

# Interventions for the Prevention of Road Traffic Injuries: Case Study of Malaysia

**Nhan T. Tran, PhD**

Research Fellow

Bloomberg School of Public Health

Johns Hopkins University, USA



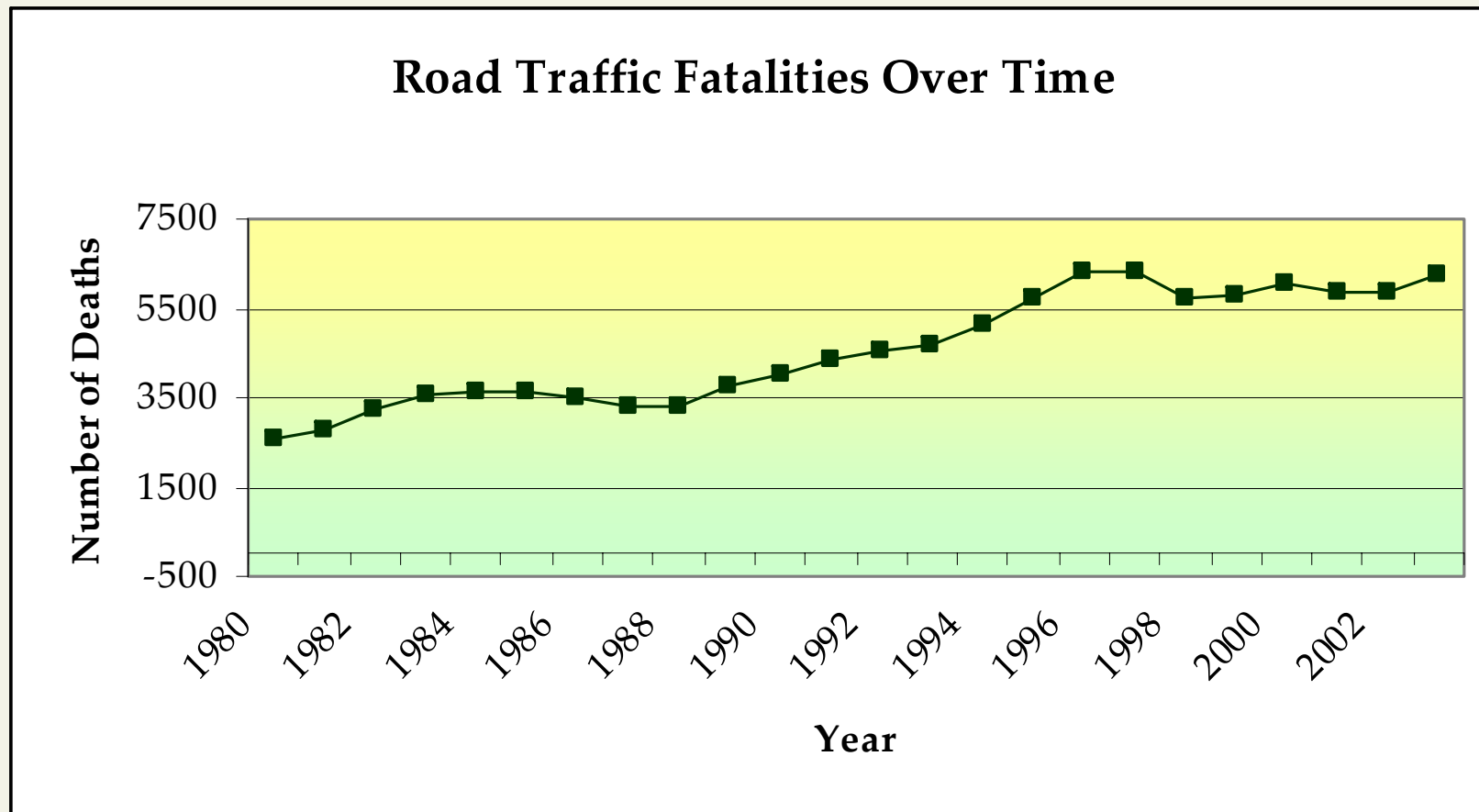
# Presentation Overview

- Epidemiology of RTIs in Malaysia
- Public approach to injury prevention
- Applications of CEA modeling to interventions for the prevention of RTIs:
  - Road Engineering
  - Conspicuity Enhancement

