



Paediatric “Off-Road Vehicle” Trauma - a Growing Problem in NSW

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Background

ORVs are popular among Australian children

Recreational & occupational

11 children <15 years old killed 1989-1992¹

97% adolescent agricultural MC riders have no formal training¹

1. **Lower, T., et al.,** *Reducing all-terrain vehicle injuries. A randomised control study of the effect of driver training*, Lower, T., Editor. 2005, Rural Industries Research and Development Corporation.



Aim

To evaluate the features of paediatric off-road vehicle (ORV) trauma focusing on the severity & pattern of injury, with a view to injury prevention





Definitions

Term	Definition	Additional information
Paediatric	Less than 17 years	
Off-road vehicle (ORV)	Motorcycle (MC)	Two wheels (>50cc)
	Mini-motorcycle (mini-MC)	Two wheels (<50cc)
	All terrain vehicle (ATV)	Three or four wheels
Organised riding	Motocross & its variants (Motorcycling Australia)	
Non-organised riding	Sport/recreational	
	Bush track	
	Home	
	Street	
	Farm	



Methods

Study design	Retrospective review
Data	Trauma database at CHW
Time	Jan 1998 to Dec 2007
Data points	Age & Gender Injury severity score (ISS) Hospital length of stay (LOS) Mode of presentation Anatomical region injured Type of vehicle Accident setting Speed Protective gear Mechanism of injury Site of accident



Results



Demographics



Number		288
Sex	Male	242 (84%)
	Female	46 (16%)
Mean age		10.3 years
Mean ISS		7.1
Deaths		1
Presentation	Direct presentation	151(52.4%)
	Transfer	137(47.6%)
Mean LOS		4.9 days
Accident setting	Non-organised riding	254(88.2%)
	Organised riding	34(11.8%)
Mean estimated speed		41.3km/h



