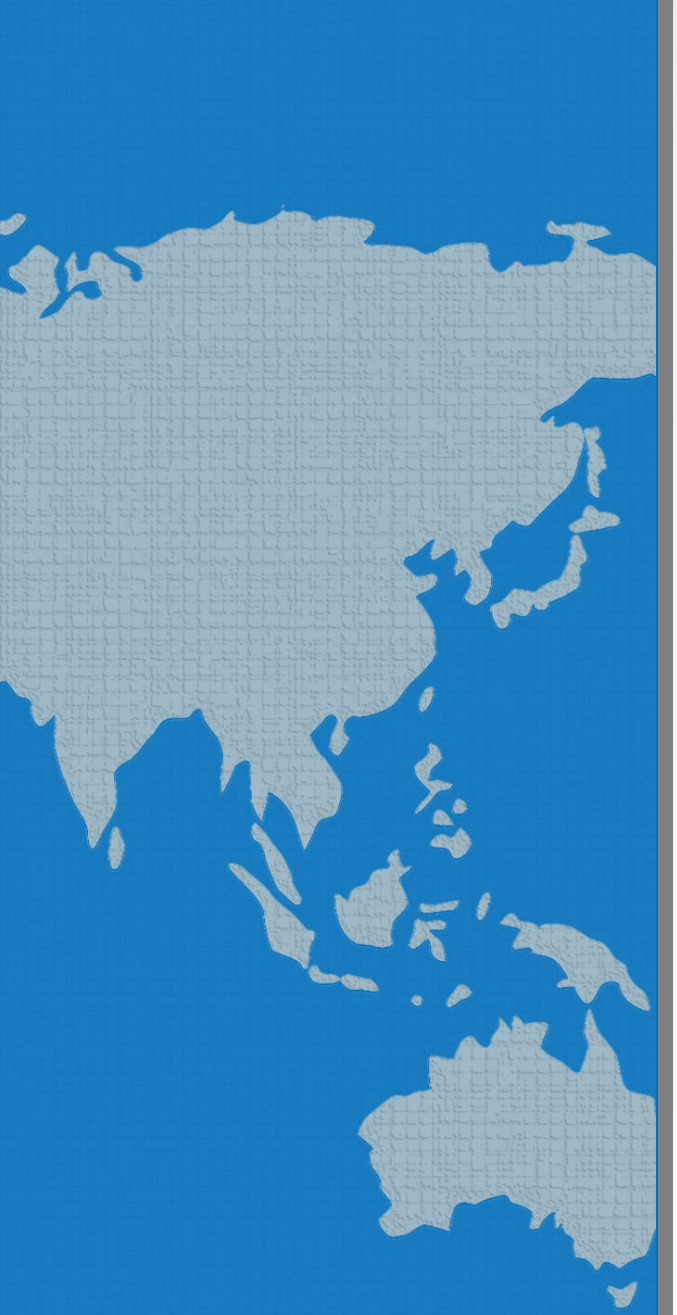


Rabies in Asia
and the
Philippines

Surveillance Integrating Phylogenetics and Epidemiology for Elimination of Disease: Evaluation of Rabies SPEEDIER

UK – PHILIPPINES Joint Health Research 2018-2021

Rabies Global

Background

- endemic in more than 150 countries around the world
- despite more effective and safe vaccines developed for both for animals and humans, still over 60'000 people die every year
- 40% of the victims - children <15 years living in Asia & Africa
- 99% of human cases are acquired via the bite of an infected dog

Rabies Global

Background

- Affects mainly under-privileged communities in developing countries who have limited healthcare access
  - PEP either too expensive or rarely available for many
  - many bite victims do not know PEP and rely on ineffective traditional methods
  - not all countries list rabies as a notifiable disease and even where rabies reporting is compulsory, inadequate surveillance is common because people from remote areas die at home
  - diagnostic possibilities are scarce and misdiagnosis presumably frequent

- All these factors lead to a continual state of neglect on all levels of disease control: missing perception of the true worldwide burden, absent international and governmental commitment and low public awareness
(Bourhy et al., 2010; Banyard et al., 2013)

