

The Direct Health Cost Assessment of Firearm Injuries at the Kenyatta National Hospital

PRESENTATION AT THE 10TH WORLD CONFERENCE ON
INJURY PREVENTION AND SAFETY PROMOTION

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INTRODUCTION

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- **The global community has recognized injury and violence as major causes of morbidity and mortality.**
- **WHO now has a department dedicated to and violence and injury prevention and UN has recognized armed violence as an impediment to the attainment of MDGs by 2015.**
- **One of the emerging concerns is the increasing use of firearms both by criminals and law enforcement officers, in suicides and by youths.**
- Krug E (ed). Injury: A leading cause of Global Burden of Disease. Geneva World Health Organization, 1999, pp.1-4.
- WHO injuries and violence prevention department in Small Arms Global Health a contribution to UN conference on illicit trade in Small Arms and light Weapons, July 2001, pp.9-20.
- Browin MM. Small Arms Survey. Graduate Institute of International studies, Editorial Geneva. Oxford University Press IV, 2003.



The Kenyatta National Hospital

The largest referral Hospital in East and Central Africa



Item			Figures
Staff Capacity			6,000
Bed Capacity			1,800 beds
Average attendance	Annual	Outpatient	600,000 visits
Average attendance	Annual	Inpatient	89,000 patients
Average length of Stay			7 Days
Annual Budgetary allocation			Kshs. 2.6 billion

Study Objectives

Assess the health cost of firearm injury incurred by -survivors treated at KNH over a ten year period (1997-2006) and establish the immediate impact on the patients.

Specific Objectives

- Establish actual cost of treating firearm injury -survivors at the Hospital
- Determine the period of time taken in hospital and rehabilitation of the survivors
- Describe the pattern of morbidity and mortality associated with firearm injuries



Literature

- **Previous studies in the area of SALW have largely focused on implication to national and regional security with a conspicuous neglect on direct impact on health, socioeconomic and psycho-emotional status of individuals.**
- However, isolated studies; Hugenberg et al in '*Firearm injuries in Nairobi, Kenya: Who Pays the Price*' compared the monthly family income of the survivor's of firearm against hospital bill. (Hugenberg et al.: Firearm Injuries in Nairobi, Kenya: Who Pays the Price? *Journal of Public Health Policy* (2007) **28**, 410-419).
- *The One bullet story* (www.IPPNW.org) and in *The Burden of Multiple Firearm Injuries in Africa* (Odhiambo, WA., Guthua, SW. and Thanga, PW.: Multiple Firearm Injury: Case Report and Review of Literature on the Burden of Firearm Injury in Africa • Proceedings of the 8th World Conference on Injury and Safety Promotion, Durban.
compares the cost of managing the injuries in hospital with other essential services that could be provided with these funds.
- WHO and Centre for Disease Control and Prevention (CDC) has recently developed a manual for *Estimating the economic costs of injuries due to interpersonal and self-directed violence* which is currently being piloted in a number of countries including Kenya. (Manual for Estimating economic costs of injuries due to interpersonal and self directed violence, WHO & CDC , 2008)
- YPLL , DALYS

Cost of Gunshot Injuries

IN THE ONE BULLET STORY!

(KENYA)

- The cost of Treating one gunshot injuries could provide one year primary education for 100 children!
- Or provide a daily *ugali* meal to an average Kenyan family of six for 10 years
- Immunization of over 250 children against *measles, polio,*
- Sub-saharan Africa has the burden of over 70% of the more than 30million people carrying the AIDS virus in the world....Resources are extremely scarce!!!! **ORPHANS**

Odhiambo, **Guthua**, et al, www.ippnw.org



Materials and Method

Descriptive study covering a period of 10 years retrospectively.
(1997 – 2006)

- KNH has a central registry where all the inpatient files are maintained.
- The method of filing used is the Terminal Digit Filing System. When files of injured patients are received in the registry, they are categorized using the WHO 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10).
- Designated files were retrieved by the record clerks and set aside for the research assistants who went through the files and entered the relevant data in the pre-designed data collection

sheet. * Mortality data only covered a period of seven years as files from earlier years had been weeded out of the registry.