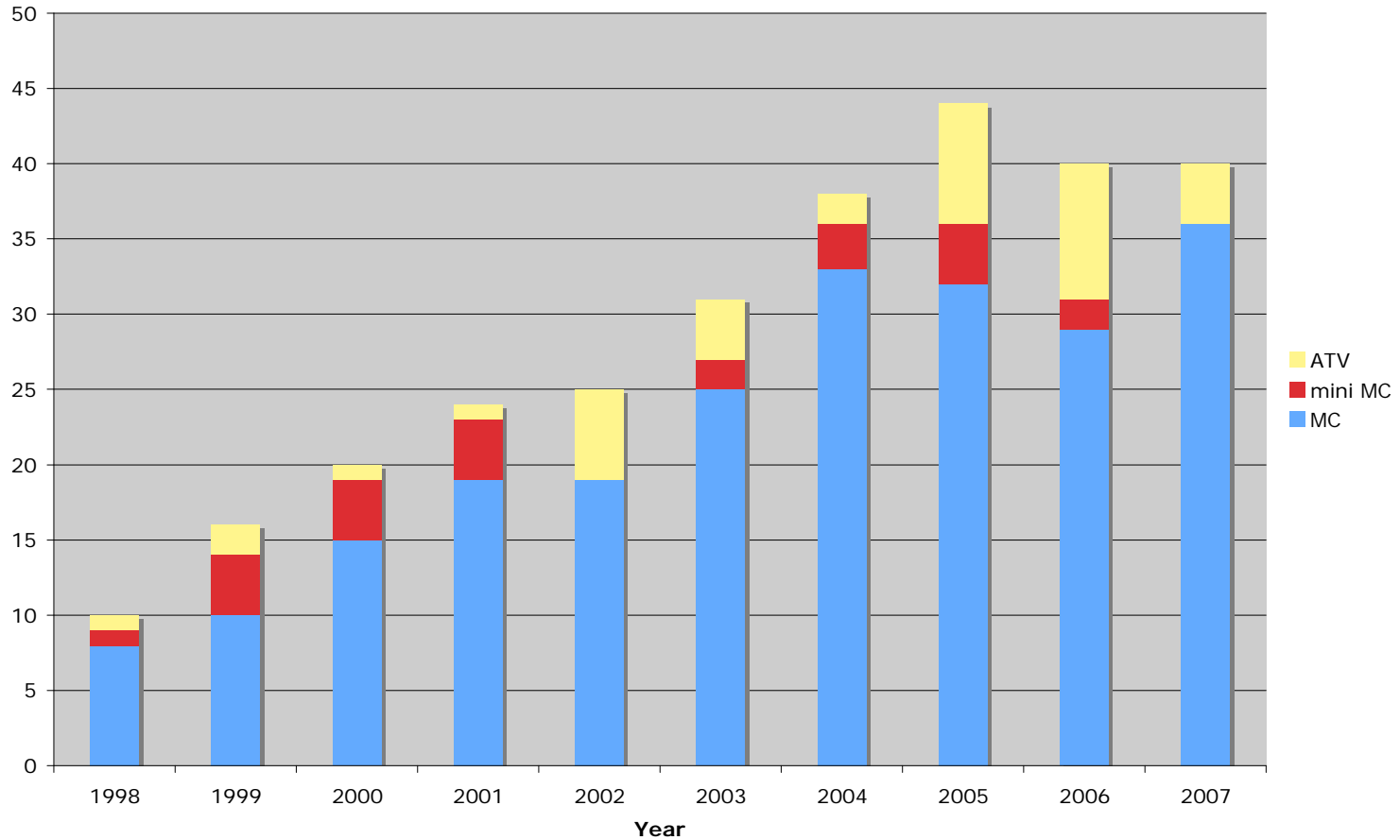
Organised vs. Non-Organised Riding



Riding category	Accident setting	Total
Organised	Motocross	34 (11.8%)
	Subtotal	34 (11.8%)
Non-organised	Bush track	89 (30.9%)
	Sport/recreational	34 (11.8%)
	Home	60 (20.8%)
	Street	37 (12.8%)
	Farm	21 (7.3%)
	Other	13 (4.5%)
	Subtotal	254 (88.2%)
	Total	288 (100%)