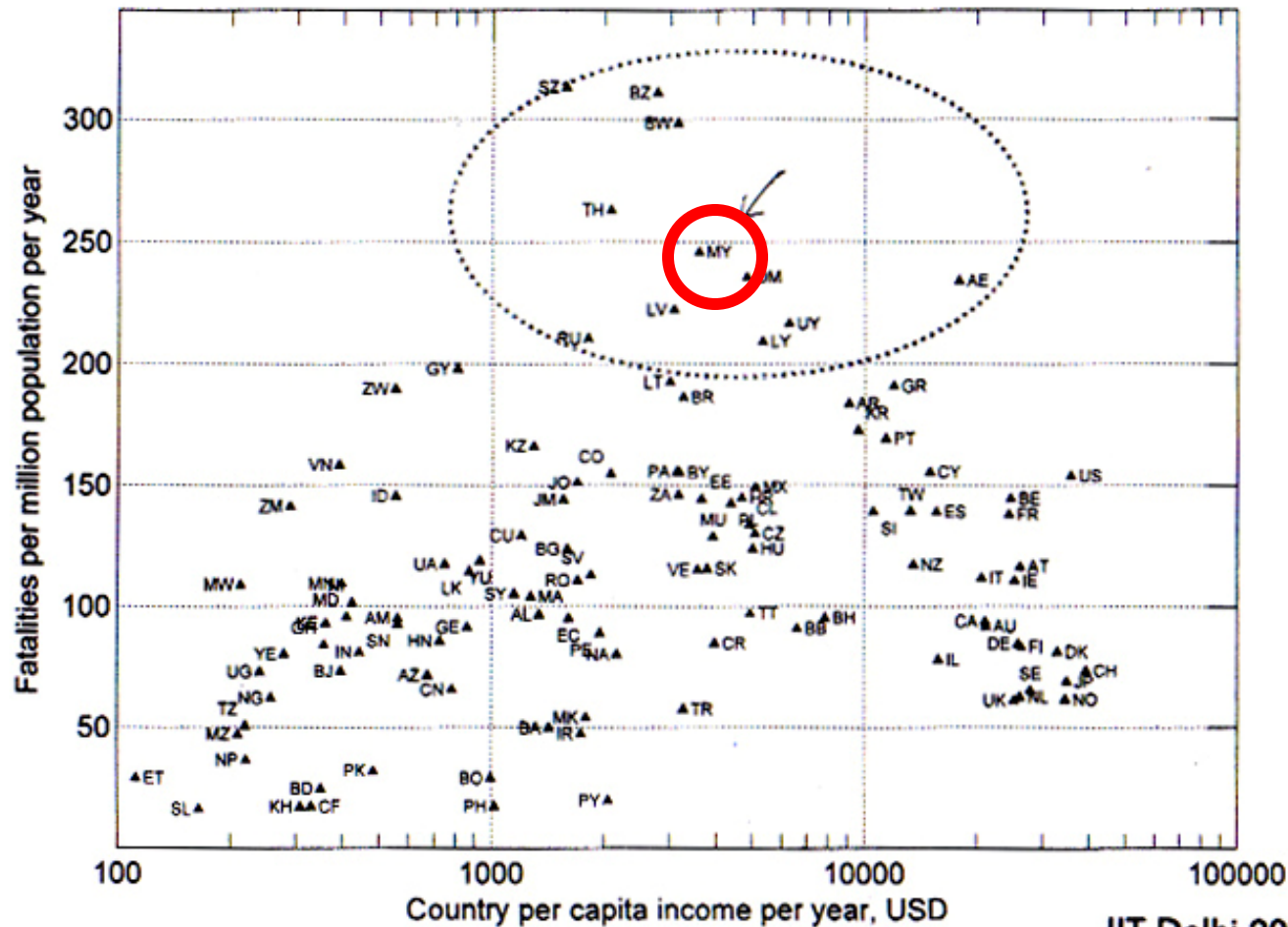
# Leading causes of DEATH in Malaysia

2000	2001	2002
1. Heart Disease	1. Heart Disease	1. Heart Disease
2. Road Traffic Injuries	2. Road Traffic Injuries	2. Septicemia
3. Septicemia	3. Septicemia	3. Road Traffic Injuries
4. Asthma	4. Asthma	4. Asthma
5. Stroke	5. Pneumonia	5. Pneumonia
6. Pneumonia	6. Stroke	6. Stroke
7. Diabetes	7. Diabetes	7. Diabetes
8. Hypertension	8. Lung Cancer	8. Lung Cancer
9. Lung Cancer	9. Hypertension	9. Hypertension
10. Colon Cancer	10. Colon Cancer	10. Colon Cancer

