Experience with vaccinating livestock in an endemic setting

Rift Valley Fever Workshop

An Integrated Approach to Controlling Rift Valley Fever in Africa and the Middle East

January 27-29 2009, Cairo, EGYPT

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INTRODUCTION 1

- Rift Valley Fever (RVF) is a viral haemorrhagic disease primarily of cattle, sheep, goats, camels, wildlife and humans
- Spread: - *Aedes* mosquitoes, other blood-sucking insects and through skin abrasions
- Virus persistence between outbreaks remains unclear

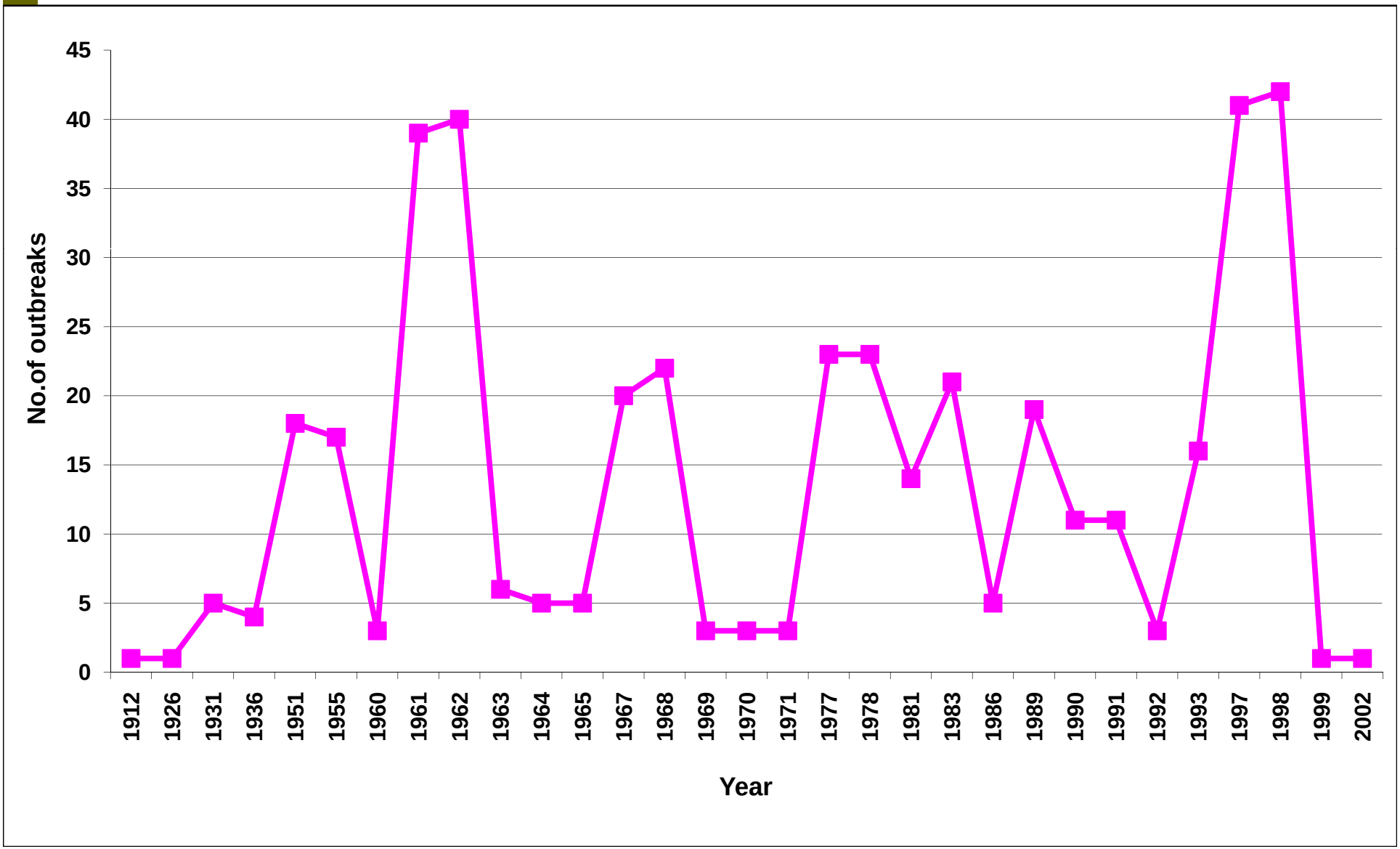
INTRODUCTION 2

- One of the most significant zoonotic disease problems in Africa.
- The haemorrhagic human disease syndrome generates a high degree of panic among the human populations at risk.

