

Geographical trends in blunt force injury deaths in South African cities (2001-2007)

Working title

A Tale of Two Cities: Distribution of blunt force injury deaths in Nelson Mandela Bay and the City of Tshwane (2001-2007)

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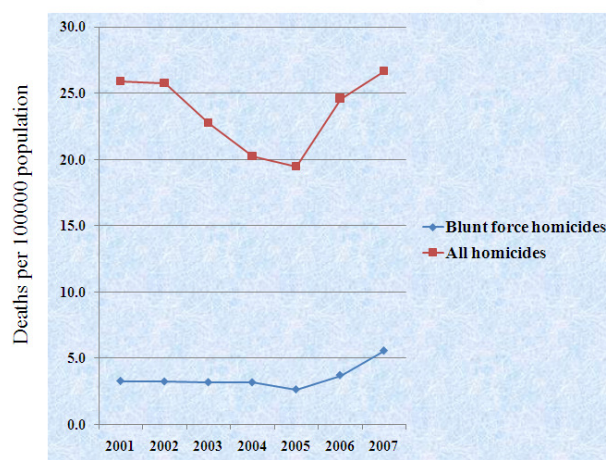


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"Inspiring public health excellence in Africa"

Violence and injury in South Africa

- South Africa is a violent society e.g. **murder at 34.1 per 100 000 population** (2009/10)
- Violent injuries - the **second leading cause of death and lost disability-adjusted life years** in South Africa – 157.8 /100 000 population (2000)
- **Developing countries** shoulder a higher burden of fatal injuries; with an urban bias
- Unemployment, poverty, patriarchy, exposure to violence, access to firearms, alcohol and drug abuse are **contributing factors**

Incidence of all homicides and blunt force homicides in South Africa (2001-07)



Sources:
NIMSS &
Statistics
South
Africa

Violence-related deaths in other developing countries

- **Jamaica** (2006): more than 66% (firearms), sharp objects (25%); blunt objects included with 'other' mechanisms (6%)
- **Pakistan** (2002): 85% (firearms), blunt objects (3%)
- **Bangladesh** (2004): less than 10% of women died of beatings and torture; blunt force is not specifically mentioned as a mechanism
- **Tanzania** (2005): firearms (12.2%), blunt objects (24.3%)
- **South Africa** (2001 to 2007): 15% of all homicides was due to blunt force, firearms (45.3%).



Small geographical areas and fatal injuries

- A need for epidemiological research to determine the **aetiology** of violence
- Research in **higher income countries** - neighbourhood socio-economic composition, socio-economic inequalities, area-based differences, social differences
- Housing conditions, child dependency and socio-economic barriers associated with **burn injuries**
- **Suicides**, with age, 'race' and geographical location
- Unemployment a risk factor for **violence**; relative wealth appeared to be protective at individual level
- High prevalence of violence in poor areas, associations with **psychological ill-health**



Key Terms

- **Socio-economic determinants** – the structural determinants and conditions of daily life namely income, services, access to health care, schools and education, conditions of work and leisure, homes, communities, rural/urban settings – which impacts one's chances of leading a flourishing life
- **External causes of death** – the mechanism that preceded an injury-related death, e.g firearms, stabbing, **blunt force**, motor vehicle collisions, etc., all of which may result in injury and eventually death
- **Blunt force homicides** - can be equated to the crime of murder; the unlawful, intentional killing of another human being, by means other than firearm discharge, sharp objects, etc.



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Aims

1. To generate an **epidemiological profile** of homicides (especially blunt force homicides) in South African cities
2. To determine whether **geographic variations in blunt force homicide** incidence exist between smaller geographical areas and if these variations are correlated with measures of deprivation
3. To determine if there is a **raised frequency of blunt force homicides** cases in small geographic areas closest to the epicentre of blunt force homicides and to correlate these with measures of deprivation
4. To determine if '**clustering**' is evident amongst areas with similar levels of blunt force homicides and to correlate these with measures of deprivation.

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Objectives for this paper

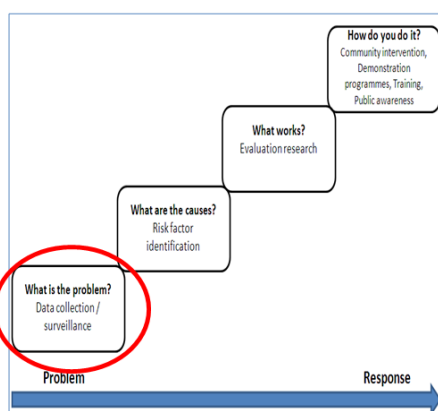
- To create a **Geographic Information System (GIS) database** of blunt force deaths at the sub-place level for the two cities;
- To create an **indicator of deprivation** at the sub-place level;
- To determine the **correlation** between the blunt force homicide incidence rankings and the deprivation ranking of sub-places

