

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
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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

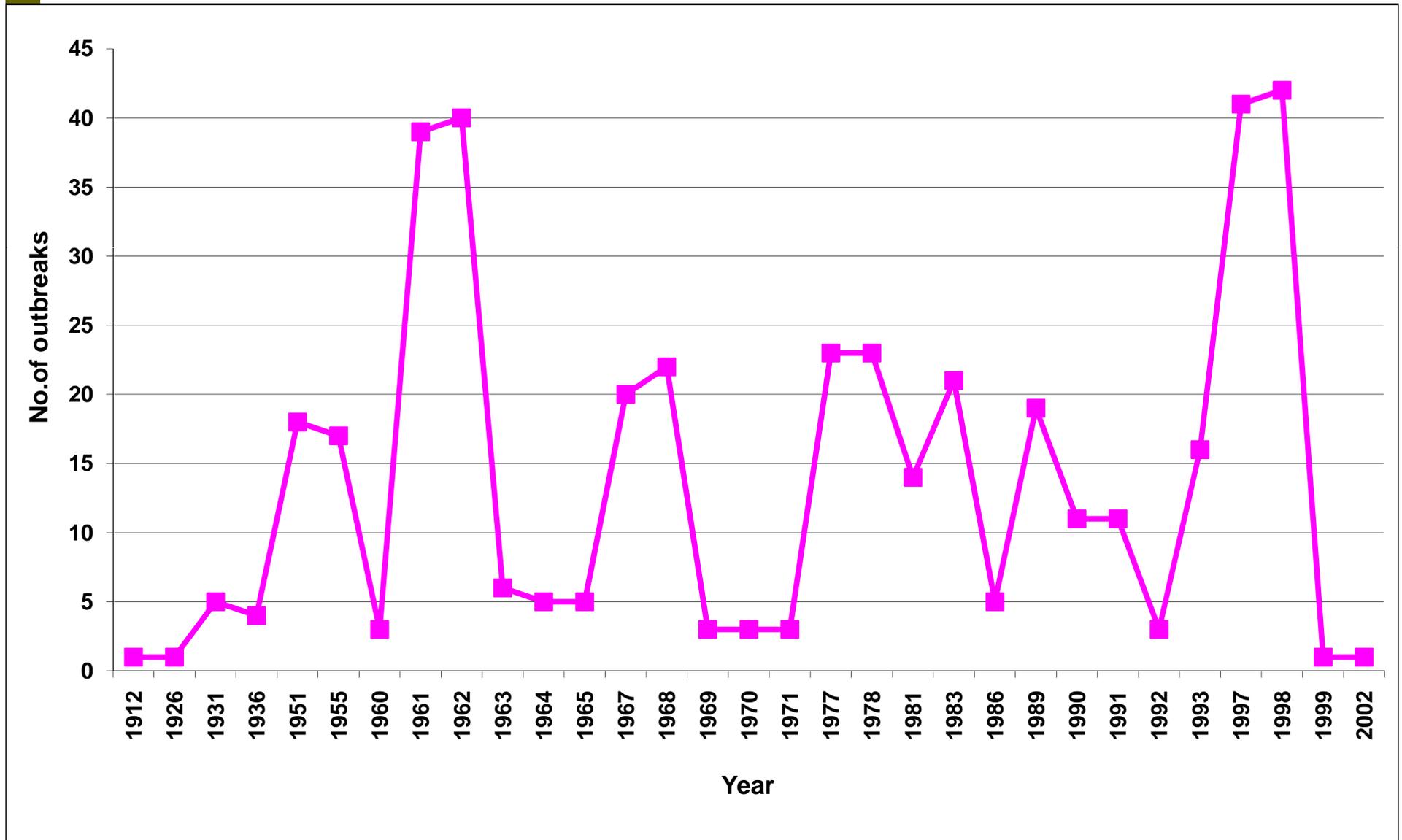
INTRODUCTION 2

- ❑ 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

- 1900s: - 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
- Stopping slaughter
- 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
- ❑ Effective vaccination- before an outbreak
- ❑ RVF is usually already well-established in animal populations by the time the first human cases are observed. Control of RVF in livestock beforehand is key to control
- ❑ Note: 1997-1998, 2006-2007 outbreaks, disease first recognized in humans