Background

- 1900:- RVF first recognized as a disease in sheep in Rift Valley province, Kenya.
- 1930:- Virus isolated
- Intermittent outbreaks in Kenya.
- 1950-51: A major epizootic
  - 500,000 sheep abortions
  - 100,000 sheep deaths
- 1997-98: Kenya, Africa
  - Largest outbreak reported
  - 89,000 humans cases - 478 deaths

Number of RVF outbreaks in Kenya from 1912-2002 (5-15 year cycles)



Control 1

- Vaccination
- Livestock movement controls -quarantines
- Vector control
- Livestock owners moving to high grounds with their animals
  - avoid areas with stagnant flood water that may host the vectors

Control 2

- First control measure that comes to mind in an outbreak-Vaccination
- To be effective, vaccination must be done between outbreaks rather than during an outbreak
- RVF is usually already well-established in animal populations by the time the first human cases are observed. Hence, control of RVF in livestock beforehand is very important
- Note: 1997-1998, 2006-2007 outbreaks, disease first recognized in humans

Control 3

- Control window very small
- Vaccination became a challenge for the vets
  - Need to know extent of disease spread
  - Vaccinate only healthy animals
  - Avoid spread of RVF and other infections during vaccination
  - Numbers to be vaccinated
  - Availability of vaccine
  - Operational funds
  - Lack of an approved human vaccine