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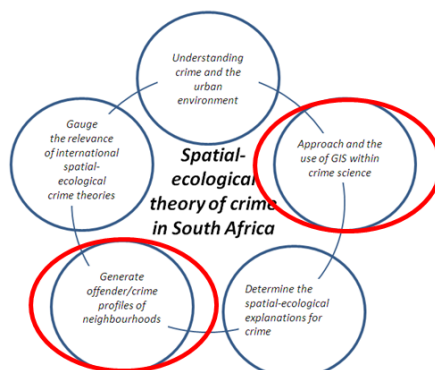


Theoretical framework for the study

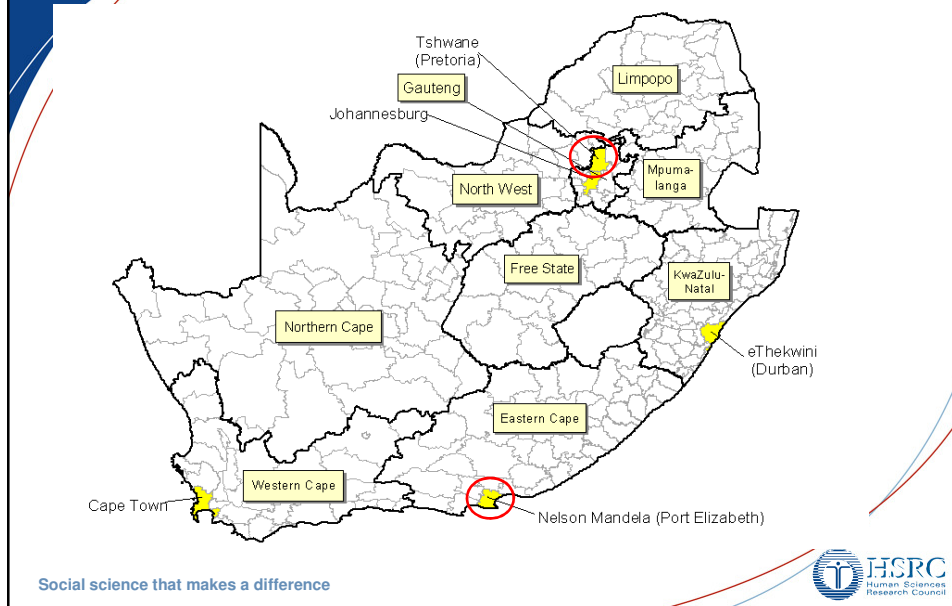
The public health approach to injury prevention



Towards a spatial-ecological theory of crime



Selected study sites



Data available for the study

Type	Frequency	Source	Description	Format
Blunt force homicides	11563 (15%)	National Injury Mortality Surveillance System (NIMSS)	2001-2007	Spreadsheet (MS Excel)
Homicides	76751	NIMSS	2001-2007	Spreadsheet (MS Excel)
Deprivation rankings by data zones	22164	Department of Social Development	2001	Shapefiles (GIS format)
Sub-places (Census)	21243	Human Sciences Research Council (HSRC)	2001	Shapefiles (GIS format)

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Description of NIMSS variables

Variable	Description	Variable	Description
MORTUARY	Name of mortuary where case was recorded	AGEYEARS	Age of the deceased at death
PMDATE	Date on which post mortem was performed	MEDICALTRE	Whether 1 No treatment 2 On scene treatment 3 Hospital care
PMDAY	Day of post mortem	PROVINCEIN	Province of injury
PMMONTH	Month of post mortem	OTHERSPECI	Code 11 of province specified
PMYEAR	Year of post mortem	TOWNINJURY	Town of injury
PATHOLOGIS	Name of pathologist	SUBURBORDI	Suburb of injury
DATEINJURY	Date of the injury	OTHSUBURB	Other suburb (refinement) any extra location details
INJURYDATE	Date of the injury	SCENEINJUR	Scene of the injury (private home, residential institute, etc.)
TIMEINJURY	Time of injury	EXTERNALCA	Firearm, sharp, blunt, etc
RACE	Race of deceased	APPARENTMA	Homicide, suicide, etc.
SEX	Sex of deceased	BLOODALCOH	Blood alcohol level of the case
DATEDATH	Date of death	NEARSAPS	Nearest SAPS police station
DAYDEATH	Day of death	MUNICIPALITY	Municipality of injury
MONTHDEATH	Month of death		
YEARDEAD	Year of death		
TIMEDEATH	Time of death		

Geographical elements

Temporal elements

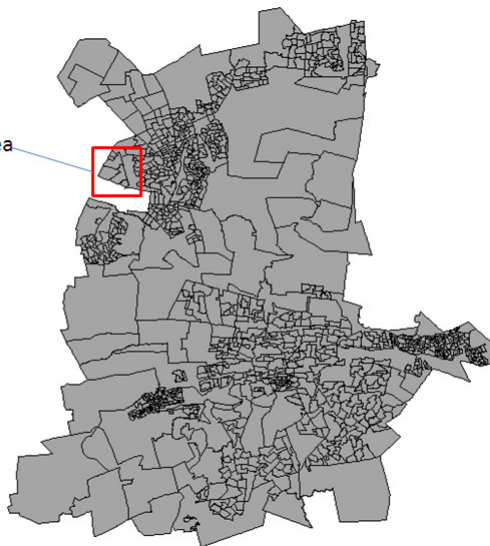
Personal characteristics

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Small geographical areas - example