Results

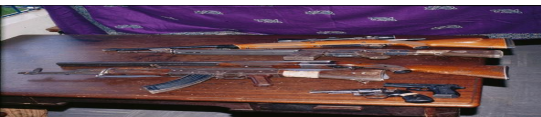
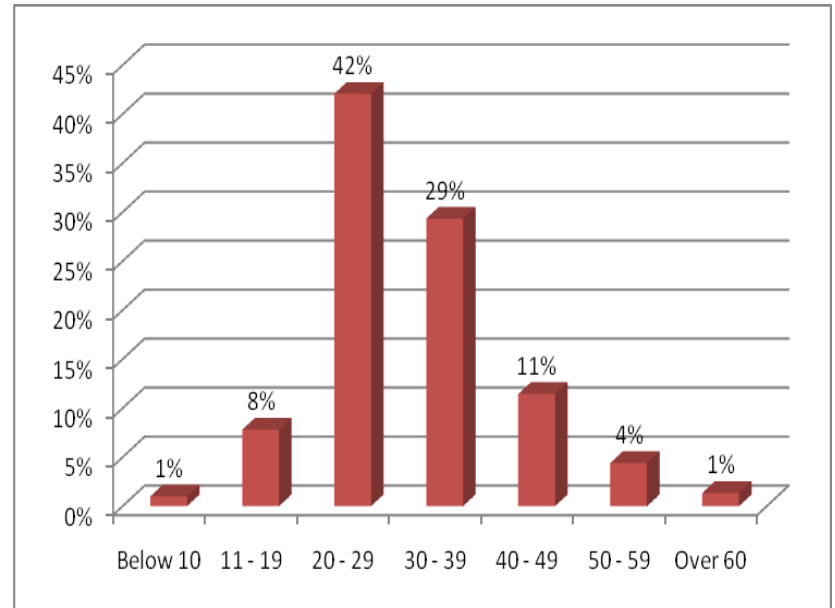
A total of 1,804 patients were recorded to have been admitted and treated for firearm injuries

