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Zoonosis control in animals: A powerful public health intervention

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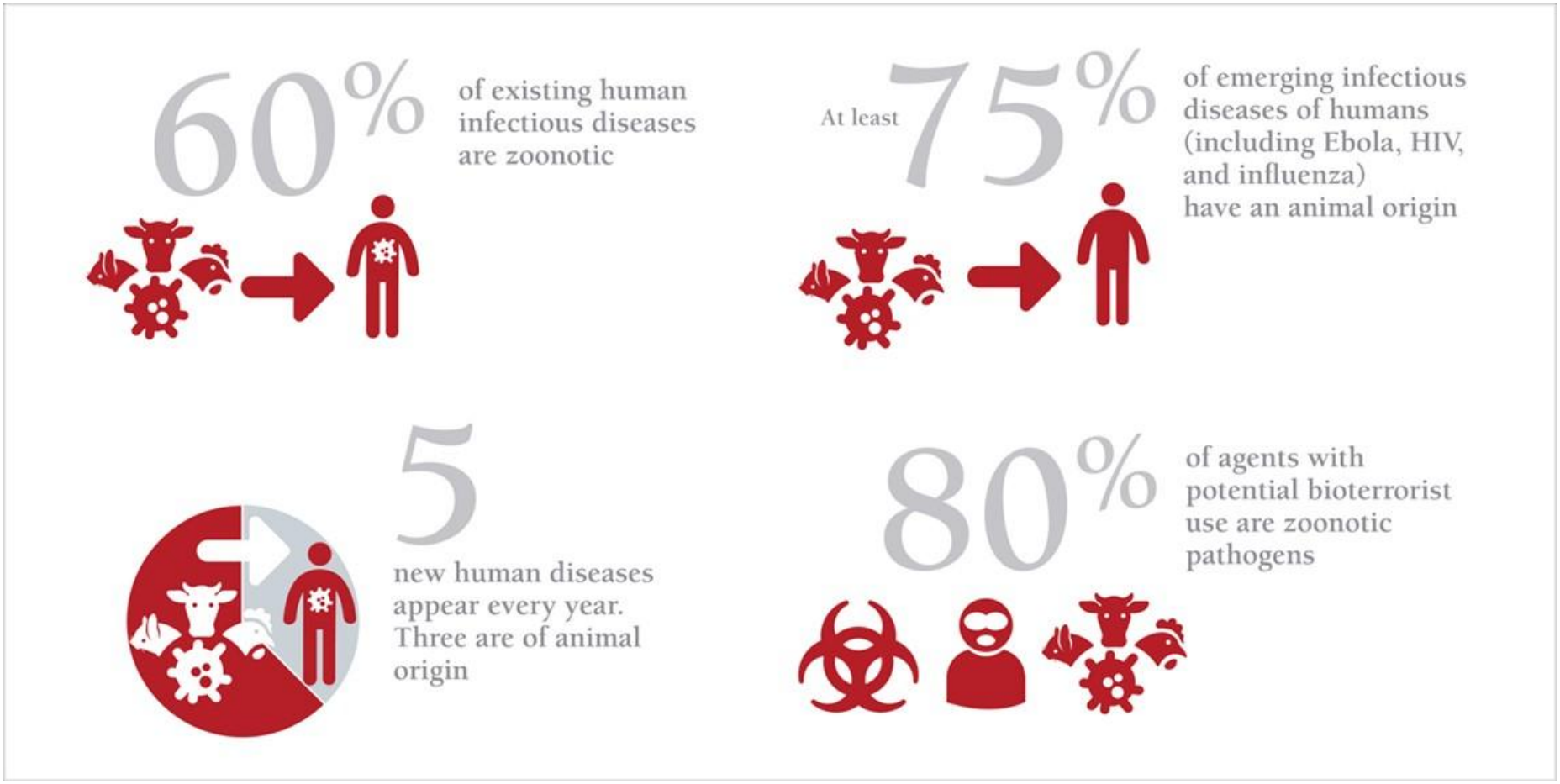
The animal factor in Zoonoses



Source OIE

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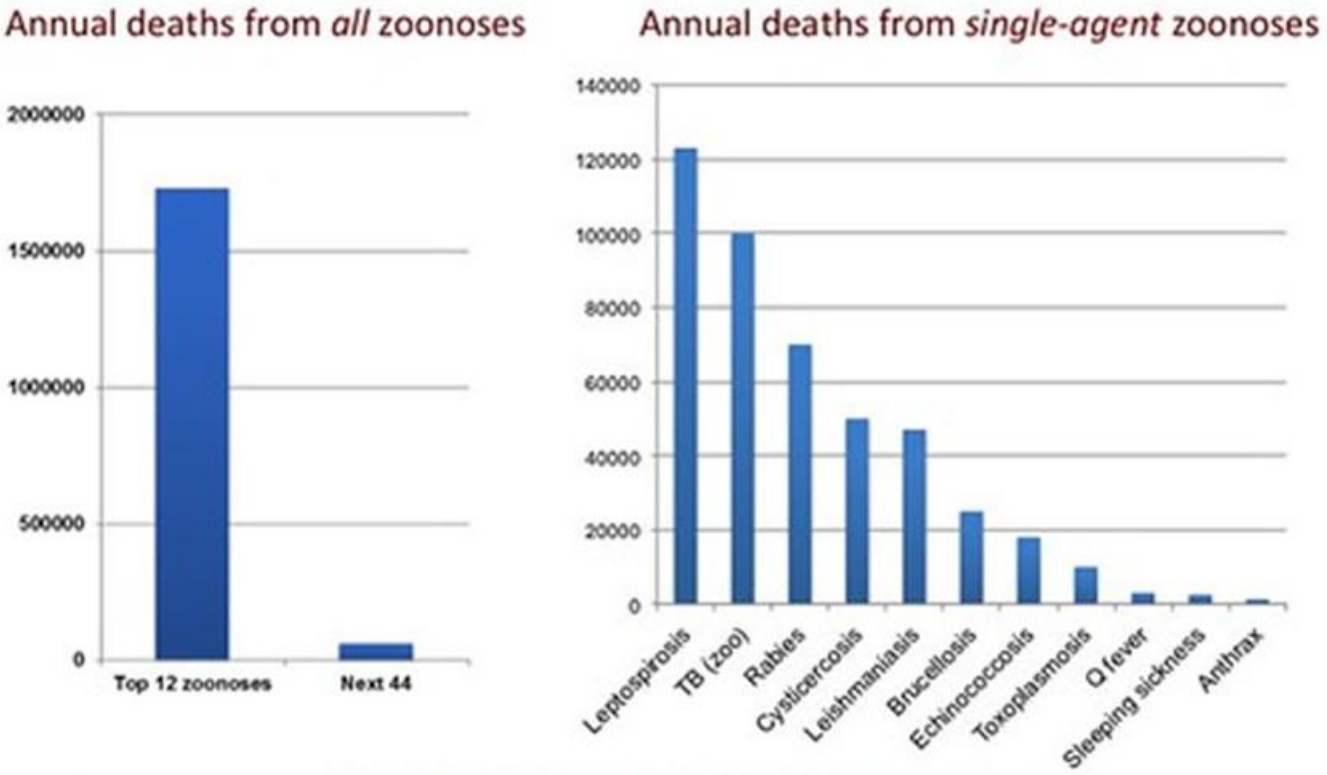
Burden of endemic zoonoses

