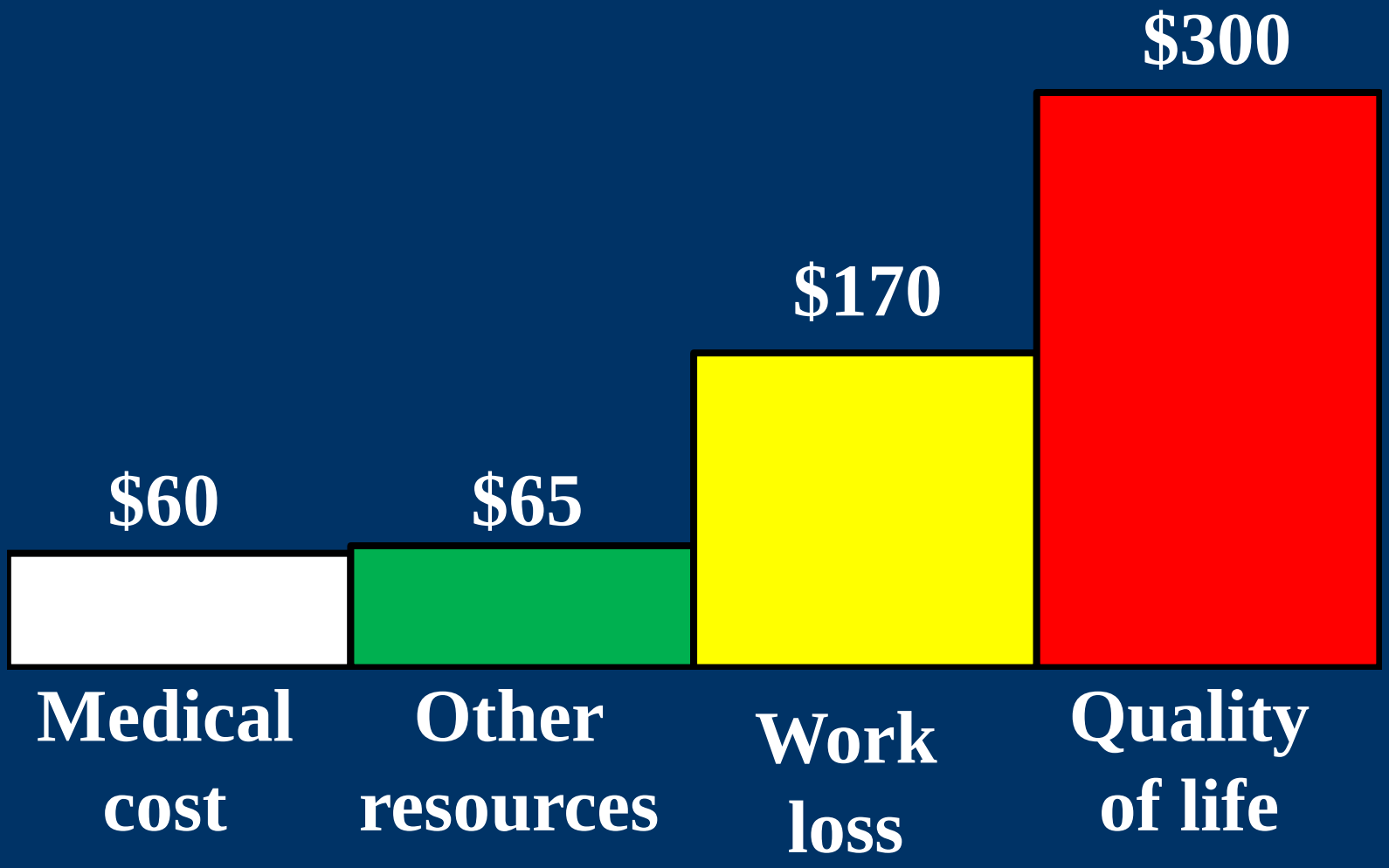


A $13 Bike Helmet for Kids 3-14 Saves Insurers $82