# Road traffic fatalities in Malaysia



# Road traffic fatalities in Malaysia





# RTIs in Malaysia

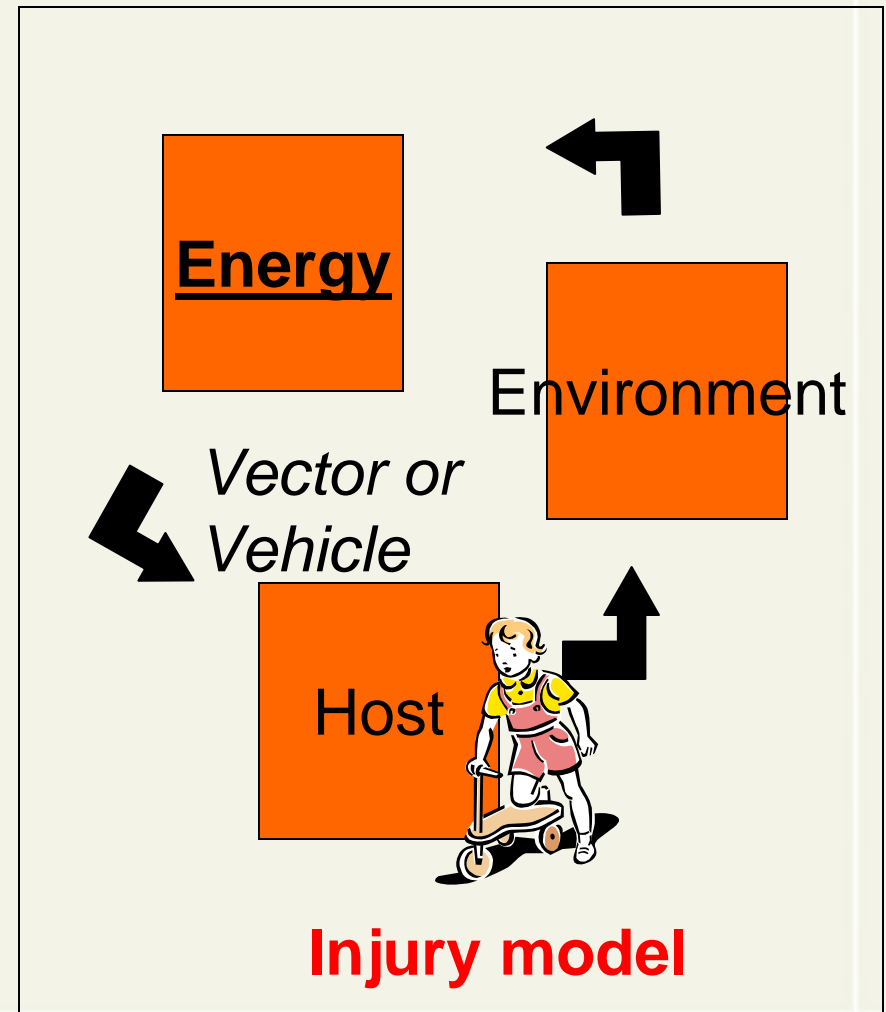
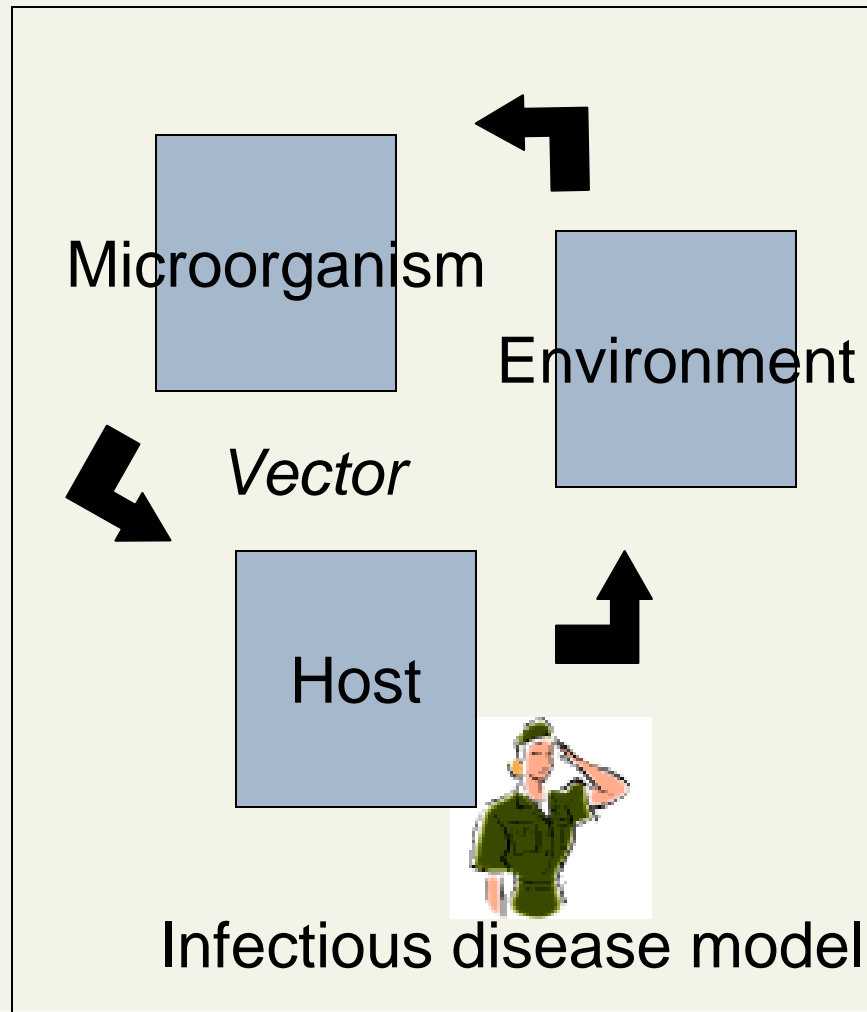
- Most of the victims are young: 70% admitted to hospitals were 12-44
- Males disproportionately impacted
- Motorcyclists account for majority of all road traffic related fatalities and injuries



