Traffic Injuries in Children:
The Problem of Safety Inequity, and Social Neglected

Adisak Plitponkarnpim

Child Safety Promotion and Injury Prevention Research Center,

Department of Pediatrics, Faculty of Medicine,

Ramathibodi Hospital, Mahidol University

Death Certificate Study
for fatal injuries among Thai children: 1999-2005

- In 1999-2005, a total of 23457 fatal injuries, accounted for 35.3% of total deaths, occurred to Thai children 1-14 years of age, MR = 22/100,000 person year

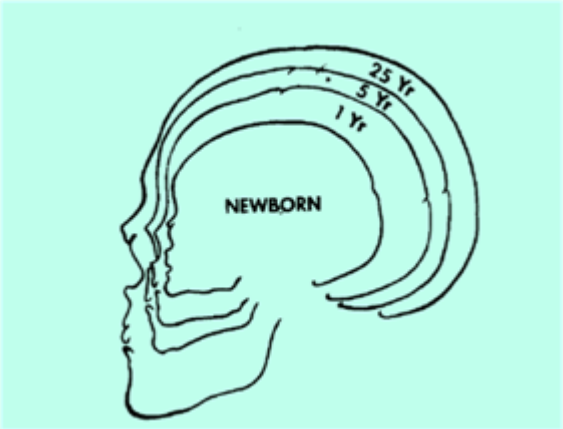
- Drowning is the leading cause of death. 1481 of children 1-14 years of age died of drowning annually , this accounted for 44% of total injury death, and 16.7% of total death.

Traffic Injuries

- 21% of injury deaths and 8% of total deaths.
- **the Second Leading Cause of Child Deaths**
- 721 children per year => MR 5/100,000 per year.

Physical Differences and Injury Risk in Children: Larger Head

- A major difference in anatomy between children and adults is the proportion of total mass in the head.
- At birth, the head comprises 30% of body weight while the adult head makes up only 6% of body weight.



Physical Differences and Injury Risk in Children: Shorter Neck

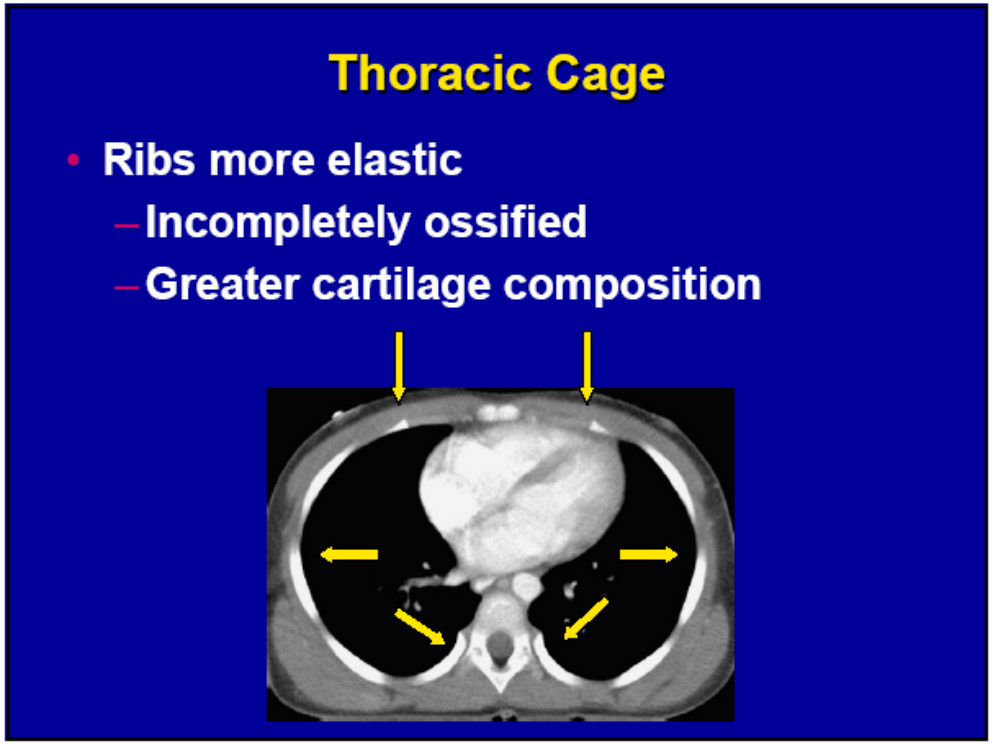
- Atlas (C1) and the axis (C2) do not complete their joining until age 4 to 6.
- Natural neck pivot of children is at C2 or C3, while in adults it occurs near C6.
- Infant neck muscles and ligaments are not well developed, and most children cannot hold up their heads until about three months.