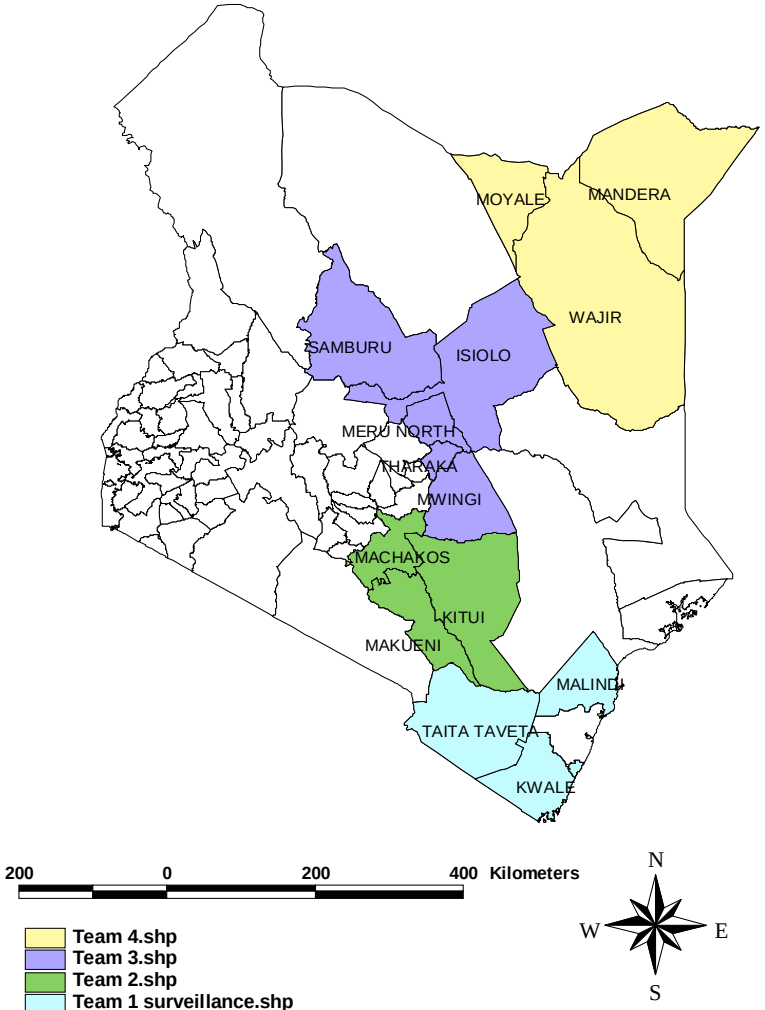
2006-2007 outbreak in Kenya

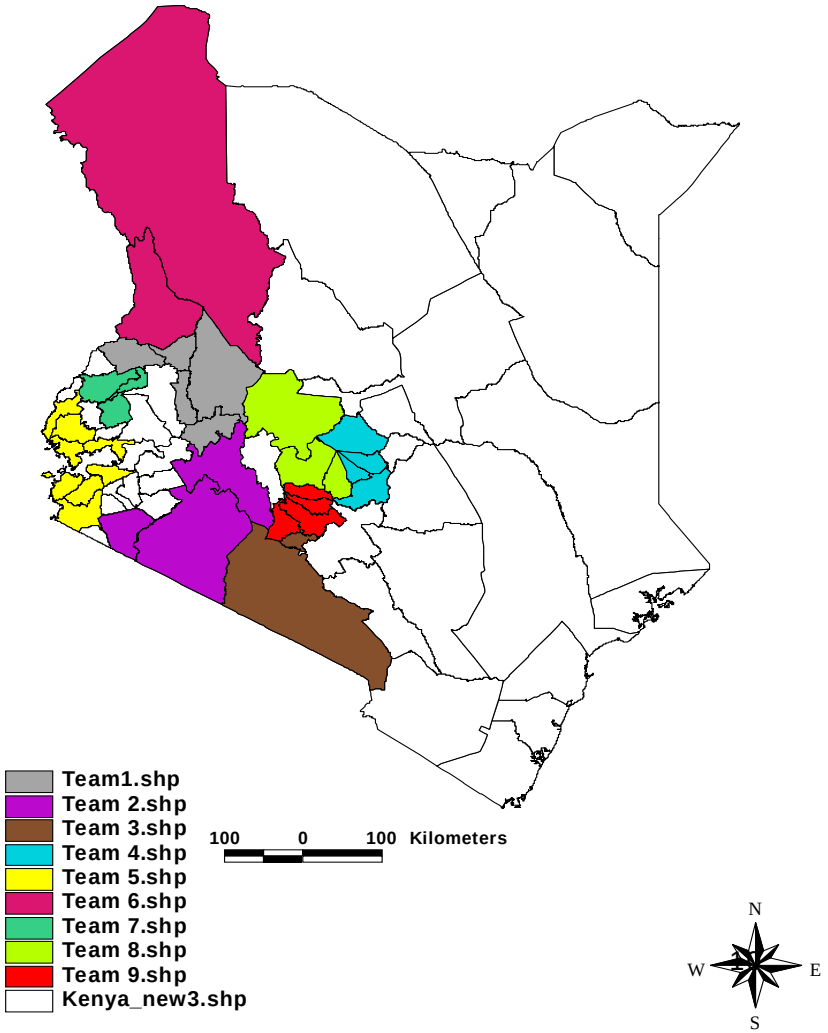
- First detected in human in Garissa district in early December 2006
- Late December RVF was confirmed in Livestock in this district
- Appeared to spread by flare ups of endemic foci
- It occurred in several districts
- Local spread from initial outbreak – limited
- Not known to spread by movement of infected animals- Reduction in transportation time has made this mode possible

RVF SURVEILLANCE JANUARY 2007

Adjacent districts to determine the spread

known endemic foci areas - based on Previous infections, areas ecologically conducive for vector habitation