# Motorcyclists in Malaysia

- Constitute about half of all motorized transport
- Increased risks for death and injury due to relative smaller size and increased body exposure
- Less conspicuous and different travel pattern

# Injury Causation Model



# Haddon Matrix (illustrative)



## Person:

- alcohol use
- driving speeds
- protective equipment



## Vector:

- VEMs
- lights
- brakes



## Environment:

- street lighting
- paved roads
- road barriers

# Haddon Matrix (illustrative)



## Pre-Crash

Intervention can prevent:

- death
- injury
- property damage

## Crash

Intervention can prevent:

- death
- injury

## Post-Crash

Intervention can reduce the chances of:

- death
- injury

# Haddon Matrix: Interventions for motorcycle injuries

	Person	Vector	Environment
Pre-Event	Driver education, avoiding alcohol	Use of VEMs	Clear road signs, street lighting
Event	Safety helmets	Placement of equipment (baskets)	Separation of traffic
Post-Event	Prevention of disability	First aid equipment	Availability of EMS



# Current interventions for motorcycle safety in Malaysia

- Mandatory motorcycle helmet legislation
- Traffic calming measures
- Electronic enforcement
- Road safety education (in primary schools)
- Separation of traffic
- Conspicuity enhancement

# Motorcycle Helmets

## **TECHNICAL FILMS SDN BHD**

Client: Kementerian Pengangkutan Malaysia

Product: Motorcycle Safety Campaign

Title: Head Injury Protection " Helmet Test"

Duration : 30 sec

Language: English

Agency: Media House

Date: 24-10-2001

# Motorcycle Helmets

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Client: Kementerian Pengangkutan Malaysia

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# Current interventions for motorcycle safety in Malaysia

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# Interventions for motorcycle injuries