A deadly dozen zoonotic diseases each year kill 2.2 million people and sicken 2.4 billion



Almost all losses are in developing countries

ILRI CGIAR

Source Grace et al. 2013 ILRI

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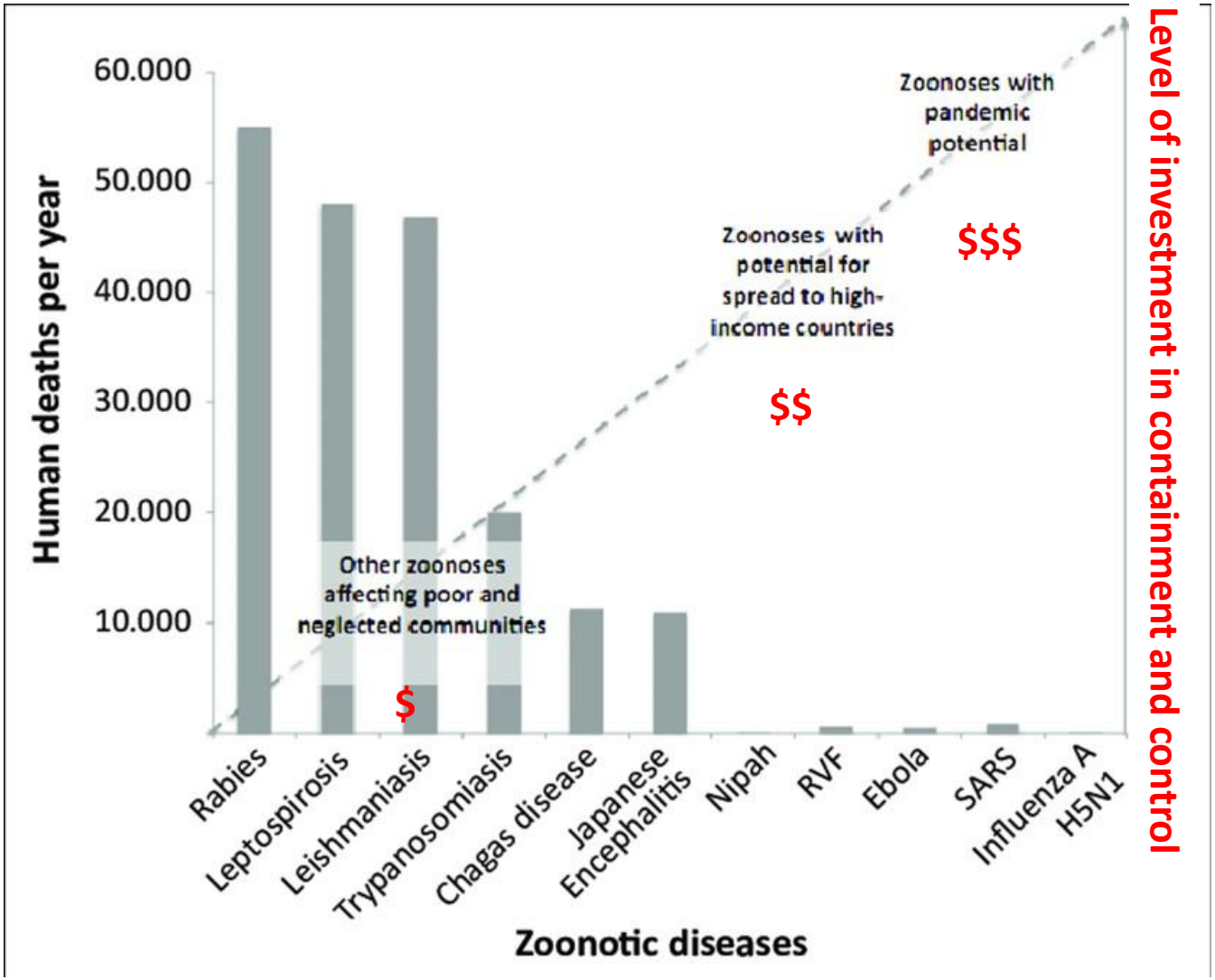
Burden and investment in zoonoses control



Modified from Cleaveland et al 2014

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Endemic & neglected zoonoses

- Do not receive enough attention, even though most of these diseases are preventable, treatable and can be cured
- Affect mainly poor and marginalized populations in low-resource settings, where:
  - People live in close proximity to domestic or wild animals
  - Are dependant on livestock as livelihoods
  - Have inadequate access to public health and veterinary services, education, safe water, and basic sanitation

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Most common interventions: Zoonosis prevention and control

Human health

- Surveillance/detection
- Treatment:
  - Antiparasitic drugs
  - Antibiotics
  - Other medical interventions (e.g. surgery)
- Hygiene measures (e.g. WASH, cooking, …)
- Education & Awareness
- Vector control
- Vaccination

Animal health

- Vaccination
- Slaughter and meat hygiene
- Treatment (preventative or curative):
  - Antiparasitic drugs
  - Antibiotics
- Animal population management & culling
- Surveillance/detection
- Vector control
- Education & Awareness