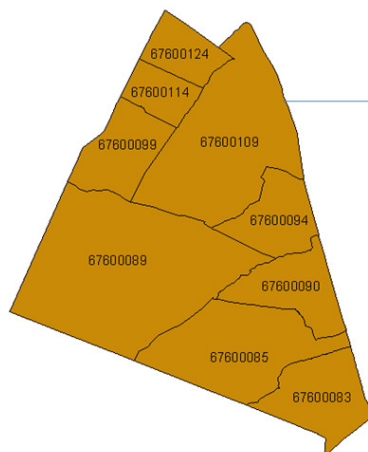
Example area



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Enumeration Areas (EAs)



EAs (9 units)

Characteristics

- Smallest census data collect unit
- Official population data for 1996 census only

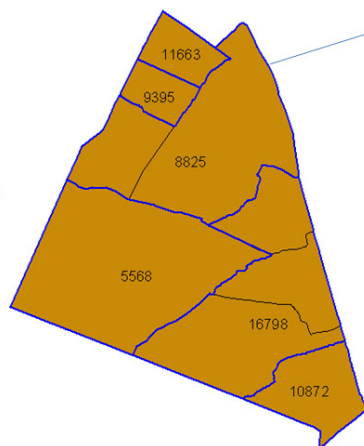
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Datazones (deprivation rankings)

Deprivation domains:

- Income and Material
- Employment
- Health
- Education
- Living Environment



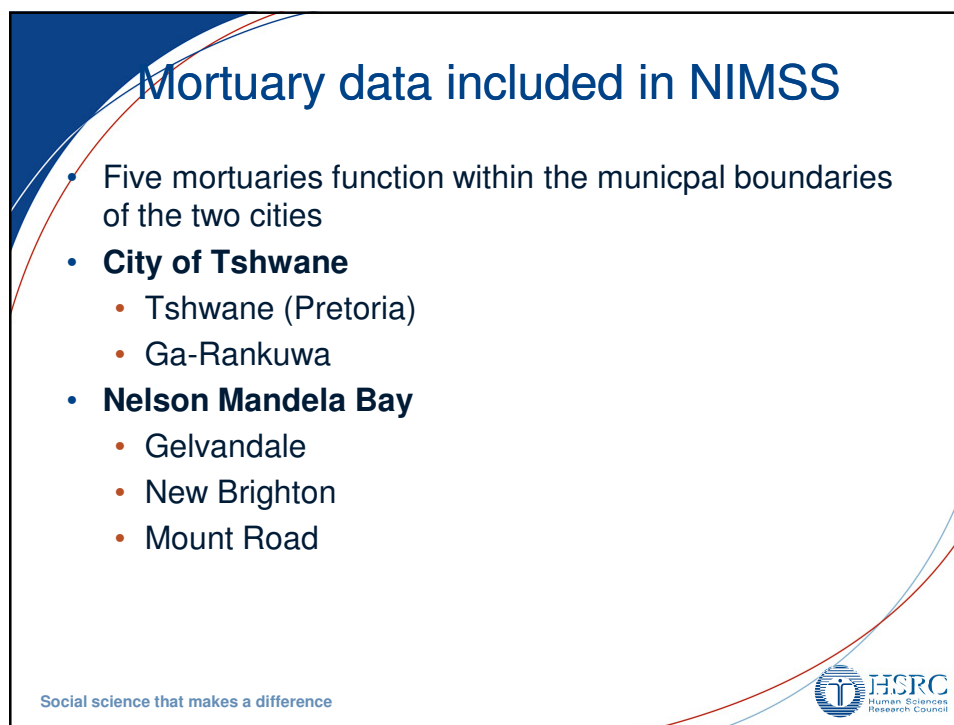
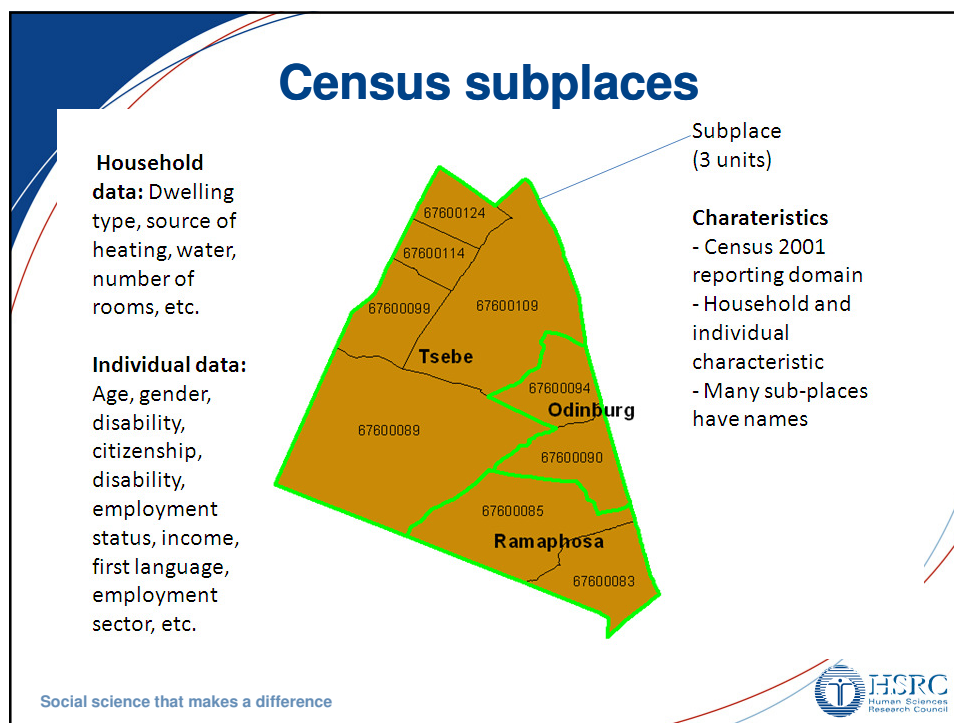
Data zone (6 units)