Males - 90%

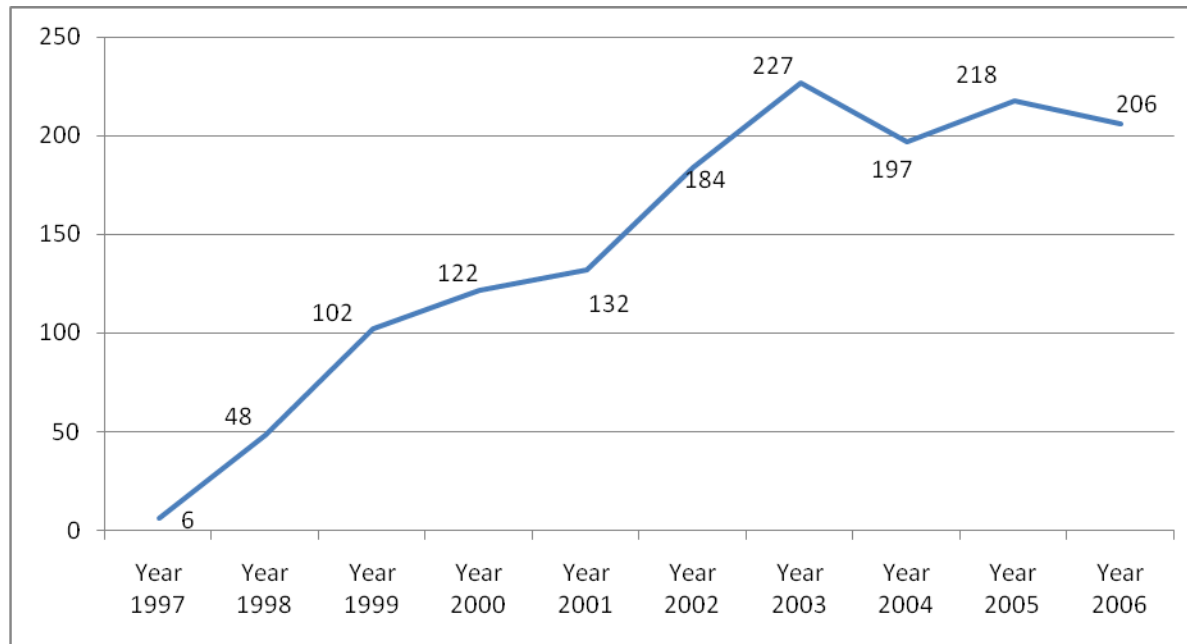
Females - 10%

Most patients were 39 years or younger (80%).

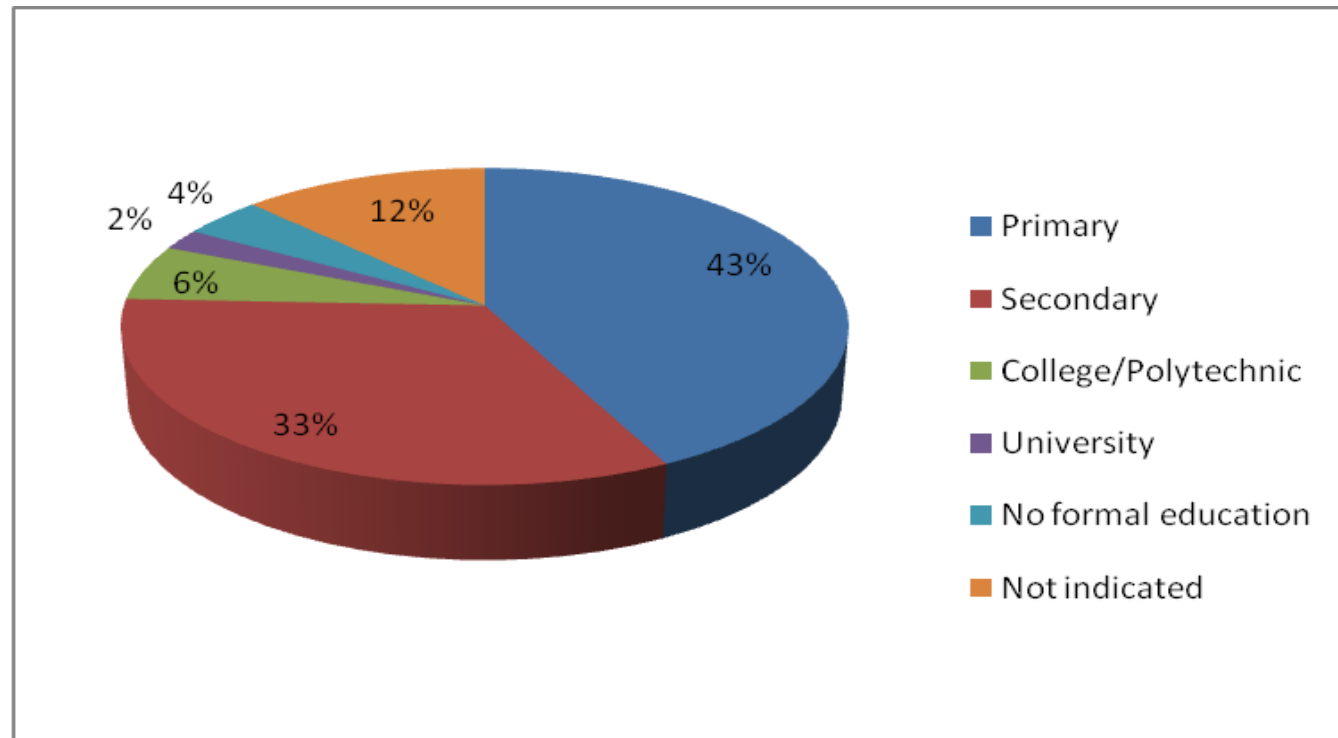
Most vulnerable - 20-29 years (42%).