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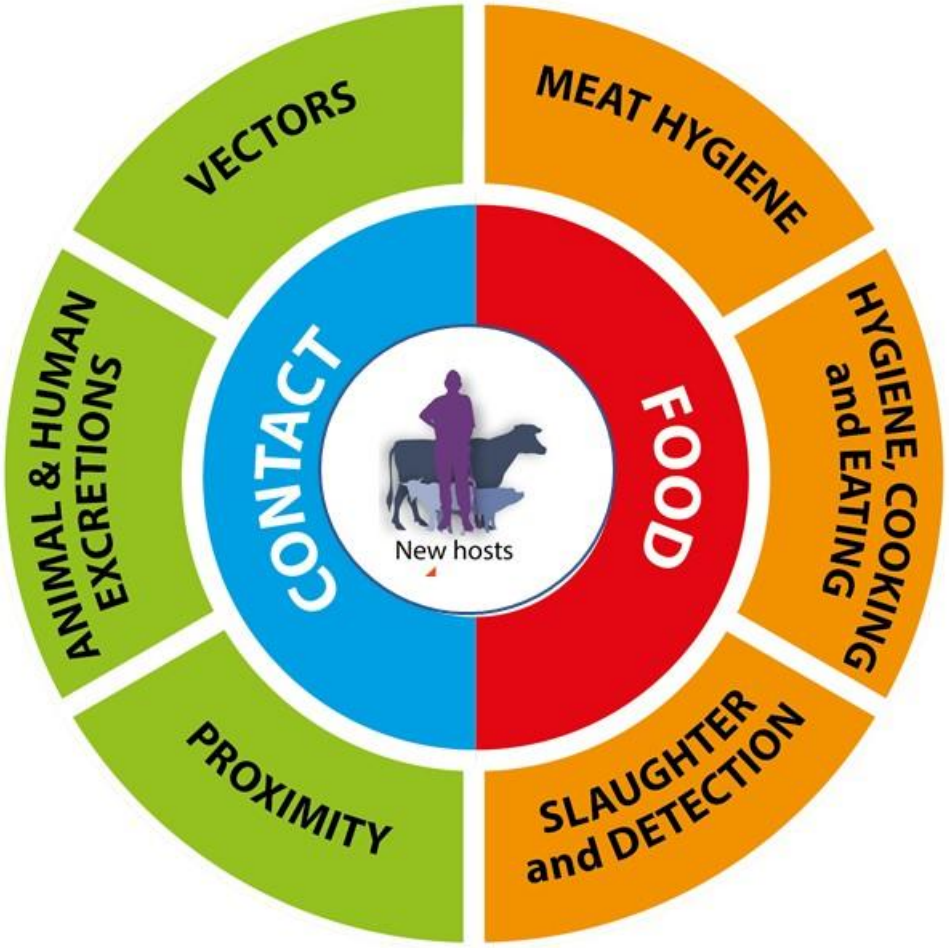
Zoonosis transmission and prevention – A One Health mission!



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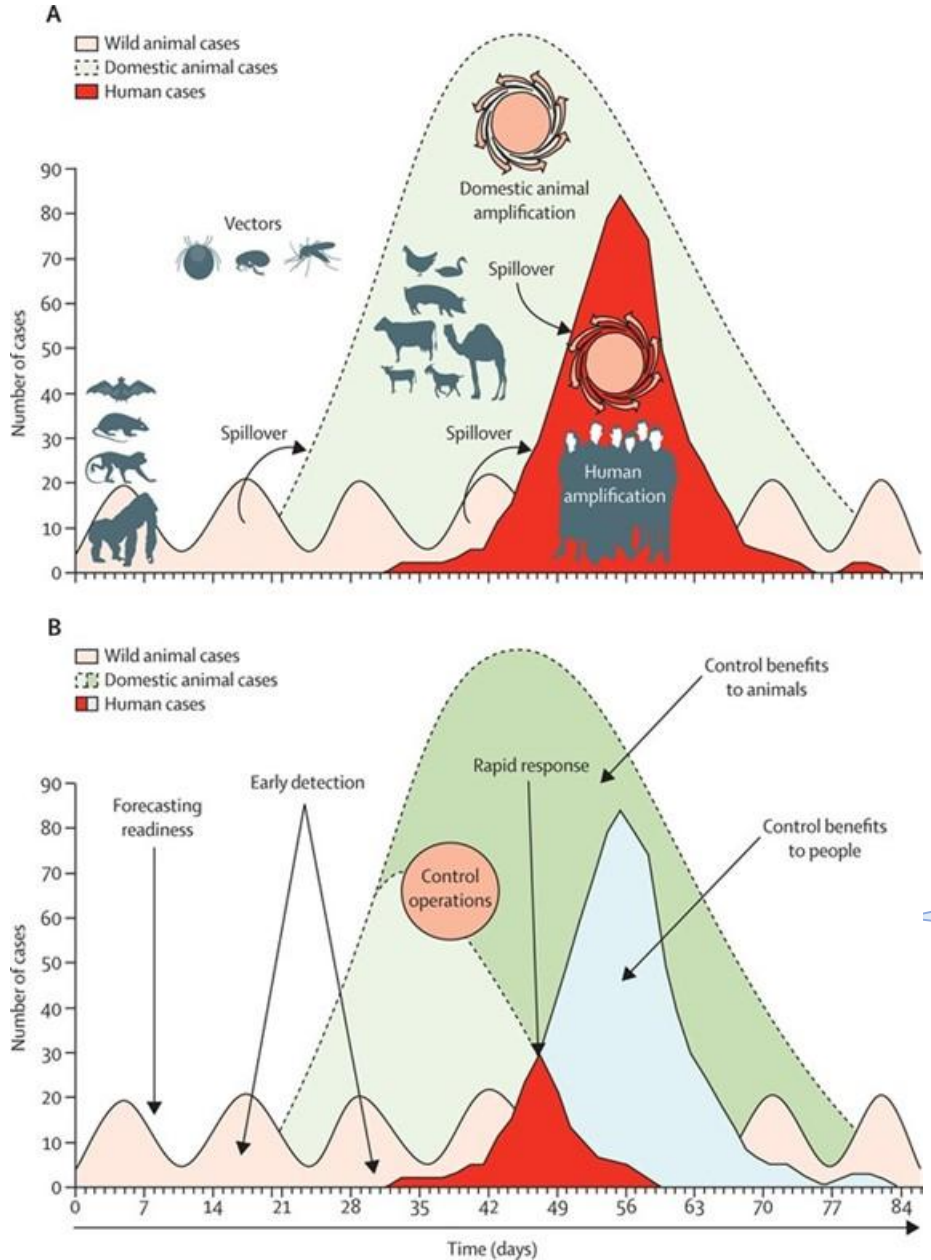
Example Rift Valley Fever (epidemic):



Early detection in animals and livestock vaccination reduce human health impact and cost for human (intensive) care, etc.

