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Choosing and Implementing Interventions

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Lecture Topics

- ◆ Types of interventions
- ◆ Criteria for choosing interventions
- ◆ Case study

Types of Intervention

- ◆ Some refer to “the three Es”
 - Education
 - Enforcement
 - Engineering
- ◆ Environmental
 - Physical
- ◆ Behavioral
 - Education
 - Incentives (economic)
 - Legislation (enforcement)

(Any intervention can be active or passive)



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Section A

*Principles and Operational Issues
(or “Generalities”)*

Maria Segui-Gomez, MD, ScD

What Do We Want to Know about Interventions?

- ◆ Efficacy
 - Do they work in experimental / ideal circumstances?
- ◆ Effectiveness
 - Do they work in the real world?

What Do We Want to Know about Interventions?

- ◆ Efficiency
 - Do we fully benefit from all the resources that we consume?
 - Do benefits exceed costs?
 - Is this cost saving?
 - Is this cost efficient?

How to Choose an Intervention

- ◆ Identify and prioritize problem (burden unit?)
- ◆ Determine specific circumstances of injury
- ◆ Consider all possible preventive measures
- ◆ Prioritize interventions
- ◆ Implement interventions
- ◆ Evaluate effect of intervention

Efficacy, Effectiveness, Efficiency, and Also

- ◆ Affordability
- ◆ Feasibility
- ◆ Sustainability
- ◆ Preferences
- ◆ Freedom / rights violation
- ◆ Equity

Why Was the Intervention Implemented?

- ◆ How / why was it selected?
 - Magnitude of problem vs. efficacy / effectiveness / efficiency of intervention
 - Proven / possible / potential unknown effectiveness

Why Was the Intervention Implemented?

- ◆ How was the intervention implemented and enforced? (process)
- ◆ Do we need to evaluate again?
 - Process, impact, and/or outcome of evaluation?



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Section B

Case Study

Maria Segui-Gomez, MD, ScD

Background

- ◆ Need (and desire) to ease decision making process regarding injury prevention intervention implementation

The Proposed Method

1. Assess:

- Efficacy: proven, promising, unknown, ineffective
- Affordability
- Feasibility
- Sustainability

The Proposed Method

2. Develop a Summary Score

- ◆ +
 - Unknown efficacy, ineffective, counter productive, expensive, unfeasible, or questionable sustainability

- ◆ ++
 - Promising effectiveness, satisfaction, affordability, feasibility, or sustainability

The Proposed Method

- ◆ + + +
 - Proven effectiveness, cheap to implement, very feasible, or excellent sustainability