Cervical Fracture

- About 60-70% of pediatric cervical fractures occur at C1 or C2, compared to about 16% of adult cervical spine fractures.

Physical Differences in Children

- **Chest more pliable**
  - **Pulmonary contusion more likely**
  - **Rib fracture is rare**



Physical Differences in Children

- **Abdominal organs less well protected.**
  - **Liver is not covered by the rib cage.**
  - **Less muscle mass to abdominal wall.**
  - **Less subQ tissue to absorb the injury.**

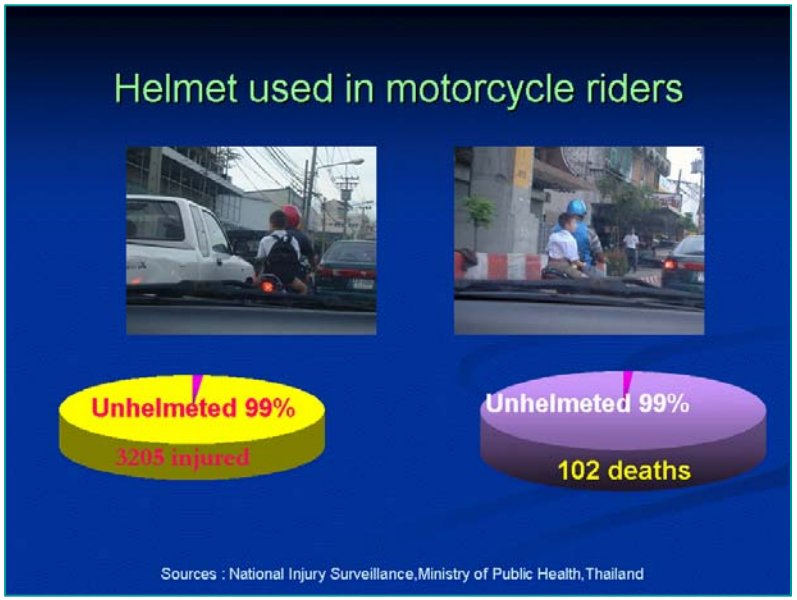
Behavioral and Developmental Factors in Pediatric Injuries