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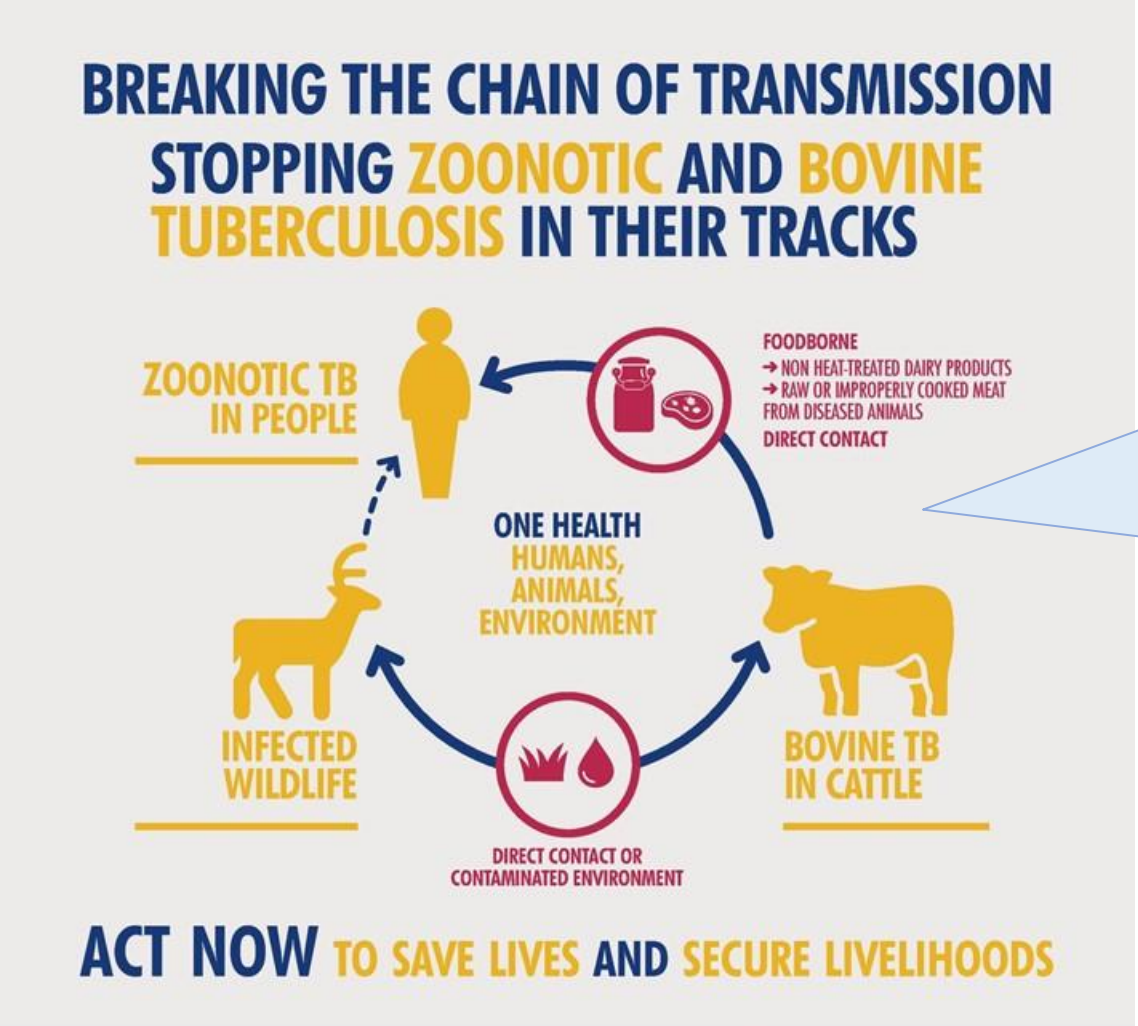
Bovine tuberculosis:



Veterinary public health reduces human health impact and cost for health sector trough :

- Prevention of food-borne transmission
- Test and slaughter/ herd certification
- Management of contacts between animals (people)

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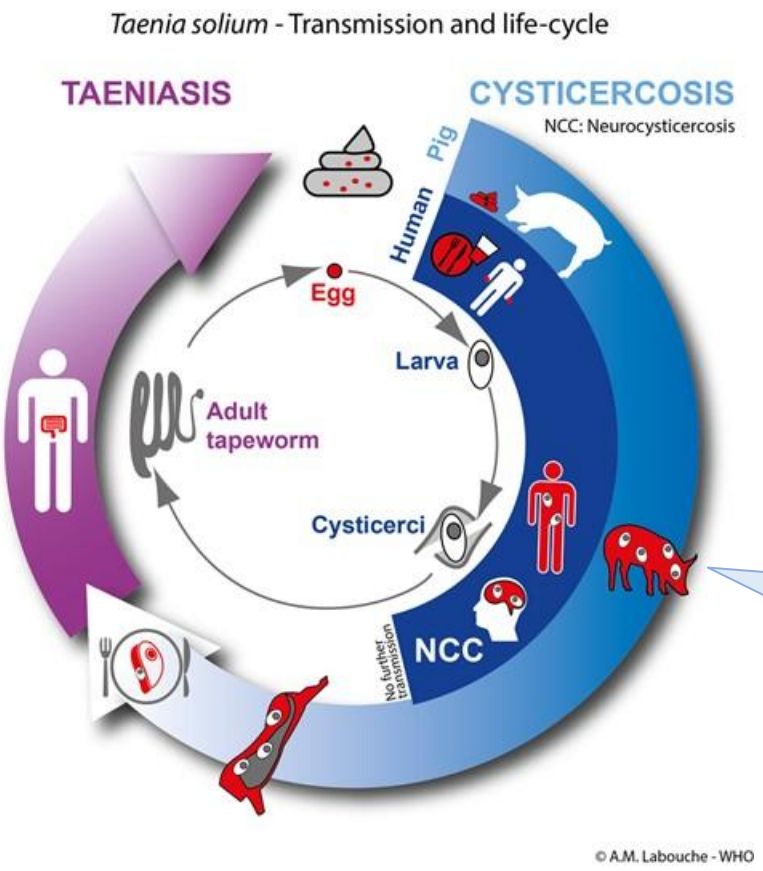
T. solium, Taeniasis & Neurocysticercosis