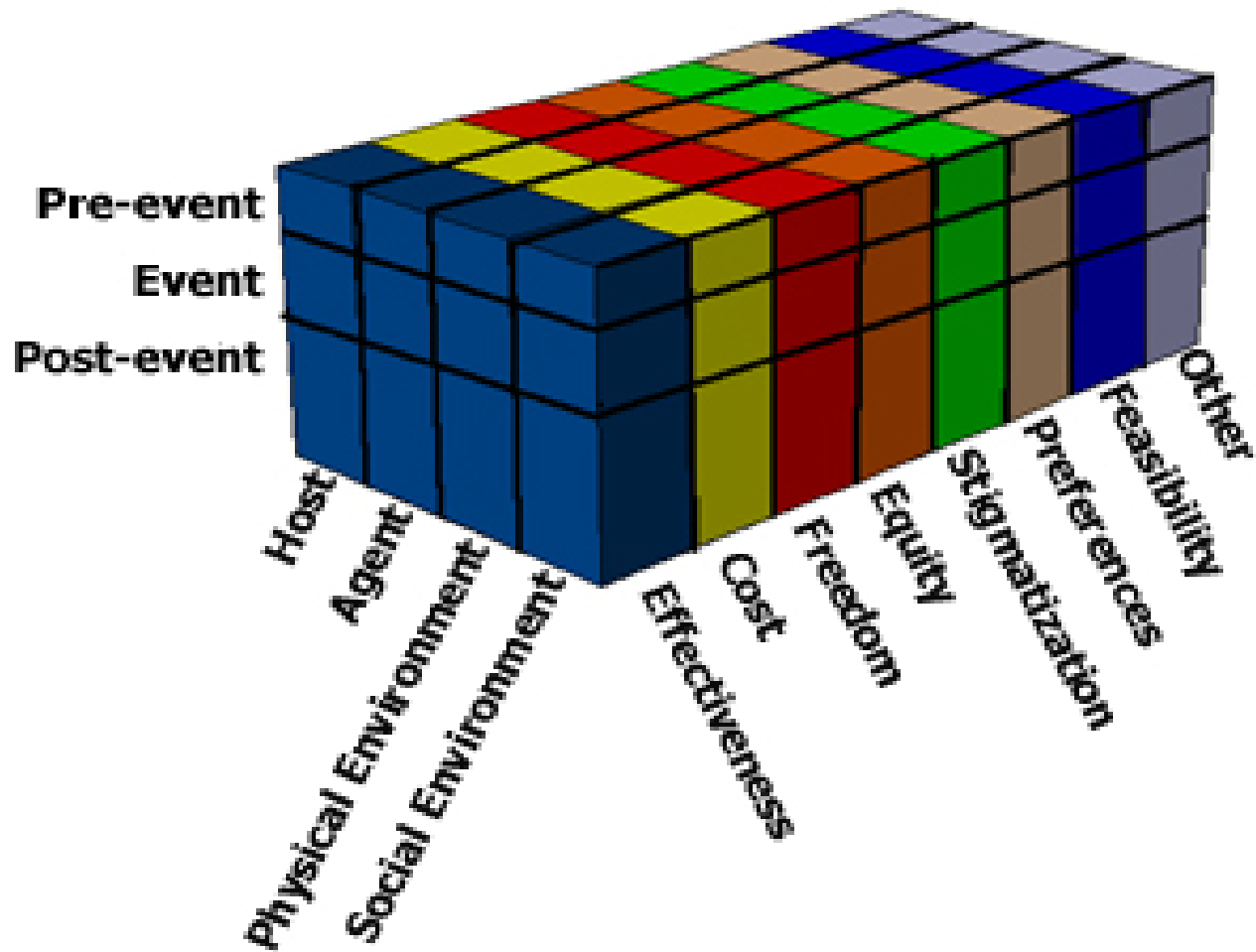
Table 1. Selected Fragments

Host / Intervention	Efficacy	Affordability	Feasibility	Sustainability
Occupant SB use*	+++	++	++	++
Occupant Education	++	+++	+++	+++
Motorcycle Education*	++	+++	+++	+++
Bike Helmets* in Educational Programs	+++	++	++	++
Roadway Lighting*	+++	++	++	++

* In text, the authors advise for its implementation

Other “Evaluation” Tools:

The 3D Haddon Matrix



Questions

- ◆ What threshold do we use to determine effectiveness?
 - Statistical significance? Clinical significance? Public health significance?

Questions

- ◆ How do we rate the quality of the evidence presented?
- ◆ One possible method: Experimental > Cohort > Case-Control
 - Checklists available from Cochrane Collaboration, U.S. Preventive Task Force (Guide to Clinical Preventive Services), etc . . .

In Reading an Evaluation

- ◆ Be critical of outcome under evaluation
- ◆ “Outcome” can be:
 - Outcome (i.e., health related), intermediate (i.e., behavior, knowledge), or process
- ◆ Be aware of all the operational and definitional issues discussed thus far regarding coding and data sources

In Reading an Evaluation

- ◆ Be critical of study design—THERE MUST BE A CONTROL
- ◆ Be critical of analytical choice
- ◆ Be critical of comments outside the realm of the research reported



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Section C

*Examples of Interventions in the
Developing World*

Adnan Hyder, MD, PhD

Effect of Motorcycle Rider *Education*: *Changes in Risk Behaviors and Motorcycle-Related Injuries in Thailand*