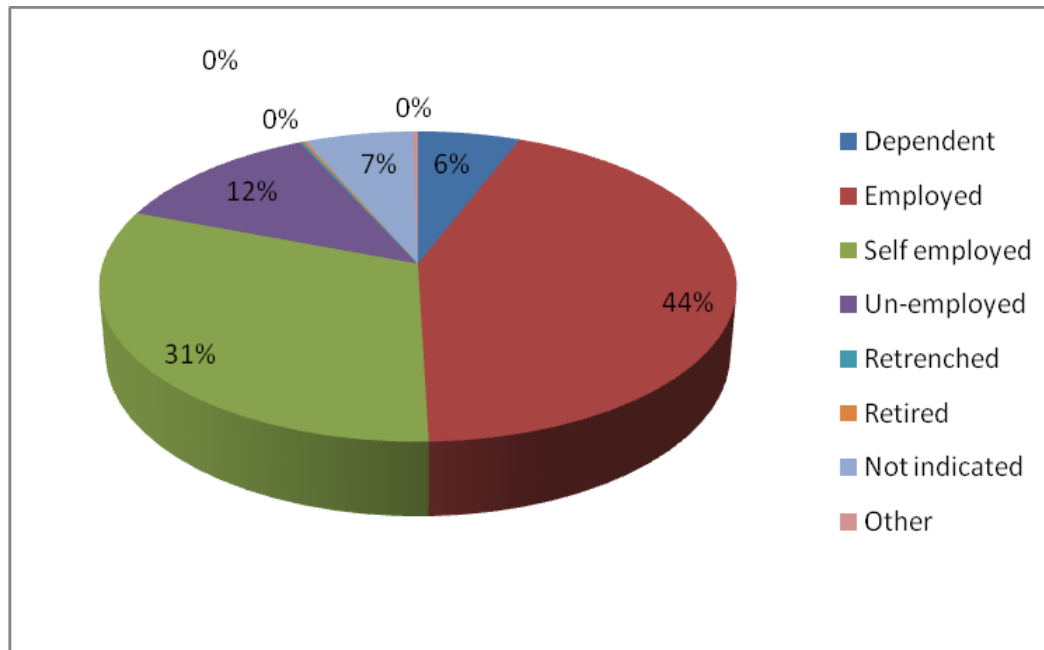
Annual trend of FAI admissions at KNH



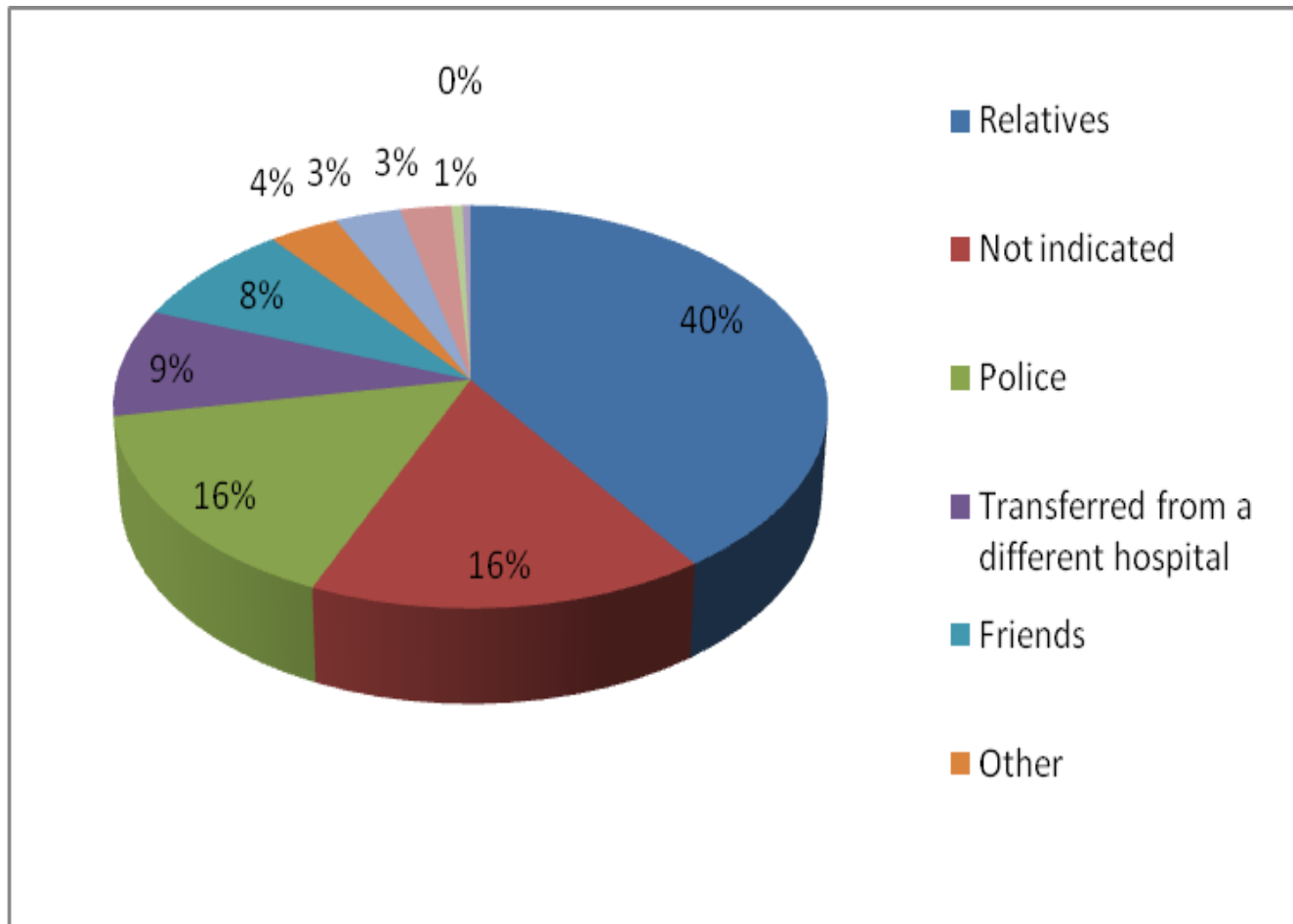
Level of Education at Injury



Occupational Status



Who/How the Injured was taken to KNH



Current KNH Charges

Daily bed charges- Ksh 450 (private wing Ksh. 2,200 – 5000)

- Theater charges- (khs.8000 (USD 100)per surgery.
- Cost of reconstruction plate range from Ksh 20,000- >Ksh 200,000
- Transfusion charges Ksh 500 per unit of blood
- ICU daily charges- Ksh 3000

Clinical Care and Surgical Management

- Eighty nine percent (1519) were admitted to the surgical wards, 7% were taken straight to the emergency theatre and 1% admitted to the Intensive Care Unit (ICU)
- Sixty eight percent (1154) of the patients were managed under general anaesthesia, 20% under local while 7% were conservatively managed.
- Three percent (44) of the patients had blood transfusion in the casualty, 69% were not transfused while this information could not be established in 28% of the records.

Immediate Danger!!



Clinical and Surgical Care

Specialists;

- As in-patients -64% treated by general surgeons
 - 33% orthopaedic surgeon
 - 12% treated by cardiothoracic surgeons
 - maxillofacial surgeons and neurosurgeons operated on 7% each,
 - ENT and ophthalmologists attended to 3% and 2% respectively.

