

# Snakebite as a serious Public Health problem for Nigeria and Africa

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A Neglected Public Health Issue  
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# The EchiTAb Study Group (ESG)

## Foundation and Purpose:

A joint research and development project between EchiTAb Study Group, Nigeria and EchiTAb Study Group, UK

- Project formally established in June 2000
- Chairman, Nigeria - Prof Lateef Salako, CON
- Chairman, U.K. – Prof David Theakston
- Clinical Consultant - Prof. David Warrel
- Project Co-ordinator - Dr Abdulsalami Nasidi, OON
- Co-Proj Coord - Prof John Landon
- Finance/Admin Coordinator – Dr Nandul Durfa
- Key collaborating organisations: FMOH, Nigeria, Liverpool School Of Tropical Medicine, Oxford University and MicroPharm, UK
- A New MOU developed

# The Problem

# Africa and Nigeria Population

- Total Populaion Africa 890 mln
- Total Pop West Africa 252 mln
- \*Total Pop Nigeria **140 mln**
- Attack rate About 170/100,000
  
- No of States 36 plus FCT
- No. of Health Districts 7850

\* *From 2006 Census*

# Africa Situation

- No regional Strategy for Production
- No Regional programme for training
- Regional Management strategy now being developed with assistance from the WHO (Nairobi meeting)

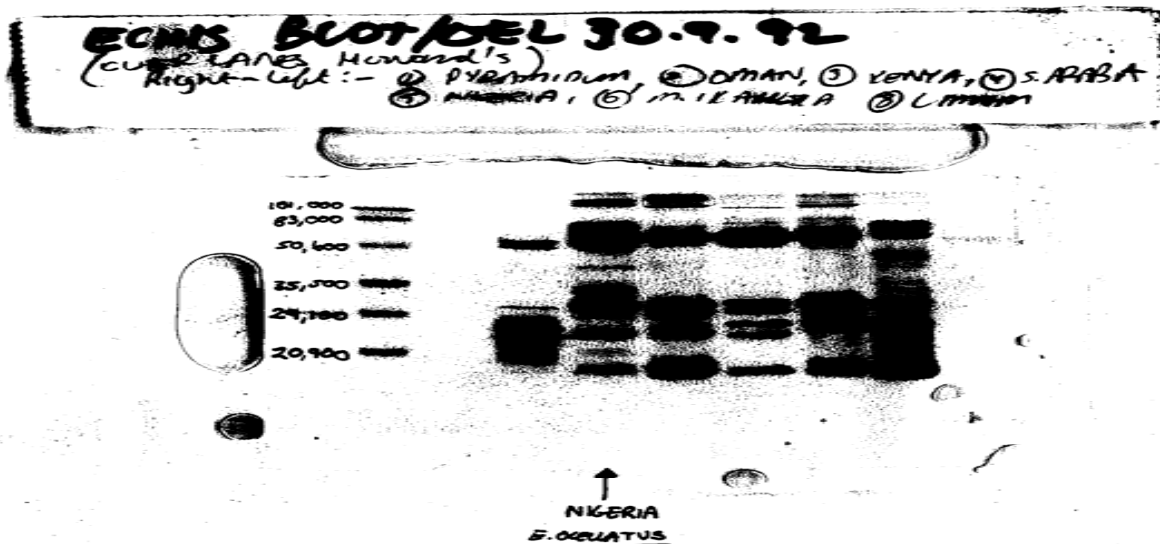
# The Main Problem for Nigeria

- Estimated incidence in Nigeria –174 bites/100,000
- This is 1/5 of all African region cases
- 90% of bites and 60% of deaths caused by the most dangerous snake – ***E. Ocellatus***
- Bites occurring mostly in very fertile areas of the country during planting and harvesting periods

# Importation of ASV /Affordability

- Often in-appropriate ASV (Indian ASV versus our snakes)
- High cost – affected population poor
- Expiry dates often unnecessarily early
- Fake products in circulation
- Poor or misleading inserts
- Inappropriate dosage strategy
- Liquid versus lyophilised (liquid very adequate)
- Monospecific versus polyspecific (both needed)

# The Main Problem for Nigeria



Nigeria Echis with most potent venom

# Regional and National Needs for ASV

- Africa - 1.6 million vials is required annually
- Nigeria: about 245,000 vials annually
- Less than 100,000 vials distributed before 1994 for the entire continent
- Most effective in the region were the IPSER-Afrique, SAIMR ASV, Berhinger-Werke products
- Presently only South African ASV available in Nigeria
- Reasons for non-availability – Economic viability for the develop country manufacturers
- Traditional healing and fake products are the only remedies available to snakebite victims

# Snakebite as medical emergency in rural Nigeria

- 12 States at particular risk(mountainous and rocky)
- 4 poisonous snakes identified with 3 major ones (*Naja nigricolis*, *Bitis Arientas* and ***Echis ocellatus***) as main causes of envenomation
- Nigerian Echis – the most dangerous snake in the World

# Echis Ocellatus





# The Sample Epidemiological Survey

- **Objective**

- Assess magnitude and Distribution of Snakebites in Nigeria
- Ascertain types of Snakes prevalent in Nigeria
- Quantify volume of ASV required

- **Study Type**

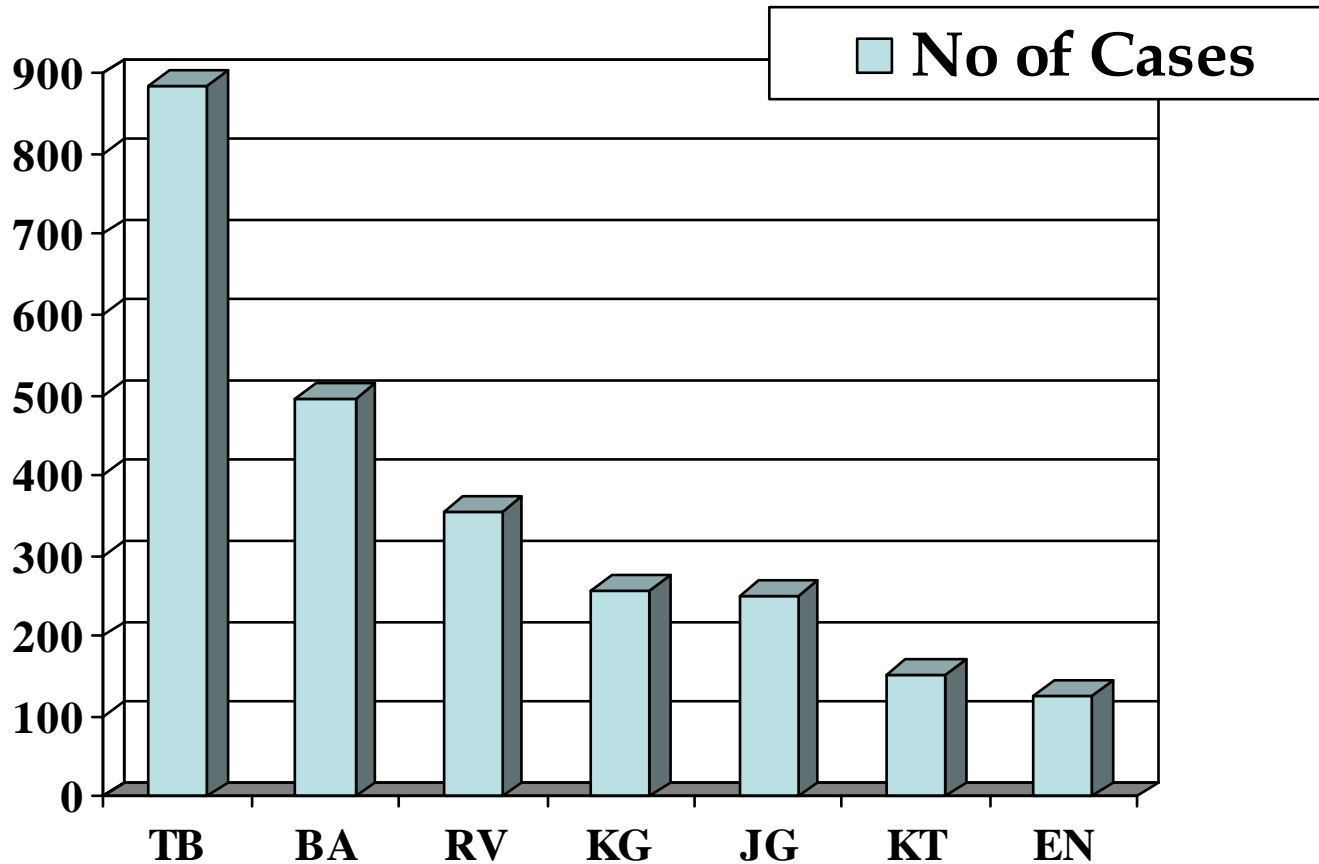
- A 5-year Health facility reviews (1989-1993)
- Cross sectional-community survey

# SAMPLING FRAME

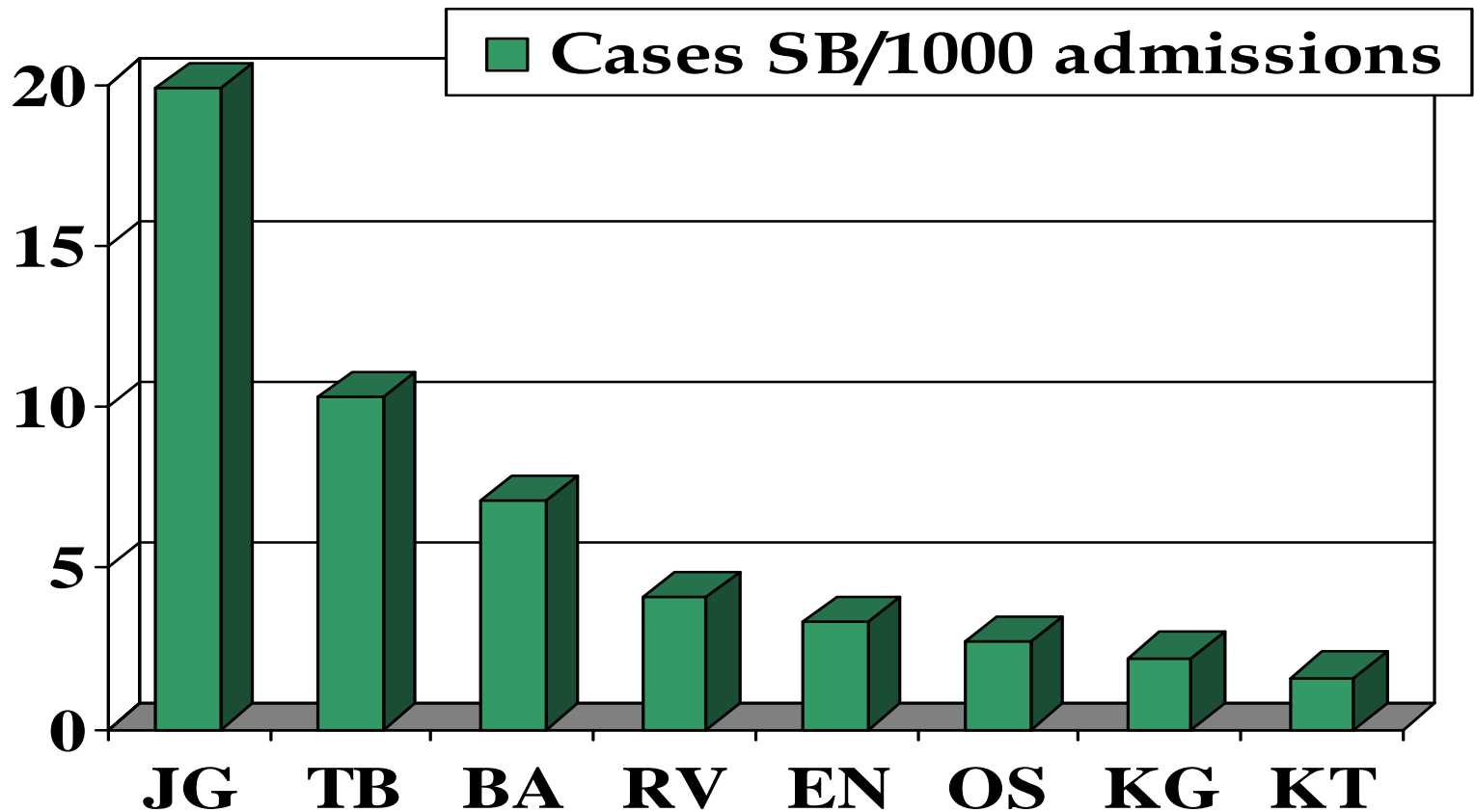
- Country was divided into 2 areas of:
  - High Prevalent Areas (HP) and
  - Low Prevalent Areas (LP)
- Each area was stratified and selection was through randomization
- Pre-designed data collection formats used
- 4,800 households involved (16,000 from HP areas and 3,200 from LP areas)
- Data retrieved from Health Institutions of all identified areas

# Results

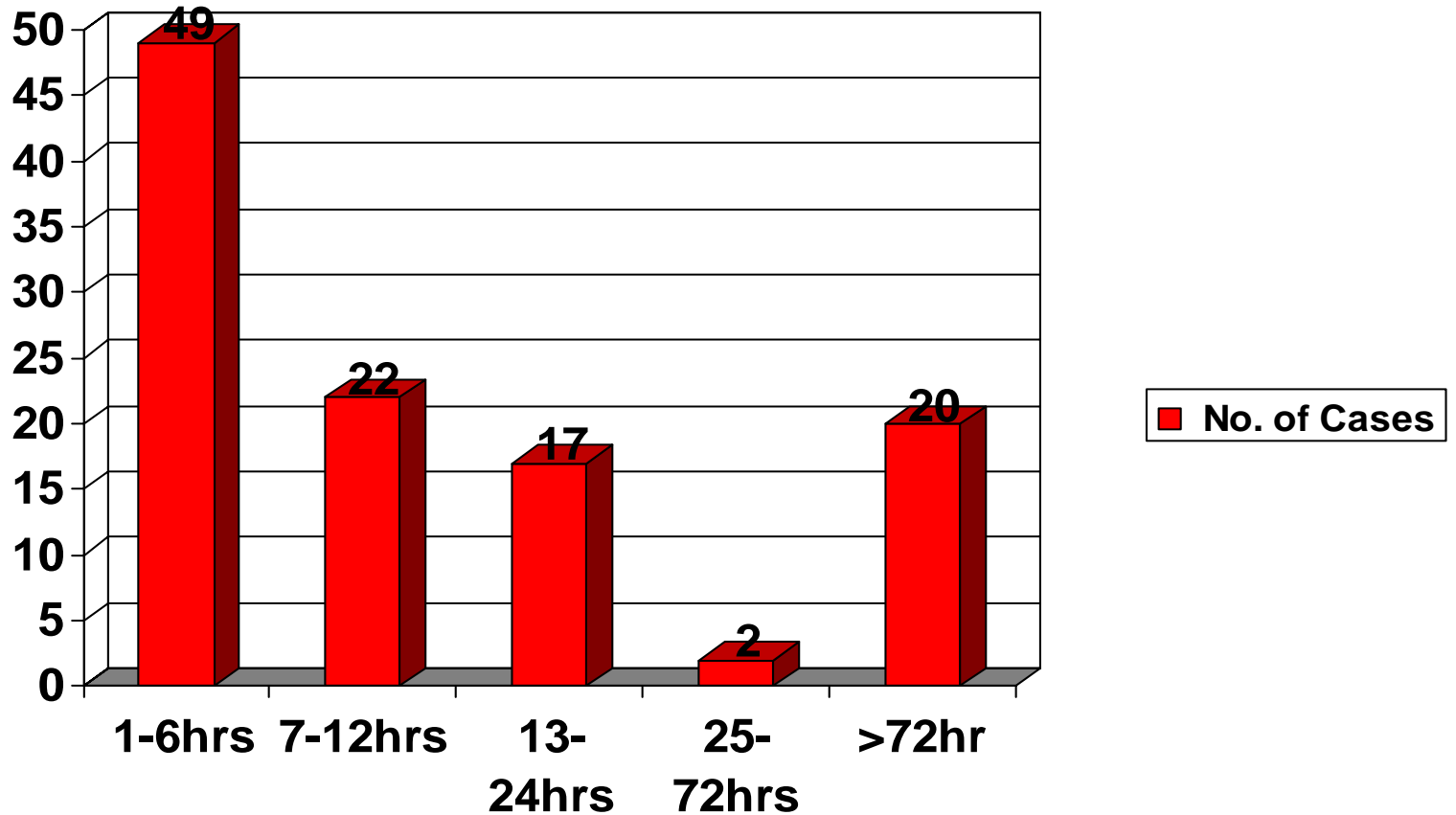
## (Frequency of bites by States)



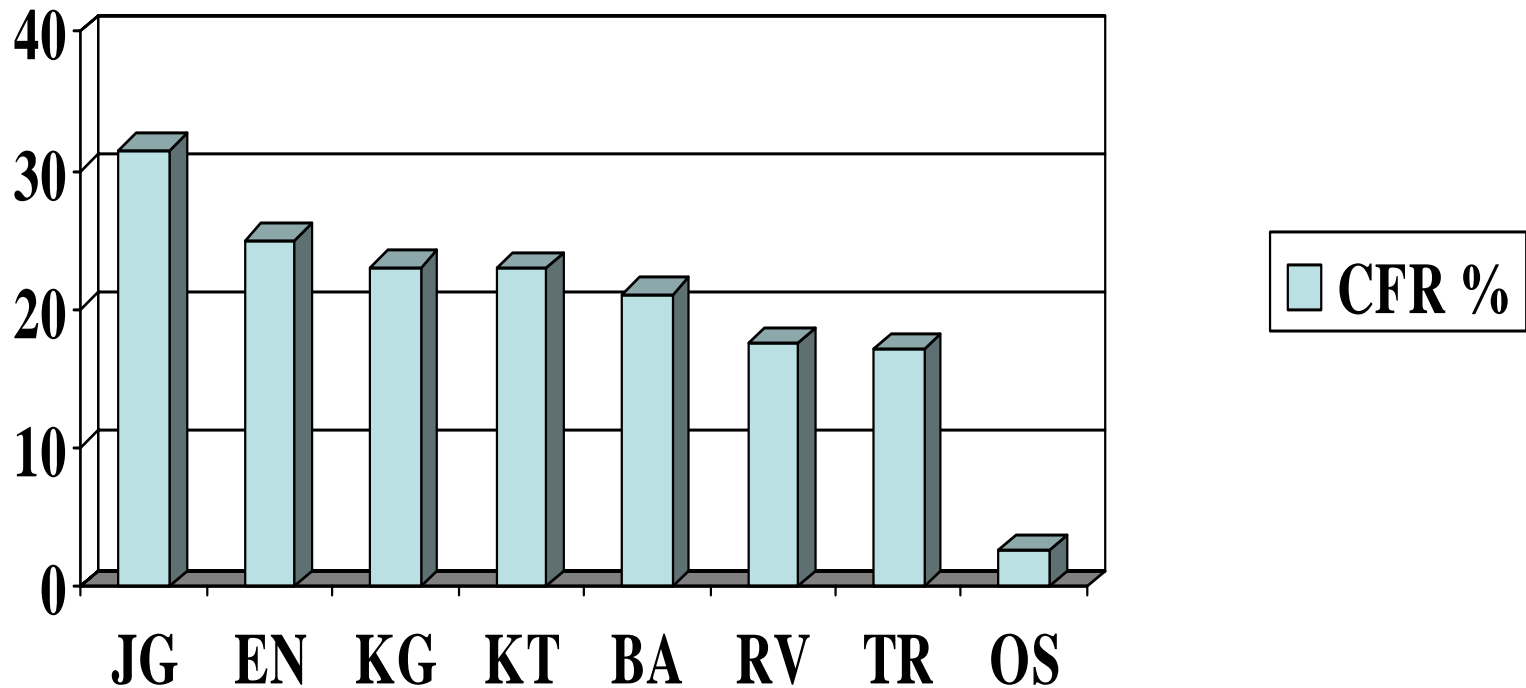
# Admissions due to Snakebites



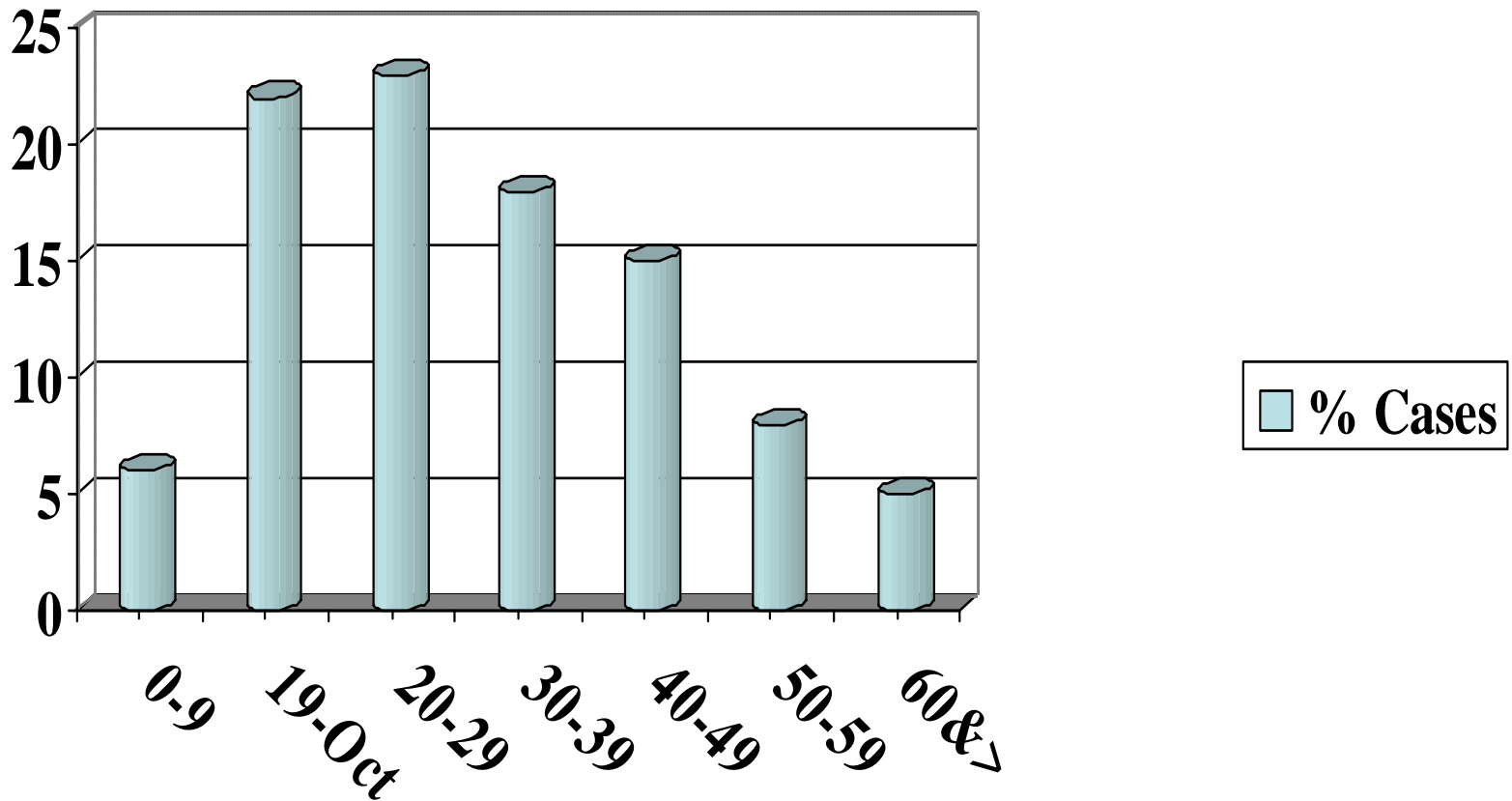
# Time of Reporting to Treatment Centre after bite



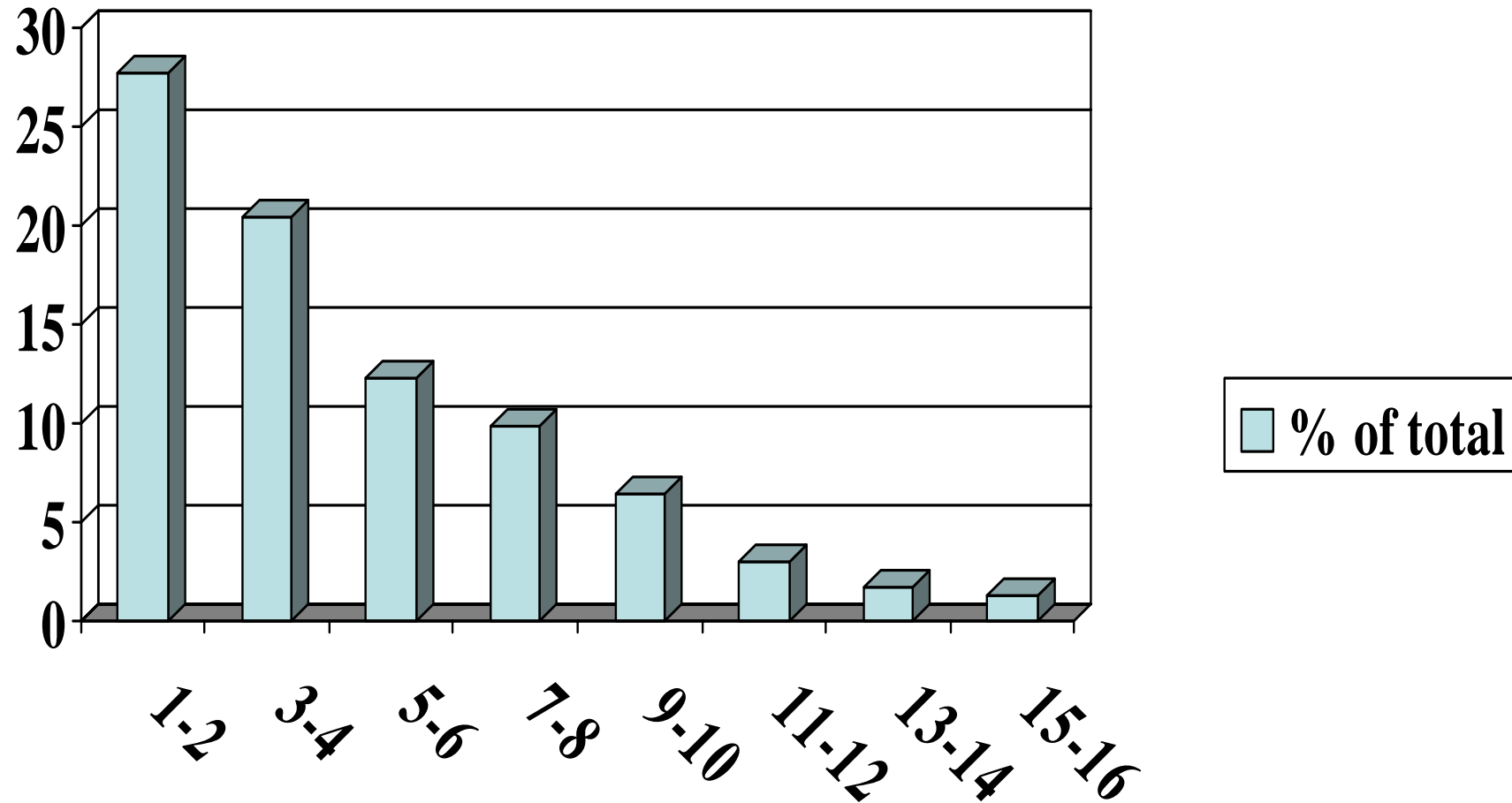
# Case Fatality Rates due to Snake Bites by State



# Age Distribution of bites- National Survey

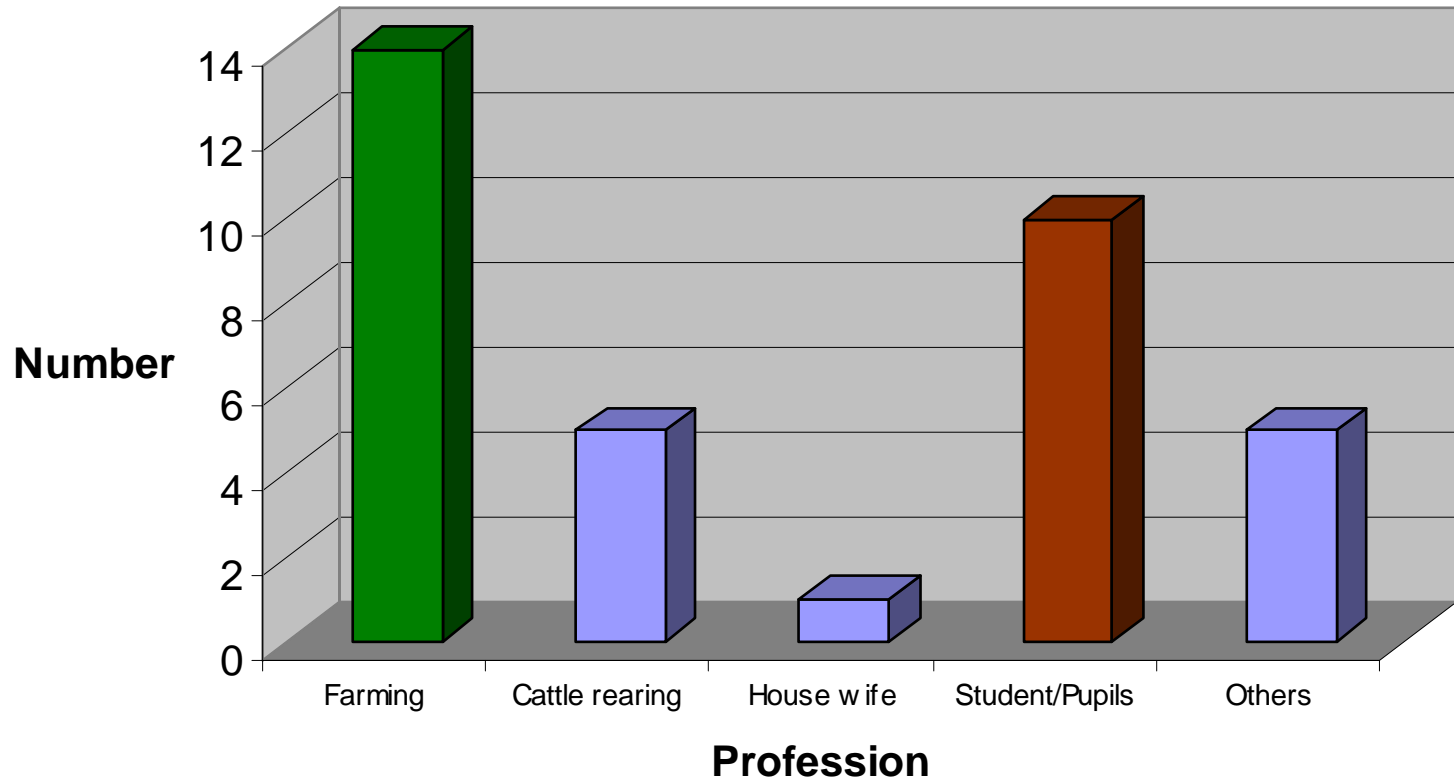


# Length of Stay in Hospital

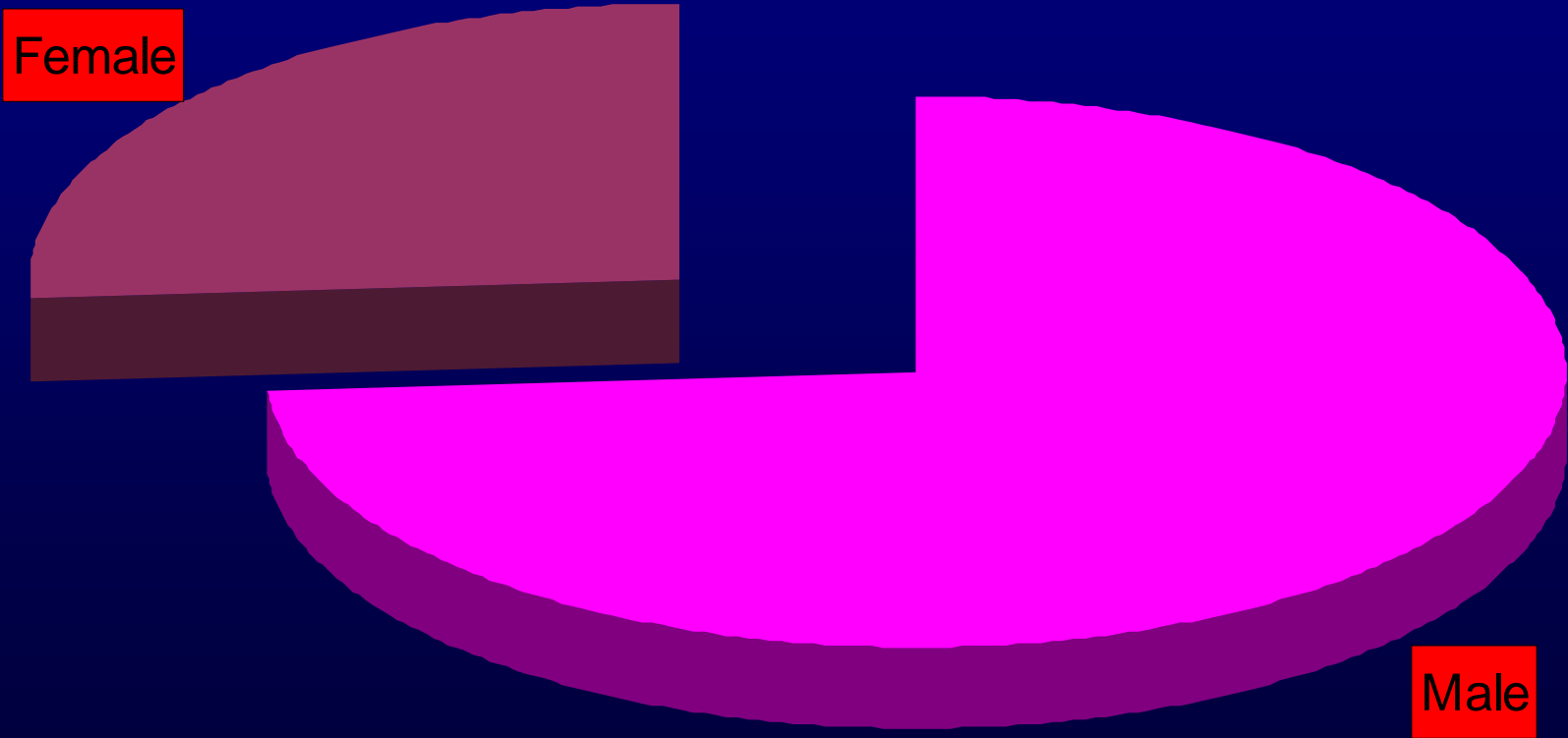


# Direct Observation at the Kaltungo Hospital 1999 to 2006

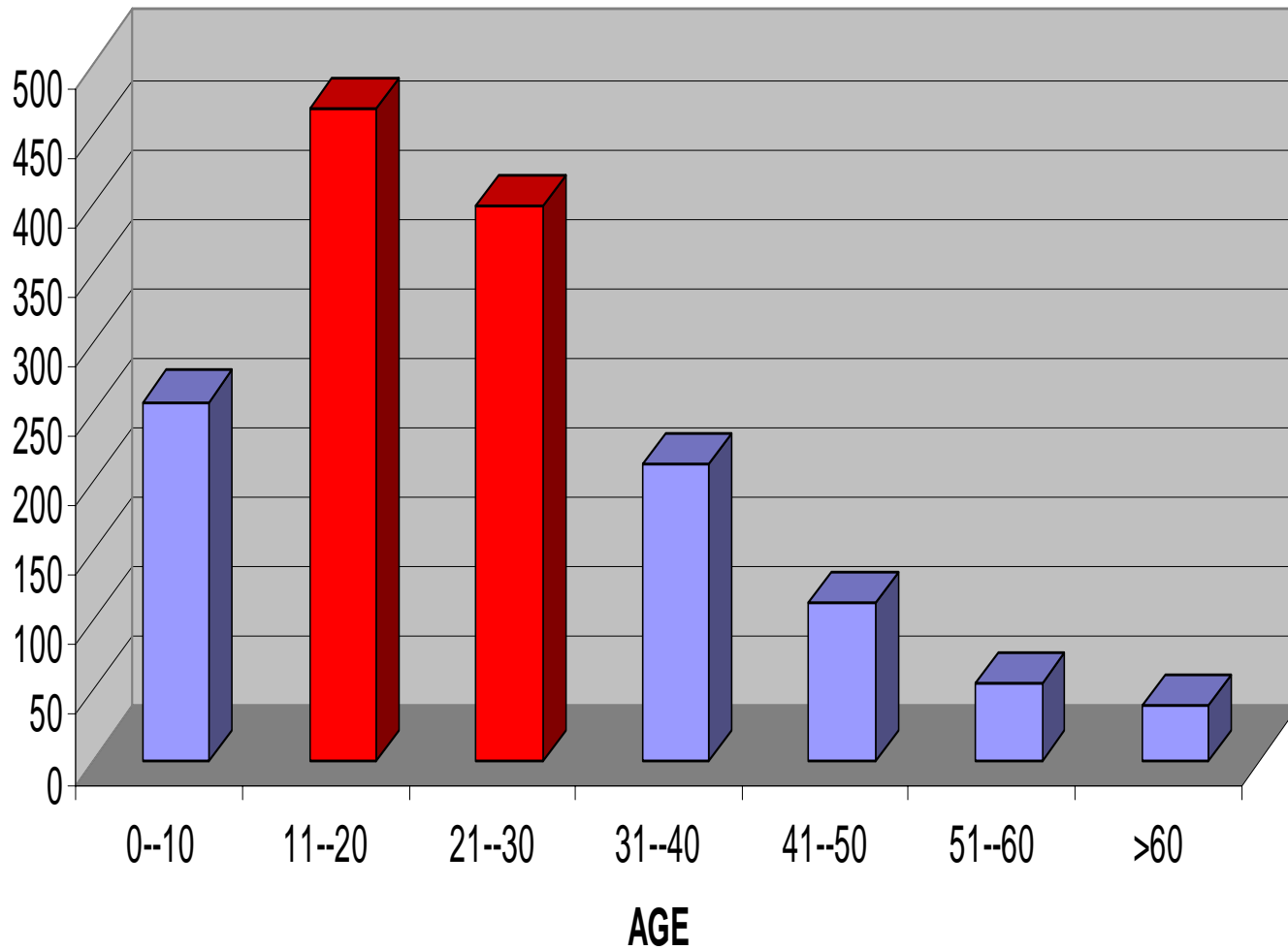
## DISTRIBUTION BY PROFESSION



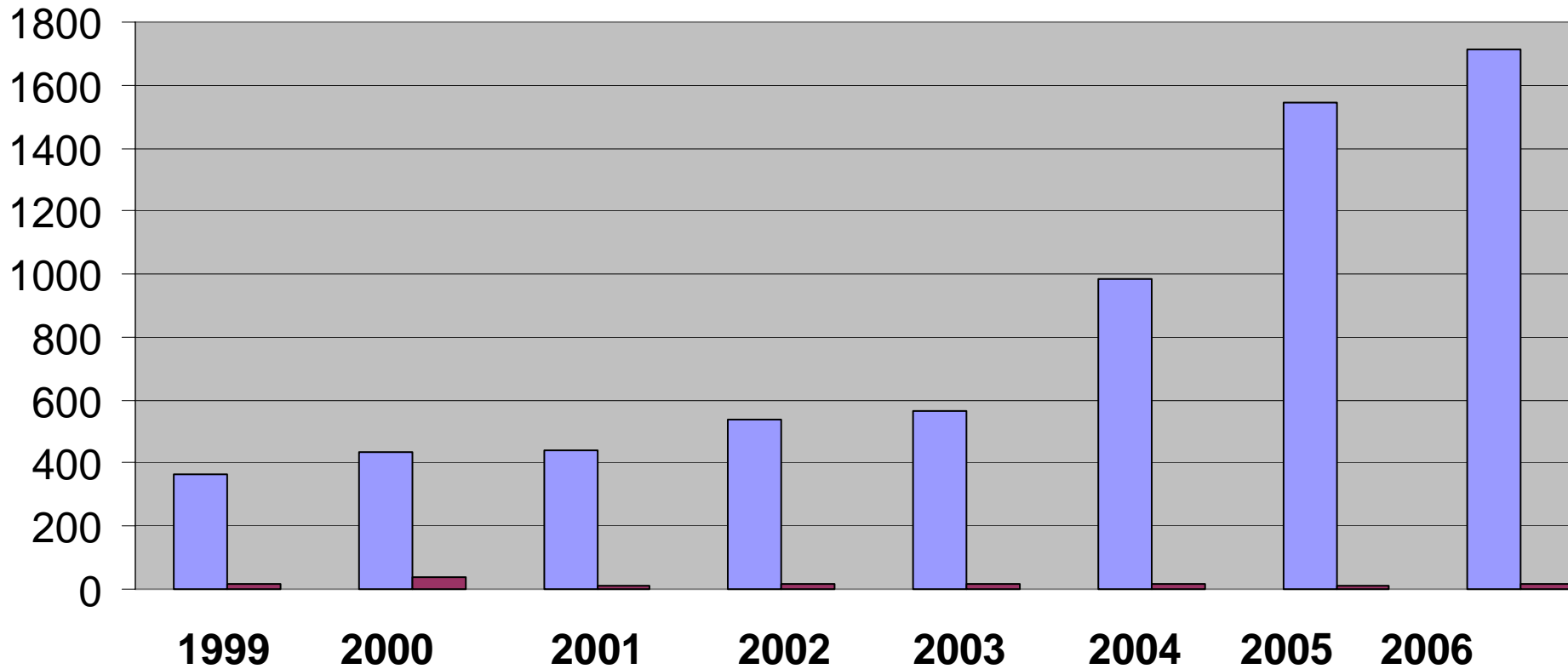
# SEX DISTRIBUTION OF SNAKE BITE CASES IN GENERAL HOSPITAL, KALTUNGO



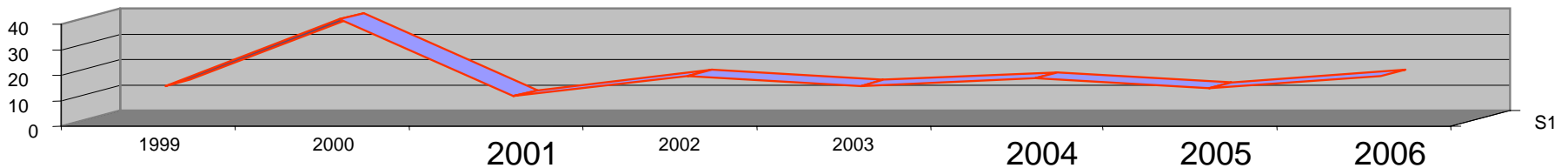
# AGE DISTRIBUTION OF SNAKE BITE PATIENTS IN GENERAL HOSPITAL KALTUNGO 199 - 2006.



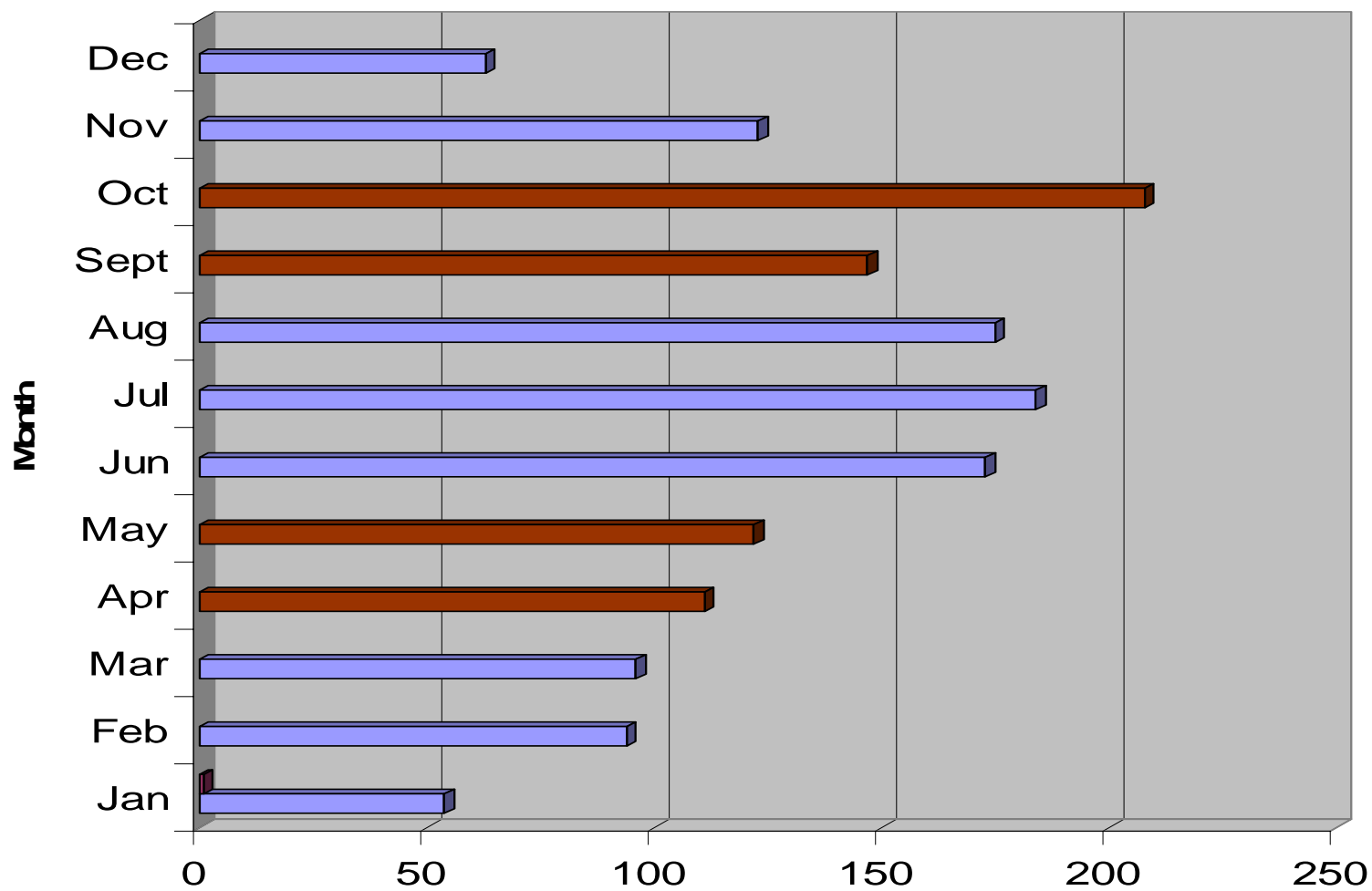
# SNAKE BITE GENERAL HOSPITAL- 1999 - 2006, KALTUNGO.



## DEATH FROM SNAKE BITE 1999-2006 IN GENERAL HOSPITAL KALTUNGO.



## Monthly distribution of snake bite patients in general hospital Kaltungo 2006.

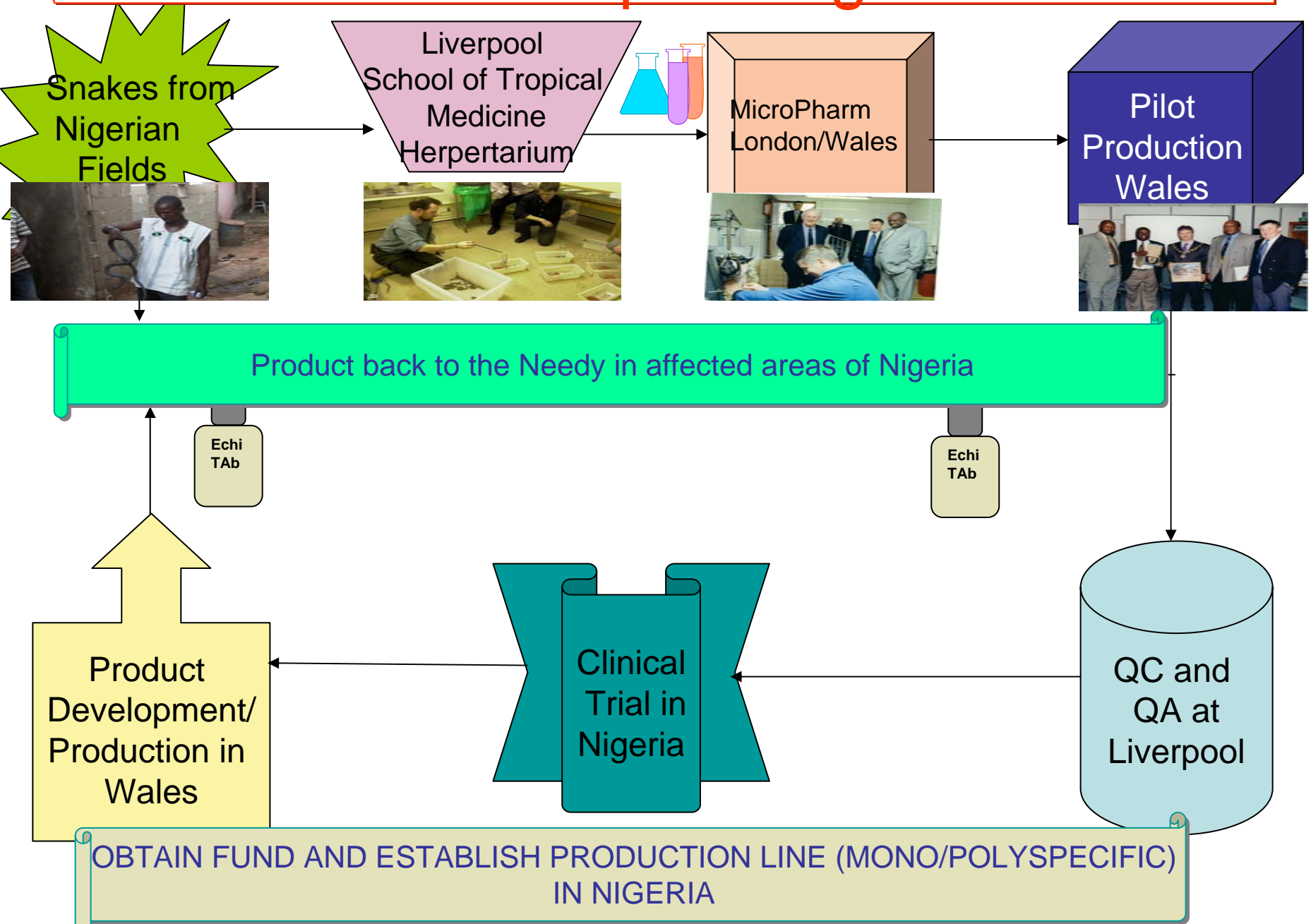


# Product Development

# Objectives

- Key Objectives:
  - Develop robust and inexpensive techniques and design pilot production facilities to manufacture effective, safe and affordable anti-venoms
  - Employ such techniques to provide a minimum of 10,000 treatments per year
  - Train staff and transfer the techniques and facilities to Nigeria
  - Finalise patenting and other documentation for the commercialisation of EchiTAb
  - Completion of clinical trials and registration of EchiTAb by NAFDAC

# Concept Design



# Achievement of Set Objectives

- Complete clinical trials and obtained registration of EchiTAb by NAFDAC – **COMPLETED** 2003
- Use robust and inexpensive techniques and facilities to manufacture effective, safe and affordable antivenoms – **COMPLETED** (Wales project)
- Employ such techniques to provide a minimum of 10,000 treatments per year – **on going**
- Train staff and transfer the techniques and facilities to Finalise patenting and other documentation for the commercialisation of EchiTAb – **Patenting concluded commercialization yet to start**
- Develop a poly-specific (polyvalent) ASV for West Africa – the Colombian/Egyptian/Nigerian/UK collaboration – **on going**

# Clinical Evidence of Efficacy

# Results

- 500mg dosage works, particularly in early reporters
- More doses required to treat late reporters
- Could be effective against puff adder bite
- Restores coagulation within 6-12 hours
- No serious side effects reported so far
- Doctors pleased but suggested improvements due reversal of coagulation (recrudescence)

# Preliminary conclusions

- EchiTAb liquid is efficacious
- Dosage to be reviewed
- Relatively safe
- Easy to handle and administer
- Relatively Stable
- Go for IgG (EchiFab G now suggested instead of EchiTAb)

# CFR at Treatment Centres

- Cases in one year – 3,780
- Deaths - 23
- CFR - 0.63%
- CFR before Treat with EchiTAb – 35% – 45%

# Conclusion

- The ESG has made significant progress in establishing a secured supply of antivenom for the FMOH and establishing the foundations for the transfer of the technology from ASV production to Nigeria
- Establishing an antivenom manufacturing unit in Nigeria will provide Nigeria with a secure supply of high quality affordable antivenom and transfer valuable antibody technology and pharmaceutical manufacturing expertise to Nigeria
- An antivenom manufacturing unit will provide Nigeria with a commercial opportunity to manufacture antivenoms for export to other countries in West Africa
- The facility will meet the national need for ASV and even have sufficient to export to all West African countries and entire Africa, subsequently

# EchiTAb Study Group (Bearing the Burden)