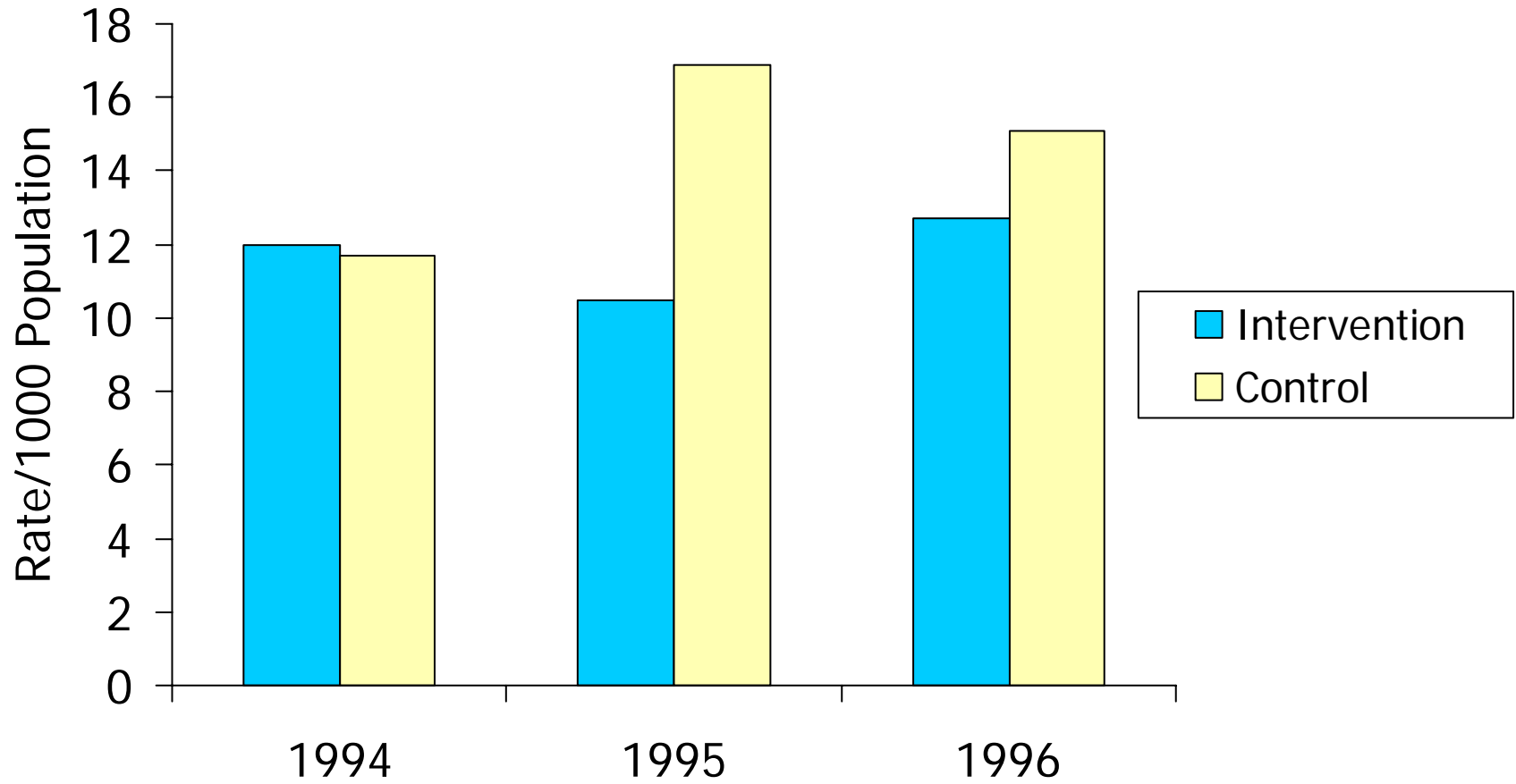
- ◆ Community based program for motorcycle rider education was provided for three randomly selected sub-districts in Northern Thailand from January 1995 to March 1995

Effect of Motorcycle Rider *Education*: *Changes in Risk Behaviors and Motorcycle-Related Injuries in Thailand*

- ◆ Interview survey conducted in sample of sub-districts and control villages in March of 1997