- Occurs in very poor communities in which there is poor basic sanitation and open defecation is practiced, and where pigs roam free.
- In endemic communities over 30% of epilepsy is due to *T. solium*. This type of epilepsy is preventable.
- Ingestion of eggs happens mainly by the faecal-oral route due to poor hygiene

Reduce human health impact and cost for public health sector:

- Prevent food-borne transmission (cooking, meat inspection)
- Antiparasitic treatment of pigs
- Vaccination of pigs (new!)

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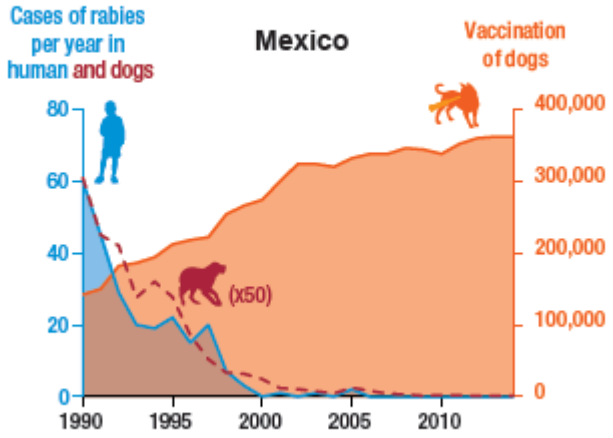
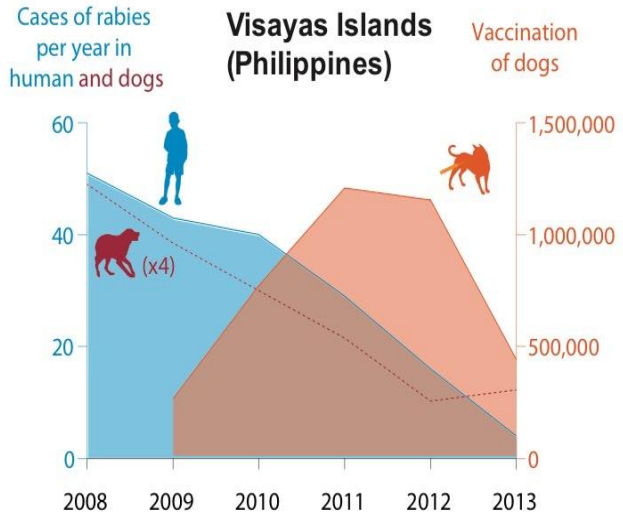
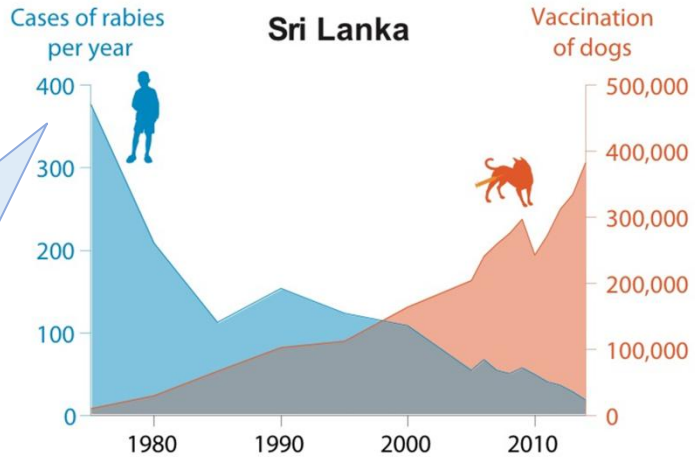
Rabies control and elimination:

Human cases and dog vaccination are linked!







Reduce human health impact :