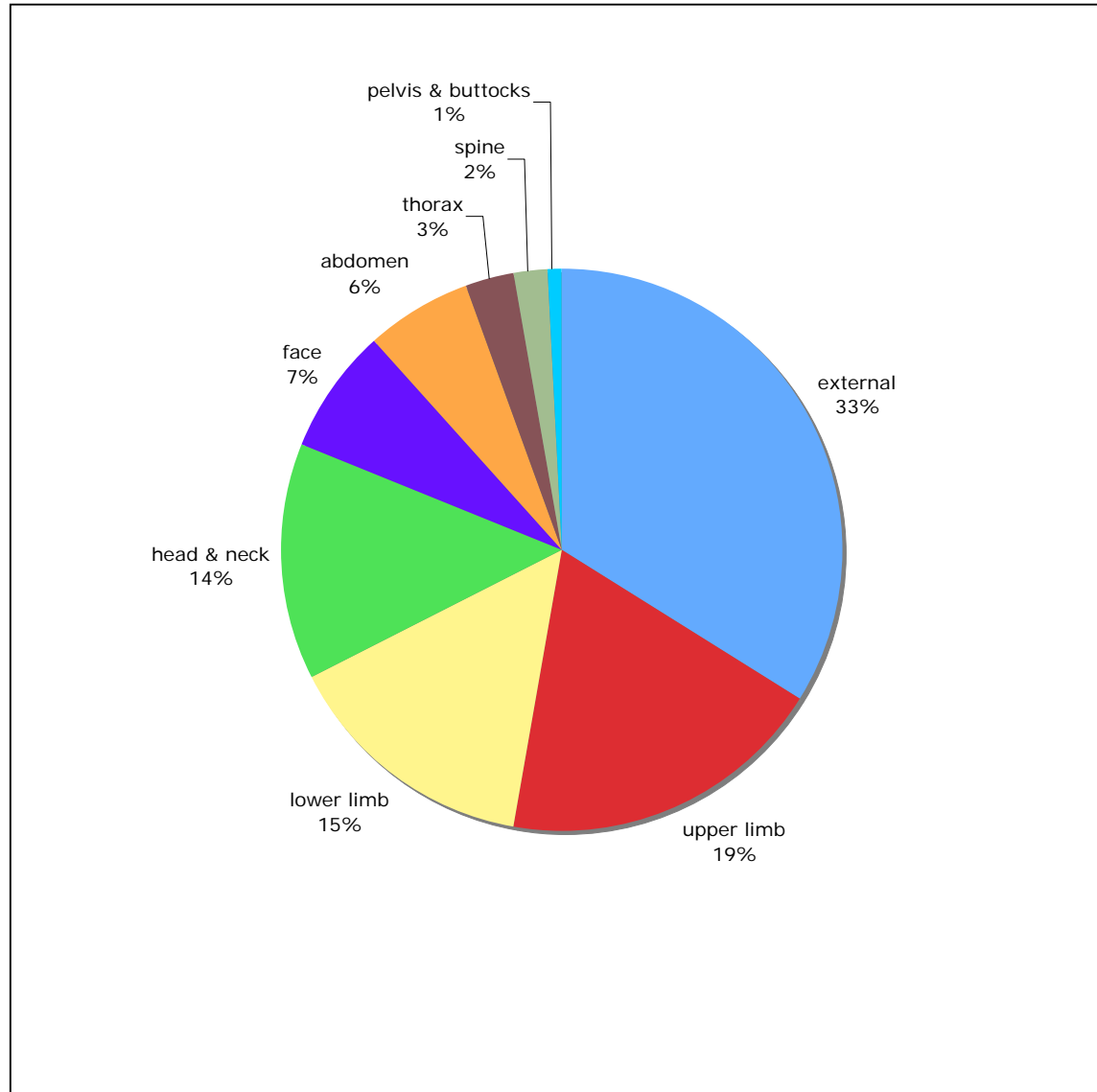


ORV Trauma Presentations per Year





Injuries Sustained

