



Rabies Challenges

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At the occasion of the Colloquium rabies
and Emerging Viral Diseases in North
Africa and Western Europe Hammamet,
Tunisia 6-8 June 2009

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

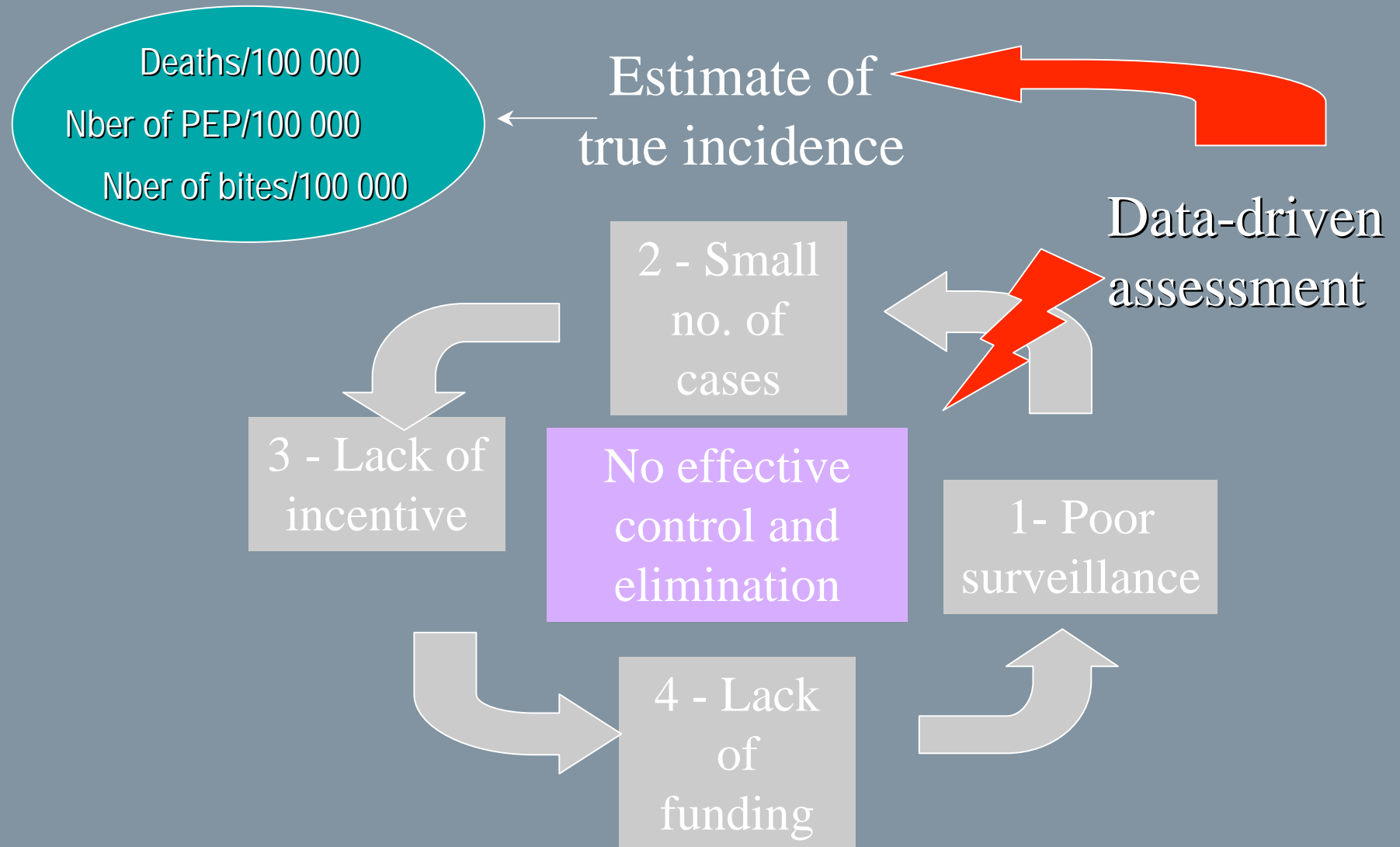
invisible

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

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

Cost per averted Deaths
Cost of PEP in \$

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

Inform general public (children)