Rabies Asia

Background

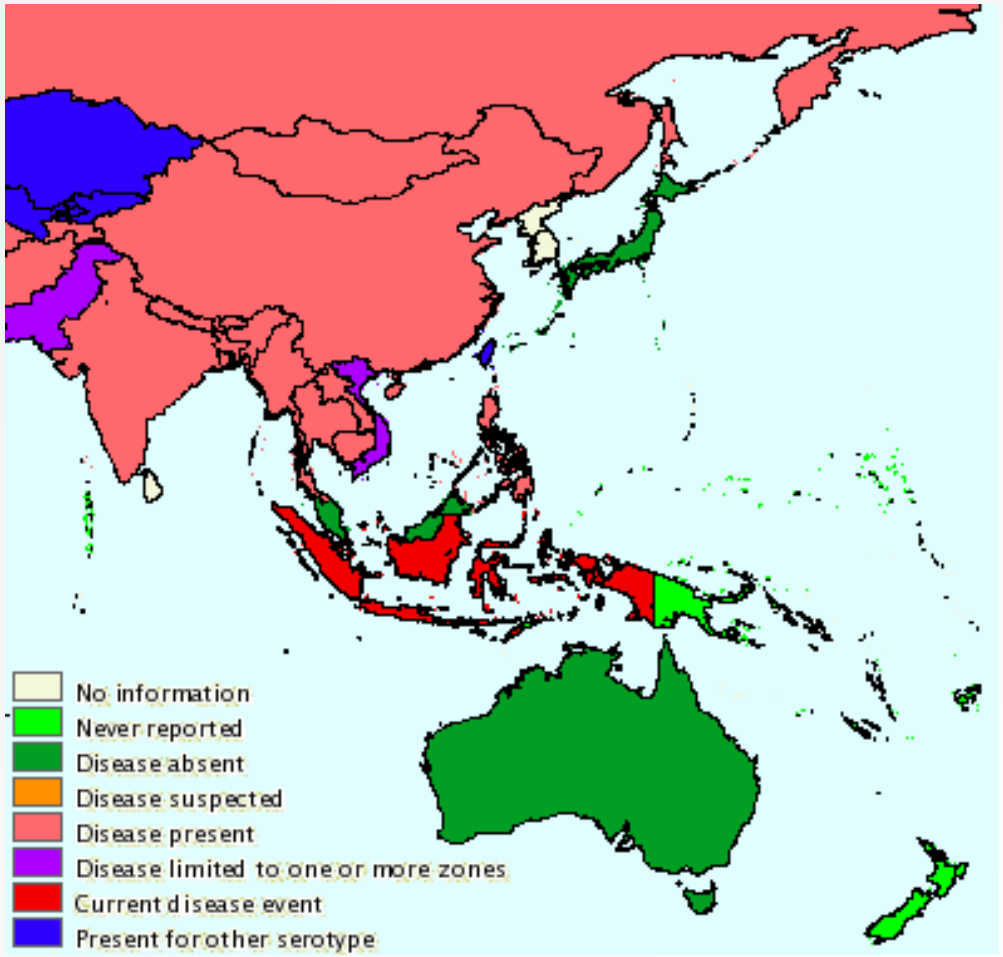
Asia carries the biggest burden associated with the disease of all continents with over 50% of all worldwide human rabies deaths and more than 80% of the global monetary expenses
(Anderson and Shwiff, 2013)

East and South-East Asian countries rabies situation - very heterogeneous and reflects the worldwide situation