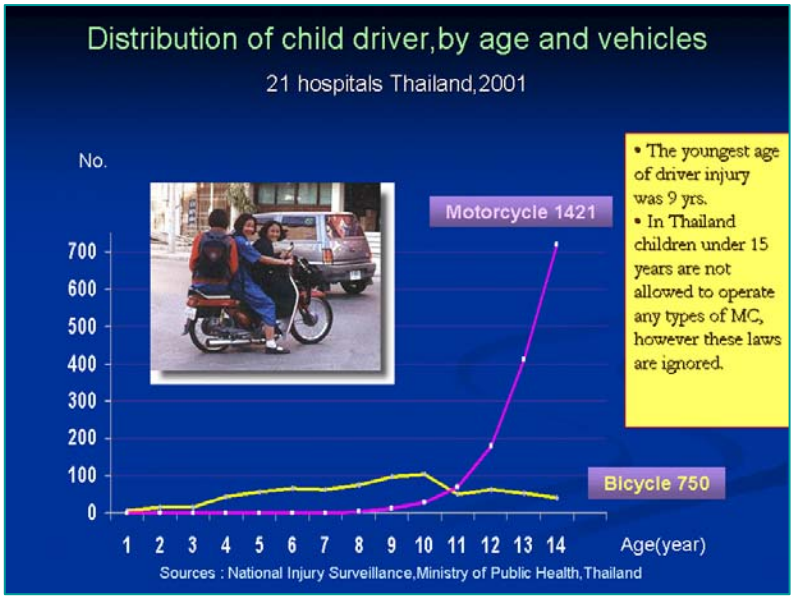
Age group	Contributing Factors	Resultant Risks
Infant	Completely dependent on parent or caregiver; requires constant supervision; unable to communicate verbally; explores by putting objects in mouth; rapid changes in motor ability and mobility	Falling; suffocation; choking on small items; child abuse; electrical burns to mouth; burn-related injuries from house fires
Toddler, preschooler	Curious and impulsive; puts objects into mouth; improved motor ability and mobility, likes to explore; high center of gravity; imitates adult behavior without knowledge of potential dangers; requires constant supervision	Falling on stairs; scald burns; drowning incidents; child abuse; poisonings; passenger in motor vehicle crashes
School-aged child	Improved motor ability and mobility; increased independence; may recognize dangerous situations but lacks judgment to make safe decisions; unable to assess speed of oncoming traffic	Pedestrian injuries; bicycle injuries; sports and playground injuries; drowning incidents
Adolescent	Dynamic emotional and physical change; increased strength and coordination; inexperienced in decision-making; greatly influenced by peers; likely to engage in risk-taking behavior, experimentation with drugs, including alcohol; increased access to fire arms; feels invulnerable; imitates behavior of older adolescents and adults; increased involvement in sports and recreational activities; increased independence; increased incidence of depression	Motor vehicle injuries; injuries from organized sports activities; injuries during outdoor recreation; drug intoxication; violence-related injuries; suicide attempts and suicide gestures

Traffic Injuries, the Second Leading Cause of Child Deaths

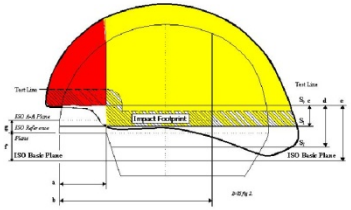
- 65% are MC related
- In Urban area, incidence of pedestrian injury is increasing

Age Inequity, and Social Neglected





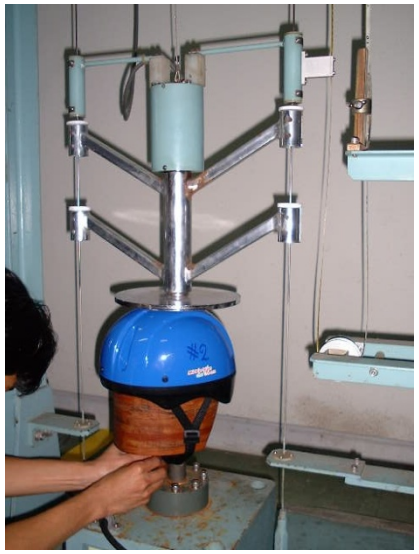
Helmet were found to reduce the risk of head injury and from five well conducted studies the risk reduction from motorcycle helmet estimated to be 72% (OR 0.28, 95%CI, 0.23:0.35).



Standard helmet is available for 2-3 year old and older

หมวกเด็ก

Helmet for kids



Test

Impact attenuation test

Penetration test

Retention test

Standard

JIS, DOT, CPSC, ECE

Key Strategy for Mc related Injury Prevention in Adolescent

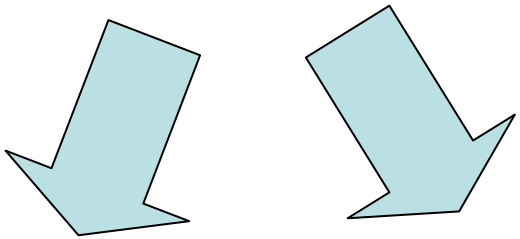
- Reduce users<2yrs
- Driving license >18 yr
- **Helmet use for all passenger > 2yr**
- Alcohol control