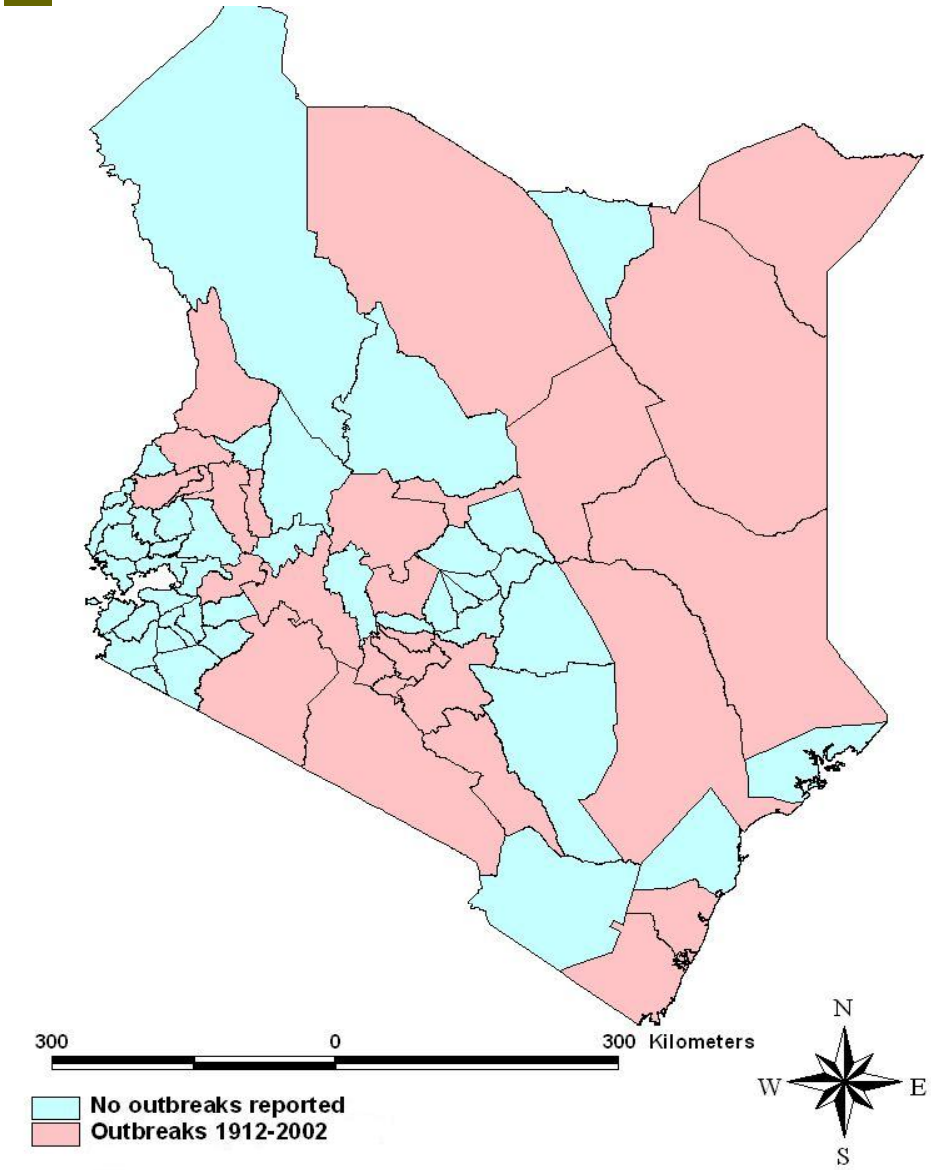
Vaccination

- Vaccinations were carried out in goats, sheep, cattle and camels
  - Started in January 2007 in the North Eastern Province
  - Later focus shifted to known endemic districts
  - A total of 2,550,300 doses of RVF vaccine were used in control efforts
  - Type of vaccine: Smithburn live attenuated vaccine