Convince funding agencies

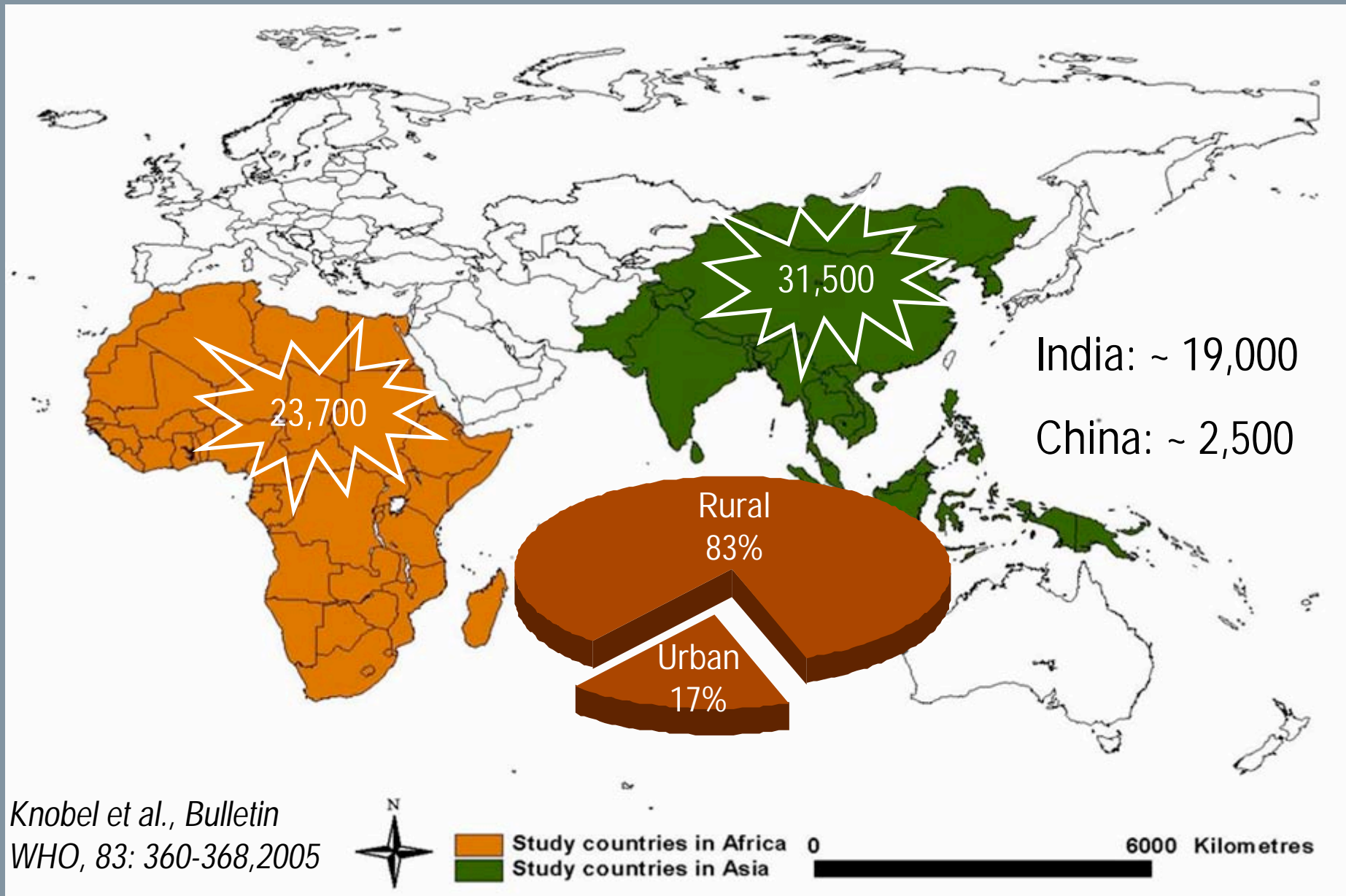
Influence decision-makers



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
- Multicentric studies: article on Assessing the burden of human rabies in India: Results of a national multi-centre epidemiological survey by M.K.Sudarshan *et al, IJID, 2007, 29-35.*

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



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



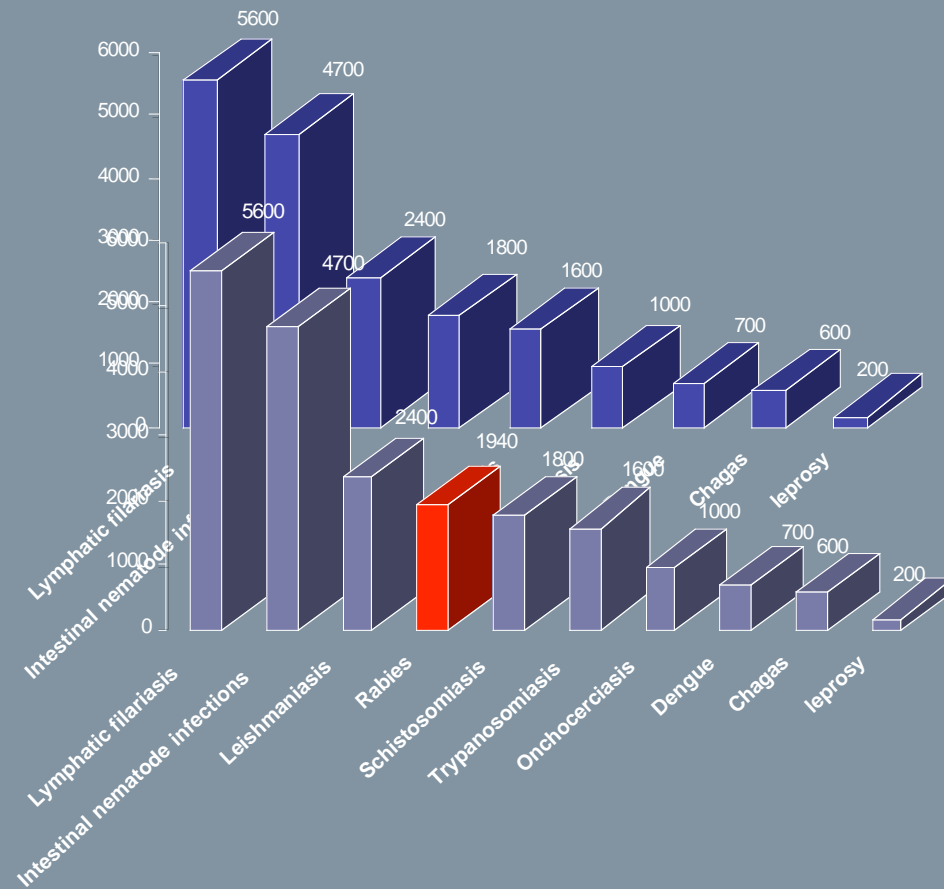
98% of human deaths come from bites of rabid dog; mostly children who come face to face with them