OIE WAHIS

Rabies Distribution Asia

Office International des Epizooties World Animal Health Info System



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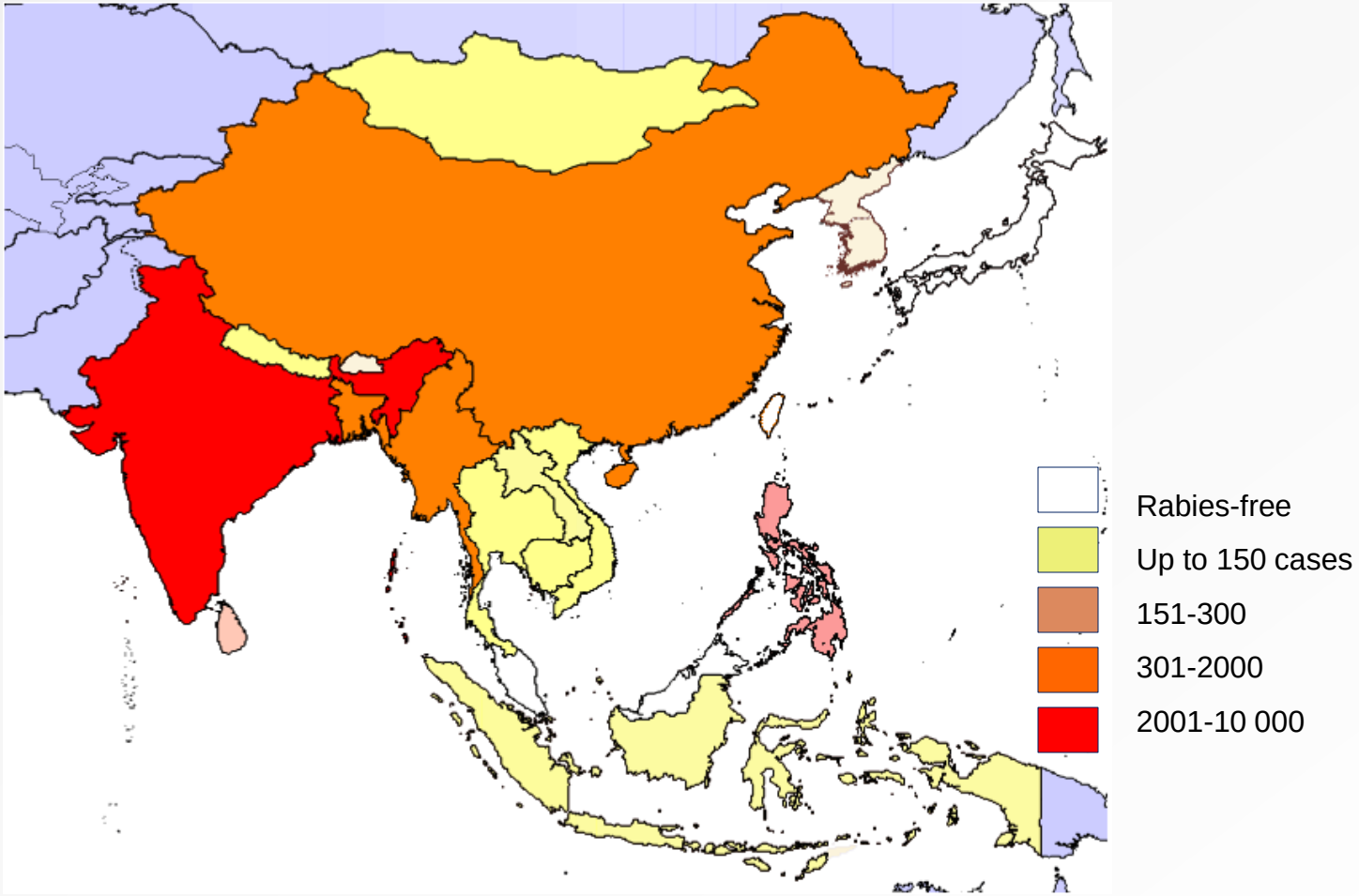
Human Deaths