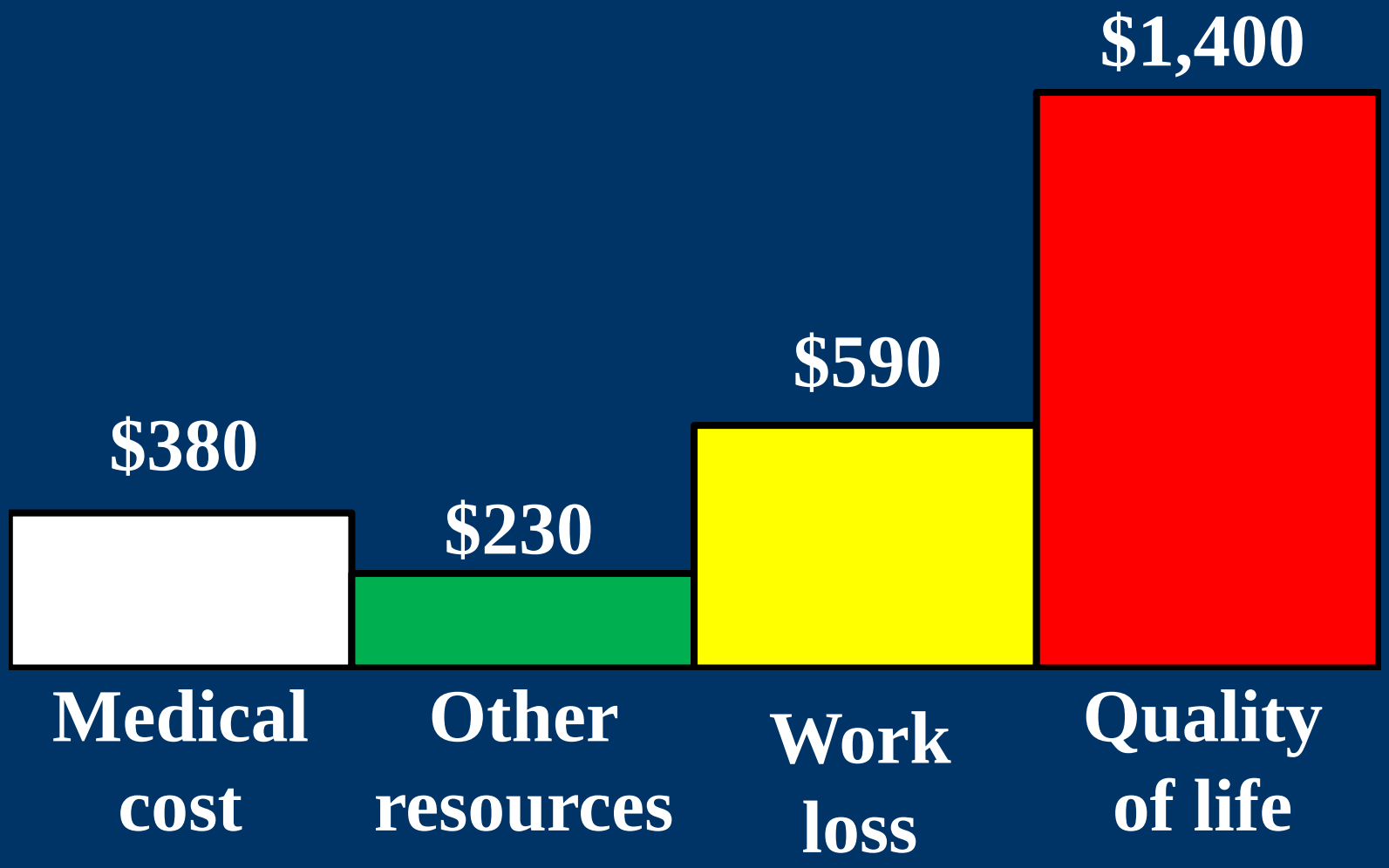
A $20 Bike Helmet for Ages 15 & Above Saves $300 (BCR 15)