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

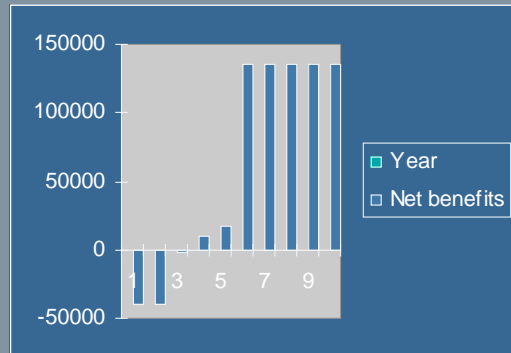
US\$ burden Asia & Africa: \$580 millions

Total Asia: 560 (96,5%)

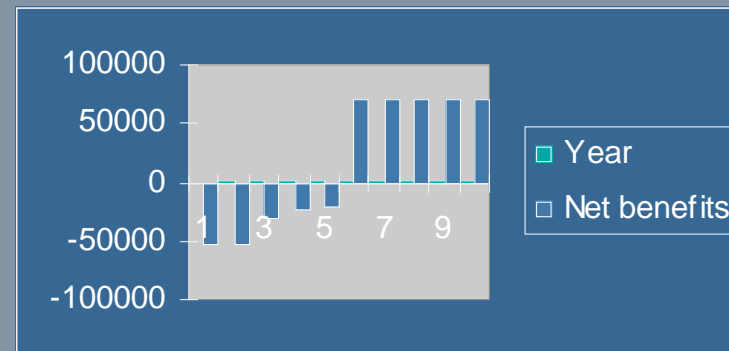
Total Africa : 20 (3.5%)

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



scenario 2

flows of net benefits

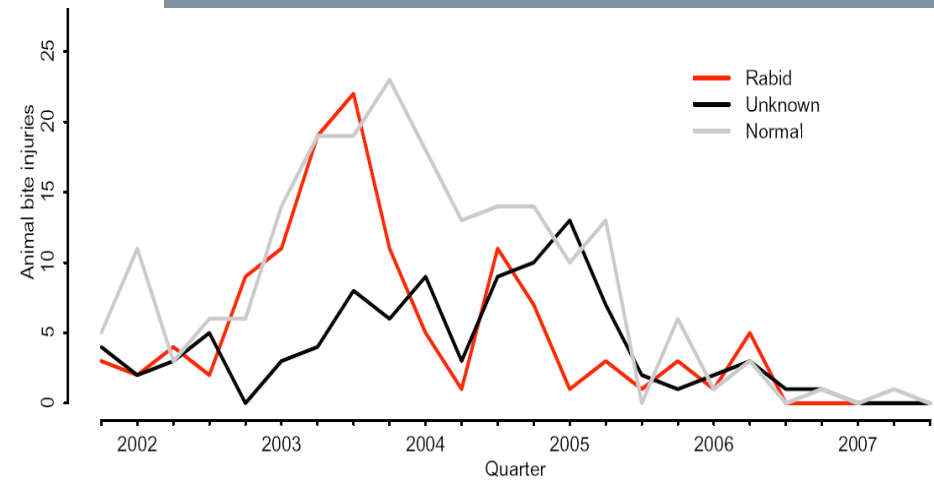
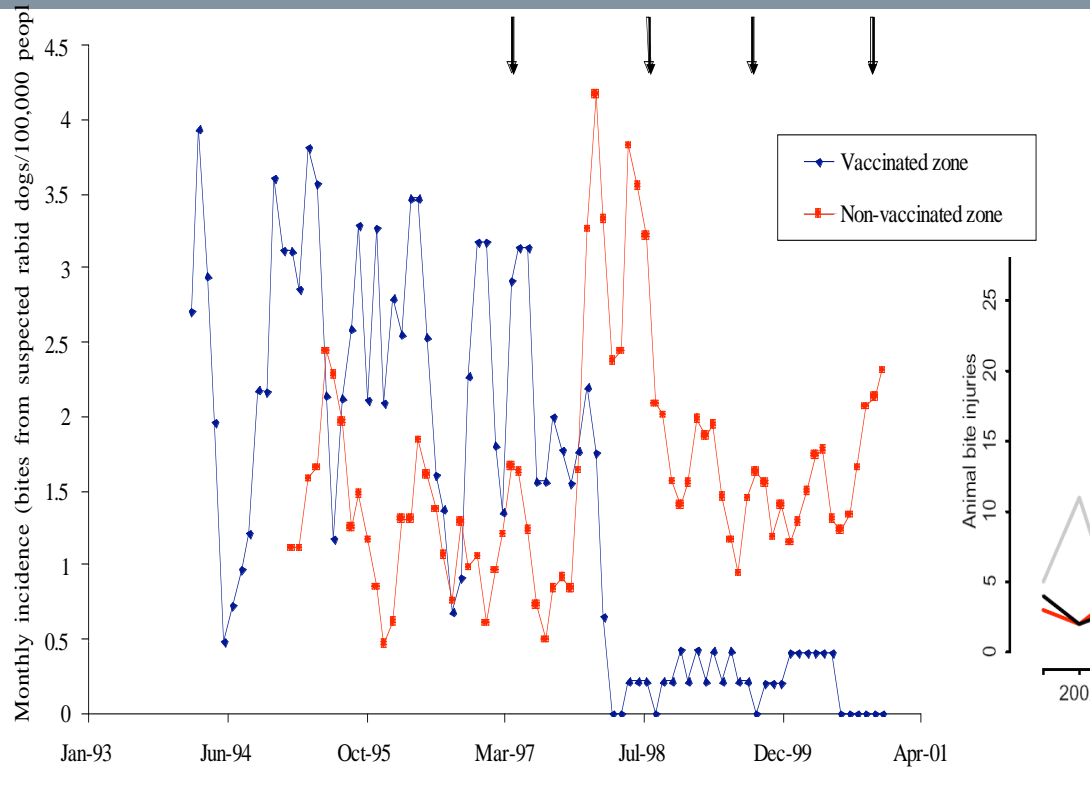
Rabies control: dog vaccination in Tanzania

