Rabies Challenges

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Attributes of the rabies (dog)

- Acute killer disease
- Low to moderate incidence (0.5-2.0 deaths/100000/year)
- Under and mis-diagnosed
- Under-reported

Rabies: "A neglected disease"

- Affecting a component of the population which is usually poor and living away from urban centres
- Falling in between sectors for its effective control

visible
un-economical
unhygienic
disease of poverty - stigma
control unfeasible
First challenge: to break the "circle of neglect" by generating the evidence base.
next challenges: inform, influence and convince

- Assess the public health burden of rabies
- Evaluate the economic burden of rabies
- Redefine the best prevention and control strategy
- Develop a communication strategy

Deaths/100 000
Nber of PEP/100 000
Nber of bites/100 000

Cost per averted Deaths
Cost of PEP in $

Inform general public (children)
Convince funding agencies
Influence decision-makers
WHO sponsored studies to re-assess the burden of rabies

- Cleaveland et al. (2002) Bull WHO 80 (4): 304-31

- Active surveillance and modelling: article on Re-evaluating the burden of rabies in Africa and Asia by D.L. Knobel et al, in WHO bulletin, 2005,83:360-368

- National cluster community surveys: Bangladesh, Myanmar and Pakistan

- Surveillance data and modelling: Cambodia

Challenge: estimate the annual Human Rabies Deaths in Africa and Asia

India: ~ 19,000
China: ~ 2,500

Knobel et al., Bulletin WHO, 83: 360-368, 2005
We have data to show that....

- Rabies is an important disease that exerts a substantial burden on human and animal health, public health economies, wildlife conservation and animal welfare

- Rabies affects mainly impoverished communities
98% of human deaths come from bites of rabid dog; mostly children who come face to face with them.
3.3 billion people at risk in Africa and Asia
Challenge: place rabies on the DALY scale

Knobel et al., Bulletin WHO, 83: 360-368, 2005
Challenge: telling how much rabies costs to society

US$ burden Asia & Africa: $580 millions

Total Asia: 560 (96.5%)

Total Africa: 20 (3.5%)
Challenge: demonstrate costs and benefits of dog rabies elimination

- from reduction of number of PET (50, 33 and 25% of initial number delivered at year 3, 4 and 5 respectively);
- from applying PET selectively after year 5 (delivering not more than 5% of initial number of treatments);
- from abandoning current low level dog vaccination and dog removal activities;

scenario 1

flows of net benefits

scenario 2
Rabies control: dog vaccination in Tanzania

Adding figures for Serengeti and Mara districts:

\[
\text{Cost per DALY averted} = \text{Cost of vaccination programme} - \text{Costs saved on PETs}
\]

\[
\text{Cost of vaccination programme} = \text{US$ 620 000}
\]

\[
\text{Costs saved on PETs} = \text{US$ 400 000}
\]

\[
22 000 \text{ DALY’s averted}
\]

Extending the analysis to the whole of Tanzania, the cost per DALY averted is $ 11 including the research costs.
Challenge: harvest the benefits of dog rabies elimination


Hampson et al., unpublished data

Dog vaccination can have rapid impacts on demand for PEP
Challenge: demonstrate the feasibility of human rabies elimination

Cases of rabies in humans

Vaccinated dogs (Millions)
In northern Tanzania: From 2003-2007, between 30,000 and 50,000 dogs vaccinated each year in 160 villages
Central-point vaccination
Kaare et al., Vaccine, in press

High coverage irrespective of socioeconomic status
Challenge: ensure sustainability of the control strategy!

- What if you don't?

Dog rabies cases

Human rabies cases

Dogs vaccinated
Rabies spreading in Indonesia

**Human rabies deaths**

Source: Bureau of General Communicable Diseases, Department of Disease Control, Ministry of Public Health, Bangkok, Thailand.
Challenge: demonstrating success when implementing the Gates foundation/WHO coordinated projects for human and dog rabies elimination

- Demonstrate in today's context in Asia and Africa:
  - the feasibility and sustainability of human rabies elimination through dog rabies elimination
  - the cost-effectiveness of dog rabies elimination through reduced number of PEP following dog rabies control and elimination
  - The validity of a "paradigm shift in dealing with human-dog mediated rabies"

- The project aims to catalyse similar initiatives for the control and elimination of rabies in Africa and Asia within the next decade.
Demonstration Project in Tanzania

- South-east Tanzania
  - 6.5 million people and
  - ~432,000 dogs

- Exploits natural boundaries

- Large enough to investigate dynamics and economics of canine rabies elimination and sustainability of maintaining rabies-free areas
Province of Kwa Zulu Natal

- 92 100 km²
- population 9,500,000) of the nine RSA provinces.
- international borders with Swaziland and Mozambique in the North, province of the Eastern Cape in the South, while inland it is bound by the provinces of the Free State and Mpumalanga, and by the Kingdom of Lesotho.
Visayas group of islands covering 25% of the total number of animal rabies cases, 28% of the total human rabies and 27% of the animal bites in the entire country.
The project will serve almost 19% of the country’s human population (with 17 million inhabitants in the area) and an estimated 9 million dogs.
We can’t control rabies because…. (or the 5 major challenges to be overcome)

- Rabies is considered a low priority for public health and veterinary services
- There are too many free-roaming/stray dogs that cannot be vaccinated. Turn-out at vaccination points would be too low to vaccinate sufficient dogs to control rabies. There are too many free-roaming/stray dogs that cannot be vaccinated.
- We don’t have enough information on dog ecology and dog population sizes
- There are many different wild animal species that can be sources of infection.
- We don’t have sufficient resources to vaccinate enough dogs.
Challenges and opportunities: Road map

- Generating the evidence base
- Developing a control strategy
- Defining the best advocacy messages
  - "human rabies: invariably fatal, eminently preventable"
- Eliciting political support and commitment
- Involving civil society:
  - Involving NGOs (case of India) –
  - Identifying Champions
- Mobilizing resources (GF) and
- (re)Demonstrating the efficacy of the chosen strategy