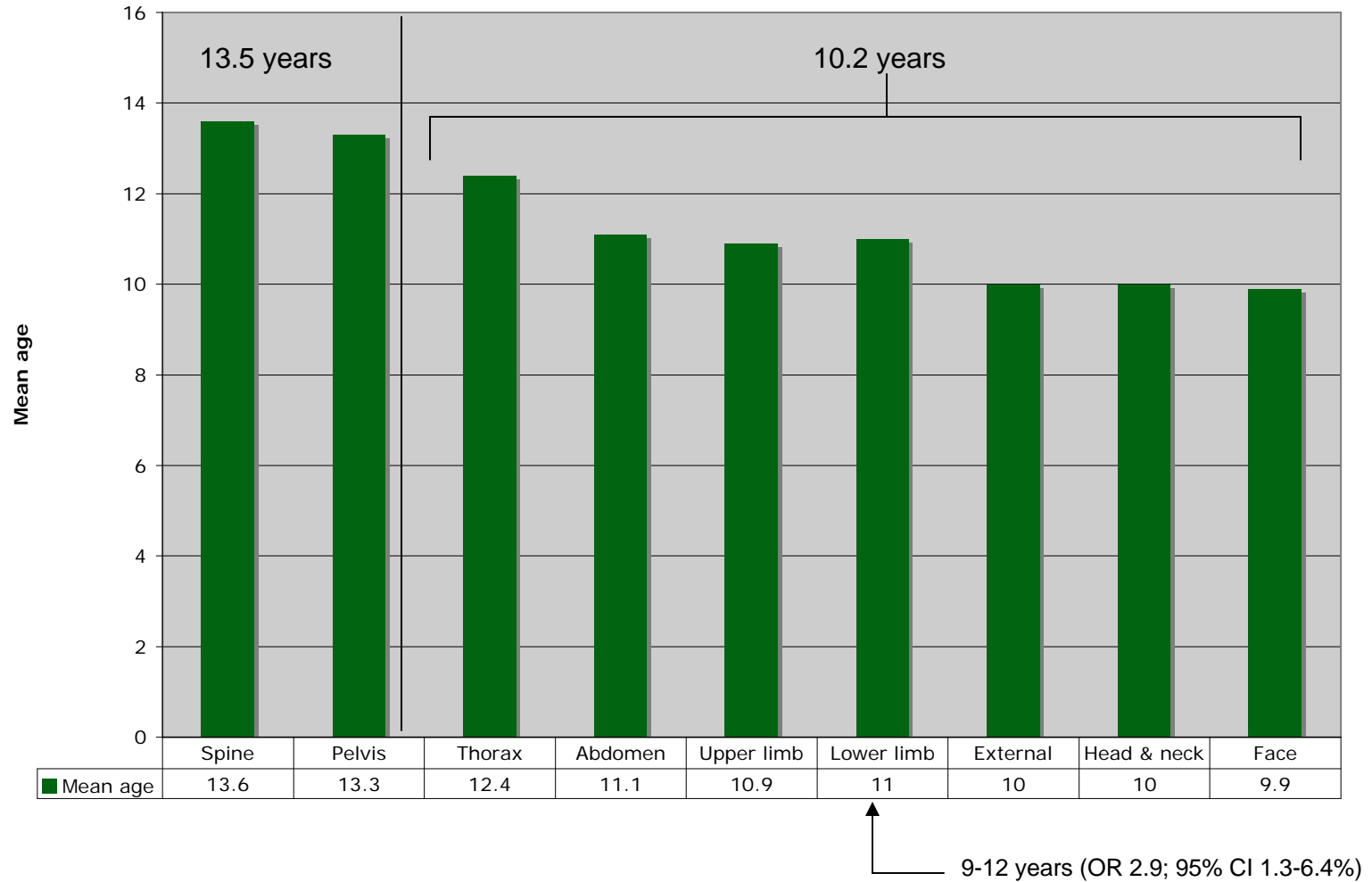




Determinants of ISS & Injury Type



Age Distribution





Gender

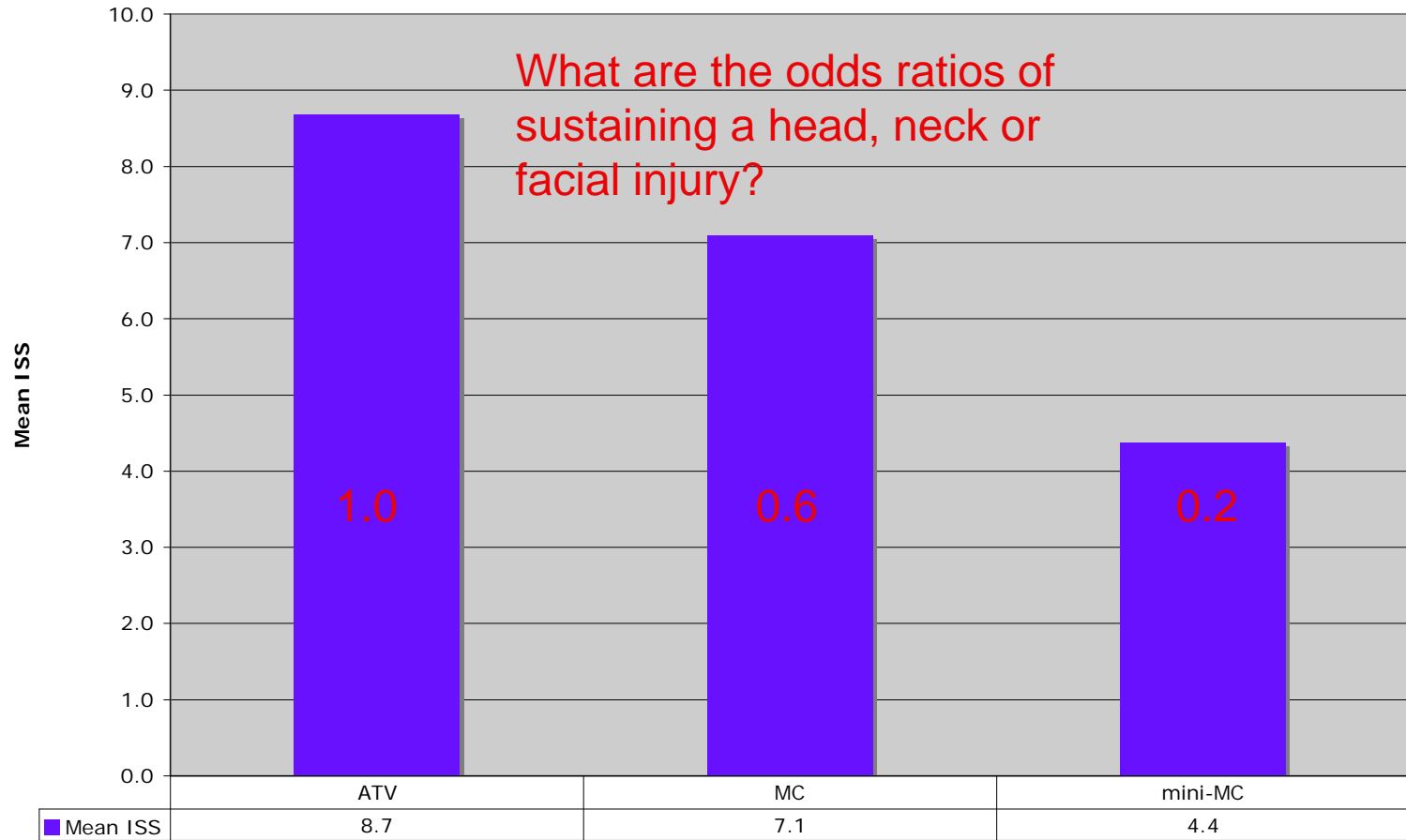