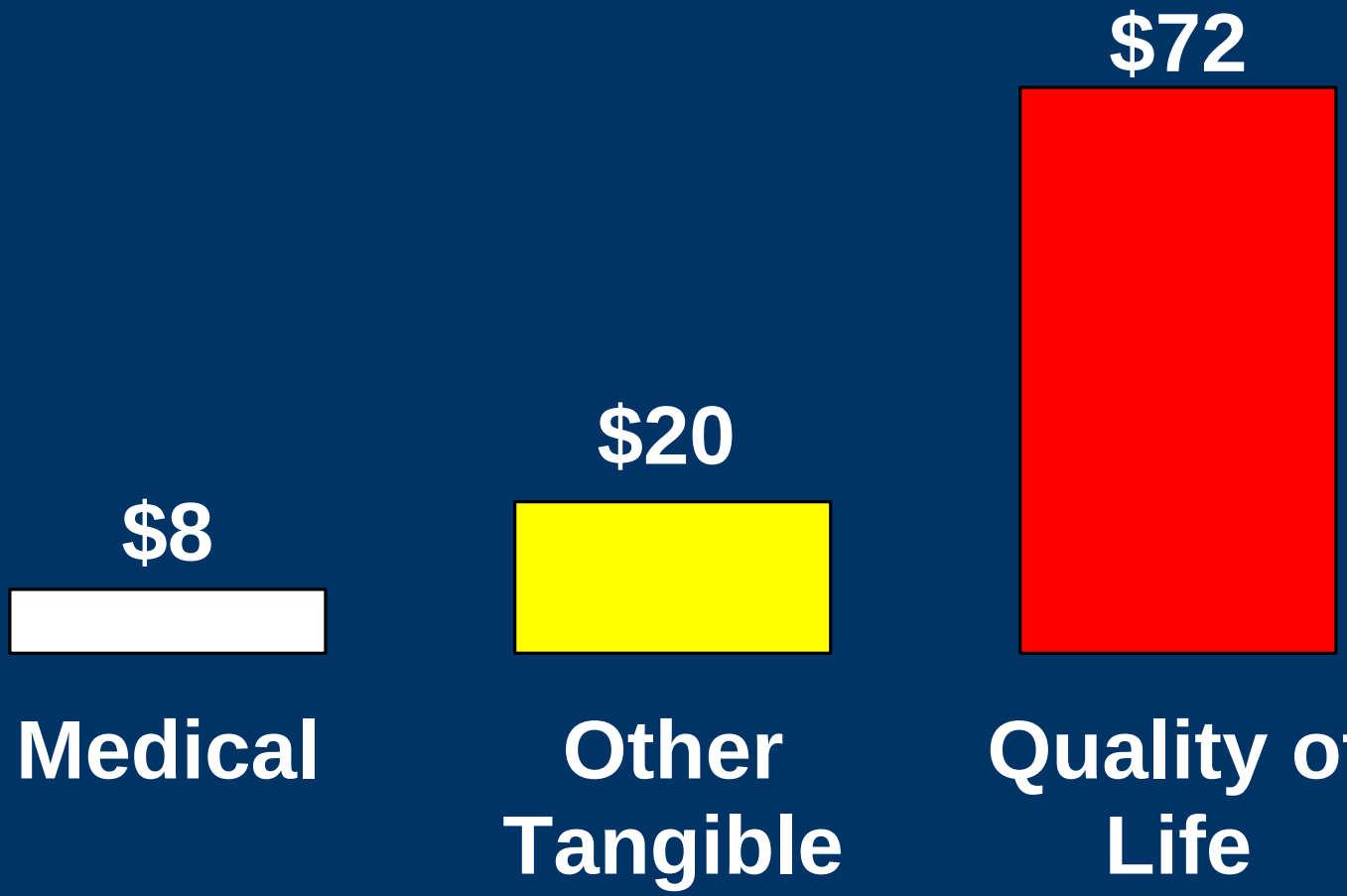
Misuse Reduction (latch system + installation checks) Costs $6/Seat & Saves $600 (BCR 94)