Adding figures for Serengeti and Mara districts:

$$\begin{array}{r} \text{Cost per DALY averted} \\ \text{US\$ 10} \end{array} = \frac{\begin{array}{r} \text{Cost of vaccination programme} \\ \text{US\$ 620 000} \end{array} - \begin{array}{r} \text{Costs saved on PETs} \\ \text{US\$ 400 000} \end{array}}{\begin{array}{r} 22\,000 \\ \text{DALY's averted} \end{array}}$$

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

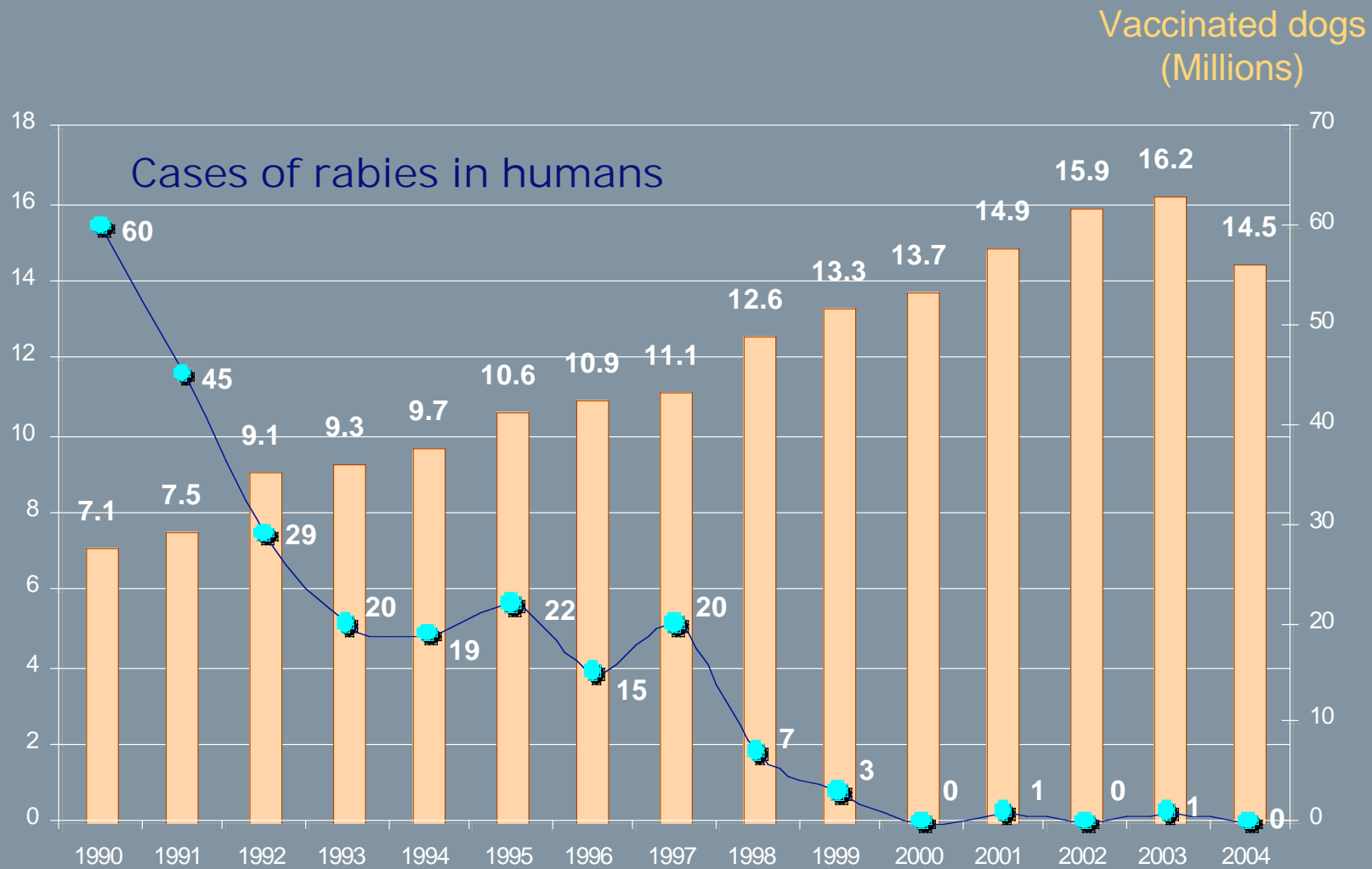


Cleaveland et al., (2003) *Vaccine*, **21**: 1965-1973