Males = Females

ISS &
Injury Type

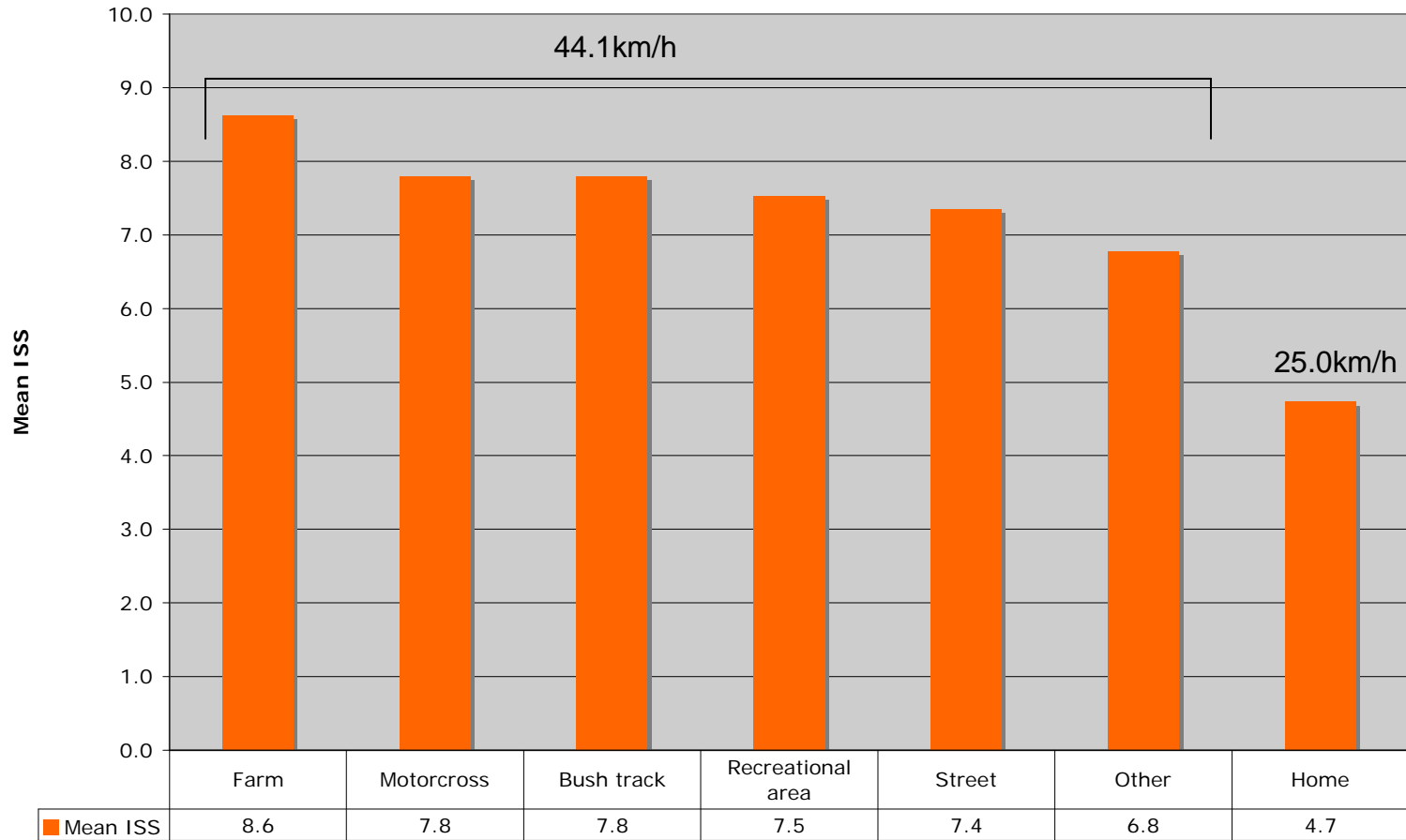


Type of Vehicle