Other Risks

- Driving with child passengers
- Driving at night
- Racing
- Traffic rule violation

curfew..limited license

- **Passenger and Driver related injuries**



Challenging

•strengthening community regulation

-Family

-Community

-School

Promising

•Early intervention for Safe behavior

Effectiveness of Helmet promotion program in preschool children on safe behavior

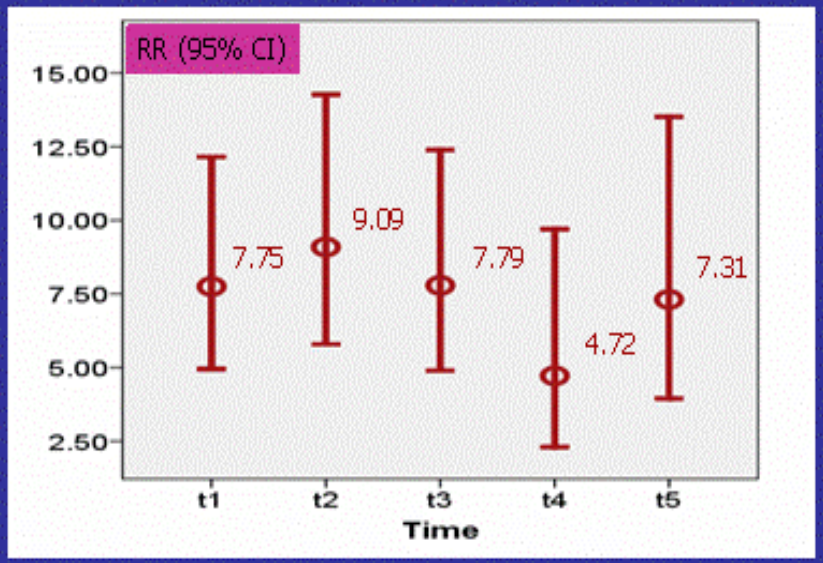
Yuvaluck Thammagasorn, MD

Adisak Plitponkarnpim, MD, MPH

Interventions

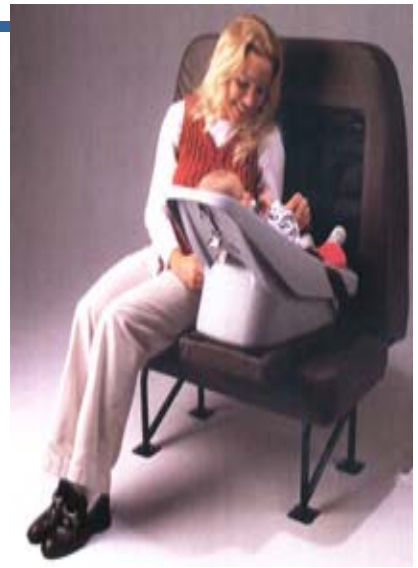
- **Primary Target = Day-care center**
  - Head injury prevention training course for day care administrators, caretakers
  - Head injury prevention policy
  - Helmet rental program

Comparison of Motorcycle helmet use proportion between control and intervention groups: Day-care coordinator and researcher observation



Traffic Safety

- Rear-facing infant seats for infants <9 kg and <1 year of age
- Install at rear seat
- Most air bag-related fatalities occur when children <12 years of age are in the vehicle's front seat