Characteristics

- National deprivation rank (1-22164)
- Rank 1 = Most deprived
- Deprivation ranking within each city can be established (most to least deprived)
- Population totals must be extrapolated

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Methods

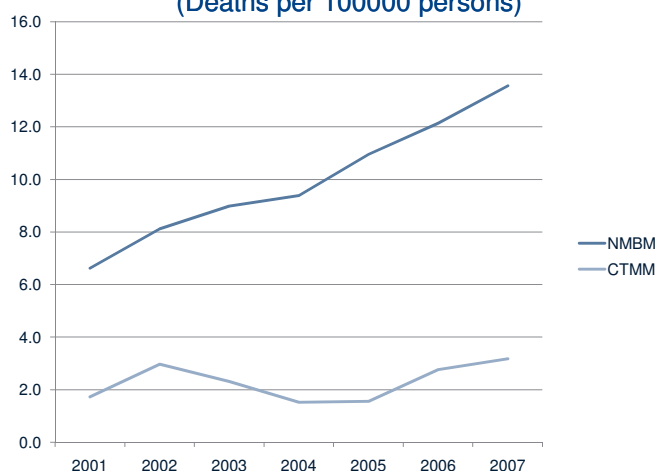
- Create GIS database from the spatial and non-spatial data available
- Assign deprivation rankings to sub-places
- Geo-code blunt force deaths to subplaces
- Calculate incidence (2001 base population)
- Rank all subplaces in terms of incidence (Lowest incidence gets Rank 1)
- Rank all subplaces in terms of its national deprivation rank (highest rank gets Rank 1)
- Calculate correlation coefficient, case by case differences and absolute differences
- Map and present the results

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Blunt force injury deaths (2001-7)

(Deaths per 100000 persons)



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Results - Nelson Mandela Metropolitan Municipality

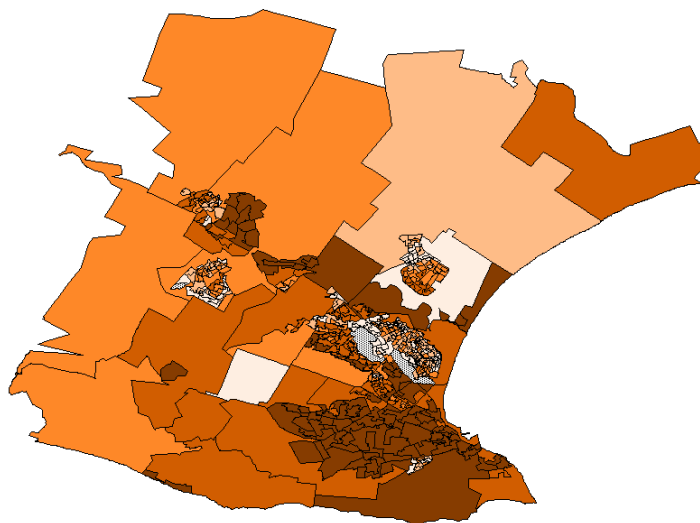
- A correlation coefficient of **-0.06** exists between the rankings for blunt force deaths incidence and the deprivation ranking of sub-places
- These preliminary results show a deviation away from assumptions on the link between interpersonal violence and levels of deprivation of small areas
- The areas that buck the trend are geographically identifiable