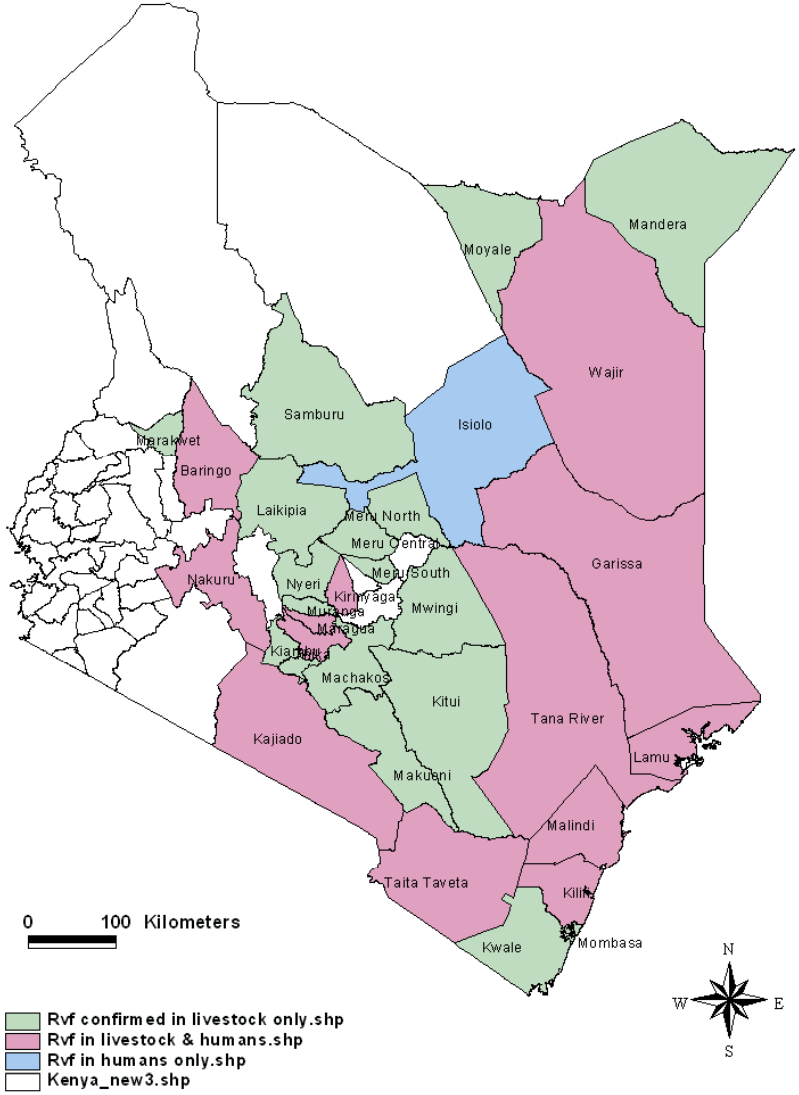
Vaccination

- Vaccination arrived too late for controlling the disease
- Aggravate the situation-
- The repeated use of needles and other equipment during vaccination campaigns could actually help to spread the disease from infected to healthy animal
- Factors that contributed to vaccination in an outbreak situation-Political, public trust

1912-2002



FEBRUARY 2007



Impact of 2006-2007 outbreak

Financial losses/gains attributed to RVF outbreak for the sample			
	Average loss/gain per unit business (Ksh)	Number of businesses	Total loss (Ksh)
Positive impacts	606,794.0	17	10,315,500.00
Negative impacts	1,104,468.4	74	81,730,659.00

Monthly numbers of livestock sold before and during the outbreak by traders and corresponding unit prices				
Livestock species	*Number sold per day before*	*Number sold per day* during	Unit Price (Ksh) before	Unit Price (Ksh) during
Sheep/goats	335	162	1350	983
cattle	111	14	19500	17000

Current alert

- September 2008: Prediction of an outbreak of RVF- Remote sensing satellite data reported by FAO/WHO- Emergency Prevention System WATCH of. Unusual high rainfall October - December 2008 affecting East Africa.
- Vaccination for RVF was carried out alongside PPR vaccination
- Targeted areas where previous outbreaks had been confirmed
- A total of **1,078,414** sheep and goats vaccinated

Task for Kenya

- Enormous work in the control of RVF in Kenya
  - A few districts on the Western side, RVF not reported
  - Quantity of vaccines to be used in control quite big
  - Source of funding especially when there is no disease
  - Political goodwill

Challenges in vaccination

- Smithburn live attenuated vaccine is used in Kenya-Provides good protection

- Challenges
  - causes abortion in a number of animals in early pregnancy
  - usually difficult, especially in the rural community, to determine when an animal is pregnant and when it is in early pregnancy

