

Driver Risk Factors Of Road Traffic Injuries in an Urban Setting in Kenya: A Case-control Study

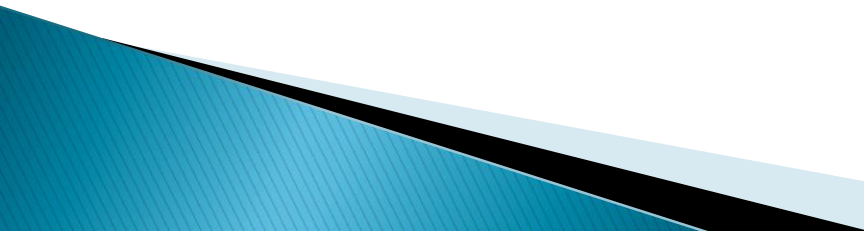
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Burden of Traffic Injury

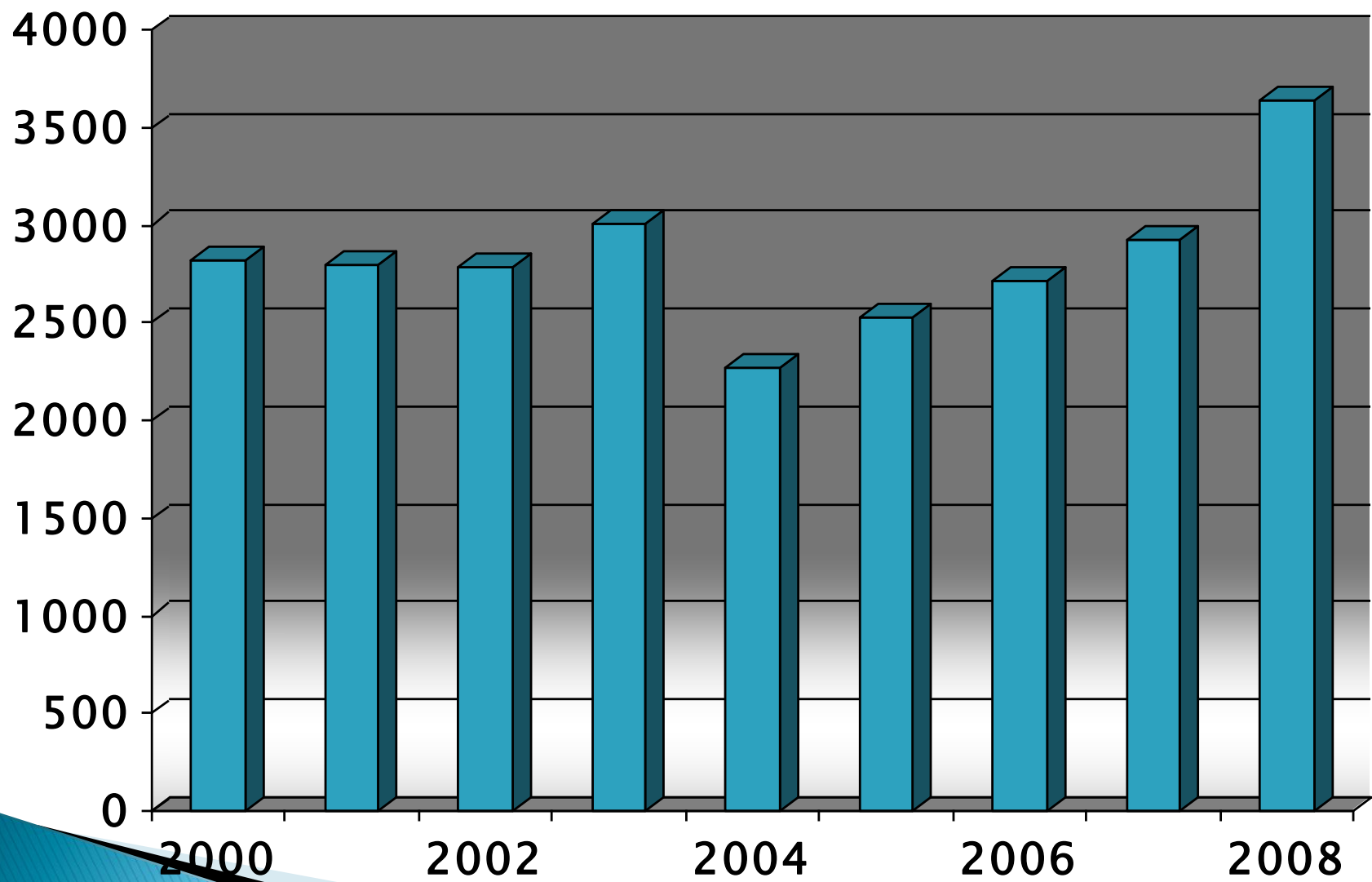
Global:

- ▶ Road Traffic Injuries (RTIs) are the leading cause of injury-related deaths worldwide
 - ▶ Over 1.2 million people killed and more than 50 million injured from more than 10 million motor vehicle crashes that occur each year
 - ▶ RTIs projected to be the 3rd leading cause of DALYs in the next 10 years, up from 9th position in 1990, unless effective interventions are implemented
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Kenya:

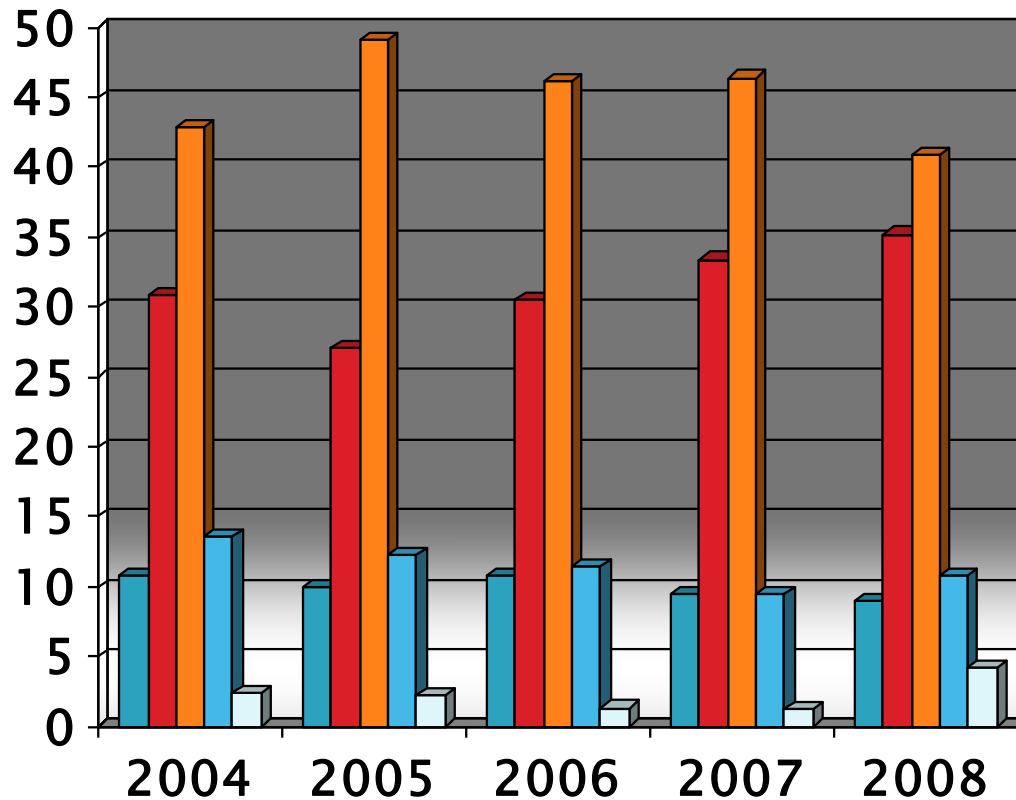
- ▶ On average, 3,000 are killed annually
- ▶ Dramatic increase in road deaths from 2,264 in 2004 to 3,633 in 2008
- ▶ A two-fold increase in road fatality per 100,000 population - of 11.0 to 21.7 between 1998 and 2006
- ▶ Nearly 80% killed are pedestrians (44%) and passengers (35%); motor vehicle drivers account for only 10%