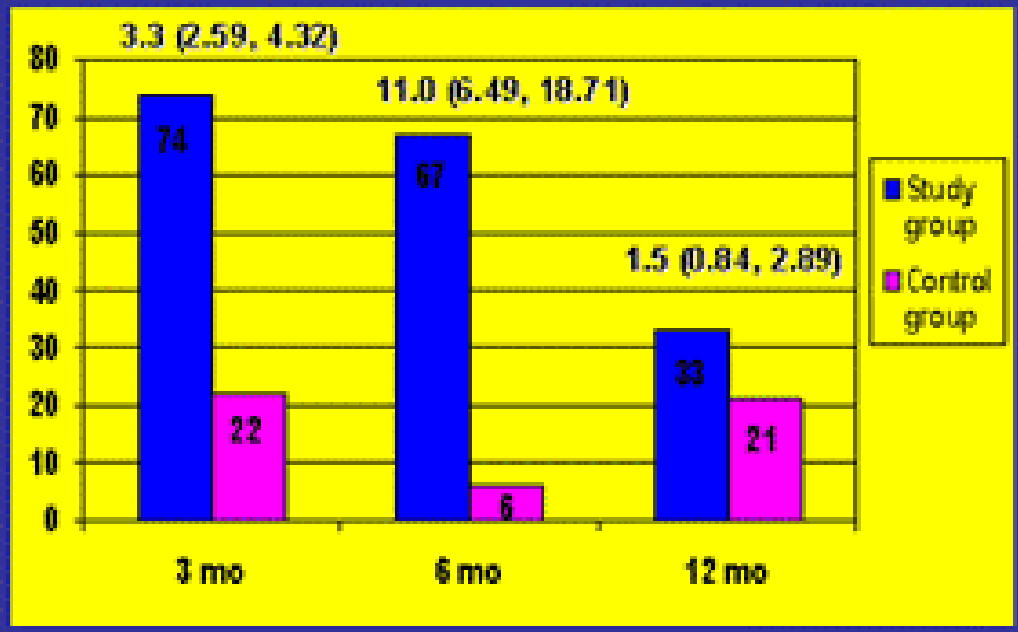


Reduce infant mortality by 69%

Effectiveness of Education and Loaning Program to Promote the Use of Child Restraint System in Motor Vehicles

Pajaree Limthongthang, MD
Adisak Plitponkarnpim, MD

Comparison between Proportion of CSS Use in Study and Control Groups

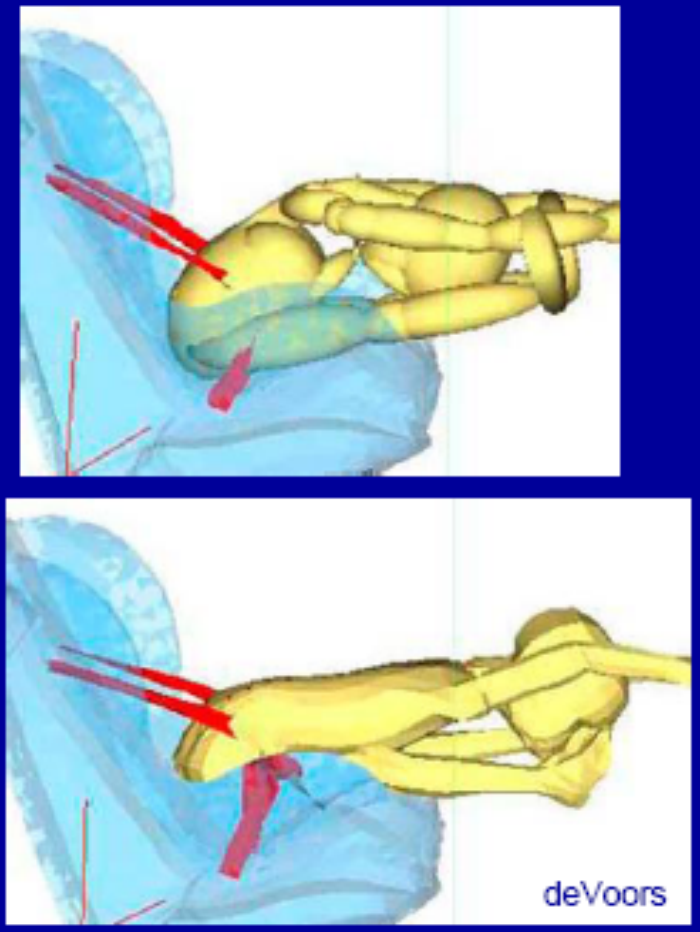


Lap Seatbelt Injuries

- 1% of children who are wearing seatbelt
- Most common between 5 – 9 years of age
- Improper position of belt
  - Small pelvis size
  - Short legs

Lap Belt Injury Mechanisms

- High center of gravity in young children
- Fulcrum of force at juncture of seatbelt and abdominal wall
- Torso free to move forward, leading to head impact



Seat Belt Syndrome

- Hip and abdominal contusions
- Ileal and pubic bone fractures
- Lumbar spine injuries
  - Chance fracture
  - Compression fracture
- Intrabdominal injuries
  - Small bowel mesenteric tears and perforation
  - Bladder rupture