- Exclusive motorcycle lane
  - First in the world, built with WB support
  - Designed to address the different traffic patterns of motorcyclists and passenger vehicles
  - Expanded to 14 Kilometers in 1992
  - Evaluation measured crashes, fatalities, and injuries pre and post implementation



# Exclusive MC Lane

- Evaluation at 9 months post implementation\*:
  - 39% in crashes over 14 kilometer stretch which translated to:
    - Reduction of 7 fatalities
    - Reduction of 5 serious injuries
- Applying assumptions from Bishai & Hyder:
  - 237 DALYs gained at 3% discounting
  - 158 DALYs gained at 6% discounting

\* Radin U & Barton E. Preliminary cost-benefit analysis of the exclusive motorcycle lane in Malaysia. REAAA Journal/January 1997

# Exclusive MC Lane

- Costs\*
  - 400,000 MYR per KM of lane
  - 100,000 MYR annual maintenance
  - Lane will last for 25 years
  - Cost per 1 year of 14 km of MC lane: 324,000 MYR = USD 90,000
- USD 12850/death averted
- At 3% discounting = USD 380/DALY gained
- At 6% discounting = USD 568/DALY gained

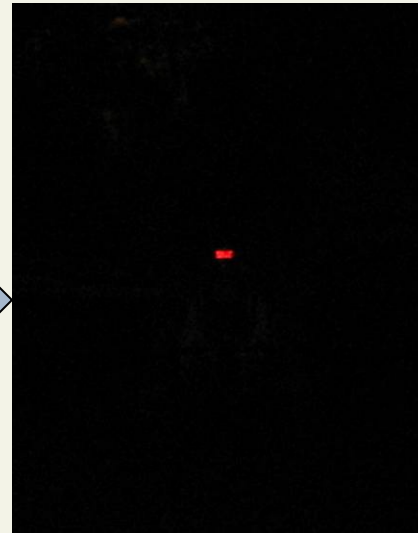
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# Visibility enhancement materials

- Intervention using rear-end adhesive reflectors to increase motorcycle visibility
- Pilot study carried out in Klang District between 2005-2006
- Reflectors distributed to all motorcyclists in Klang district; Kajang district used as a comparison
- Pre/post crash and injury data collected by traffic police

# Visibility enhancement materials



# Evaluating the VEM intervention effectiveness

	Post-intervention (10/5-10/06)	
EVENT	<b>KLANG</b>	<b>KAJANG</b>
All Injuries	-22* (CI: -26.5 ~ -17.5)	0.8 (CI: -1.5 ~ 1.6)
Day	-10.7* (CI: -12.7 ~ -8.7)	0.2 (CI: -0.7 ~ 1.3)
Night	-4.4* (CI: -6 ~ -2.9)	0.1 (CI: -0.4 ~ 0.7)
Dawn	-6.7* (CI: -8.8 ~ -4.6)	-0.2 (CI: -0.7 ~ 0.2)
Fatalities	1 (CI: -1.2 ~ 3.4)	-1.8 (CI: -4.5 ~ 0.8)

## Odds of having a VEM among motorcycles involved in crashes

Traffic police in one jurisdiction reviewed all crashes to determine whether there was a reflector on the rear end of the motorcycle

	(n)	OR	SE	P-value	CI
10/05-9/06	837	.77	.14	.16	.52-1.1

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# Visibility enhancement materials

- Evaluation results:
  - No impact on fatal injuries
  - prevented ~230 night-time injuries in Klang District
  - 10% with permanent disability = 23 injuries
- Applying Bishai & Hyder CEA modeling assumptions:
  - At 3% discounting: 221 DALYs gained
  - At 6% discounting: 268 DALYs gained

# Visibility enhancement materials

- Costs of the intervention
  - Reflectors: 180,000 MYR = USD 50,000
  - Staff & Volunteer: 150,000 MYR = USD 41,500
  - Promotional materials & launch events: 100,000 MYR = USD 27,5000
  - No enforcement costs
- At 3% discounting: USD 443/DALY gained
- At 6% discounting: USD 538/DALY gained



# Summary

- RTIs continue to be serious problem for middle-income countries such as Malaysia
- Interventions such as exclusive MC lanes and helmets can be effective at reducing the burden
- Malaysian case study examples are consistent with assertion that interventions for injury control are among the most cost effective