Road deaths in Kenya, 2004–2009



Proportion (%) of deaths by road user 2004–2008

■ Driver ■ Passenger ■ Pedestrian ■ P/cyclist ■ M/cyclist



Causes of motor vehicle crashes

Based on Accident Cause Code Classification used by the Kenya traffic police

▶ Causes of crashes:

- Human: 84.2%
 - Driver error (44%) – misjudgment, improper overtaking, losing control, speed
- Vehicle: 5.1%
- Road environment 4.5%
- Others 6.2%

Study Objective

- ▶ Estimate the contribution of driver risk factors for motor vehicle crashes occurring in an urban area



Methods

- ▶ Setting: Eldoret, an urban municipality in Western Kenya – pop. 250,000
- ▶ Study design: population based case-control
 - Cases were crash-involved drivers identified from 2 sources
 1. Eldoret traffic police station where the drivers reported the crash;
 2. From injured crash-involved patients seeking treatment at any of the 3 hospitals located within the town
 - Demographics, crash scene and driving behaviour data collected from the ‘case’ drivers using an interviewer-administered questionnaire
 - 150 case drivers interviewed and breathalysed for BAC

Methods...

- **Controls:** identified through a roadside survey where non-crash involved drivers were randomly selected and interviewed
 - 27 survey sites on the urban road network, each located close (within 1km) to the crash scene
 - Survey undertaken in conjunction with the traffic police stopped vehicles for routine check then drivers requested to participate. Police also ensured traffic flow and safety
 - Administration of a short questionnaire eliciting driver characteristics and driving behaviour
 - High response rate 327 of the 330 approached (99.1%)

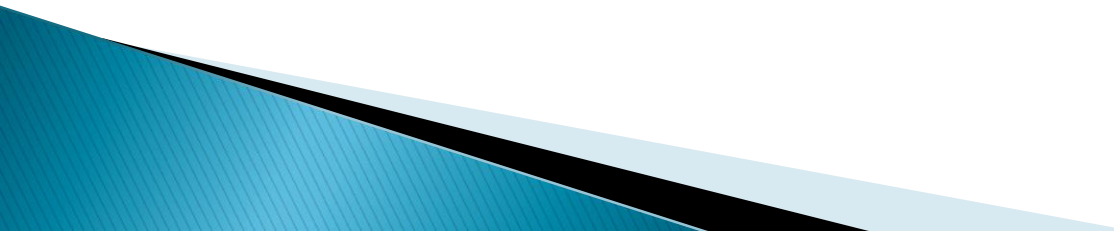
Study variables

(for case and control drivers)

