Eradication of rinderpest from South Sudan

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Outline

- What is rinderpest?
- Global rinderpest eradication programme
- South Sudan rinderpest eradication programme
Calves affected by rinderpest during the 1998 rinderpest outbreak in Lopit, South Sudan: lacrimation, nasal discharge, mucosal erosions, dehydration, diarrhoea.
Cetaceans

Dolphin
Porpoise
morbillivirus

Carnivores

Canine
Phocid
distemper
distemper
virus
virus

Ruminants

Peste des petits
ruminants virus

MORBILLIVIRUS PHYLOGENY

Figure courtesy of Peter Roeder based on Barrett et al 1999

Primates

Measles
virus

Rinderpest
virus

Ancestral virus
History and distribution

- Originated in Asia
- Frequent epidemics across Europe and Asia – trade, war
- 1880-90s African pandemic
  - Loss of milk, meat, transport, draught power
  - Famine

- Successful elimination:
  - Europe – early 20th century
  - southern Africa by 1905
  - East and southeast Asia 1950s-60s

- Endemic or repeated introductions
  - India, Pakistan
  - Middle East and Arabian peninsula
  - Sub-Saharan Africa
Rinderpest Eradication

Feasibility
- No reservoir or carrier status
- Transmission by direct contact
- Short infectious period
- Lifelong immunity
- Safe, effective, cheap vaccine
- Limited distribution

Impact
- Food security
- Livelihoods
- Trade

Political will

Early 1980s
Key international stakeholders

- United Nations Food and Agriculture Organisation (FAO)
  - Regional coordination since 1940s
  - Global Rinderpest Eradication Programme (GREP) operational from 1994
  - Coordination, technical guidance and assistance
  - Goal of eradication by 2010

- World Organisation for Animal Health (OIE)
  - guidelines for surveillance and accreditation of freedom – “The OIE Pathway”
  - diagnostic and vaccine standards
  - scientific commission and ad hoc rinderpest group
Global Freedom from Rinderpest 2011

- Declared in mid-2011 by OIE and FAO
- Rinderpest virus no longer circulating in domestic or wild animals
  - Last confirmed outbreak Kenya 2001
  - No vaccine in use
  - No evidence of virus circulation
  - All countries accredited rinderpest infection free by OIE
- Pending - virus and vaccine stocks
South Sudan (1980s-90s)

- large area
- climatic extremes
- 8 million people – pastoralist, agro-pastoralist
- 10 million cattle, 20 million sheep and goats
- Chronic conflict from 1956 to 2005 (except 1972-1983)
  - Millions killed, displaced or refugees
  - Destruction of infrastructure, disruption of trade, lack of social services, prevention of development
- 1989 Operation Lifeline Sudan
  - consortium of UN agencies and NGOs, providing humanitarian relief
South Sudan – endemic focus of rinderpest

- Introduced to southern Sudan during African pandemic (1890s), periodic epidemics with major impact on livelihoods

- Early attempts at control through vaccination:
  - Resumption of conflict in 1983
    - animal health services disrupted → increase in livestock diseases, rinderpest widespread - 1980s, early 1990s endemic focus

_Calves affected by rinderpest during the 1998 Torit outbreak, Eastern Equatoria, southern Sudan_
Operation Lifeline Sudan: Livestock Programme

- Community-based animal health programme from 1992
  - Led by UNICEF with international and indigenous NGOs and local counterparts (12-15 NGOs)
- Goal: food security and protection of livelihoods
- Objective: increased livestock productivity through control of major epidemic and endemic diseases
  - baseline assessments: rinderpest highest priority
  - community workshops, selection and 2-week training of community based animal health workers – CAHWs
  - basic kit of medicines and equipment, cold chain, heat stable rinderpest vaccine, vaccination equipment
  - training of supervisors and coordinators (4-9 months)
  - supervision by field vets
Different agendas:
- rinderpest
- other diseases
- privatisation
- food relief vs food security
- children and women
- pro-poor
- multi-sectoral programmes
- conflict, etc. etc.

Coordination:
- OLS livestock coordination meetings (north, south)
- PARC programme coordination meetings
- GREP expert consultations
- OIE meetings
Vaccination Phase 1992-02

- annual mass vaccination for at least 3 years
- free of charge
- ear notching
- local planning of vaccination campaigns – community meetings, timing with cattle movements
- CAHWs carried heat stable vaccine to cattle camps – up to 30 days outside cold chain supervision
- sero-monitoring
- rinderpest outbreaks widespread in 1993, reduced over the years, only one outbreak in 1998

Southern Sudan rinderpest vaccination figures 1989 - 2002

Number of cattle vaccinated

Year

- 1989
- 1990
- 1991
- 1992
- 1993
- 1994
- 1995
- 1996
- 1997
- 1998
- 1999
- 2000
- 2001
- 2002

Northern Sector

- 0
- 200,000
- 400,000
- 600,000
- 800,000
- 1,000,000
- 1,200,000
- 1,400,000
- 1,600,000
- 1,800,000
- 2,000,000
Challenges

> Security
> Extreme weather conditions
> Famine
> Human disease
> Lack of infrastructure
> Limited transport
> Limited communications
> Limited resources
> Technical;
  • cattle numbers, migration
  • cold chain
  • other priorities
  • appropriate equipment
  • laboratory services
OIE pathway – demonstrating freedom from infection

> Five years of disease freedom, no vaccination with;
  