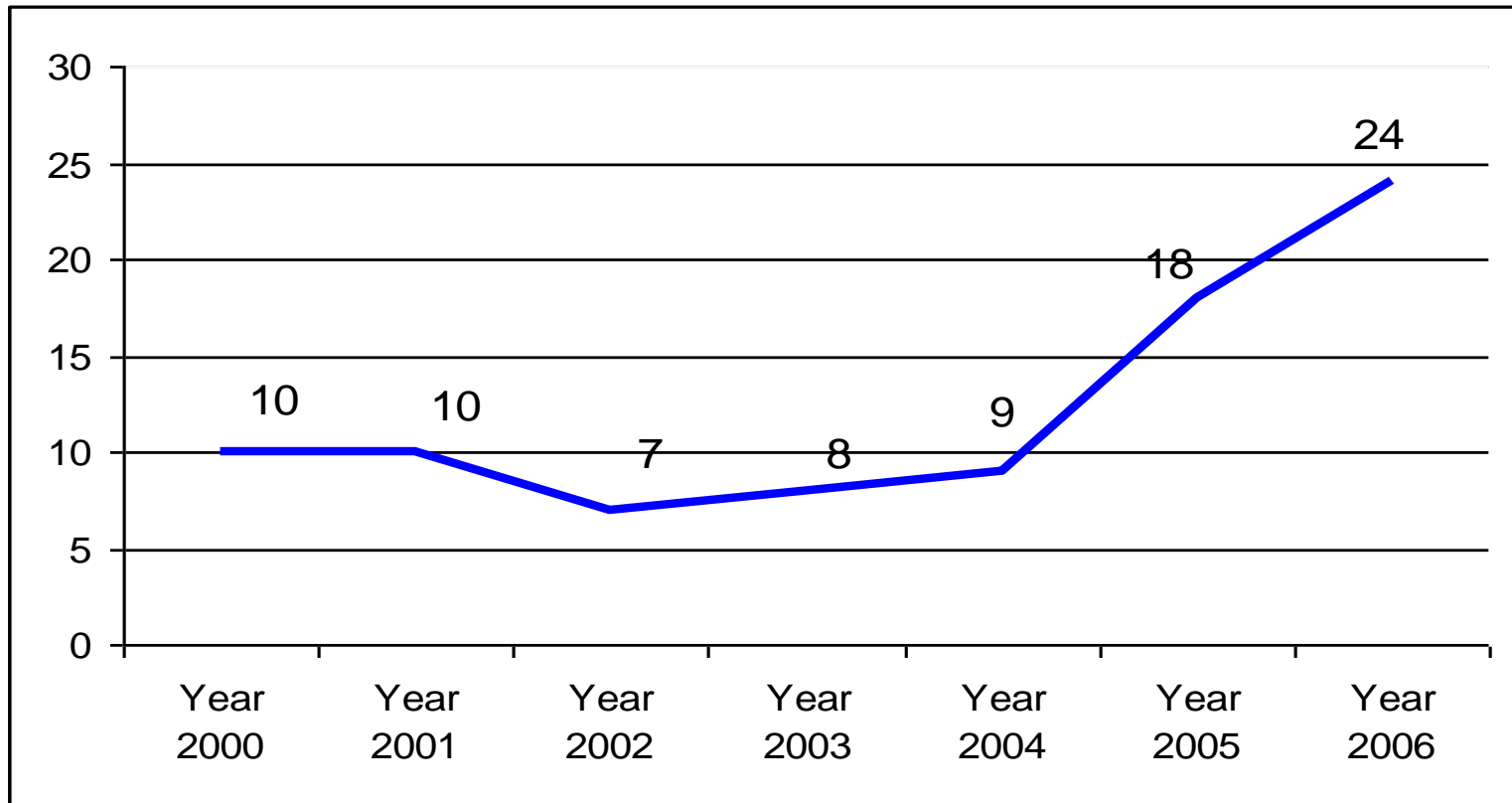
555 (30.9%) patients were seen by a doctor of a special discipline as out patients (after discharge); 40% were attended by general surgeons, 37% by orthopaedic surgeons, Neurosurgeons 5%, cardiothoracic 4%, while maxillofacial surgeons and ophthalmologists managed 3% and 2% respectively.