Hampson et al., unpublished data

Dog vaccination can have rapid impacts on demand for PEP

Challenge: demonstrate the feasibility of human rabies elimination

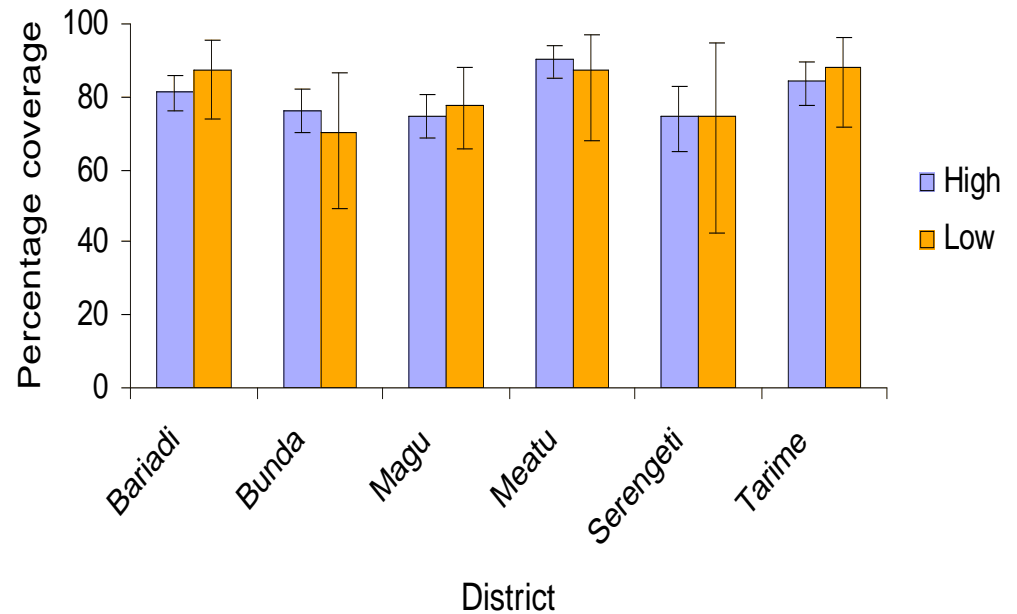
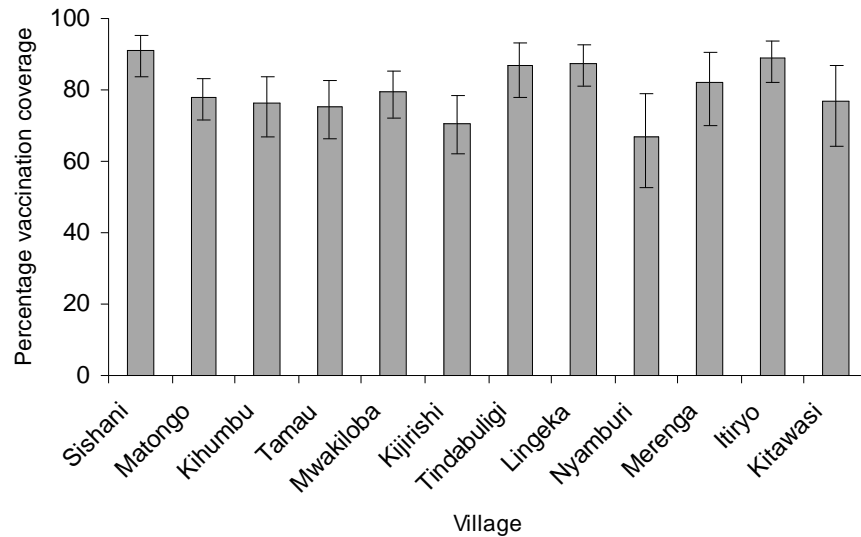




In northern Tanzania: From 2003-2007, between 30,000 and 50,000 dogs vaccinated each year in 160 villages

Central-point vaccination

Kaare et al., Vaccine, in press



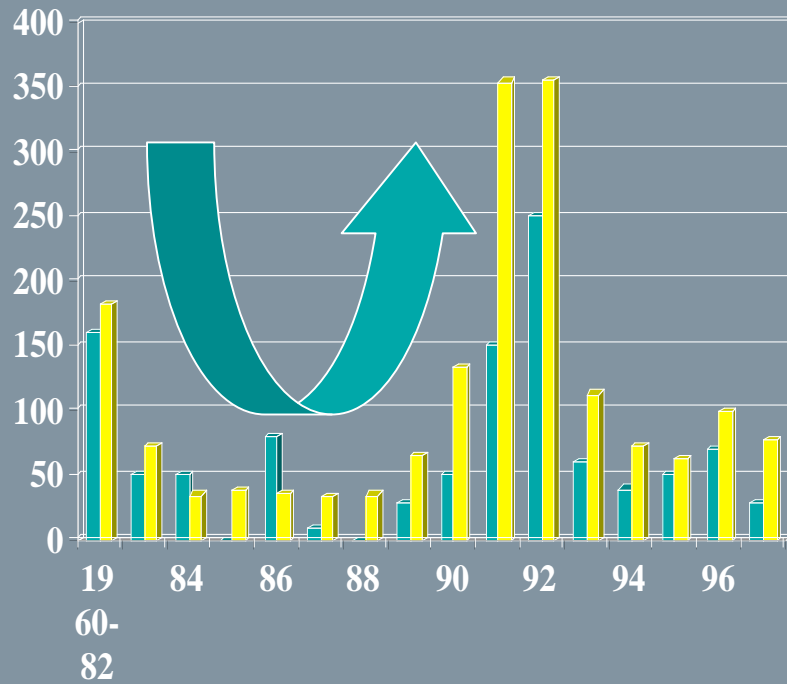
High coverage
irrespective of
socioeconomic
status