Control 3

- Control window very small or none
- Vaccination became a challenge for the vets
 - Need to know extent of disease spread
 - Vaccinate only healthy animals
 - Avoid spread of RVF during vaccination
 - Numbers to be vaccinated
 - Availability of vaccine
 - Operational funds
 - Lack of an approved human vaccine
 - Personnel to carry out vaccination

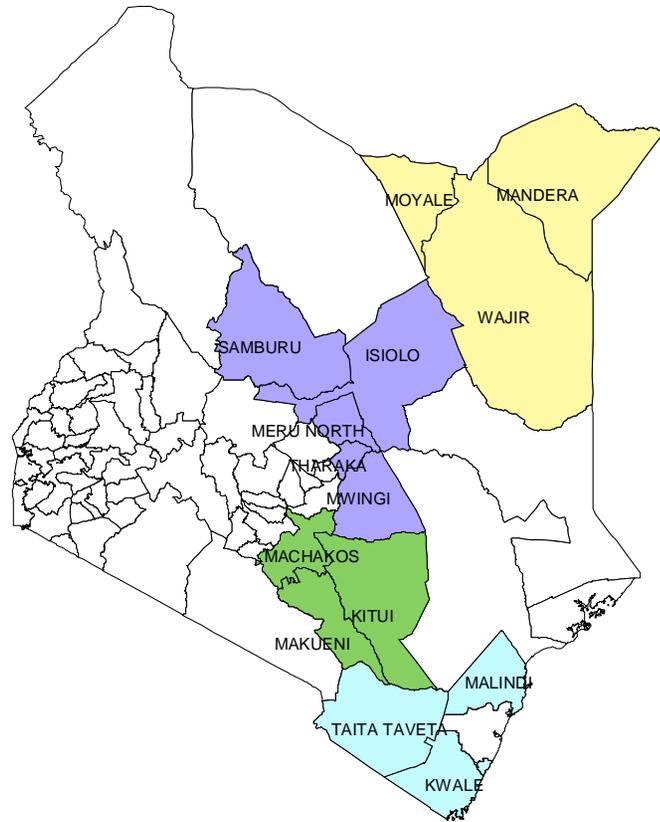
2006-2007 outbreak in Kenya

- ❑ 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
 - Movement of infected animals- Reduction in transportation time has made this mode possible

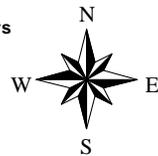
RVF SURVEILLANCE JANUARY 2007

Adjacent districts to determine the spread

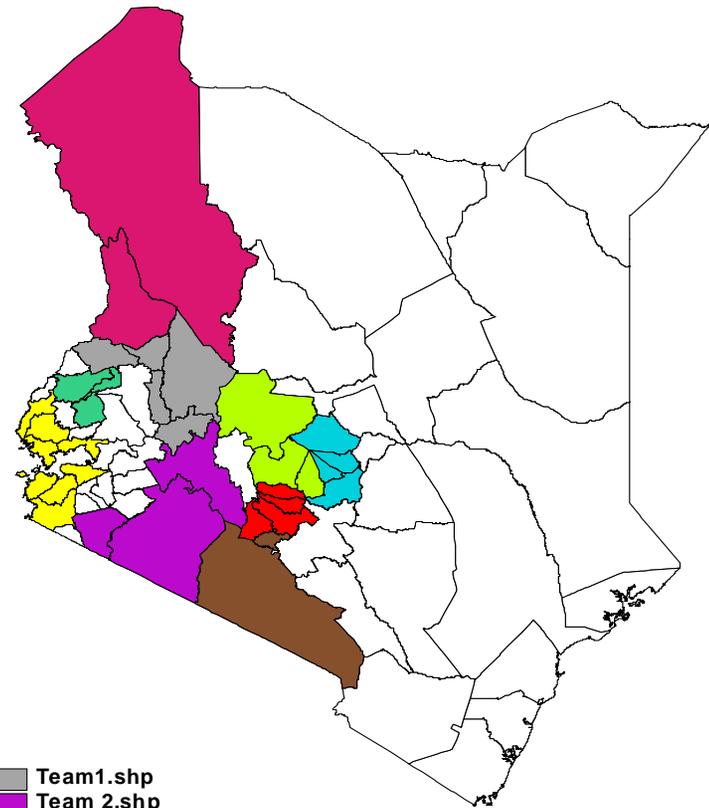
known endemic foci areas - based on Previous infections, areas ecologically conducive for vector habitation



