

X

The application of GIS in childhood injury surveillance

Adlai Davids
GIS Centre
Human Sciences Research Council



Towards a Child Safe South Africa
International Conference
Cape Town
15-17 October 2003

Child injuries and their prevention

- CAPFSA estimates that more than 10 children die every day due to injuries
- A public health model for injury prevention requires an initial description of the magnitude and characteristics of the injury problem (Van Niekerk & Duncan, 2002; Chotani, Razzak & Luby, 2002).
- Quality local injury data (Marais & Stevens, 2002)
- Systematic and rigorous information systems (Matzopoulos, Van Niekerk, Marais & Donson, 2002)

Leading Diseases and Injuries in the WHO Africa Region, 2000

1. HIV/AIDS
2. Lower Respiratory Infections
3. Diarrhoeal Diseases
4. Childhood Cluster Diseases
5. Low Birth Weight
6. Malaria
7. Unipolar Depressive Disorders
8. Ischaemic Heart Disease
9. Tuberculosis
10. Road Traffic Injury

Current Injury Surveillance Systems in South Africa

- National Injury Mortality Surveillance System (NIMMS)
 - Based on data from selected mortuaries and other sources
- National Non-Fatal Injury Surveillance System (NANFISS)
 - Operational at selected hospital emergency units

The Injury Pyramid



Source: WHO

Focus of this presentation

- Evaluate ambulance data as an additional and routine source of injury data
- Integrate ambulance data into a geographical information system (GIS)
- Determine the spatial and temporal aspects of childhood injuries in terms of a public health model for injury prevention

GIS: Definition

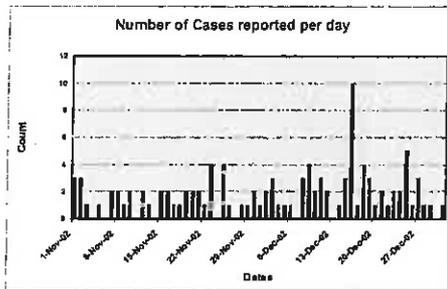
- **Geographical Information System (GIS):** A computer-based system for the input, management, analysis and output of georeferenced data



Tshwane Metro Emergency Services Ambulance Data (1 Nov to 31 Dec 2002)

- Emergency Services System (ESS) records calls for an ambulance
- 4 875 calls (80 per day) received for study period
- 81 incidents involved a child
- Selection based on information provided by the caller

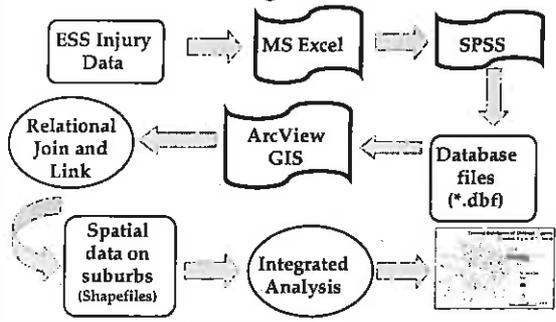
Emergency Code	Frequency
D00 - Pedestrian	28
Q01 - Motor	4
Q03 - Fall From A Train	2
Q07 - Motorcycle/Bicycle	2
Q40 - Assault	9
Q41 - Domestic Accident	17
Q42 - Industrial Accident	1
Q43 - Burn	6
Q44 - Animal Attack	1
Q67 - Drowning	1
D60 - Abysisk	5
Q69 - Rape	1
200 - Jump Of A Structure	1
201 - Grandee	3
205 - Falsening	10
Total	81



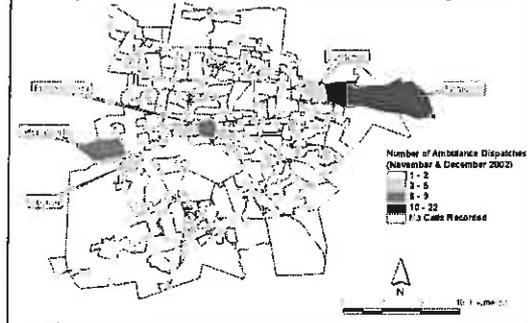
Data recorded on ESS

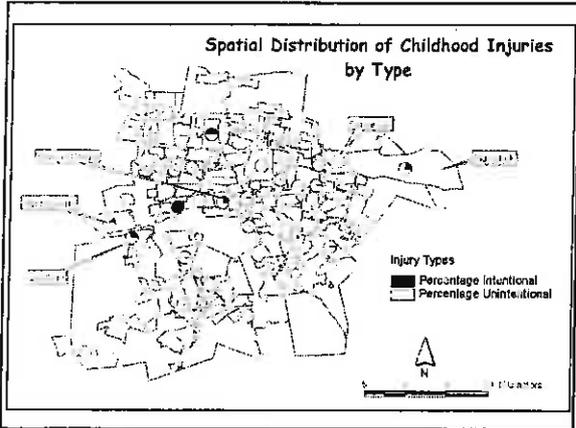
- Incident Nr
 - Date
 - Time
 - Time_slot *
 - Street
 - Suburb
 - Sub_code *
 - Sub category
 - Inj_category
 - Transferred To
 - Caller Said
 - Patient Priority and Total
- Temporal Aspects
 - Spatial Aspects
 - Event Coding and Descriptions
- * Data element generated for purposes of the research