Challenge: ensure sustainability of the control strategy!

- What if you don't?

Re-emergence of human rabies in Tunisia (1982-1997)

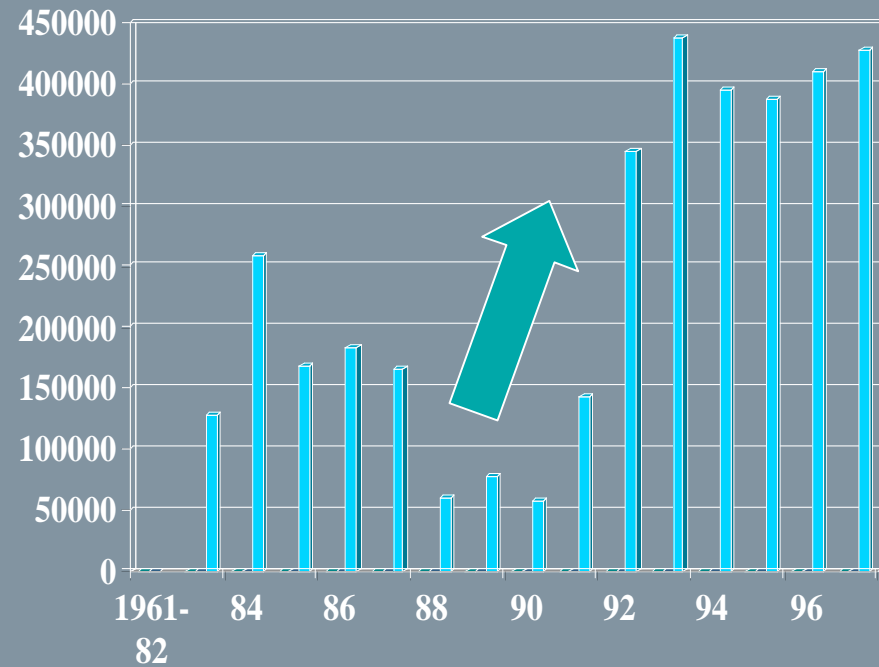
Dog rabies cases



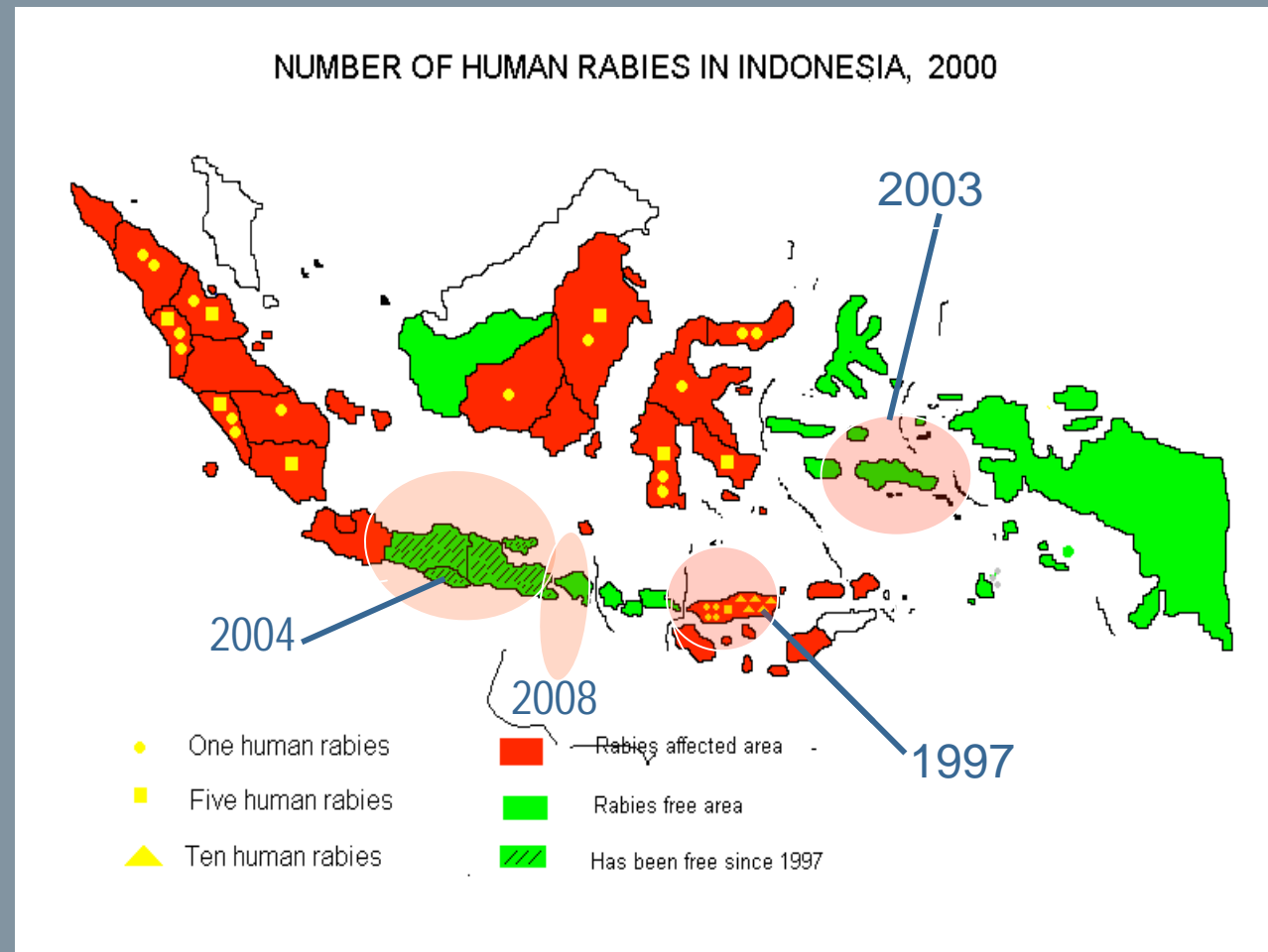