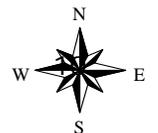
200 0 200 400 Kilometers



- Team 4.shp
- Team 3.shp
- Team 2.shp
- Team 1 surveillance.shp
- Districts_bnd.shp



100 0 100 Kilometers



- Team1.shp
- Team 2.shp
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Vaccination during the outbreak

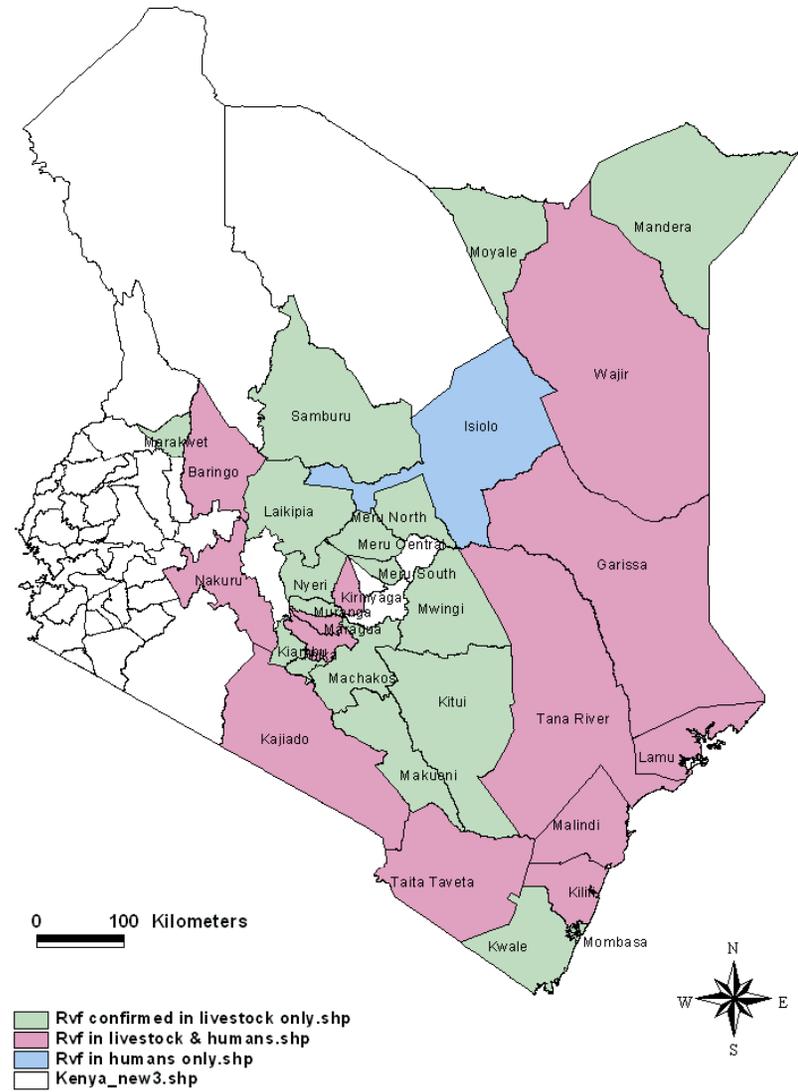