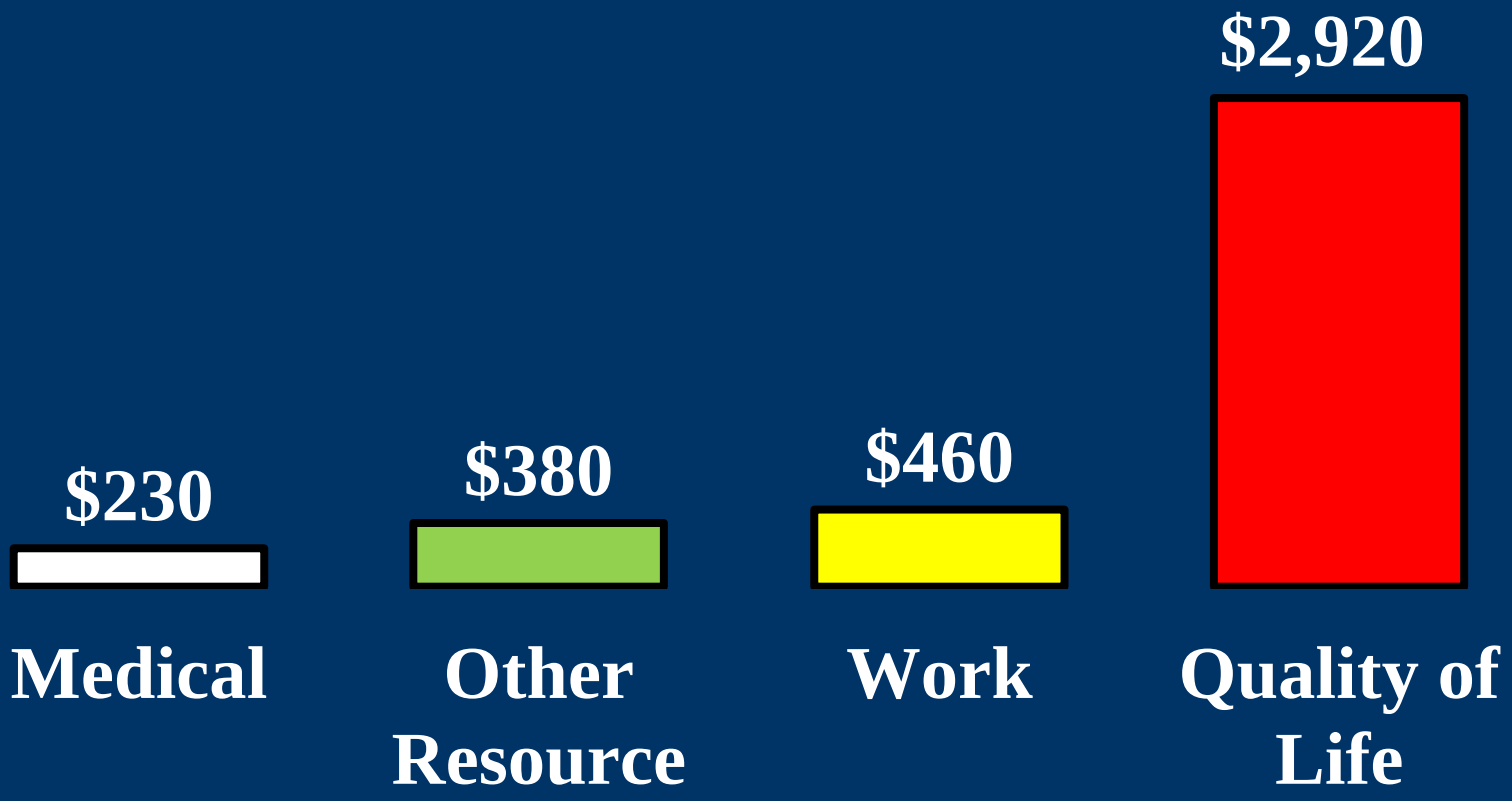
A Booster Seat with Back Costs $35 and Saves $2,600 (BCR = 72)



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)



Shaken Baby Syndrome

- Annually 5000 children 0-4 die or are medically treated for abusive head trauma
- “Survivors” of severe shaking rarely live to age 21
- Average nonfatal case costs $3.2 M
- Cost $17B/year : $4,100/live birth including $284 out-of-pocket
- Hospital-based education costs $5/newborn
- Break even on out-of-pocket costs if prevent 1.8% of cases