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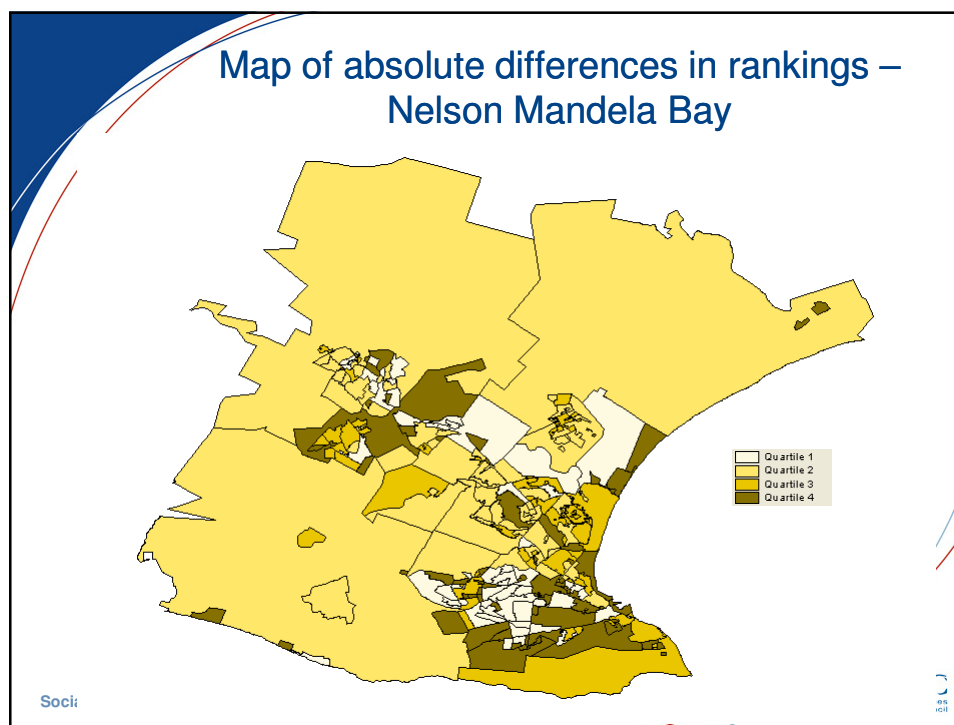
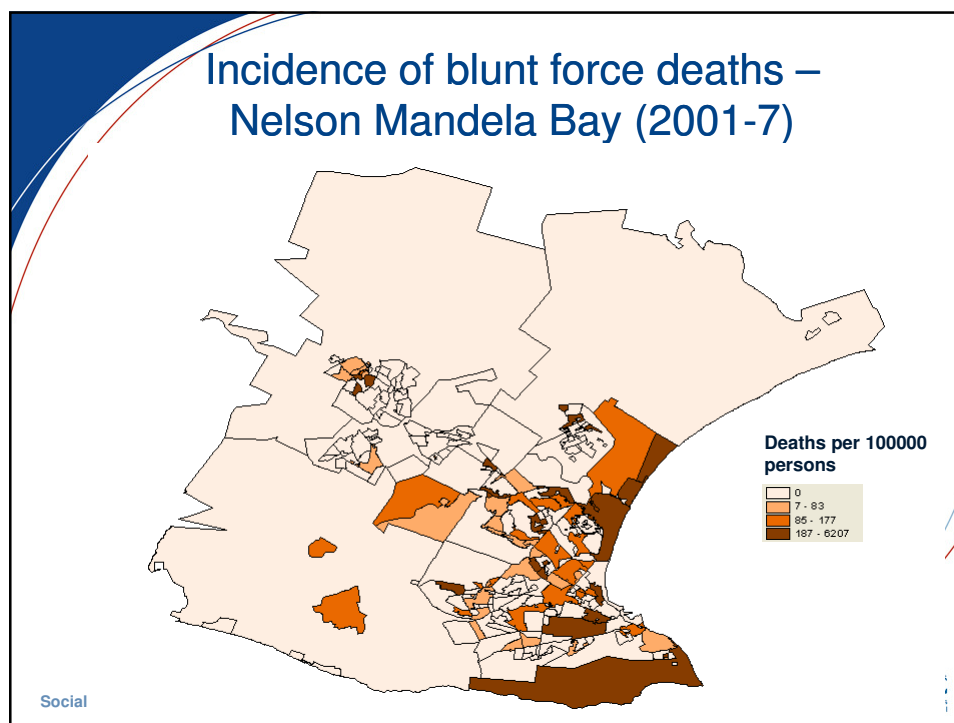
Multiple Deprivation Ranking – Nelson Mandela Bay