Data processing for GIS integration



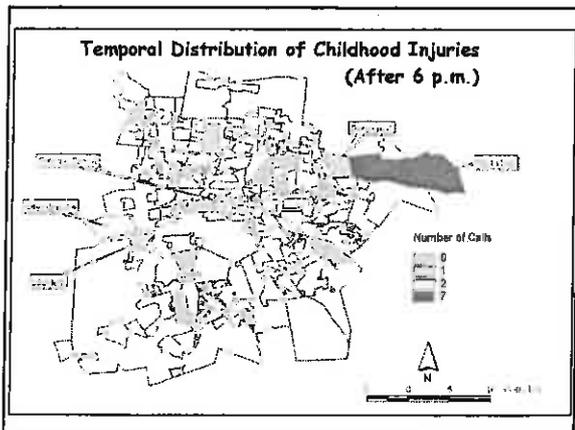
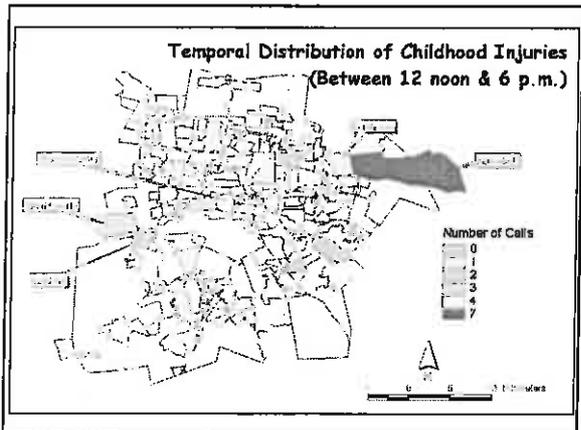
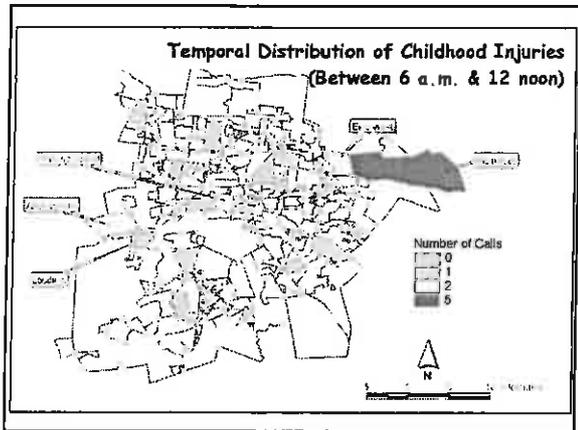
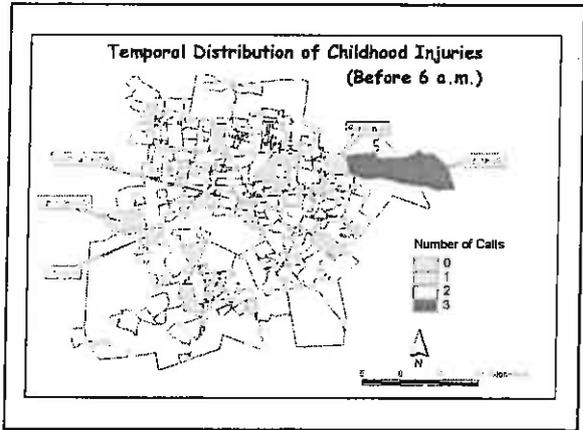
Spatial Distribution of Childhood Injuries





Temporal Breakdown of Recorded Childhood Injuries

Time_slot	Frequency
Before 6 am	6
Between 6 am & 12 noon	19
Between 12 noon & 6 pm	38
After 6 pm	18
Total	81



Limitations of the Data

- Residential area may not be accurately recorded
- Only a limited data set was used (2 months)
- Only public sector data used
- Population-based investigation not possible
- Not all suburbs of the municipality could be represented (spatial data shortage)

Future Research

- Access more data for the study area
- Compare ambulance data to relevant hospital admissions records
- Integrate other sections of the injury pyramid into a GIS
- Create a catchment area in order to determine the socio-economic variations in injury patterns based on local area census and lifestyle segmentation data
- Investigate how **web-based GIS** can be applied to injury data dissemination

Thank you

for your interest
and attention!!

adavids@hsr.ac.za