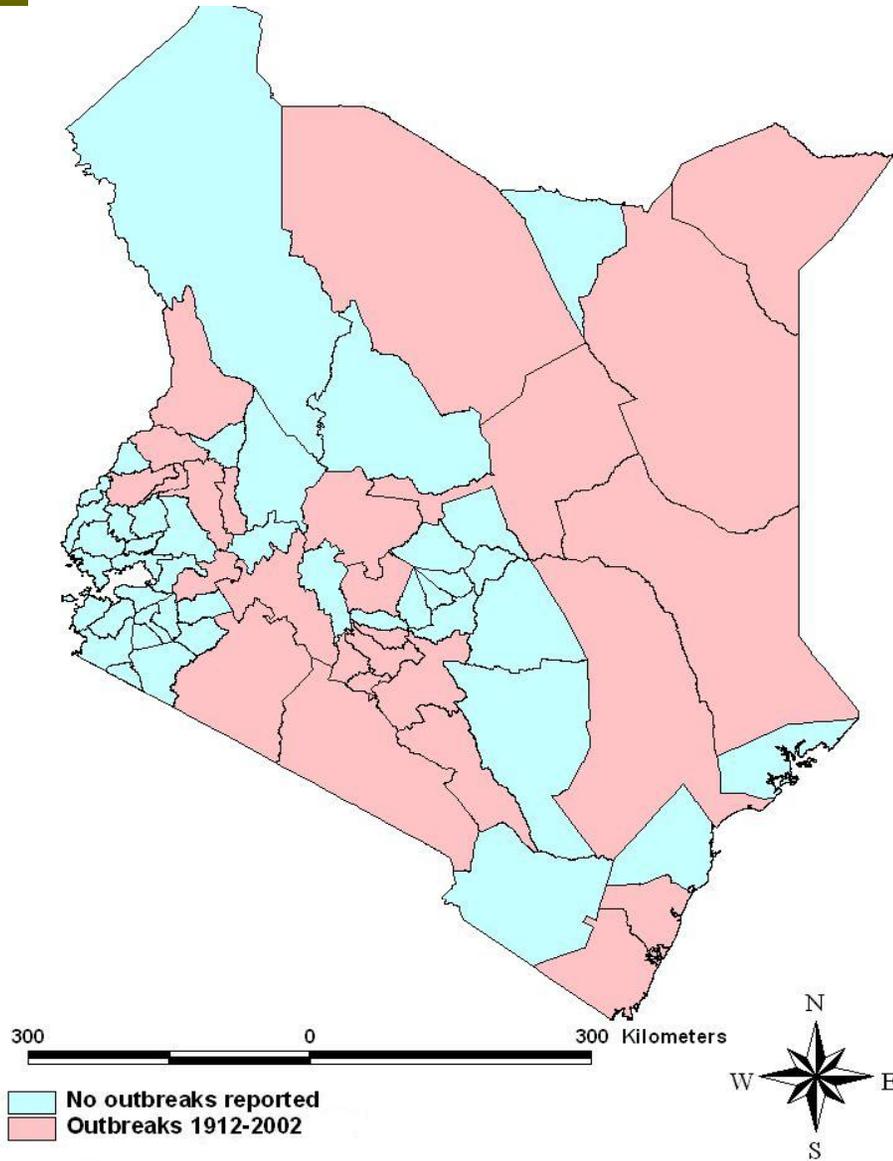
- Vaccinations were carried out in goats, sheep, cattle and camels
 - Started in January 2007 in the North Eastern Province
 - Later focus shifted to known endemic districts
 - A total of 2,550,300 doses of RVF vaccine were used in control efforts
 - Type of vaccine: Smithburn live attenuated vaccine