- Mass dog vaccination
- Awareness campaigns

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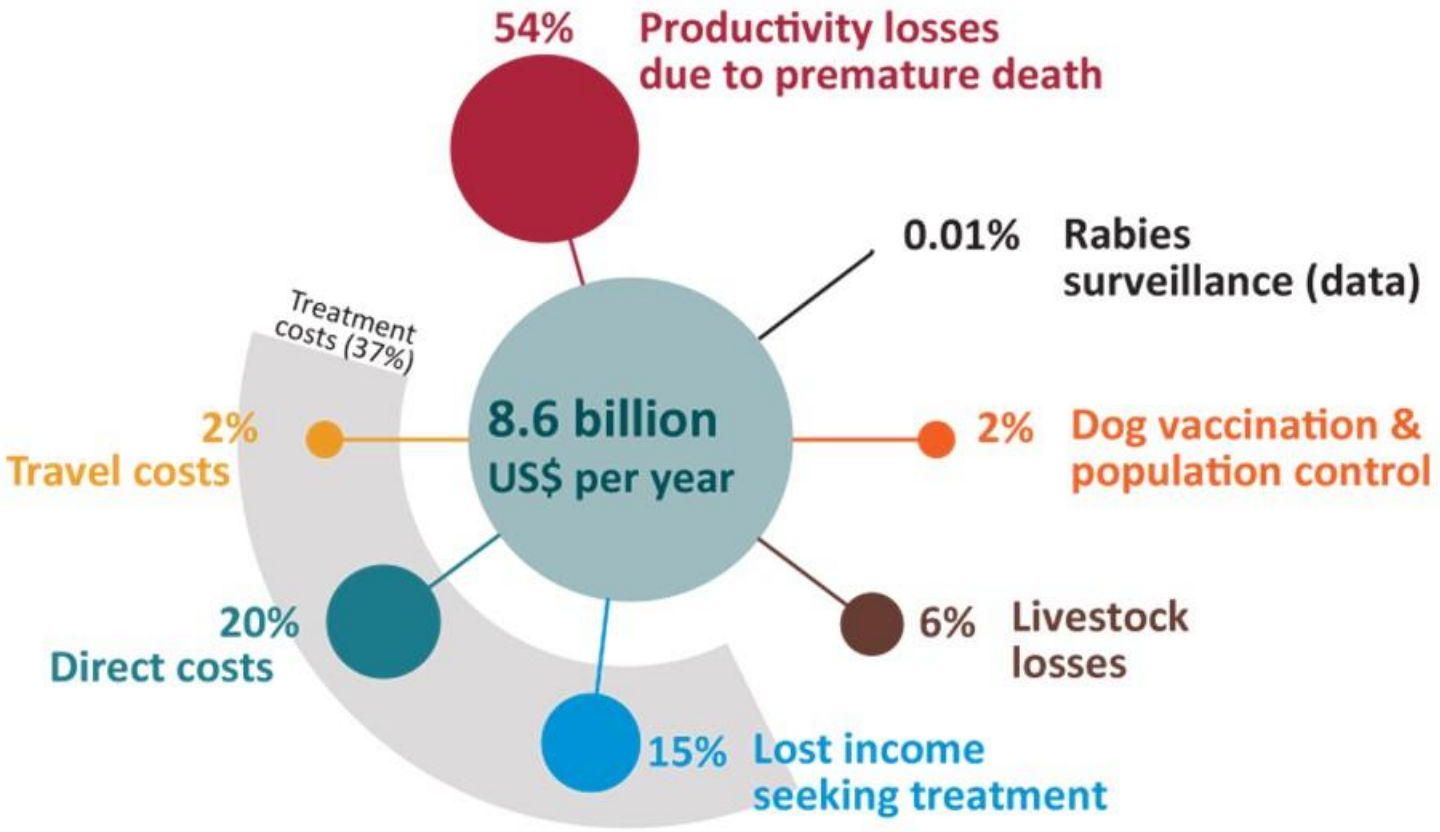
The imbalance of the sectoral cost of rabies



http://www.who.int/rabies/resources/9789241513838/en/

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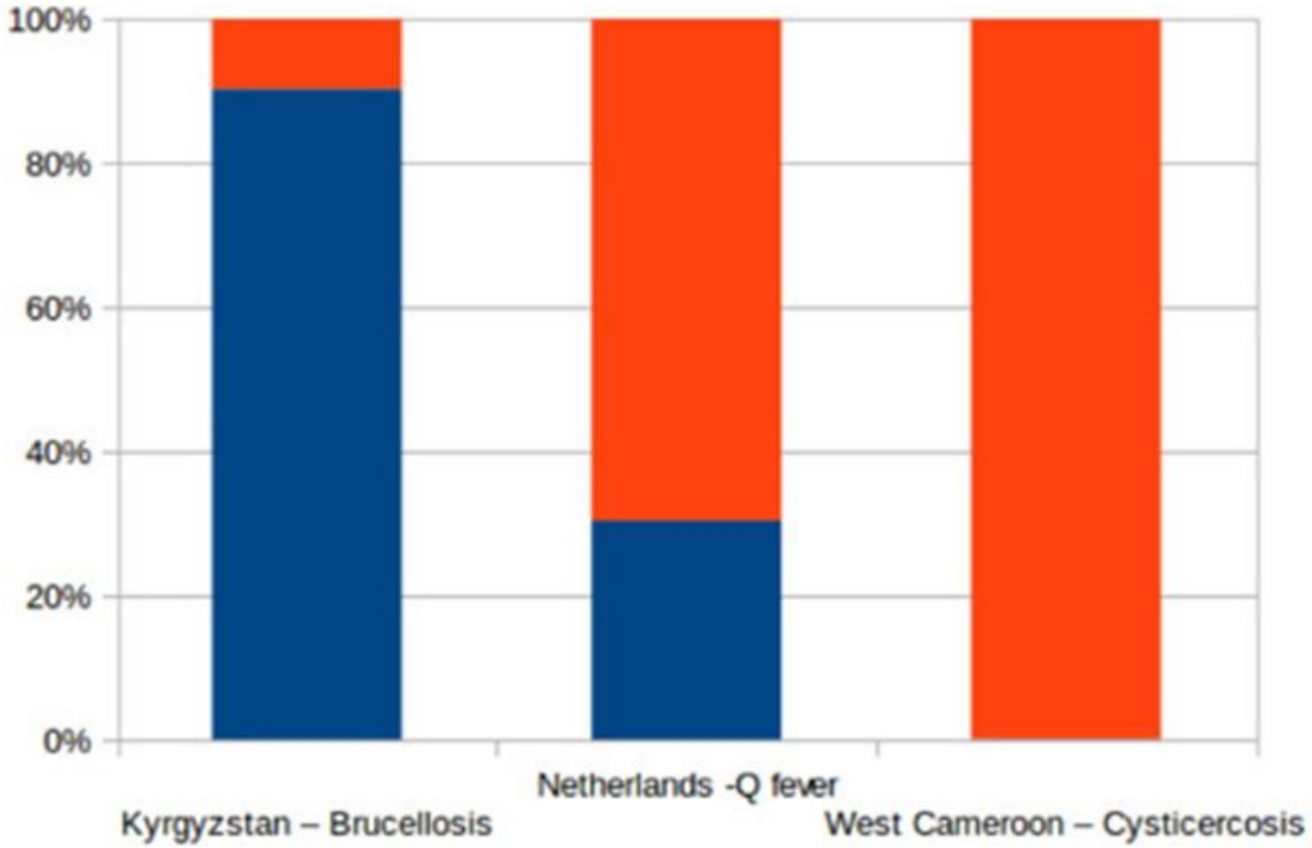
Impact of a zoonotic diseases on human or animal health – which priorities for interventions?