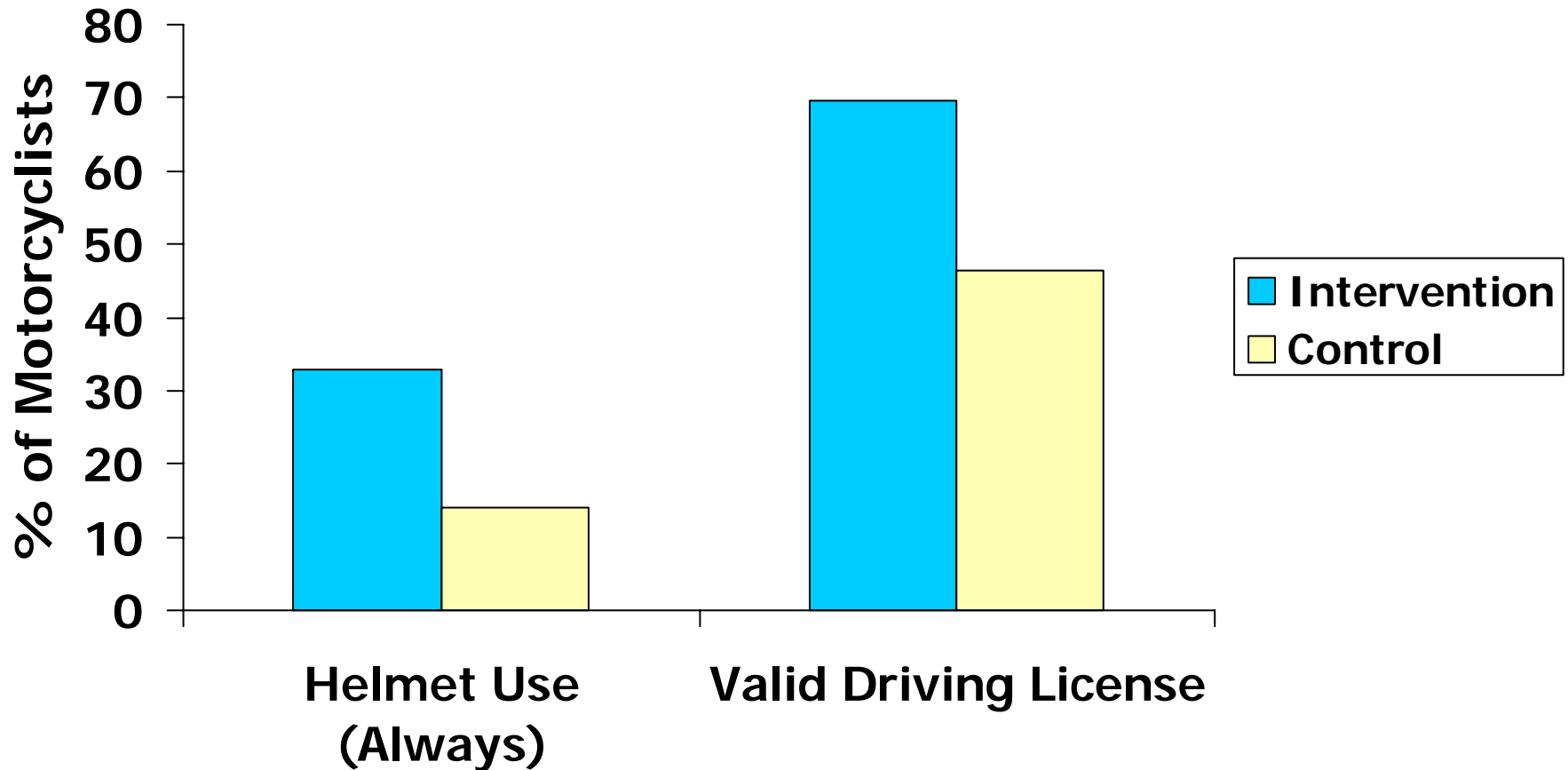
Motorcycle Injuries

In Intervention and Control Sub-Districts in 1994–1996

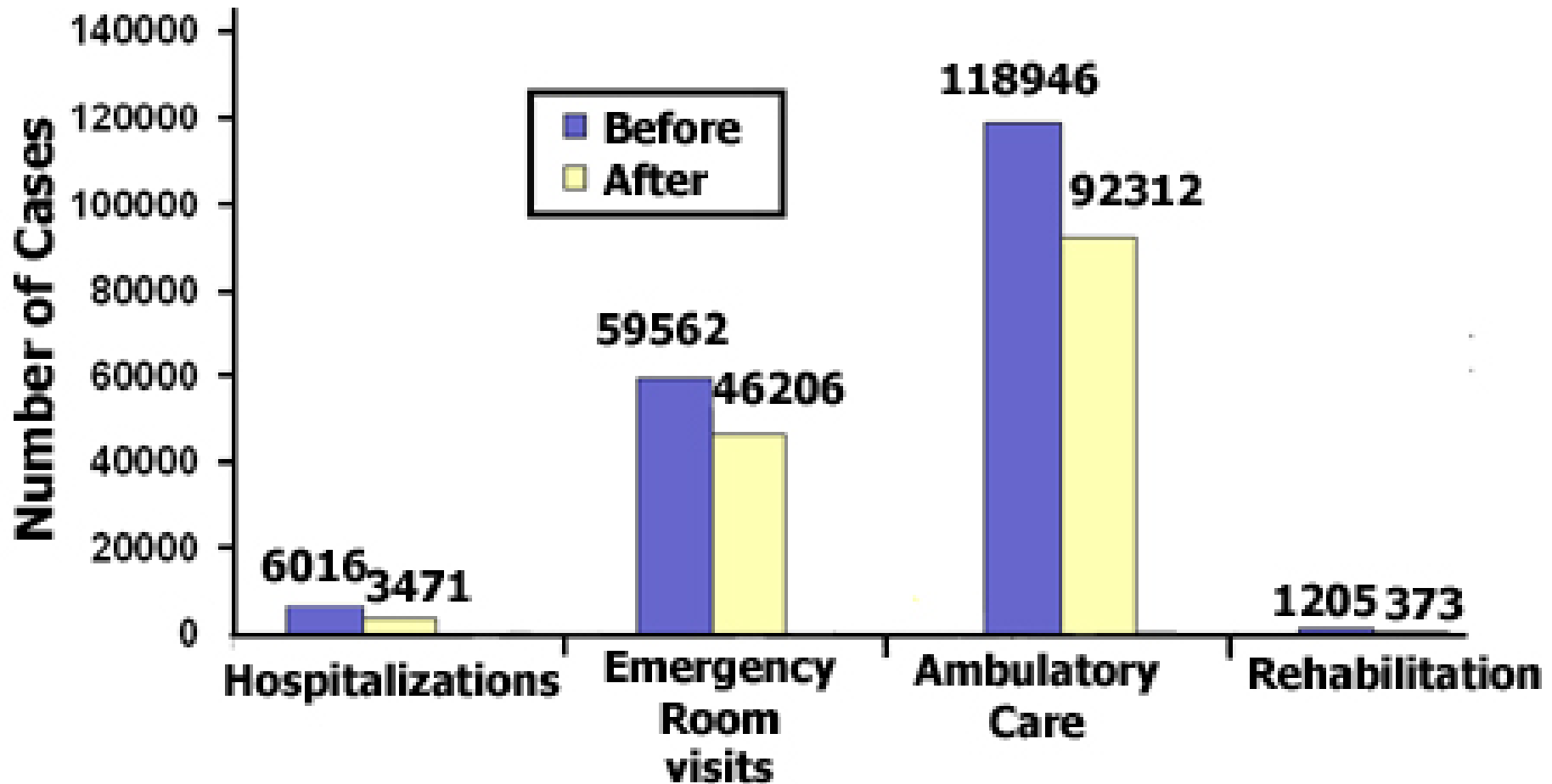


Driving Behaviors among Motorcyclists

In the Intervention and Control Group, March 1997



Estimation of Benefits of Crash Helmet Legislation *For Bicyclists for Five Years in Israel*



Effect of the *Mandatory Helmet Law* in Taiwan

- ◆ Taiwan passed a mandatory helmet law in June 1997
- ◆ After six months:
 - Motorcycle fatalities decreased 14%
 - Head injuries fell 22%
 - Non fatal motorcycle injuries fell 31%

Taxation and Economic *Incentives*: Potential Effectiveness

- ◆ Price increases of harmful products are frequently associated with injuries and can decrease their use
- ◆ **35% tax** on the retail price of alcoholic beverages could reduce alcohol related fatalities by **50%**
- ◆ **50% tax** could reduce injuries by **75%**

Product Designs

- ◆ The relative risk of head injury among motorcycle riders was significantly reduced by wearing a ***full face helmet***, but not by wearing a partial coverage helmet in Taipei, Taiwan

Product Designs

- ◆ In rural Nepal, where burns are the second most common source of injuries, a program to introduce low-cost, enclosed wood burning stoves known as “chulos” led to a substantial and significant decrease in the number of burns