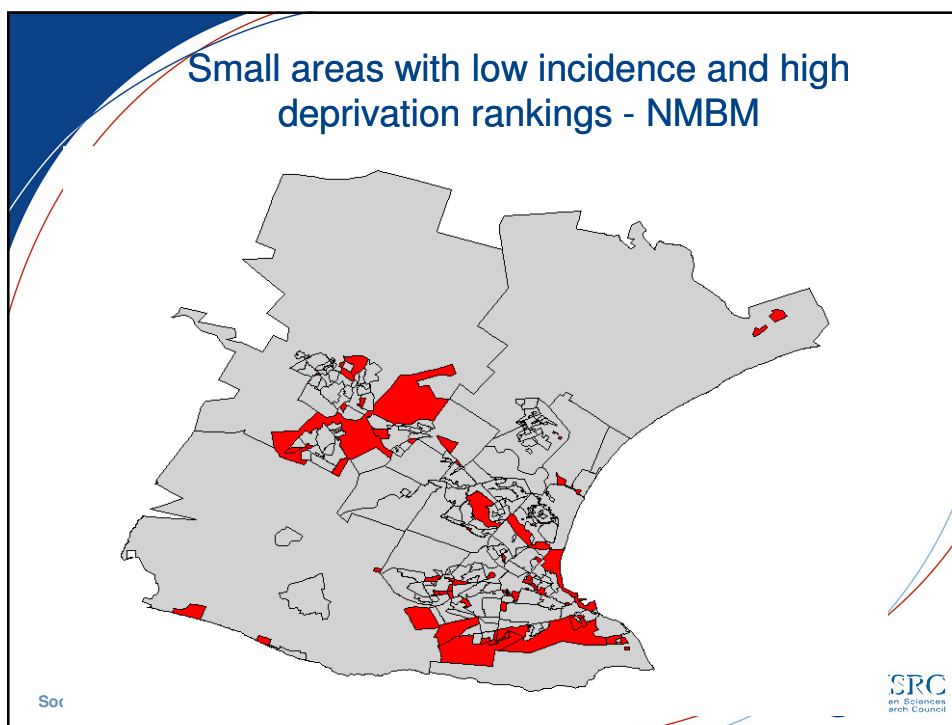
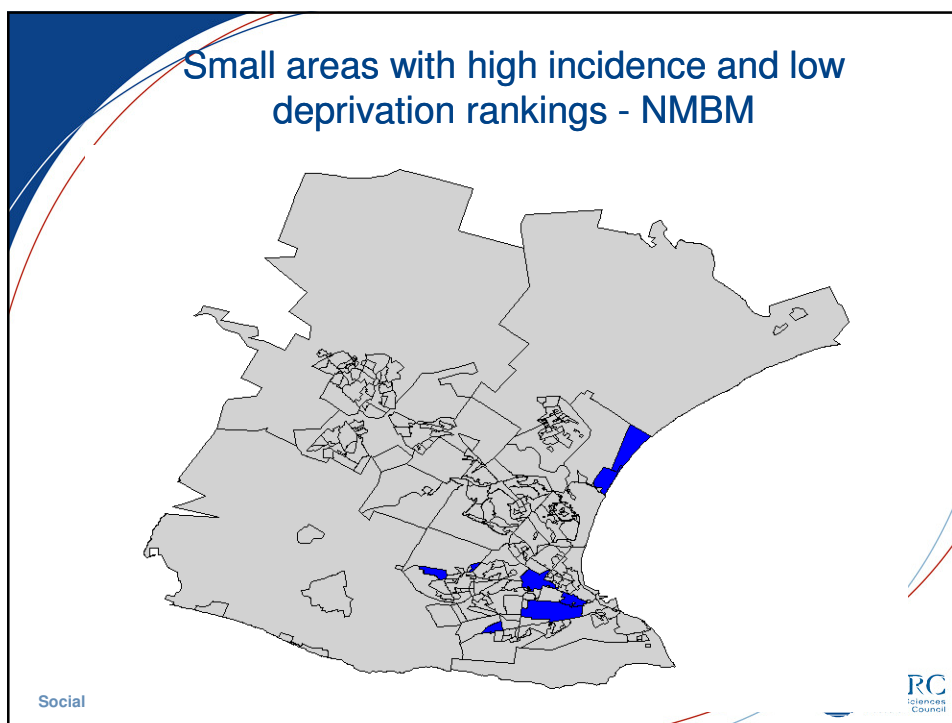
Ranking for the city by datazone



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Results - City of Tshwane

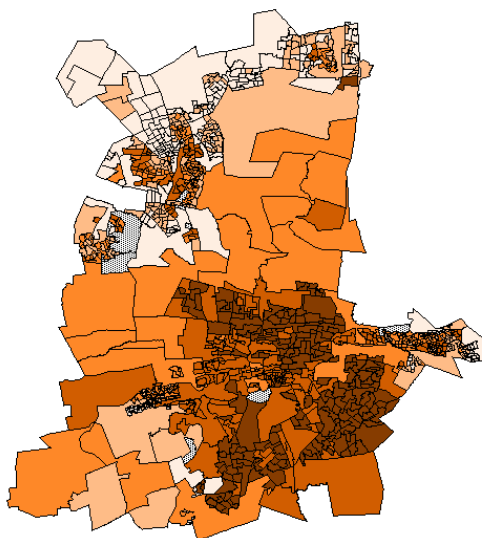
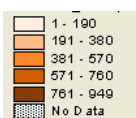
- A correlation coefficient of **-0.22** exists between the rankings for blunt force deaths incidence and the deprivation ranking of sub-places
- These preliminary results show a deviation away from assumptions on the link between interpersonal violence and levels of deprivation of small areas
- The areas that buck the trend are geographically identifiable