Car seat for a child 1-4 years

Tray Shield

5 Point Harness

T- Shield

Convertible seat and forward facing seat

booster seats with seat belts for children 4 to 7 years of age

Pedestrian Injury Related Death

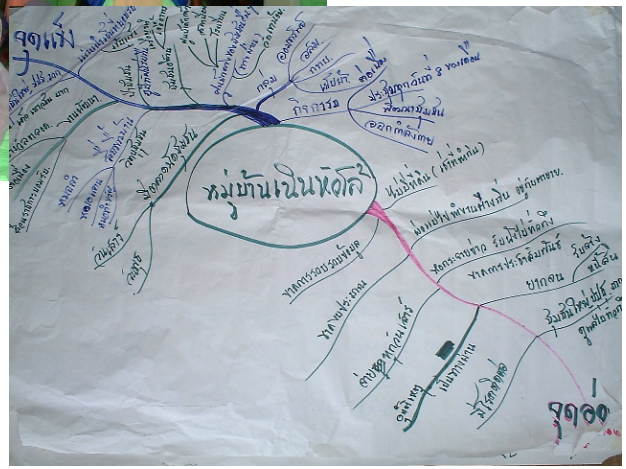



64% 0f traffic injury deaths in Bangkok were pedestrian related.

- **31.3% were related to young children staying beside the road way nearby home-place.**
- **25% were related to child behaviour of darting out.**
- **18.8% were related to crossing the street.**
- **12.5% were the events occurring while walking on the sidewalks.**

Safe community for children

- Research for empowerment
- Community based participatory research
  - Empower community
  - Child participation
- Building co-operation, knowledge and skill of community in the level of grass-root coalition in order that community itself have ability to promote child safety and injury prevention.



School bus

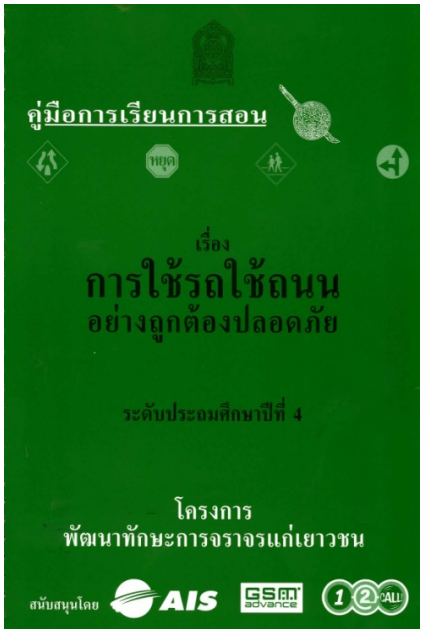
- 5 year-old sat on the front seat of the school bus with the other 2 students. While the driver making a U turn, the door opened, he fell drown and was hit by the truck.

CSIP Safe School and Safe Daycare Program

- Safe school
- Safe daycare

- Six Safe
  - Safe environment
  - Safe teaching, rearing and learning
  - Safe from persons
  - Safe route
  - Safe preparedness for emergency
  - Safety skill

Safe school: Education

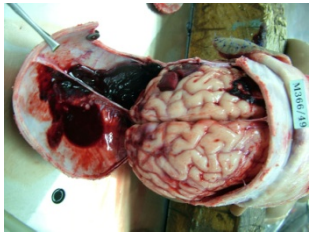


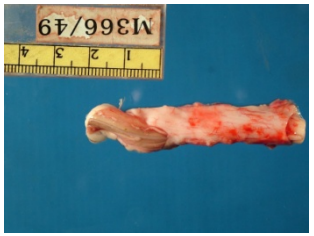
Traffic safety

Safe school: Student activities

Multisectorial –Multidisciplinary Approach for IP
" We go together on the frontline"

- **CDR = Child Death Review** "From one life, to prevent other lives"
- BKK initiate the 1st CDR team composing of prosecutor department, forensic medicine, Mn of justice, BKK Police department, National child protective committee, Mn of Social dev
- All deaths by external causes -> Indepth interview+ forensic data+ hospital data+ Police data in 30 days
- Helping other children, Change death certificate, Meeting =>How to prevent the repetitive events, Report to all responsible organizations, Report to policy maker and media
- More 3 pilot provinces under Provincial Child Protective Committee
- "This is for prevention purposes, not for beat anyone"





Interventions attack all levels!

Safe Kids Thailand Program: