

# Anthrax Outbreak Investigation, Hamisi District in June 2013

# Introduction & Background

- An outbreak notification: 12<sup>th</sup> June 2013
- An investigation team went out to investigate the outbreak on 26<sup>th</sup> June 2013
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# Introduction & Background

- Anthrax is a bacterial disease caused by *Bacillus anthracis* Bacteria
  - Primary disease of herbivores among *which* it occurs in outbreaks
  - Transmission: Contact with spores from infected animals
  - Incubation 1-7days
- Types:
  - Cutaneous, Gastrointestinal, Inhalational

# Objectives

- To verify the existence of an anthrax outbreak in Hamisi District in June 2013
- To establish the magnitude of the anthrax outbreak in Hamisi District
- To characterize the outbreak in terms of time, place and person
- To determine factors associated with incidence of anthrax in Hamisi District

# Materials & Methods

- Hamisi District
  - In Vihiga county
  - 4 administrative divisions, 4 locations and 28 sub locations
  - Area: 189 square kilometers
  - Population of 189,559 persons
  - Main Occupation:
    - small holder farming livestock keeping & Mining



# Case definition

- Cutaneous anthrax:
- Any resident of Hamisi District presenting with papules and **or** characteristic blisters with central necrosis and surrounding oedema, and an epidemiological link to a confirmed or suspected animal case or contaminated animal products from 1<sup>st</sup> June 2013

# STUDY DESIGN

- Descriptive study
  - To describe the outbreak & Characterize cases in time, place and person.
  - To determine attitudes and practices related to anthrax
  - A sub analysis of risk factors using retrospective cohort approach
- key informant interviews



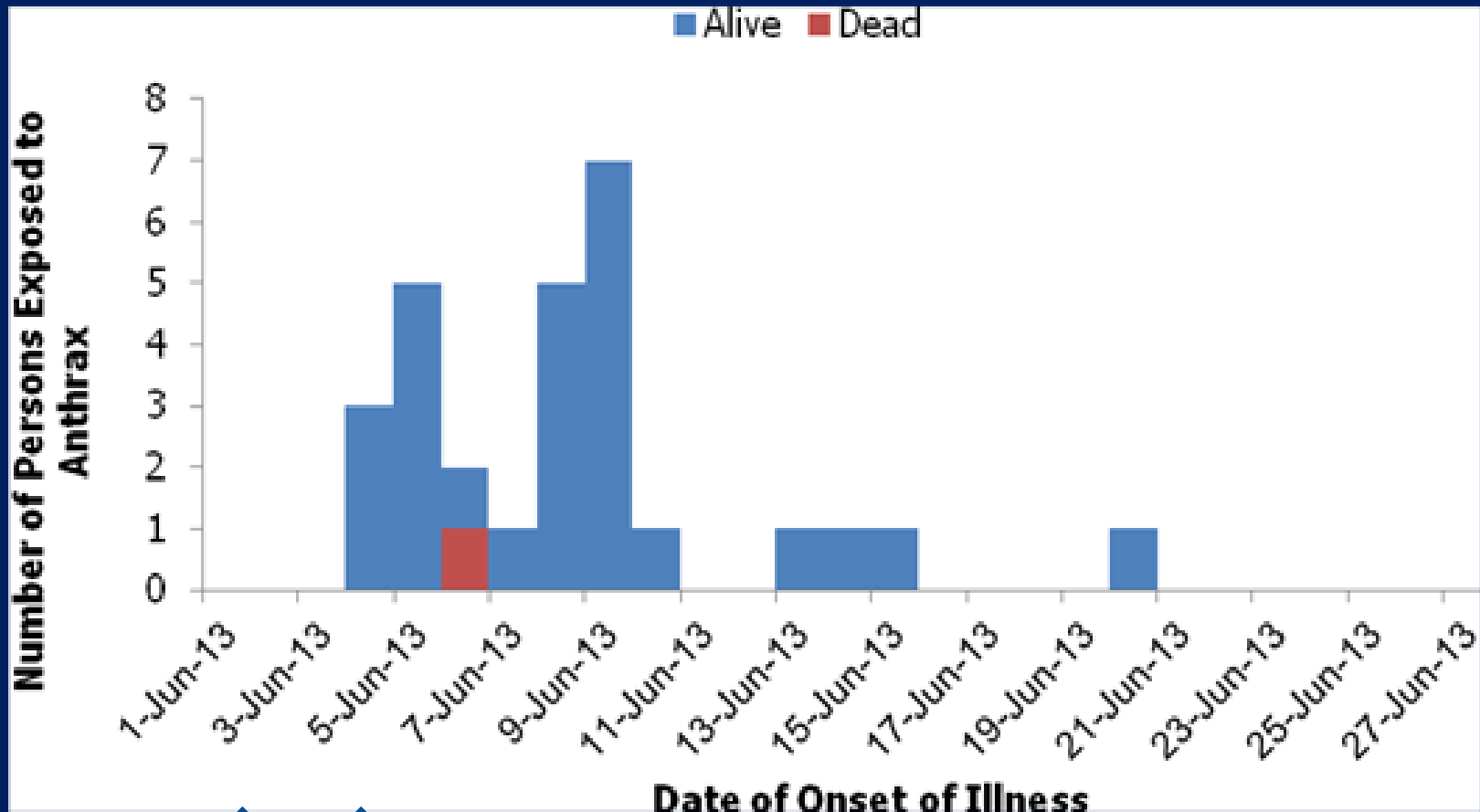
# Data Collection & Analysis

- From 26<sup>th</sup> June 2013 to the 29<sup>th</sup> 2013 in Hamisi District, Vihiga County
  - Semi structured interviewer administered questionnaires
  - Unstructured Key Informant Interviews
- Laboratory Methods
  - Specimen (exudates/ pus swabs from lesions) for microscopy & culture
- Data analysis
  - Epi\_info & MS Excel

# RESULTS

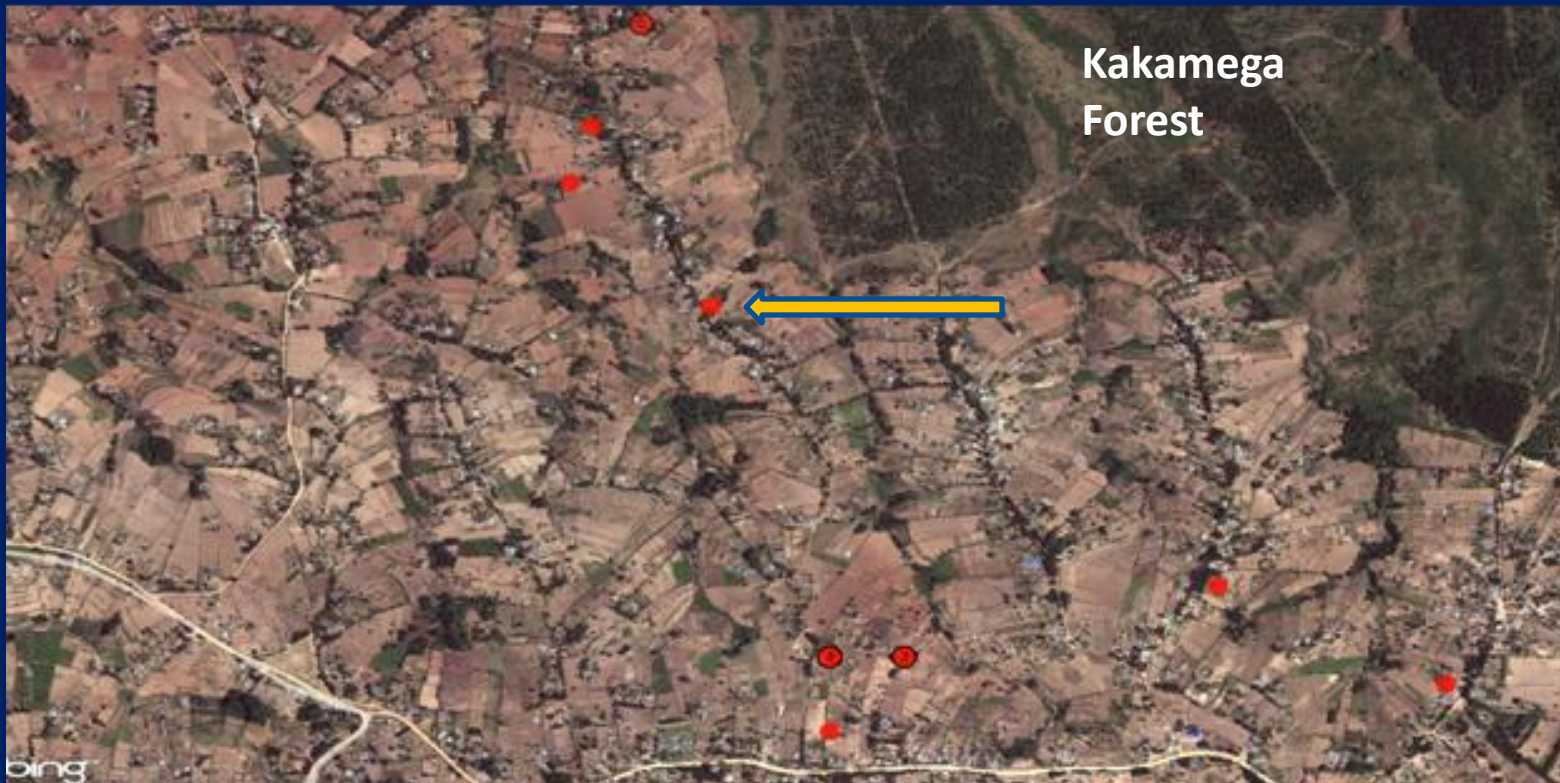
- A total of 28 persons of the initial 33 exposed were interviewed
  - Median age of 35years. (IQR= (IQR=10 - 52)R
  - Range 1-80 years
- Females were 14 (50%) of exposed persons ( M:F ratio= 1:1)
  - Majority exposed to two animals AB &ED

# Distribution in Time



# Spot Map

- Cases were from three villages in Muhudu sub location;
  - Shanda village 11 (68.7%)
  - Syekuti village 3 (18.7%)
  - Lurungula, 2 (12.5%)



# Distribution of cases by Person

- Sixteen(64%) persons became symptomatic
- Age distribution
  - Adults & Adolescents above 15 years: 12(75 %)
  - children: 4 (25%)
- The median age for cases: 36 years
  - (IQR= 14.5-56.0)
  - mean of 35.6 years. (SD= 24.2).
- Cases more frequently males 14 (87.5%) than females 2 (12.5%)
  - Male to females ratio = 7:1

# Distribution of cases by Person

- Cases were more frequent among uneducated & primary education
  - No education (40%) and Primary(60%) of the cases respectively
  - Only 1 case had secondary education or above among the cases.
- Gold miners were commonest among cases 5(33.3%), farmers 4 (26%)

# Clinical Symptoms

Symptoms	N(%)	95% CI	
Oedema	16 (100)	-	**
Papule	13 (81.2)	(54.3-96.0)	*
Erythema	12 (75)	(47.6-92.7)	
Eschar	3 (18.7)	(4.0-45.6)	

Part Affected	N(%)	95% CI	***
Hand & Finger	9 (56.2)	(11.0-58.7)	*
Head and Neck	5 (31.3)	29.9-80.2)	*
Torso	1 (6.3)	(0.16-30.2)	
Lower	1 (6.3)	(0.16-30.2)	

# Health seeking behaviour

Variable	N(%)	Admission	Type	Ownership
Overall Attendance	10(62.5)	1		
Kaimosi Mission	3(30.0)	1	Level4	FBO
Kaptech Dispensary	3(30.0)	-	Level2	GOK
St. Consolata	2(20.0)	-	Level 2	Private
Vihiga District Hospital	2(20.0)	-	Level 4	GOK

- **Non attendance:** 6 (37.5 %) did not present to any health facility.
- **Case fatality rate = 6.3% (1)**
  - The child succumbed on the way to the hospital