Vaccination during the outbreak

- 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



2/9/2009

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2008 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

2/9/2009

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 used in Kenya-Provides good protection
 - Challenges
 - causes abortion in a number of animals in early pregnancy- reluctant to use it
 - usually difficult, especially in the rural community, to determine when an animal is pregnant especially in early pregnancy

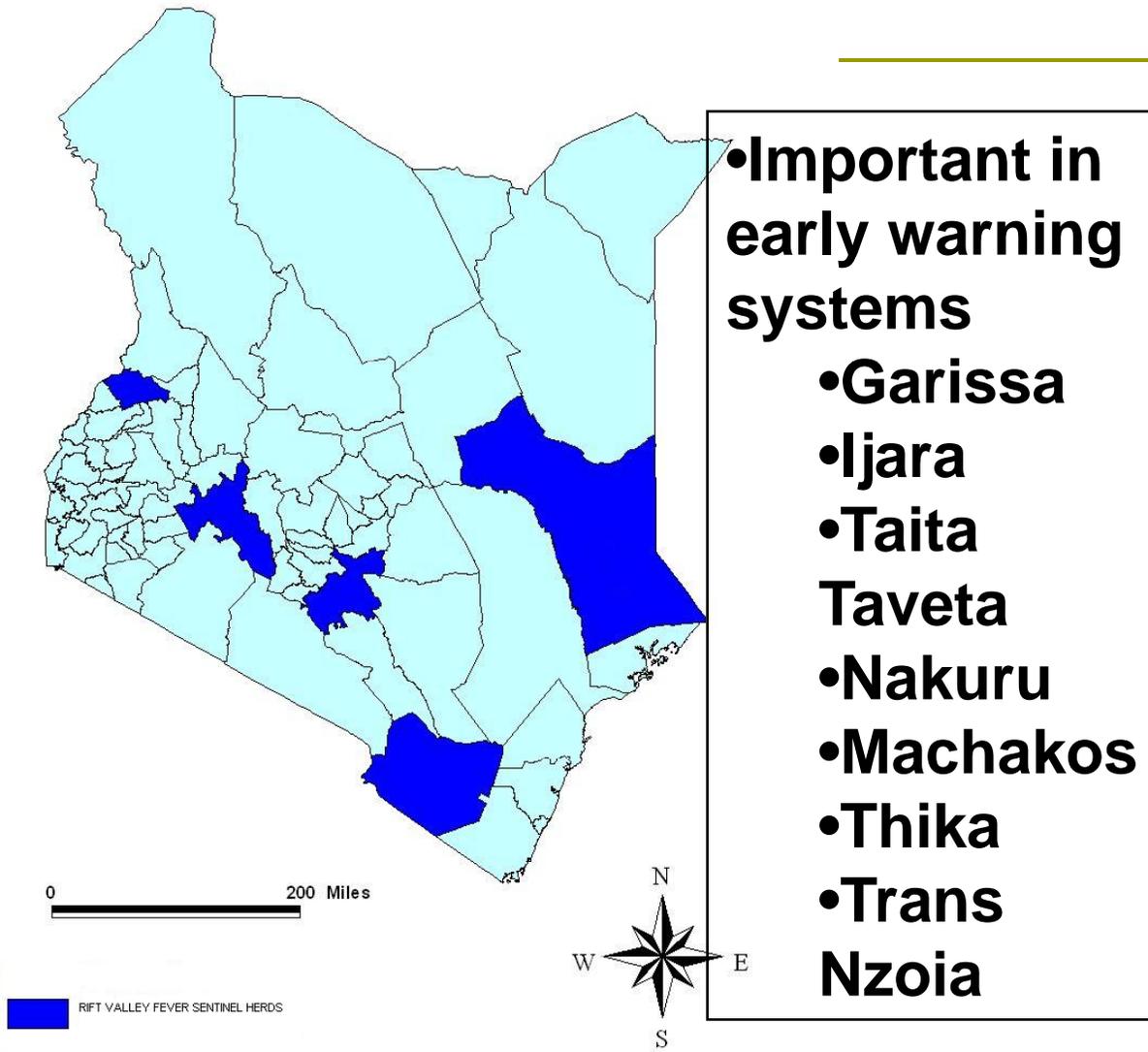
Challenges in vaccination

- long run is a drop in productivity
- Personnel to carry out the vaccination
- Ready source of vaccine when needed
- Vaccination done only during outbreaks
- Control window very small
- Accessibility to 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