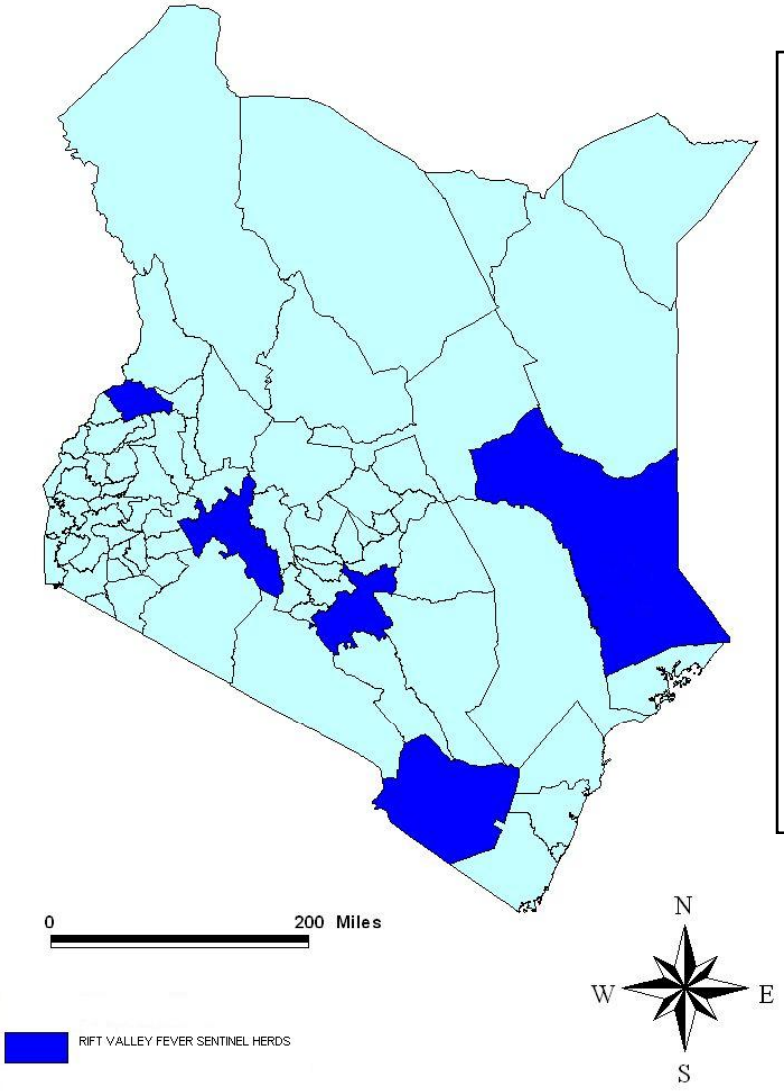
Challenges in vaccination

- long run is a drop in productivity and more abortion occurring.
- People have been always reluctant to use it- abortions
- Not always ideal to use a vaccine in the middle of an outbreak because it is a preventative measure
- Ready source of vaccine when needed
- Control window very small
- Accessibility of the areas affected

Follow up after the 2006-2007 outbreak

- Technical Committee comprising stakeholders jointly chaired by DVS and DOPHS – meetings weekly initially, bimonthly later
- Weekly weather reports
- Draft contingency plan in place- need to be operationalised
- Surveillance alongside PPR surveillance
- Review of sentinel herds and locations
- Vaccination in late 2008