# Risk factors

Cases	Cases	Non Cases	RR	P-Value
Exposure	N(%)	n(%)	RR (95% CI)	
Male	14(87.5)	2(12.5)	<b>3.3</b> (1.0-11.5)	<b>&lt;0.01</b>
Keeps animals	10(45.4)	12(54.6)	<b>0.4</b> (0.3-0.7)	<b>0.01</b>
Animal death at home	9 (69.2)	4(30.7)	1.7 (0.7-4.0)	0.09

# Risk factors

Exposure	Cases N(%)	Non Cases n(%)	RR (95% CI)	P-Value
Handling animal a dead animal	9(52.9)	8(47.6)	0.83 (0.4-1.5)	0.7
Exposed to COW 1 or COW 2	10(41.9)	4(28.6)	<b>2.0</b> <b>(1.2-2.3)</b>	<b>P&lt;0.01</b>

# Risk factors

- Handling carcass of **COW 2** (slaughter, meat products or hides)
  - was associated with a 4 times risk of cutaneous anthrax (RR=4.3; 95% CI 1.8-11.9, P<0.01)
- Participating in slaughter of **COW 1** was associated with an 8 times risk
  - (RR=8.8; 95% CI 1.2-50.0; P=0.04)
- Handling meat from **COW 1** was associated with a five times
  - (RR=5.0; 95% CI, 1.4-17.2; P=0.05)

# Key Informant interviews

## DVO:

- Annual animal vaccination is done (Passive approach, no certification)\*
- Handling , eating of **carcasses**\* is common *Shibiringa*
  - Buried 33% (11.8-61.6), 66% ate the carcasses
  - 15% interfered with
  - All skinned before disposal

## MOH:

Active Case search, Inspection of meat

- Anthrax case definition Poorly grasped
  - Cases not diagnosed or reported

# Key Informant Interviews

- **Village Elder**

- Over 30 animal deaths in 2 months (not captured by surveillance system)
- Culture requires skinning of animals that die before disposal
- The locals share same houses at night with their animals, prevent animal theft
  - Out of 15 respondents 80% (51.9-91.6%)

# DISCUSSION

- There was an outbreak of suspected anthrax in animals in *Muhudu* location
  - A case confirmed in animals
- Human outbreak of suspected anthrax
  - Point source outbreak
  - No confirmation
- Exposure to cow 1 & 2 animal carcasses
  - Main factor associated with most cases
- The last outbreak was in 2008

# Discussions Cont.d

- Risk factors for suspected anthrax
  - Slaughter and Handling raw products of the 2 animal carcasses, posed the highest risk
- Cases were more frequently males with poor education
  - Generally low academic levels among exposed persons
  - Males prepared carcasses for disposal

# Discussion Cont'd

- Hands and fingers mostly affected
  - Consistent with *Mwenye et al* (1996) in Murewa, Zimbabwe
- Miners and farmers were more frequently affected
  - Hand lesions has economic repercussions for victims in the short term
- A most affected age group were aged 35 to 55 years



# Discussion Cont'd

- No Gastro intestinal cases were found
  - Case definition?
  - Risk still present in the community
- Case fatality rate 6.3%
  - consistent with findings of *Lakshmi N et al* in India
  - Child aged 1.5 years
  - Shared residence with cow 1
  - Possessed none of the risk factors assessed
  - Had head & trunk lesions

# CONCLUSIONS

- Outbreak resulted from two infected animal carcasses
  - Handling products from the animals were the main exposure with high risk of infection
- Risk to humans still present
- Knowledge of main risk factor is poor
- Weak anthrax Surveillance in humans and animals
- Weak & Isolated control efforts

# RECOMMENDATIONS

- Active anthrax case search during the outbreak period to identify unreported cases
- Evaluate surveillance system & strengthen it
  - Disseminate human anthrax Case definitions to community and facility workers
  - Sensitize Health workers on the importance of anthrax case notification.
- Investigate animal outbreak

# RECOMMENDATIONS

- Routine Vaccination of animals (with certification)
- Institutionalize the one health approach in District & county health & Vet teams
  - Health Education (Modes of transmission & risk factors)
  - Anthrax Surveillance & Outbreak prevention & Control

# Head and neck lesion



# Hand lesions



# Animal in a residential house



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