Human rabies cases

25
10
5

Dogs vaccinated

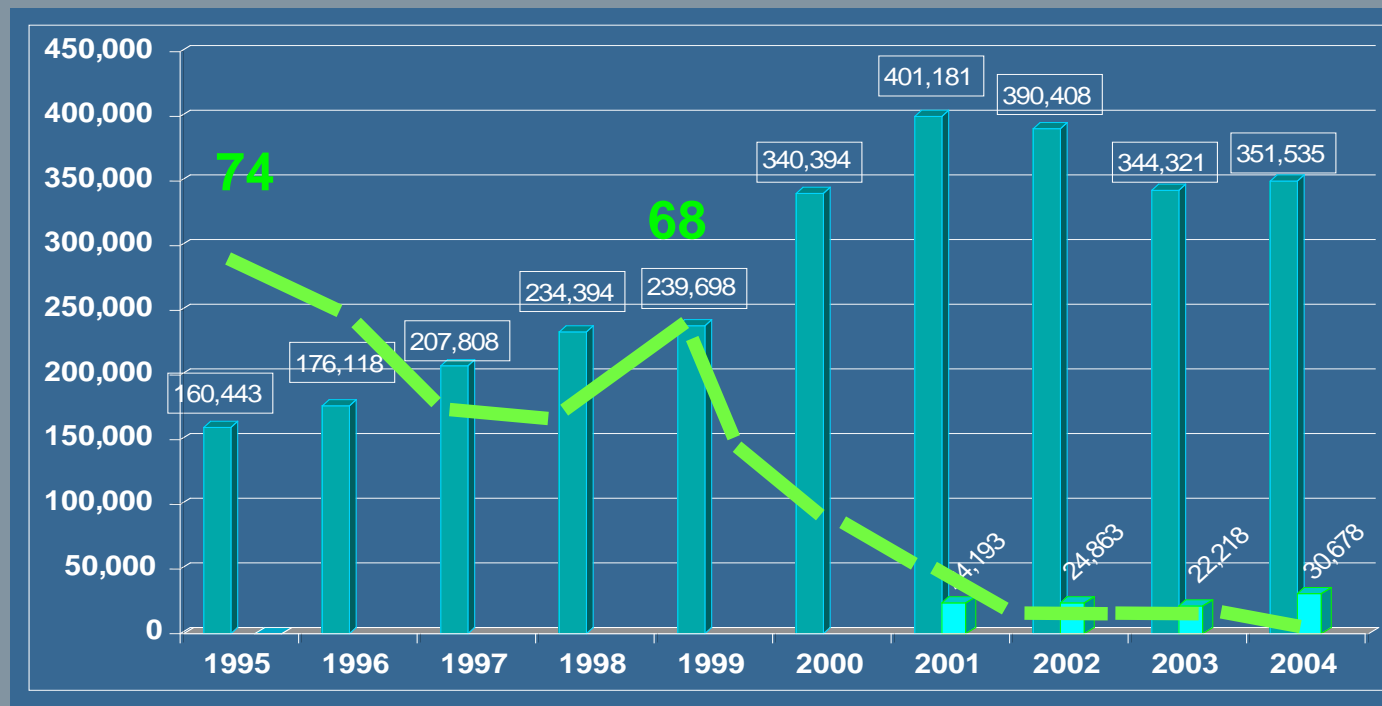


Rabies spreading in Indonesia



Rabies Post-Exposure Prophylaxis, Thailand, years 1995-2004.

Human rabies deaths



■ : P.E.T □ :

RIG.