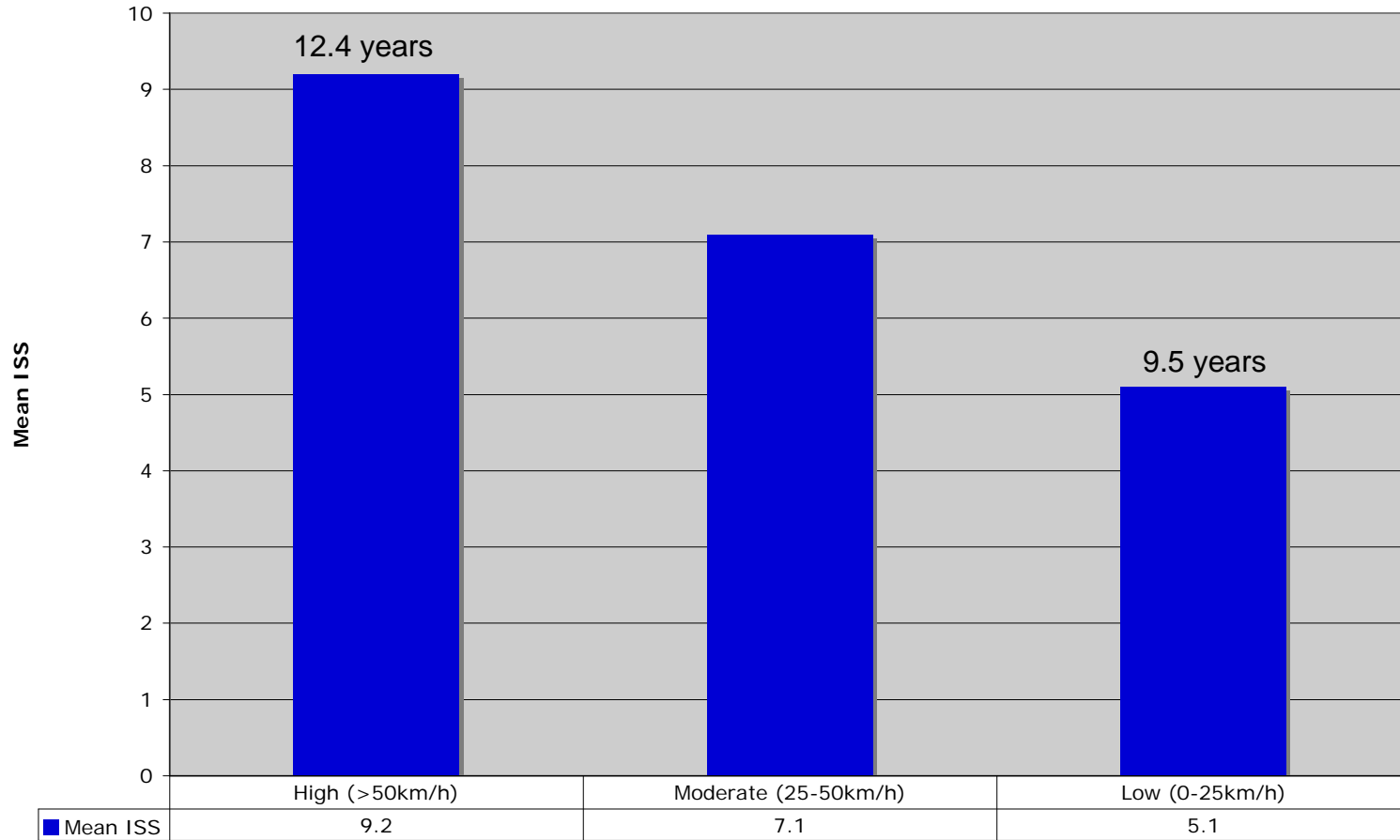
Accident Setting



Mean ISS may be related to speed rather than setting...