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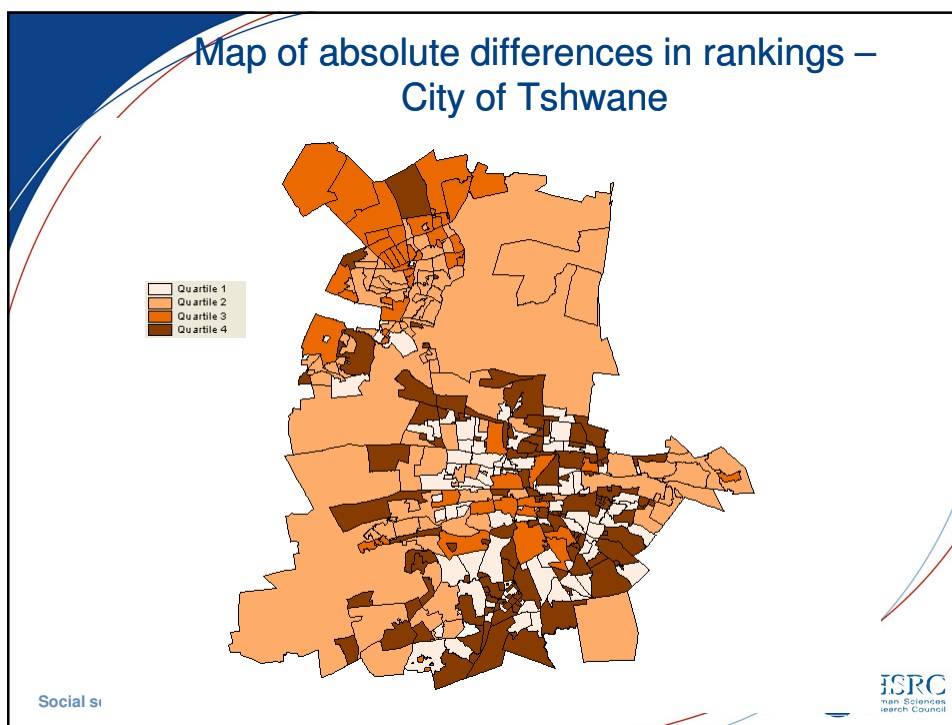
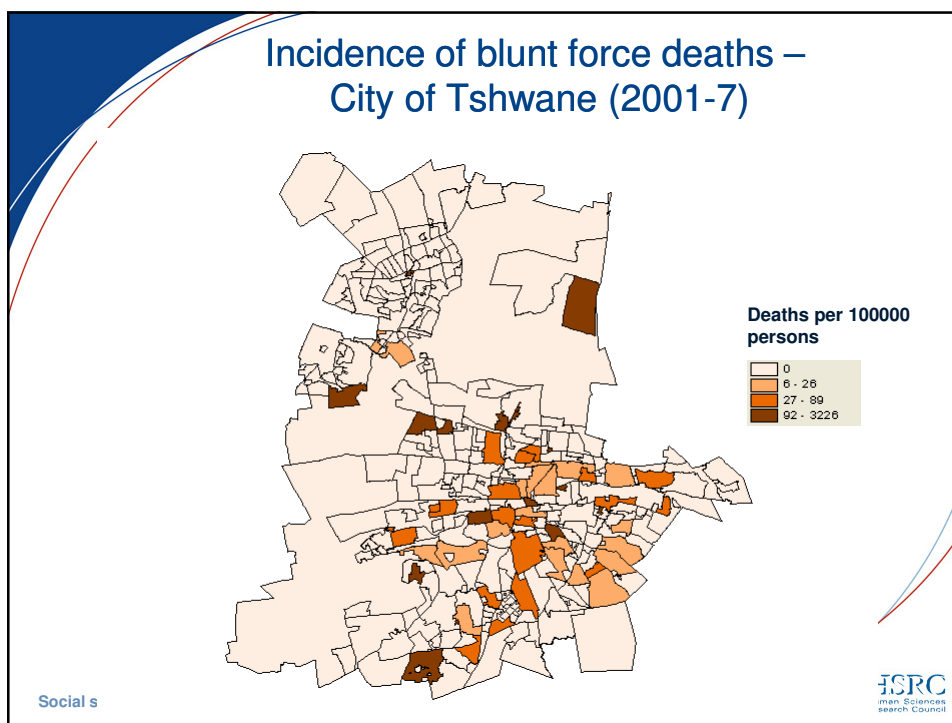
Multiple Deprivation Ranking-Tshwane