DALYs = Disability Adjusted Life Years

ALEs = Animal loss equivalents

Source Torgerson et a. https://doi.org/10.1016/j.onehlt.2017.11.003

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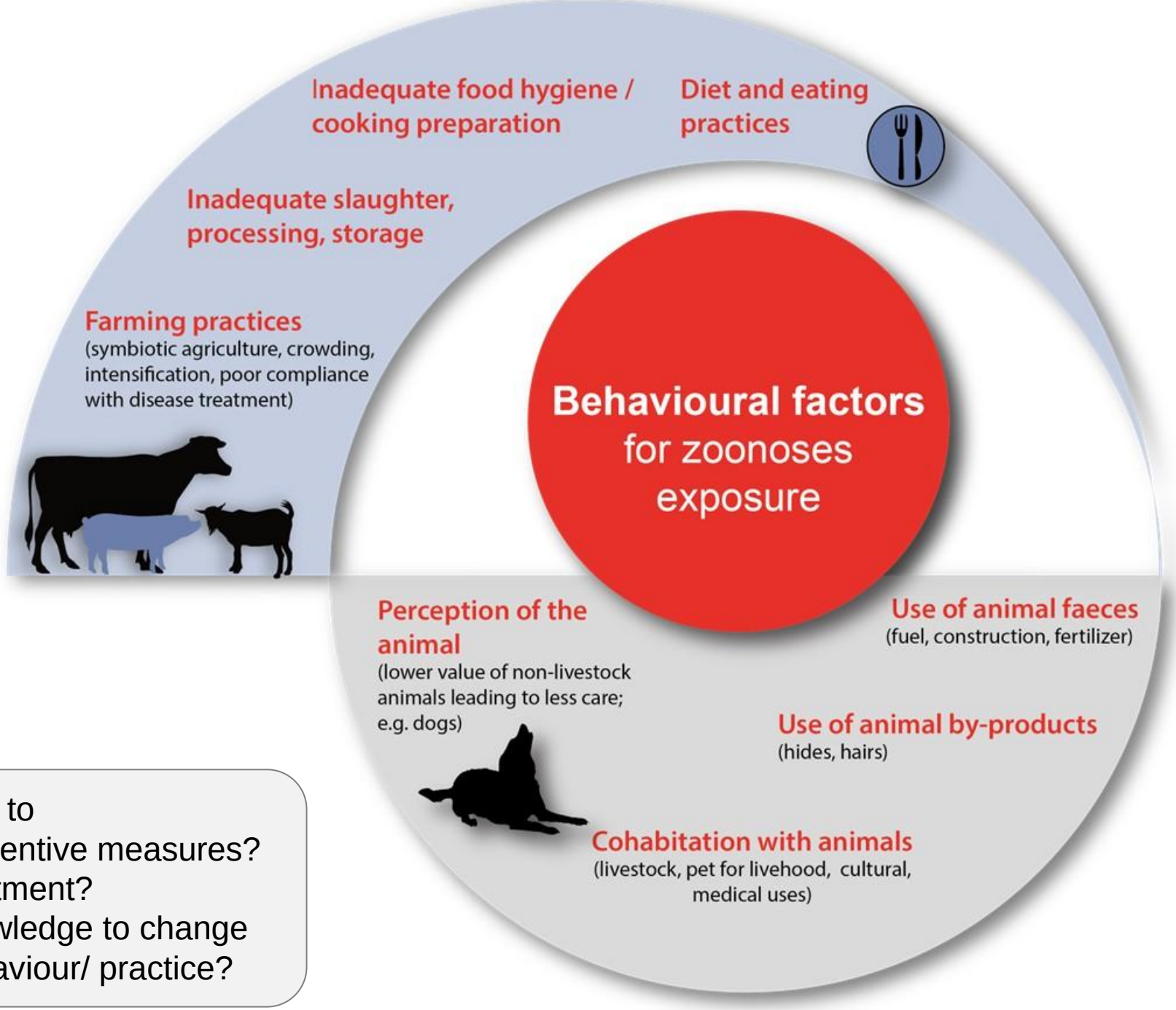
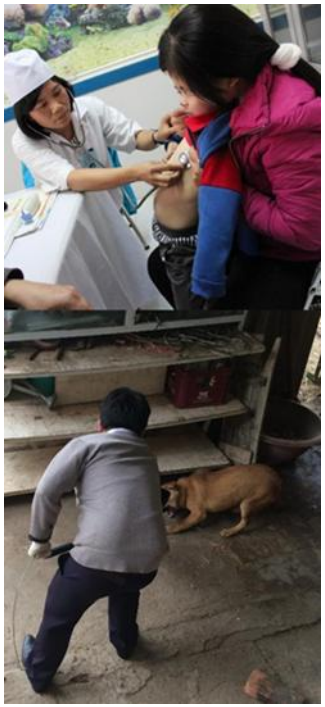


Access to
- preventive measures?
- treatment?
- knowledge to change behaviour/ practice?

Zoonoses and the dogs

Dogs are:

- Ubiquitous and associated with mankind
- Have multiple functions, but little economic value and usually receive little care
- Are a reservoir for or play a role in numerous zoonoses (Rabies, Echinococcosis, Leishmaniosis, Leptospirosis, other bacterial or fungal zoonoses…)
- Transmitting diseases directly, through food or vectors
- Posing a hygiene problem (stray dogs, poop,…)
- A major source of traffic accidents
- Their bites are a public health issue



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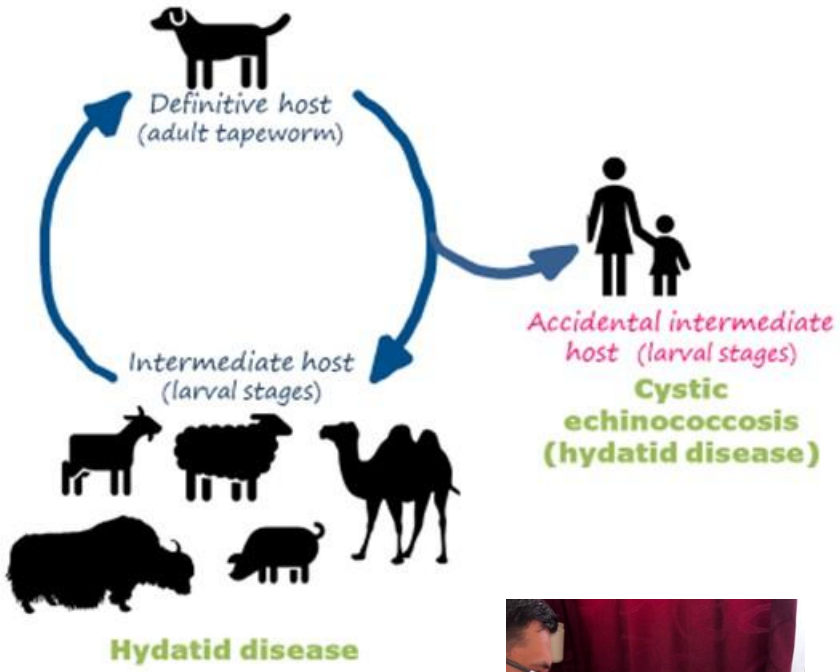
Cystic echinococcosis (CE)