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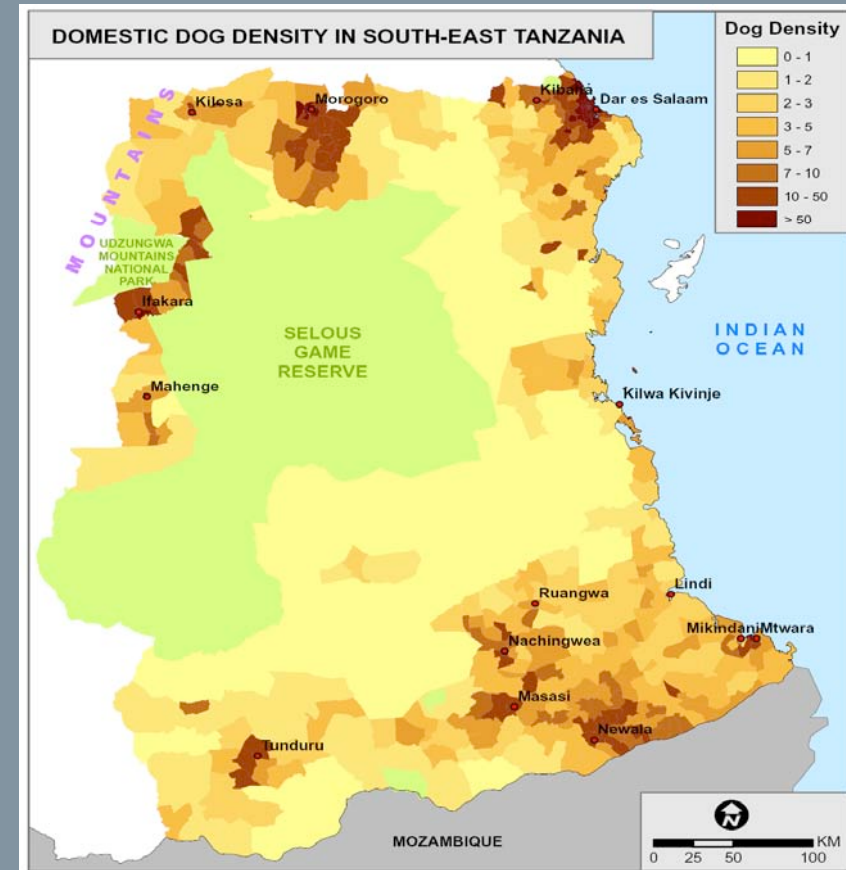
Source : Bureau of General Communicable Diseases, Department of Disease Control, Ministry of Public Health, Bangkok, Thailand.

Challenge: demonstrating success when implementing the Gates foundation/WHO coordinated projects for human and dog rabies elimination

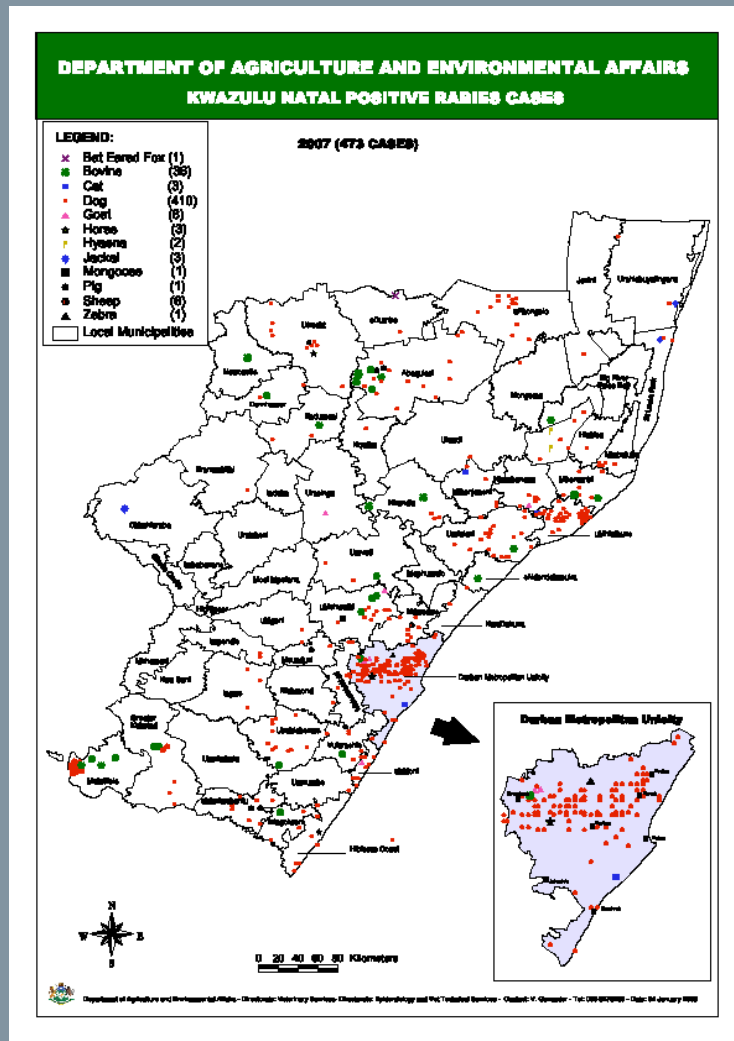
- Demonstrate in today's context in Asia and Africa:
 - the feasibility and sustainability of human rabies elimination through dog rabies elimination
 - the cost-effectiveness of dog rabies elimination through reduced number of PEP following dog rabies control and elimination
 - The validity of a "paradigm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



Demonstration Project in South Africa



- 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.

Project area in the Philippines

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