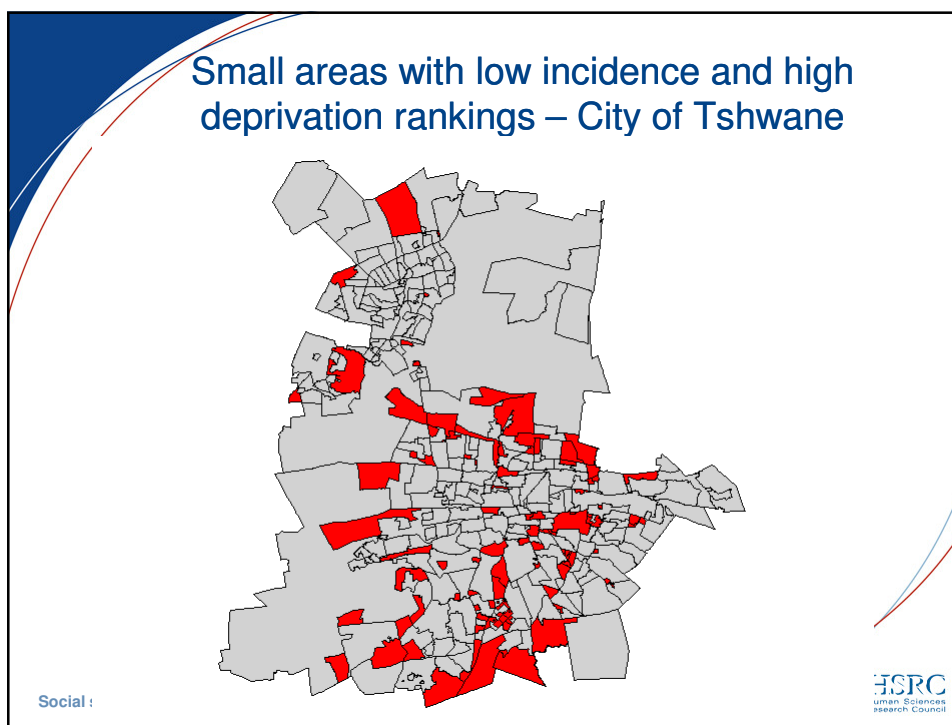
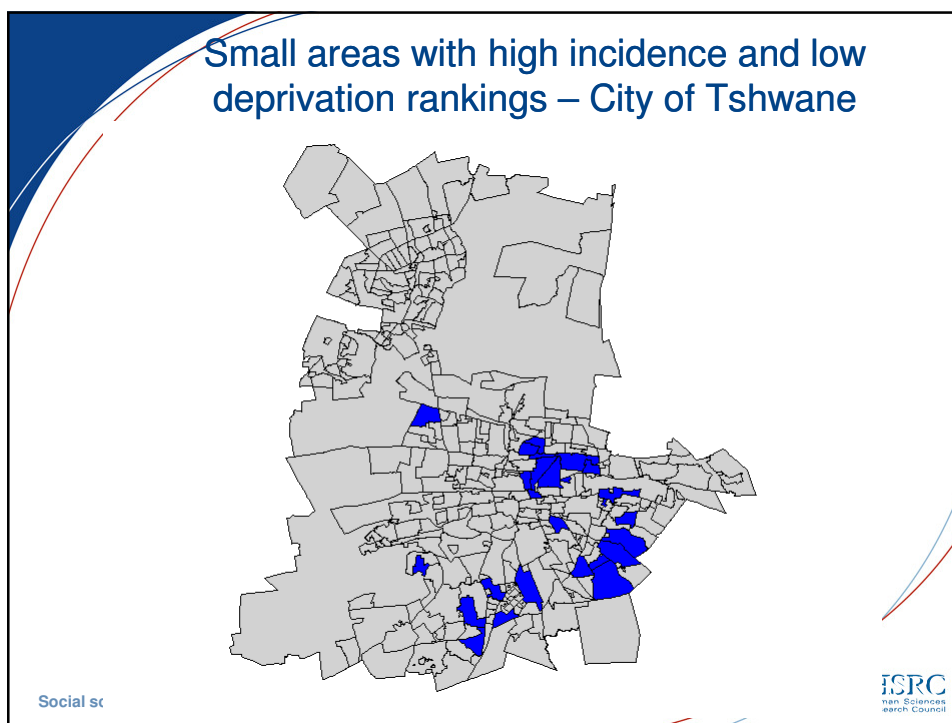
Ranking for the city by datazone



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Limitations of the study

- Variable geo-coding rate, absolute dependence on quality of the data
- Forced exclusion of inaccurate placenames and use of 'colloquialisms'
- Cases from outside the municipalities or the country
- Deaths late in a particular year is recorded in a subsequent year
- Looking at blunt force deaths in isolation – no comparison with firearm and sharp force deaths

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Prospects for the study

- Incidence of blunt force deaths estimates can be calculated at a small area level
- The individual characteristics of victims (age, gender, etc) and circumstances can be matched to the area profile
- Sub-local picture is emerging that may direct safety promotion activities going forward
- Different perspective to interpersonal violence is likely to emerge in South African cities

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Acknowledgements

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**Tack för ditt intresse
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