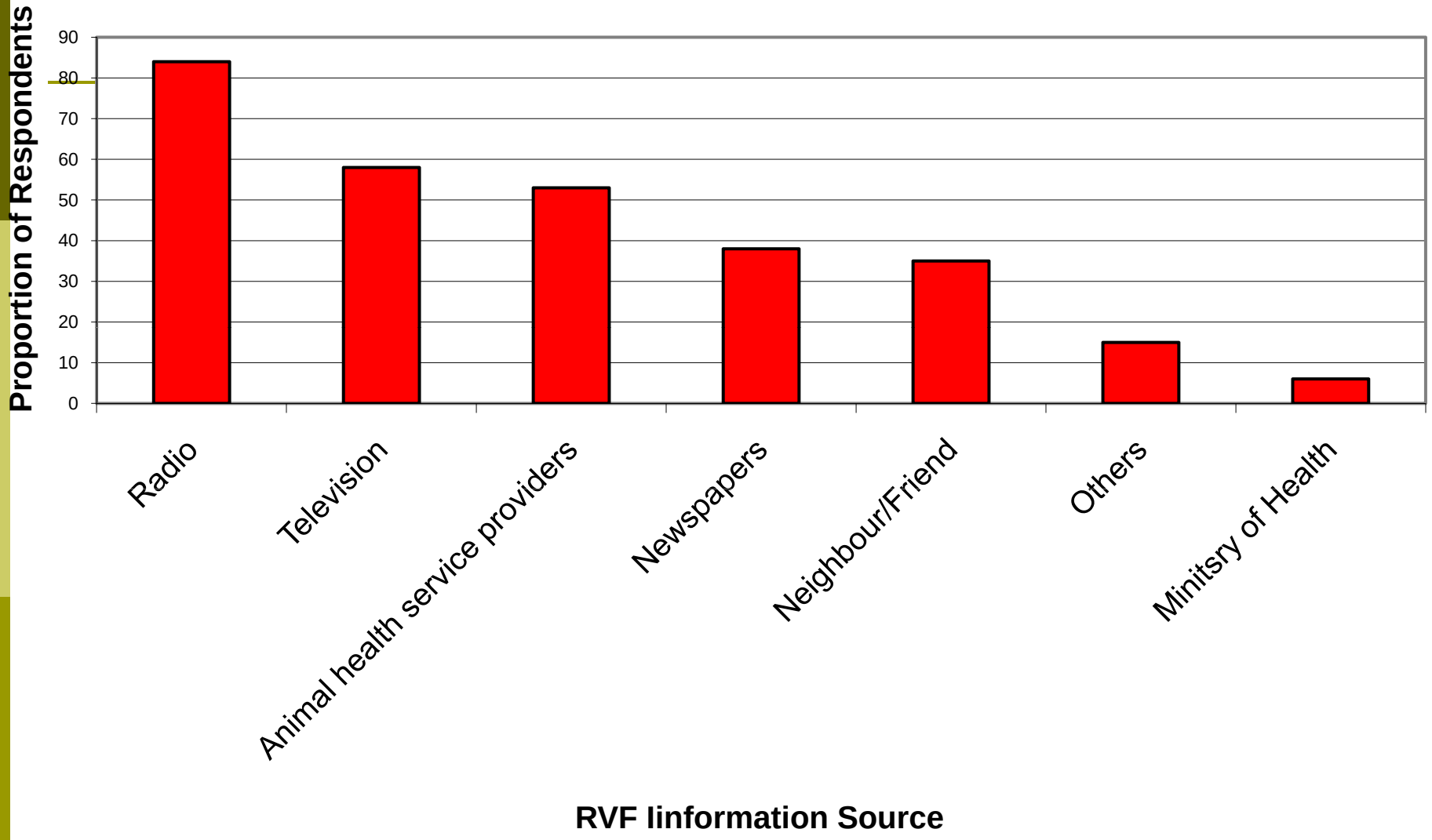
Placement of the Sentinel herds



- **Important in early warning systems**
- **Established in 1999**
  - **Garissa**
  - **Ijara**
  - **Taita Taveta**
  - **Nakuru**
  - **Machakos**
  - **Thika**
  - **Trans Nzoia**
- **Criteria for selection**
  - **RVF ecological zone**
  - **Enough animals**
  - **Good Record keeping**

Year	Vaccines doses issued
1997	0
1998	183,300
1999	11,600
2000	500
2001	11,600
2002	59,000
2003	8,900
2004	0
2005	20,000
2006	0

Public awareness in RVF control



Estimates of sequence of events after above normal rains

- The prediction of RVF provides a lead period of 2 months through which the following are expected:
  - 33 days from the start of rains vectors will have multiplied greatly and swarmed
  - 52 days from the start of rains the first livestock cases will be reported
  - 73 days from the start of rains, the first human cases will be reported

Vaccination only way out

- Need to develop a safer vaccine and to mass produce it
  - Impact of disease on human life
  - Impact on the meat industry
- smallholder livestock owners need an affordable and accessible vaccine- Finances, cost effective vaccine

Vaccination only way out

- Vaccine developers/manufacturers- lets look at the benefits of development of a better vaccine and not only the profits made
- Rapid pen-side test to test animals before vaccinating
- Vaccination only effective before an outbreak

Conclusion

- Experts need to work together – work on RVF need to be harmonised
  - Research work
  - Vaccine development
- Lobbying for governments support on RVF activities during the inter-epidemic period
  - Funding
  - Emergency funds
  - No political interference

REFERENCES

- **Department of Veterinary Services-Kenya reports**
- **An Outbreak of Rift Valley Fever in Northeastern Kenya, 1997–98 Christopher W. Woods et al,***

Thank you