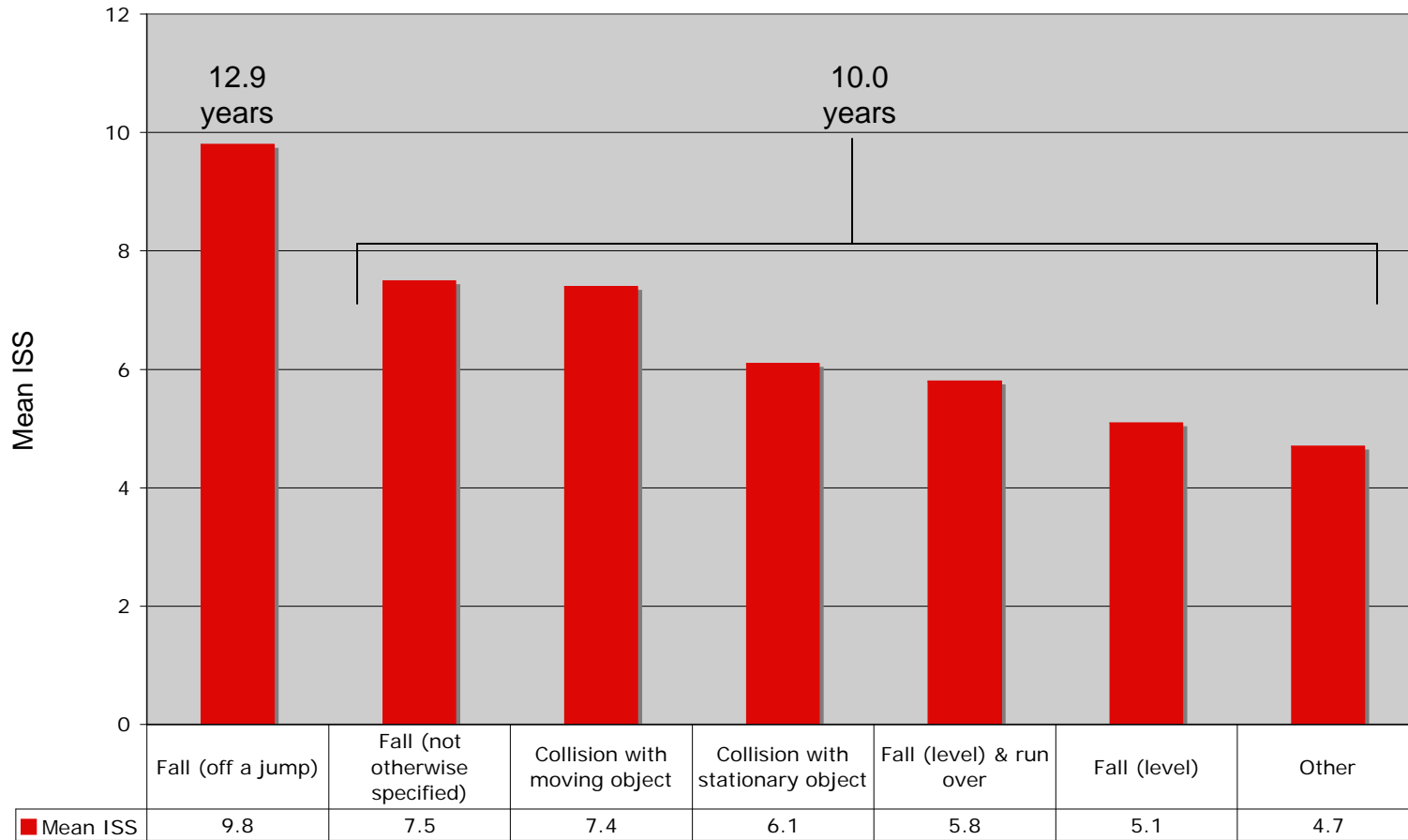


Speed





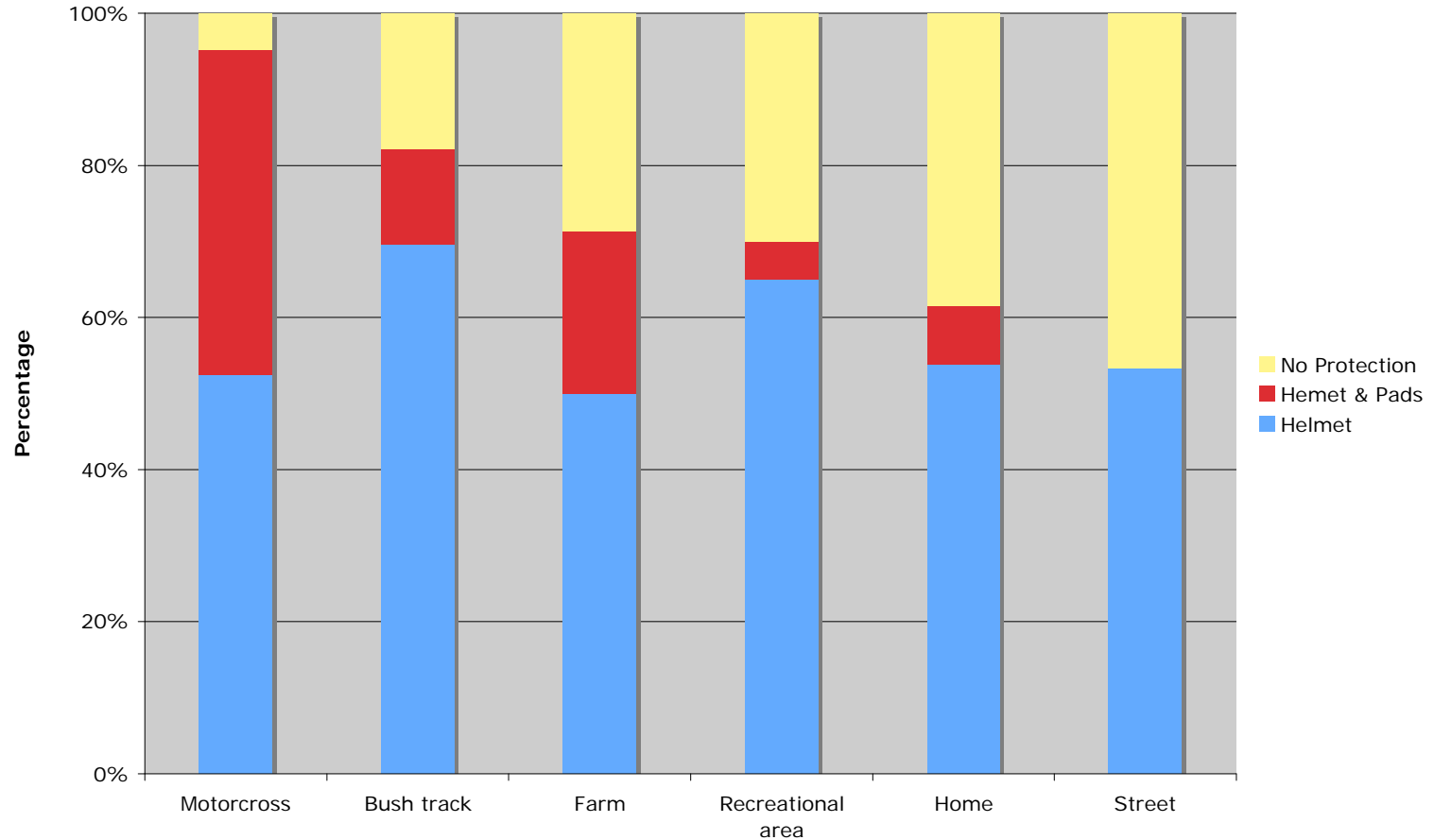
Mechanism of Injury



'Fall from a jump' = abdominal or thoracic injury



Protective Gear



Not wearing a helmet triples the chance of an open head injury...