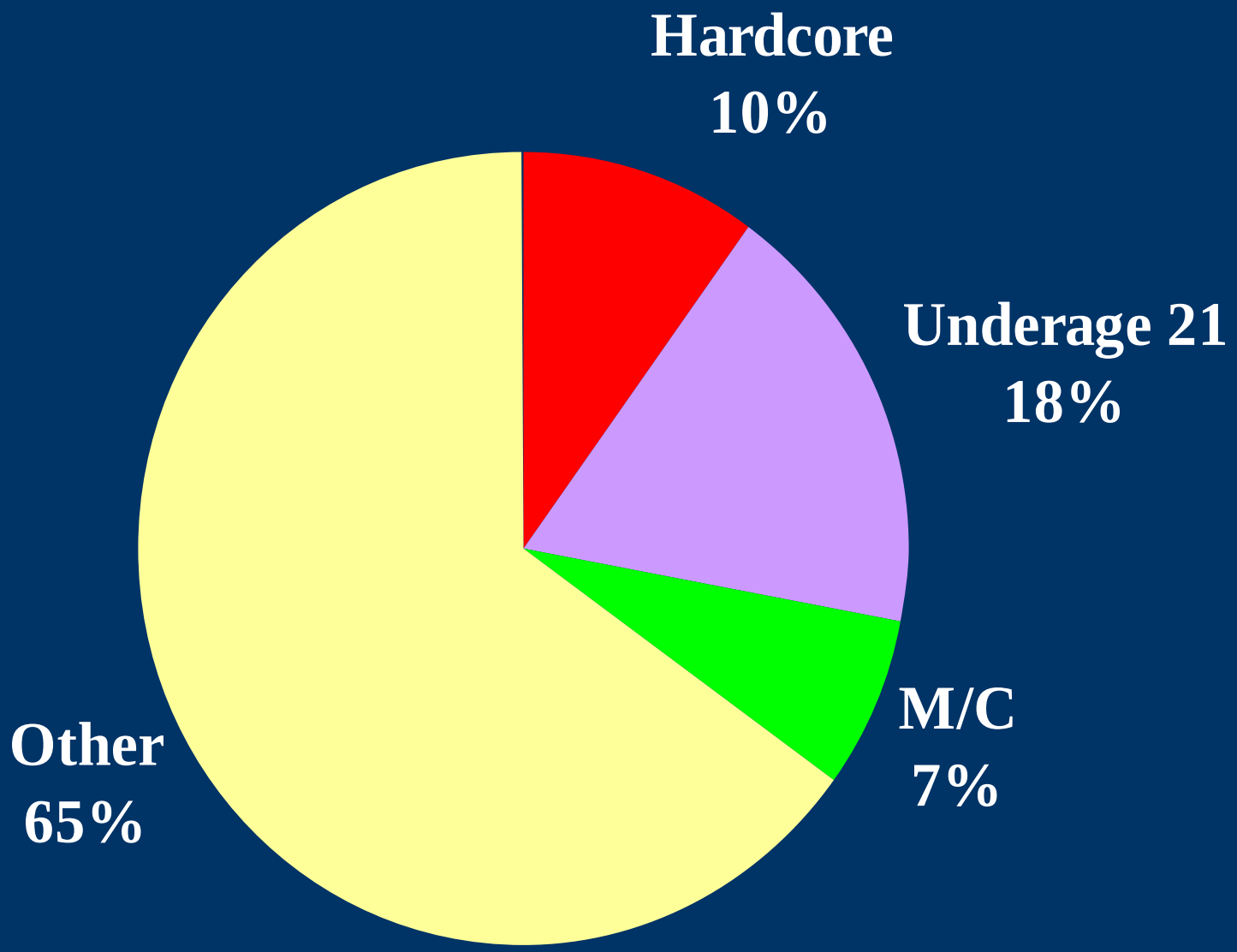
Choosing Interventions

- **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**

Program Selection

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

DWI Deaths



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

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

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

Unmeasured Spillover Effects

- GDL midnight curfew
- Zero Alcohol Tolerance for Drivers under 21
- .08 maximum driver BAC