Environmental Modification

- ◆ Modifying road networks to divert high speed traffic away from areas with a large number of unprotected people, such as pedestrians and cyclists
- ◆ Constructing barriers around bodies of water to prevent small children from falling in and drowning

Environmental Modification

- ◆ Fatal head injuries can be prevented by planting coconut trees away from home and busy village trails in rural Africa

The Effect of Speed Cameras on Injuries

From Road Accidents in London

- ◆ The Highway Agency reported the findings of a six year experiment in the use of speed cameras on west London truck roads

The Effect of Speed Cameras on Injuries

From Road Accidents in London

- ◆ Comparison of deaths and injuries in the three years before the installation of cameras and the three years afterwards showed:
 - The number of deaths reduced threefold, from 68 to 20, and the number of serious injuries by over a quarter, from 813 to 596
 - Lesser injuries also fell significantly, from 4,983 to 4,375

Prevention of Injuries in Malaysia

Road Safety

- ◆ The National Road Safety Council is responsible for road safety
- ◆ It meets annually and acts in an advisory capacity on major policies and issues
 - Suggested better enforcement measures (e.g., speed cameras along highways and alternate highways) as priorities

Prevention of Injuries in Malaysia

National Road Safety Council

- ◆ Set target to reduce road accidents by 30% by the year 2000

Injury Prevention Efforts in Mexico

- ◆ Earliest initiative at national level was a governmental decree to establish a **National Accident Prevention Council** in 1961; affirmed by a second decree in 1987
- ◆ Mexico has held national conferences on injury and injury prevention

Injury Prevention Efforts in Mexico

- ◆ **In 1994:** An injury surveillance system was set up as part of the National Epidemiological Surveillance
- ◆ **In 1995:** Mexico introduces “basic packet of health services” that represents the minimum health services that should be made available to all citizens

Injury Prevention Efforts in Mexico

- ◆ “Accident prevention and initial treatment of injuries” one of 12 packet components (a symbol of heightened government commitment to injury prevention)

PAHO Involvement in Injury Prevention

- ◆ **In the 1980s:** PAHO sponsored a variety of workshops on motor vehicle injuries and information systems
- ◆ **In 1985–1986:** PAHO sponsored a study in four selected countries (Brazil, Chile, Cuba, Venezuela) to examine the incidence of injuries in children and adolescents under age 20

PAHO Involvement in Injury Prevention

- ◆ **In 1994:** PAHO published an epidemiological bulletin
 - Describing the lack of information about the extent, type, and severity of unintentional and intentional injuries in America
 - Lack of information on the response of health and legal response to injury and violence

PAHO Involvement in Injury Prevention

- ◆ **In 1995:** PAHO assigned responsibility for activities related to unintentional injuries to a non-communicable disease program (HCN)
- ◆ **Since 1995:** Several WHO collaborating centers have been designated to the region to define the problem, develop a policy, and disseminate relevant information

PAHO Involvement in Injury Prevention

- ◆ **In 1996:** Injury surveillance demonstration project initiated in various Caribbean countries
- ◆ **In 1998:** PAHO co-sponsored an injury policy development forum with Rollins School of Public Health at Emory University, Atlanta

Government Response: *South Africa*

- ◆ Establishment of:
 - Child Accident Preventive Foundation of South Africa in 1978
 - The National Trauma Program of Medical Research Council in 1987

Government Response: *South Africa*

- ◆ Establishment of:
 - The Cape Metropolitan Violence and Injury Mortality Surveillance System in 1993
- ◆ Indicates the level of commitment to tackling injury and violence by civil society and the South African government

Government Response: *Ghana*

- ◆ In Ghana, traffic related injuries have received some attention on the part of the government and the World Bank
- ◆ World Bank funded the “**Ghana Road Safety Project**” which has been ongoing since 1990

Government Response: *Ghana*

- ◆ **Ghana Road Safety Project**
 - Strengthening the Building and Road Research Institute (BRRI) in its work of collecting, analyzing, and providing crash statistics for Ghana
 - Enhancing vehicle inspection capabilities for the Vehicle Examination and Licensing Division

Government Response: *Ghana*

- ◆ **Ghana Road Safety Project**
 - Improving the training and equipment for speed monitoring and control by the Motor Transport Traffic Unit of the Ghana police service

Source: Forjough, S.N., Trop Med Int Health 1998; 3: 349–356