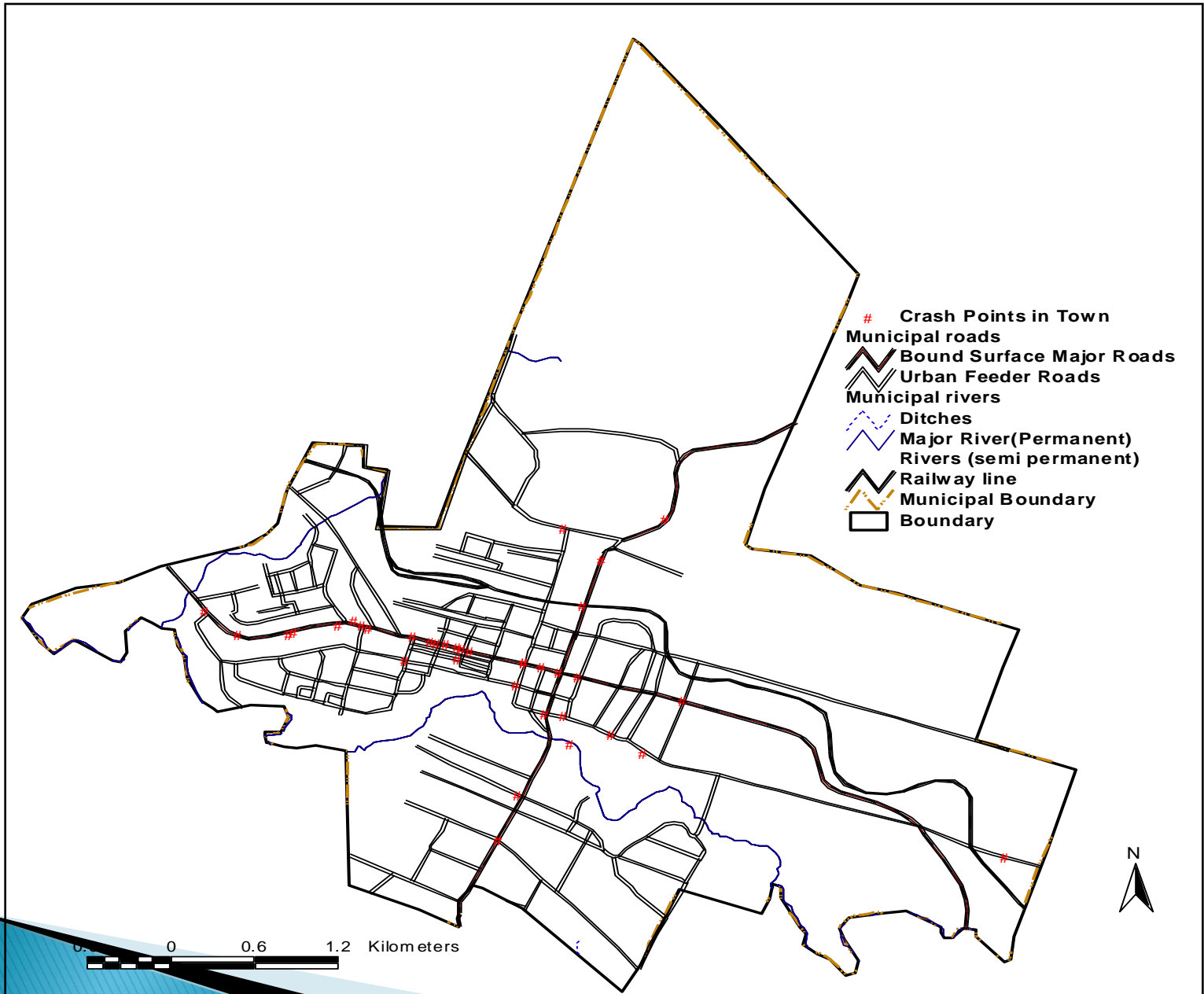
- ▶ Demographics:
 - age, sex, marital status, driver licensing, medical insurance
- ▶ Driver behaviour:
 - Seat-belt wearing
 - speed
 - Self-reported use of alcohol and mood altering drugs *(not breathalysed due to a court injunction)*
 - use of mobile phone during the trip
 - traffic violation in last 5 years

Findings

Characteristics of Crash sites:

- ▶ Clustering along the main highway (Uganda Road) transecting the central business district and densely populated residential areas
 - ▶ Pedestrians and pedal cyclists were the most involved in the crashes – in nearly 70% of the sites
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Crash Sites, Eldoret Municipality



Type of crash

Motor vehicle–pedestrian	38.4%
Motor vehicle–cyclist	30.2%
Vehicle–vehicle collision	12.7%
Single vehicle:	13.4%
- <i>losing control</i>	<i>10.8%</i>
- <i>speeding</i>	<i>2.6%</i>
Tyre burst	5.3%

Status of road environment

- ▶ All the identified crash scenes (N=59) were visited and inspected, and the following features observed:
 - Tarmacked road surface and in good condition (84% of the sites)
 - Absence of any road markings (93.3%), traffic signs (83.9%) and controlled intersections (all)
 - No posted speed limits on the roads (90.3%)

Driver Characteristics

	Cases (N=150)	Controls (N=327)	Odds Ratio (<i>p</i>)
Age: 18–44	86.0	81.4	0.73
≥45 years	14.0	18.6	(0.21)
<i>Mean age</i>	<i>36.8 yrs</i>	<i>36.1 yrs</i>	
Male	96.7	98.5	0.45 (0.20)
Married	86.0	84.7	1.14 (0.65)
Licensed	97.0	98.5	0.45 (0.20)
Medical Insurance	16.7	17.4	0.95 (0.76)