- Caused by the parasite *Echinococcus granulosus*.
- The definitive hosts of this tapeworm are **dogs** which release the parasite eggs with their faeces.
- Intermediate hosts (sheep, camels, yaks, goats, pigs) get infected by ingesting those eggs. They develop hydatid cysts in their livers and lungs.
- **Humans get infected by ingesting the parasite eggs** released with the faeces of a dog harboring the tapeworm. Children are at particular risk because of their frequent contact with dogs.
- **Transmission is most intense in communities where pastoral activities predominate** and where offal from slaughtered animals is accessible to dogs, mainly in central Asia, southern and eastern Europe, northern Africa and the southern top of South America.
- Humans develop CE characterized by fluid/filled parasitic cysts that occur most commonly in their liver and lungs but may occur in any body organ. It interferes with the functions of the organ involved causing **anaphylaxis and death.**

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Proven pillars for success, Rabies and beyond

Awareness & community engagement

Dog population management &vaccination

Timely care

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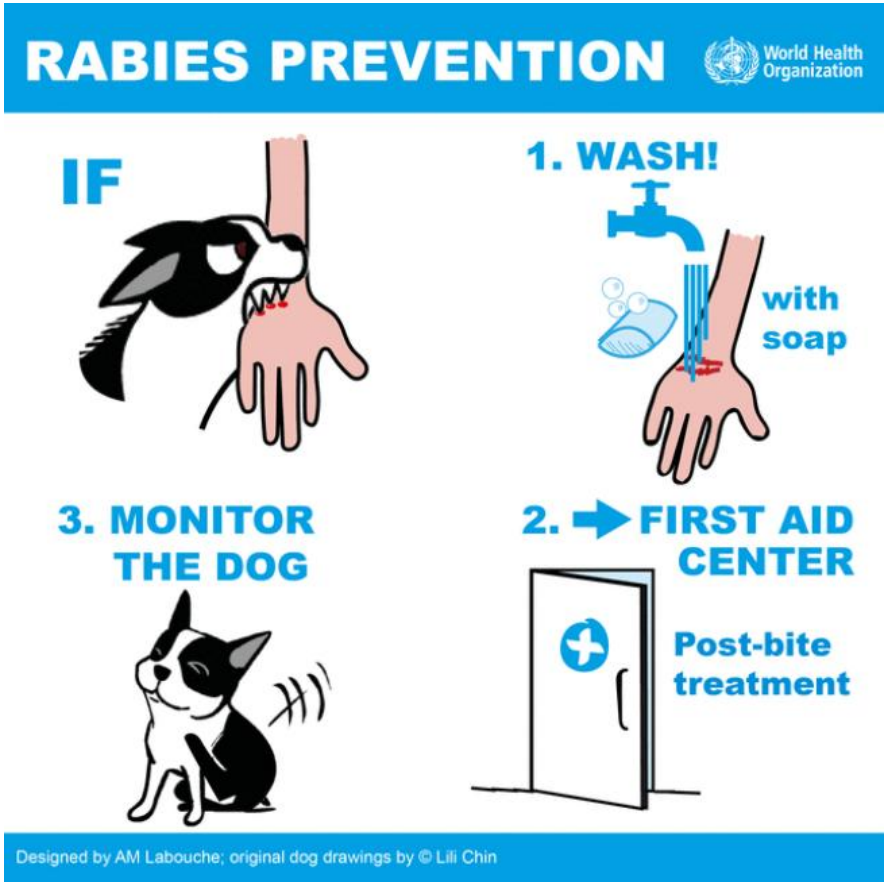
Dog bite prevention, appropriate behaviour around dogs/animals



http://www.who.int/rabies/en/

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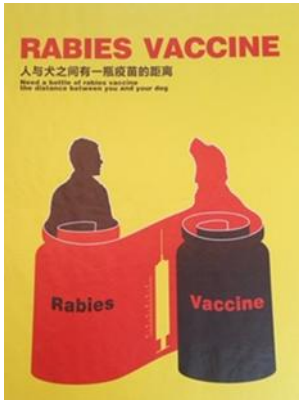
Dog population management



- Create awareness about responsible dog ownership
  - Compliance with dog-related legislation (leash, registration)
  - Assure behavioural, physical and medical needs of a dogs
  - Prevent risks (aggression, disease transmission or injuries) to community, animals or the environment.
- Decrease number of dogs being born
  - Surgical or chemical sterilization
  - Enforce leash laws/animal confinement- especially during females heat cycles
- Decrease influx of new dogs
  - Remove garbage from streets
  - Rubbish bins with lids
  - Don’t feed community dogs

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Strengthening collaboration across sectors and disciplines

Challenges

- Different sectors with different focus
- Health systems not developing equally
- Limited communication
- Limited evidence and guidance on how to deliver e.g. WASH alongside other disease interventions most effectively
- Cost sharing

Opportunities

- Examples of success
- Building a body of evidence
- More cost-effective delivery
- Tackling multiple health issues at once
- Health system strengthening
- Sustainable over long-term

No one sector can do it alone!

The FAO-OIE-WHO Collaboration

Sharing responsibilities
and coordinating global activities
to address health risks at the
animal-human-ecosystems interfaces

A Tripartite Concept Note

https://extranet.who.int/sph/one-health-operations

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Thank you!

WHO technical and other updates on neglected zoonotic diseases:

- **For further reading:**

https://www.who.int/neglected_diseases/zoonoses/en/

- **Resources by disease**

Echinococcosis

Foodborne trematode infections

Rabies

Snakebite envenoming

Taeniasis / Cysticercosis

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