Prevention



Summary of Findings



1. **Paediatric ORV trauma presentations to CHW quadrupled between 1998-2007**
 2. **Only 11% injuries were sustained in an 'Organised' setting**
 3. **Use of helmets & protective gear in an 'Organised' setting is very high**
 4. **No helmet = 3x risk of skull fracture**
 5. **Injuries are more severe:**
 - On more powerful ORVs
 - At higher speeds
 - When a rider falls from a jump
- } **Older kids**



Prevention USA & Canada



- American Academy of Pediatrics (AAP)
 - “Children who are not licensed to drive a car should not be allowed to operate off-road vehicles.”²
 - “Laws should prohibit the use of ATVs, on- or off-road, by children and adolescents younger than 16 years”²
- Canadian Paediatric Society Injury Prevention Committee
 - “Children younger than 16 years of age should not operate all-terrain vehicles”³
- Canadian Association of Pediatric Surgeons (CAPS)
 - “Children younger than 16 years should not operate ATVs, anytime, anywhere, any size”⁴

2. Committee on Injury and Poison Prevention. *All-terrain vehicle injury prevention: two-, three-, and four-wheeled unlicensed motor vehicles.* Pediatrics, 2000. **105:** p. 1352-1354.

3. Canadian Paediatric Society Injury Prevention Committee. *Preventing injuries from all-terrain vehicles.* Paediatrics and Child Health, 2004. **9:** p. 337-340.

4. Trauma Committee of the Canadian Association of Pediatric Surgeons. *Canadian Association of Pediatric Surgeons' position statement on the use of all-terrain vehicles by children and youth.* JPS, 2008. **43:** p. 938-939



'Non-Organised' Riding



ORV use in Australia, for children less than 16 years old:

1. On the street or on public land (e.g. bush tracks) is **ILLEGAL**⁵ (60% accidents)
2. On private properties & farms is **NOT LEGISLATED FOR** (28% accidents)

5. Road Transport (Driver Licensing) Act 1988 (NSW) ss 25, A., Schedule 1.



'Organised' Riding

	License	Setting	Authority	Compulsory training (hours)
Adult >16years	Automobile	Roads	NSW Roads & Traffic Authority	120
	Motorcycle	Roads	NSW Roads & Traffic Authority	120
Child <16years	Off-road vehicle	Off-road	Motorcycling Australia	5



Recommendations



1. **Licensing & training**
 - Competency based rider training programs, accreditation & licensing
 - Vehicle handling training (esp. jumps)
 - Attitudinal training
 - Adult mentor training (training the trainers)
2. **Public Education**
 - Inherent dangers of ORVs
3. **Education at point of sale**
 - Type & size of ORV
 - Use of protective gear (helmet & pads included in sale price)
 - No passengers
4. **Engineering**
 - In-built speed restrictors
 - Improved vehicle design e.g. seatbelts & rollover bars on 4-wheelers
 - Track safety & maintenance
5. **Further collaborative research (manufacturers, licensing bodies & medical community)**
 - Injury surveillance systems at hospitals
 - Rider training programs
 - Better helmets & protective gear
6. **Legislation & enforcement**
 - Legislating for ORV use on farms & private property
 - Improved enforcement & mandatory reporting (e.g. injuries from riding in the street)
 - Motorcycling Australia's pivotal role in both 'organised' & 'non-organised' settings



Limitations of the Study



1. Single institution
 - Sydney Childrens Hospital, John Hunter Hospital, rural & regional hospitals
2. Retrospective
3. Missing data
 - Each record examined
 - Deficiencies identified & corrected
 - Estimated speeds
4. Small sample size
 - May have hidden some findings e.g.direct correlation of ISS & age
5. Non-homogeneous sample
 - Transfers had a higher ISS then primary presenters
6. No denominator



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Suggested Reading



1. **Lower, T., et al.** *Reducing all-terrain vehicle injuries. A randomised control study of the effect of driver training.* Lower, T., Editor. 2005, Rural Industries Research and Development Corporation.
2. **Committee on Injury and Poison Prevention.** *All-terrain vehicle injury prevention: two-, three-, and four-wheeled unlicensed motor vehicles.* *Pediatrics*, 2000. **105**: p. 1352-1354.
3. **Canadian Paediatric Society Injury Prevention Committee.** *Preventing injuries from all-terrain vehicles.* *Paediatrics and Child Health*, 2004. **9**: p. 337-340.
4. **Trauma Committee of the Canadian Association of Pediatric Surgeons.** *Canadian Association of Pediatric Surgeons' position statement on the use of all-terrain vehicles by children and youth.* *JPS*, 2008. **43**: p. 938-939
5. **Royal Australasian College of Surgeons.** *Position Paper - All Terrain Vehicles (ATV's).* Division of Fellowship & Standards, 2007.



End