Range of fee charged per patient for various procedures at KNH over the 10-year period (Ksh)

	Minimum Fee	Maximum Fee	Average Fee Per Patient
Total Charged/patient	50	618302	18487.6
Deposit Paid/patient	100	35000	5420
Daily Charges/patient	100	13950	823
Medication/ patient	30	49450	2521
Surgery per patient	100	50000	3503
Physio-therapy/patient	50	21600	598
Dressing/patient	30	23250	978
X-ray per patient	100	10600	1348
Counselling per patient	200	2100	1040

Longest Period in Hospital	Days	340
Average Number of days in Hospital	Days	18

Annual Mortality trend



Discussion

About 60% of Nairobi's population live in slum and slum-like settlements (Warah, 2004). No road or infrastructure in slum.

Household survey undertaken by the Ministry of Health in 2003 found that only 12% of households in Nairobi owned cars, and 35.4% of households owned telephones.

The majority of residents rely on public transportation, usually in the form of *matatus* (minibus taxis) and buses.

KENYA Household Expenditure and Utilization Survey
Report 2003

The Kibera Slums in Nairobi



The Figures

- KNH figures are government subsidized and far below the actual cost of patient management. Using the WHO guidelines, we can estimate the cost of treatment at KNH.
- The cost of medico-legal investigations is not possible from this study.
- It is also not possible to factor in the cost of transportation as less than one percent used ambulance services.
- **Private hospital bed charges average** Ksh 5000 ; an average of 18days in hospital translates to **Ksh 90,000** per patient at private hospital rate.
- **Theater Charges;** A study by *Odhiambo et al* over a two year period from the same hospital established that FAI surgical operations **lasted two hours** on average. At a private hospital in Nairobi theater fee is charged at Ksh. 300 per minute which translates to **Ksh.36,000 in** two hours.
- The recommended Surgeon's fee by the Medical Practitioners and Dentists Board range from Ksh.30,000 to Ksh 180,000 working with an average figure, the average Surgeon's fee is **Ksh 105,000**. The anaesthetist's fee averages **Ksh 35,000** per surgical procedure.

...The Figures...

- Drugs or medications, implants cost an average of **Ksh 160,000 per patient**
- X-rays & imaging are estimated to cost on average **Ksh. 8,000** per patient.
- The above costs total **Ksh. 434,000** per patient and constitute about two-thirds of the cost of managing each patient who survived firearm injury and was treated at the KNH.
- The additional one third of the cost is accrued on other clinical management requirements ; physiotherapy, blood transfusion, counselling , rehabilitation , out-patient follow up and other unspecified expenses. The total actual cost of managing a single firearm injury at KNH can therefore be objectively estimated at **Ksh. 651,000** this equivalent to **USD 8,700**. (USD 1 = Ksh. 75)

***The estimate is subject to the limitations of a lengthy retrospective study.**

More Figures

According to the Kenya Bureau of Statistics 2006 report, the urban poverty line in Nairobi was **Ksh 2648 (USD 35) per month** with **44%** of the city population living below this line.
Government of Kenya, Ministry of Planning and National Development, Central Bureau of Statistics, 2006

The average hospital bill for FAI-survivors of KSh18,488 (USD245) was on average **seven times** more than the monthly urban poverty line . For the fatal FAI cases the average hospital bill of **Ksh. 57,045 (USD 760)** was **twenty one times** the monthly poverty line or twice the annual level of poverty

Same old data!



8year old Turkana girl in ICU



Frustration remarks!

Firearm injuries impart direct and indirect costs on individuals and society. These include those that can be quantified and those that are impossible to give a socioeconomic tag. Such non-quantifiable costs include psychological trauma associated with permanent disability, loss of a loved one or simply the trauma of the experience that may include the post traumatic stress disorder. *May be if we keep walking we shall confirm that the earth is not flat, but must we go the full circle?? Are all these data necessary to convince the Thomases of the Burden of FAI.*

Sunset at the Mara - *ASANTENI*



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THANK YOU