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%**

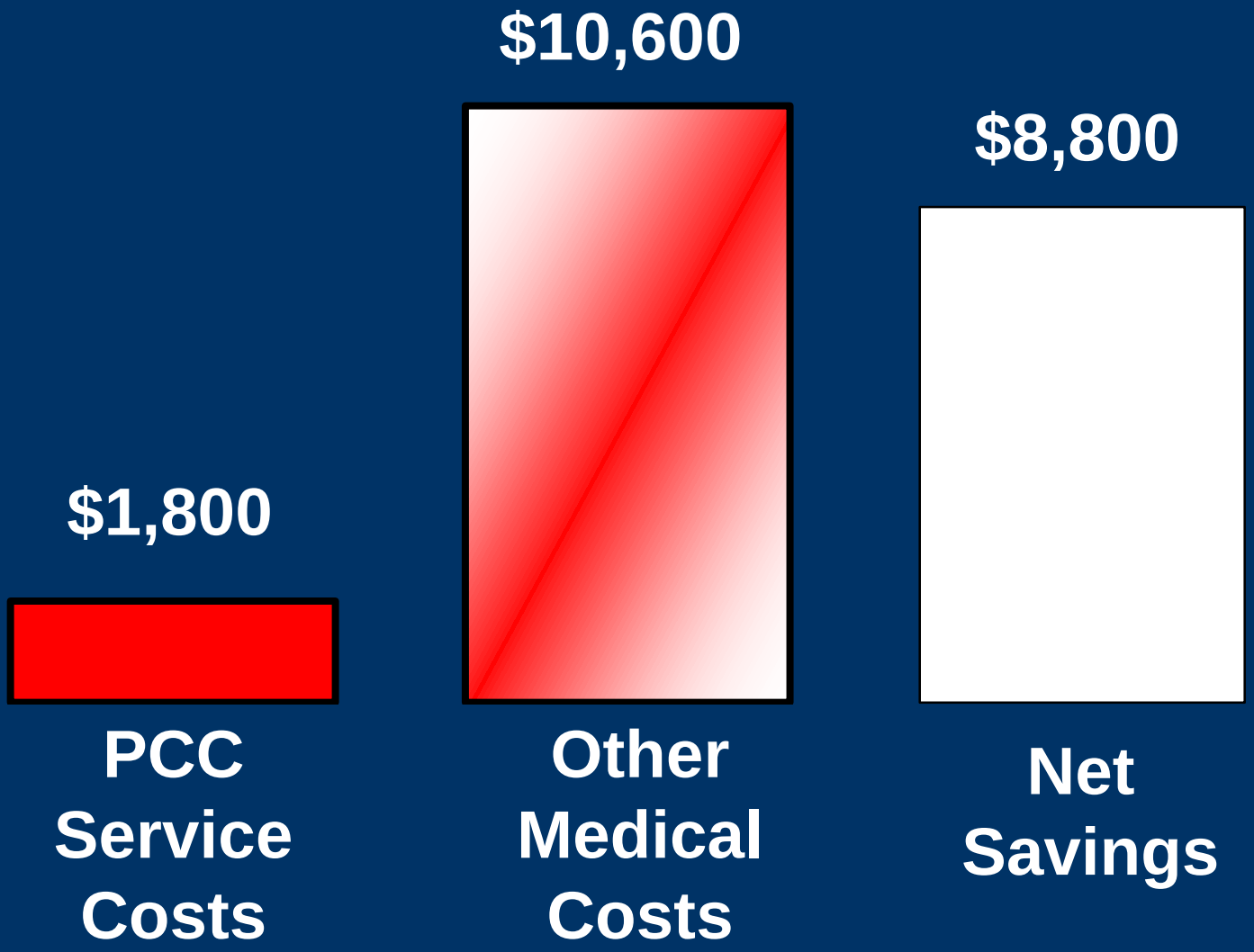
- **Confuses college presidents**

NAS Committee Advice

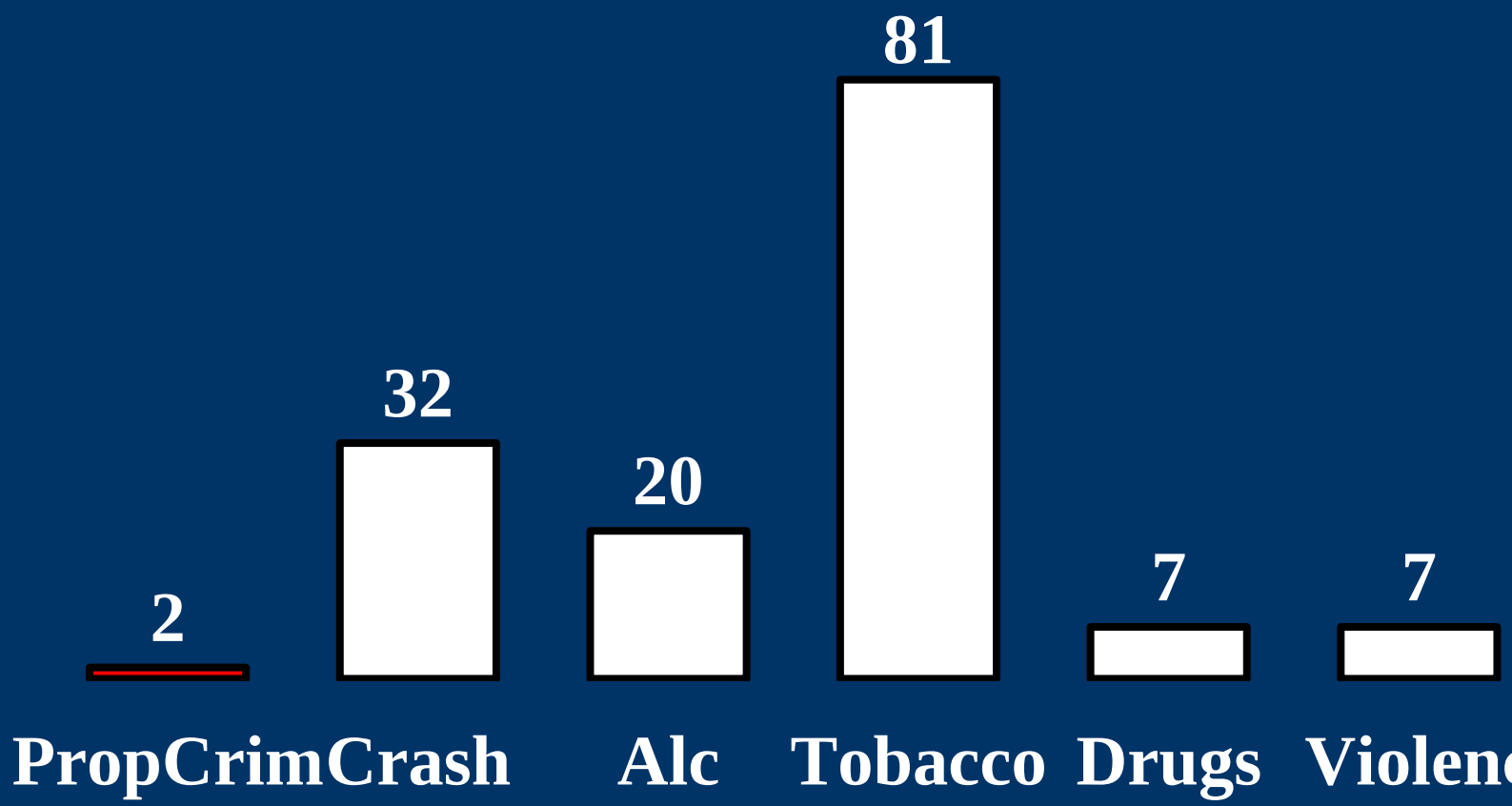
- If you publish a RCT, report intervention cost
- Train future PH decision-makers on use of economic & other evidence
- Incorporate comprehensive stakeholder partnerships (involving producers, consumers, & intermediaries) into action plans related to use of economic evidence
- Integrate economic evaluations into budget processes
- Report %age of budget spent on interventions with proven effectiveness

- **Successful replication requires that resources & TA/training are available to support implementation and outreach with fidelity**

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



BCR for State to break even on its investment



If target intervention to Medicaid recipients

- 35%-50% of medical care savings go to state

- **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**

Online Resources

- **ROI fact sheets, costs of child abuse & neglect by state at http://www.childrenssafetynetwork.org/publications_resources/showPubByTopic.asp?pkTopicID=10**
- **Underage drinking by state, crime costs by state, total or alcohol & drug involved : e-mail miller@pire.org 301-593-7471**
- **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**
- **National Academies of Science. *Advancing the Power of Economic Evidence to Inform Investments in Children, Youth, and Families*, http://www.nap.edu/catalog/23481/advancing-the-power-of-economic-evidence-to-inform-investments-in-children-youth-and-families**

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- **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.**
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- **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.**
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SUMMARY

- **Injury is the leading health risk ages 1-45**
- **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 $**