  • outbreak reporting system
  • investigation and lab diagnosis of outbreaks
  • random sample surveys - clinical disease
  • purposive surveys in high risk areas - clinical disease, serology, wildlife
  • random sample serological surveys in final two years
Demonstrating freedom 2002-07

2001 plan: AU-IBAR PACE Programme, Gov of Sudan and FAO
- Zonation
- Stop vaccination by mid-2002
- Five years surveillance
  - 3 years – reporting and investigation of rinderpest outbreaks, active clinical surveillance
  - final 2 years – sero-surveillance

VSF Belgium contracted by to co-ordinate and implement in the SPLM-administered areas in the south
- focus on ending vaccination, establishing surveillance system, emergency-preparedness
- within OLS framework, after 2005 in partnership with Government of Southern Sudan MARF

FMARF implemented northern PACE Sudan project
Strategy

- Integration of rinderpest eradication activities into community-based animal health service
- Collaboration and co-ordination with all other livestock agencies
- Strengthening network of animal health workers
  - 1500 CAHWs, 200 AHAs, 40 vets
- Promoting participation of all stakeholders
- Training and awareness raising
  - community dialogue guidelines, CAHW training module, training course for AHAs and vets
- Appropriate communication methods for awareness-raising:
  - cloth flip charts, photo-cards, posters, songs, t-shirts
- Motivation of animal health workers; payments, reward
Surveillance system

➤ Objectives
  ➤ detect any remaining foci of rinderpest
  ➤ provide evidence of freedom from rinderpest (meeting requirements of OIE)
➤ Adapted surveillance methods – pastoralist communities, CAHW/AHA network
  ➤ Outbreak reporting and investigation
  ➤ Active clinical surveillance
  ➤ Wildlife surveillance
  ➤ Serological surveillance

Cloth flip charts for community meetings – clinical signs, reporting outbreaks
Outbreak reporting and investigation

- All stakeholders encouraged to report outbreaks
- Investigation – animal health worker, vet
- Sampling kits
- Penside tests
- Samples to RP reference laboratories

Reward
1000 US$
Active Clinical Surveillance

- Cattle camp surveillance; visits by AHAs
  - livestock keeper interviews
  - observation of herd
- Market surveillance; visits by AHAs
  - livestock keeper/trader interviews
  - observation of cattle on sale
Participatory Disease Searching

- Targeted “high rinderpest risk” areas
- Team of CAHWs, AHAs, led by vet
  - animal health workers; key informants, liaison, translators
- Duration 1-3 weeks
  - semi-structured group interviews, mapping, timelines, ranking
  - observation of cattle, sampling of clinical cases
Wildlife surveillance: Boma National Park 2004

- PACE wildlife specialist, NGOs, wildlife personnel, animal health workers
- Local information – locate wildlife
- 48 blood samples collected from white-eared kob, buffalo, eland and roan antelope
- RP and PPR cELISA
Serological surveys 2005-6, 2006-7

> Objective: to demonstrate absence of infection

> Survey design:
  - 2 strata, random sample of 314 herds per stratum (95% confidence level, expected prevalence 1%),
  - 25 samples per herd (2-3 yr cattle) (95% confidence level, expected prevalence 20%, test sensitivity 70%)

> Sampling frame; dry season cattle camps, villages

> Field teams; vets, AHAs and CAHWs

> dialogue with livestock keepers, ageing, blood sampling, ear-tagging
## Surveillance Results

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| Monthly                           |      |      |      |

- Confirmed as other disease (MCF, HS, FMD, ECF etc.)
- Individual RP-like cases
- Rumours, false alarms
- No current clinical rinderpest
- A range of other common diseases recorded
- No current clinical rinderpest
- Individual clinical cases sampled
- Reports of recent rinderpest investigated
- 48 samples rinderpest -ve
- No evidence of rinderpest
- Positive cattle followed up

Overall – in five year period since ending vaccination in June 2002 to June 2007, no evidence of recent or current rinderpest virus circulation.
Provided data for FMARF’s application to OIE for recognition of freedom from rinderpest 2007

In 2008, Sudan recognised by OIE as free from rinderpest
Discussion

> Network of CAHWs and AHAs

> Motivation of animal health workers;
  • training, information, feedback, incentives

> Stakeholder coordination and collaboration
  • promoting and maintaining participation, common goal

> Communication;
  • awareness and training, information sharing

> Understanding of context
  • culture, livestock production system, diseases, local knowledge and practices

> Flexibility;
  • constant changes, adaptation, rapid decision-making, resource mobilisation

> Expert support;
  • appreciation of difficult conditions
Acknowledgements

> VSF Belgium Rinderpest Project personnel
> CAHWs, AHAs, Stockpersons and Vet Assistants, field veterinarians
> livestock keepers of southern Sudan
> ACORD, ACROSS, ADRA, CARE, COOPI, CDOT, NCDS, NPA, Oxfam-GB, SC-UK, VSF Germany, VSF Suisse, Vetwork Services Trust, ZOA
> Peter Roeder, Gijs Van’t Klooster, Tim Leyland, Andy Catley, Jeff Mariner
> Ministry of Animal Resources and Fisheries, Republic of South Sudan
> FAO South Sudan
> Federal Ministry of Animal Resources and Fisheries, Government of Sudan
> Donors:
  • African Union Interafrican Bureau for Animal Resources (AU-IBAR) PACE Programme (Pan-African Programme for the Control of Epizootics), funded by the European Union
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