Placement of the Sentinel herds

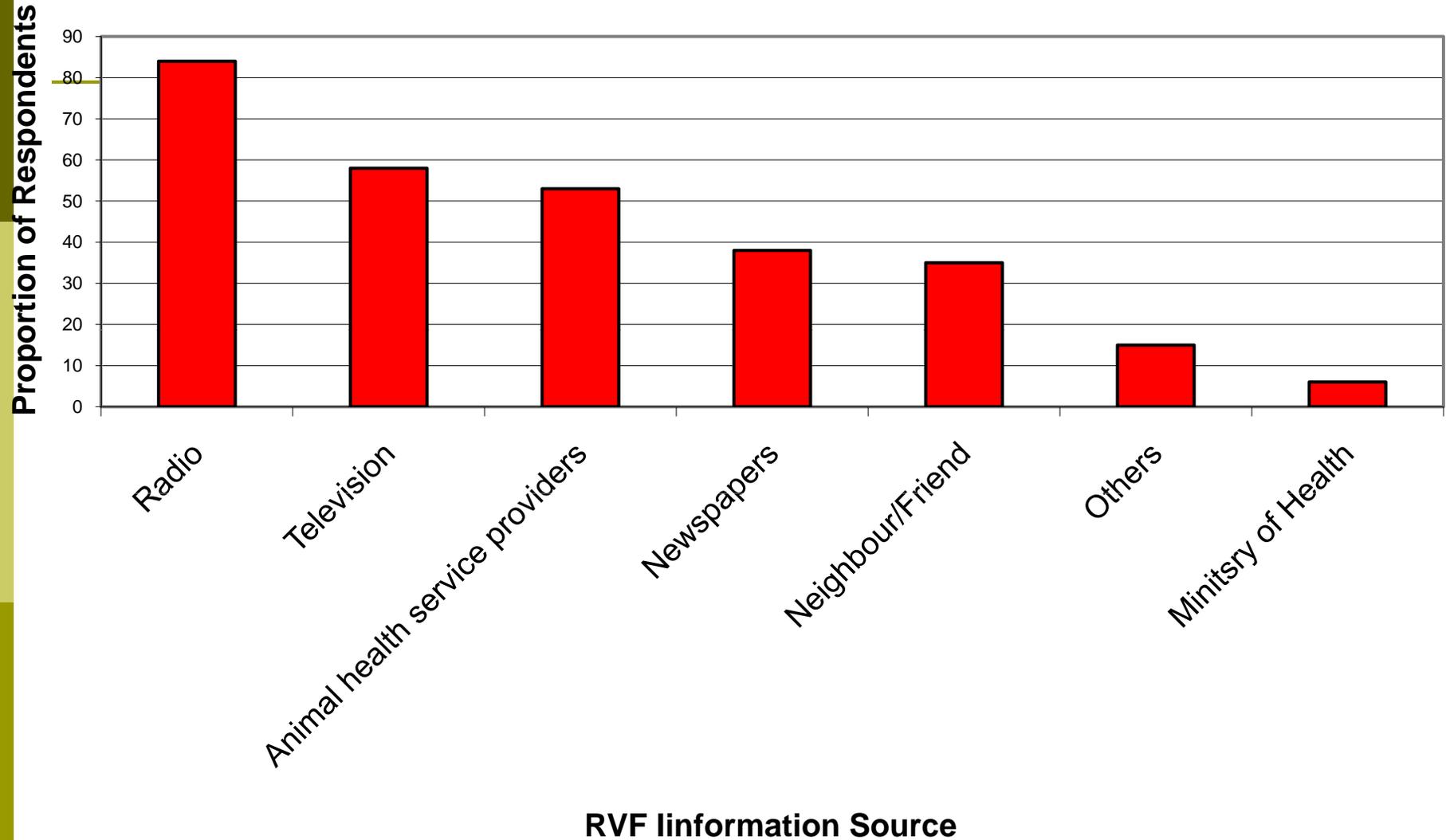


Year	Vaccines doses issued
1997	0
1998	183,300
1999	11,600
2000	500
2001	11,600
2002	59,000
2003	8,900
2004	0
2005	20,000
2006	0

Impact of 2006-2007 outbreak

Parameter	Value (KSh)
Total herd meat loss due to RVF (20,237,829 kg)	1,251,909,117
Total milk loss due to RVF (21,134,520 litres)	221,912,460
Net losses to business actors	2,320,000,000
Government expenditure in control measures	200,000,000
TOTAL COST OF OUTBREAK (excluding value of human lives lost)	3,993,821,577

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
 - Efficacious vaccine
 - Mass production
- smallholder livestock owners need
 - an affordable
 - 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
- ❑ Vaccinate only 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
 - Personnel
 - 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