Driver behaviour: comparison of cases and controls


	% Cases (N=150)	% Controls (N=327)	Odds Ratio (95% CI)
Wearing seat belt	79.6	83.1	0.79 (0.47-1.34)
Use of Alcohol	15.0	5.5	3.02 (1.50-6.12)
Over speeding (>50km/hr)	46.7	8.6	9.34 (5.49-15.96)
Using mobile phone	12.7	22.6	0.50 (0.28-0.88)
Traffic offence (last 5 yrs)	14.9	28.1	0.45 (0.26-0.77)

Most important driver risk factors (*Multivariate Logistic Regression*)

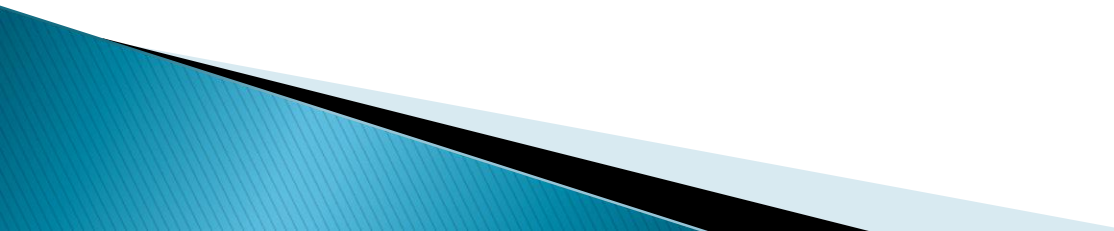
Holding all other factors constant, the most significant driver factors contributing to injury-crashes were:

	Odds Ratio	p-value
Alcohol use	2.95	0.004
Speed	10.37	<0.0001
<i>Traffic offence</i>	<i>0.42</i>	<i>0.004</i>
<i>Using mobile phone</i>	<i>0.46</i>	<i>0.015</i>

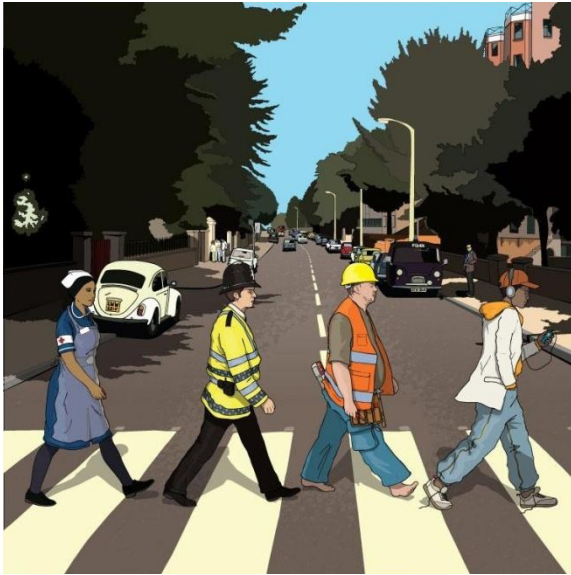
Conclusions

1. The case-control design allowed for simultaneous assessment of multiple driver factors related to injury crashes
 2. The most important driver risk factors for crashing on urban roads are **alcohol** and **speed**.
 3. There was a reduced risk of crashing by drivers who had previous crashes in the past 5 years, and those using a mobile phone while driving – this could be due to unreliability of self-reports for these variables.
 4. Though the effects of road factors were not examined, the general lack of road markings and signage imply their potential to contribute to crashes. Further studies using suitable designs are needed to estimate their interaction with driver factors.
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Implications for Road Safety

- ▶ This case–control study, for the first time in Kenya, provides evidence on the contribution of specific driver factors in injury crashes, rather than just listing of frequency distributions of the ‘causes’.
 - ▶ Priority given to establishing and implementing interventions targeting alcohol and speed, (e.g., BAC limit, law enforcement and driver education campaigns) may result in significant reductions in injuries or death of up to 10%.
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THANKS



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