Data sources – MoHs and WHO

Rabies Distribution Asia



Rabies Asia — Resurgence

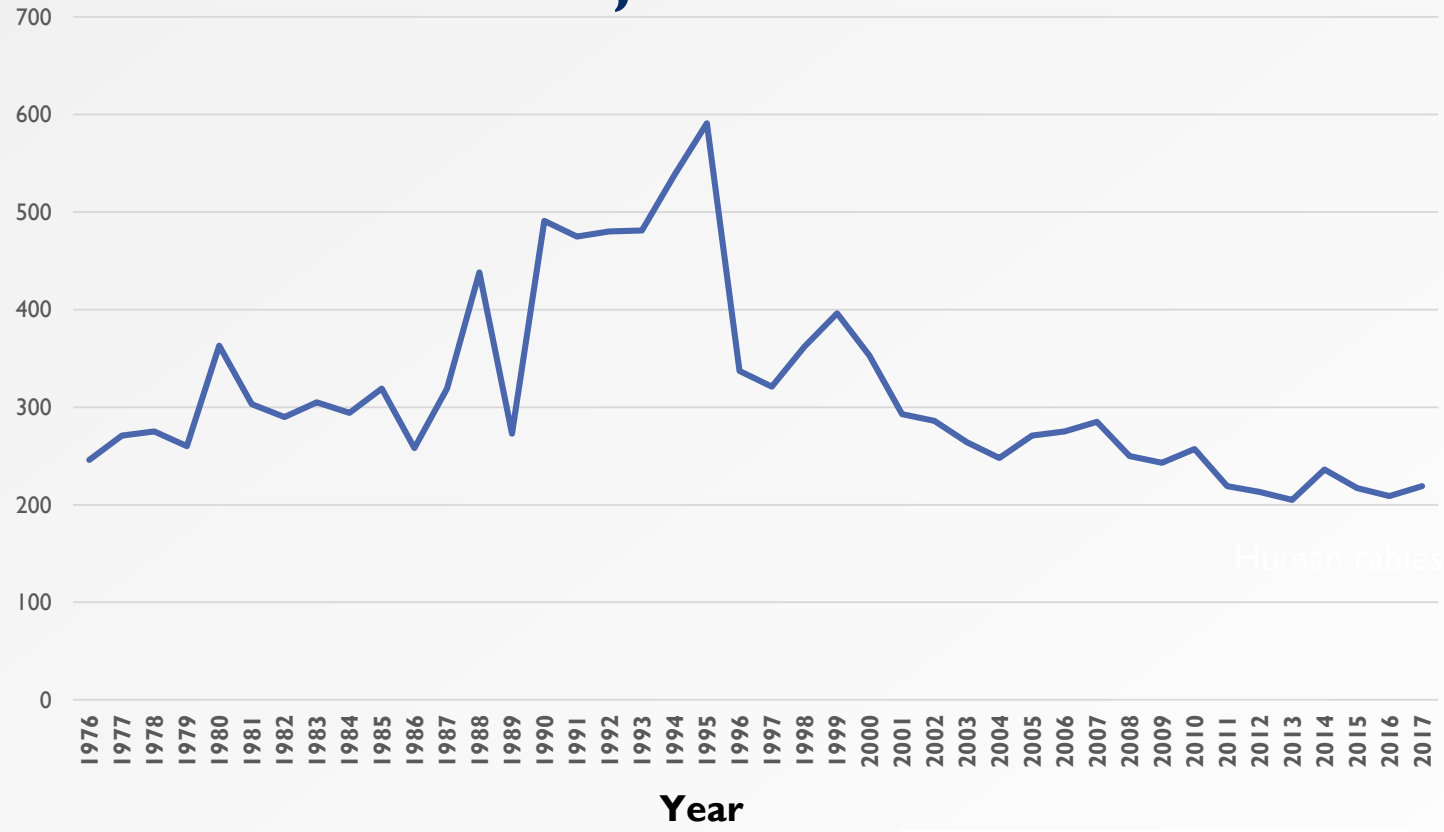
- INDONESIA - has become endemic in Bali since it emerged in 2008, and still reporting human cases this year; other historically free islands now reporting emergence
- MALAYSIA - emergence in historically-free Sarawak State; 12 human deaths since July 2017
- THAILAND - 2018 outbreak news with >400 lab-confirmed animal cases, double compared to 2017
- VIETNAM - >900 human cases in last decade, >400k PEP; cost per dog vaccinated USD1.32; per PEP USD153

Rabies in the Philippines

- Reportable disease since 1999
- Average of 250 human rabies cases per year for the past five years
- Domestic dog is the main vector
- National dog vaccination coverage at best only 54% in 2017
- The National Rabies Prevention and Control Program of the Philippines aims to eliminate rabies by 2030

Rabies in the Philippines

Human Rabies Cases, 1976 - 2017



NRPCP EB-DOH, Department of Health

Rabies in the Philippines

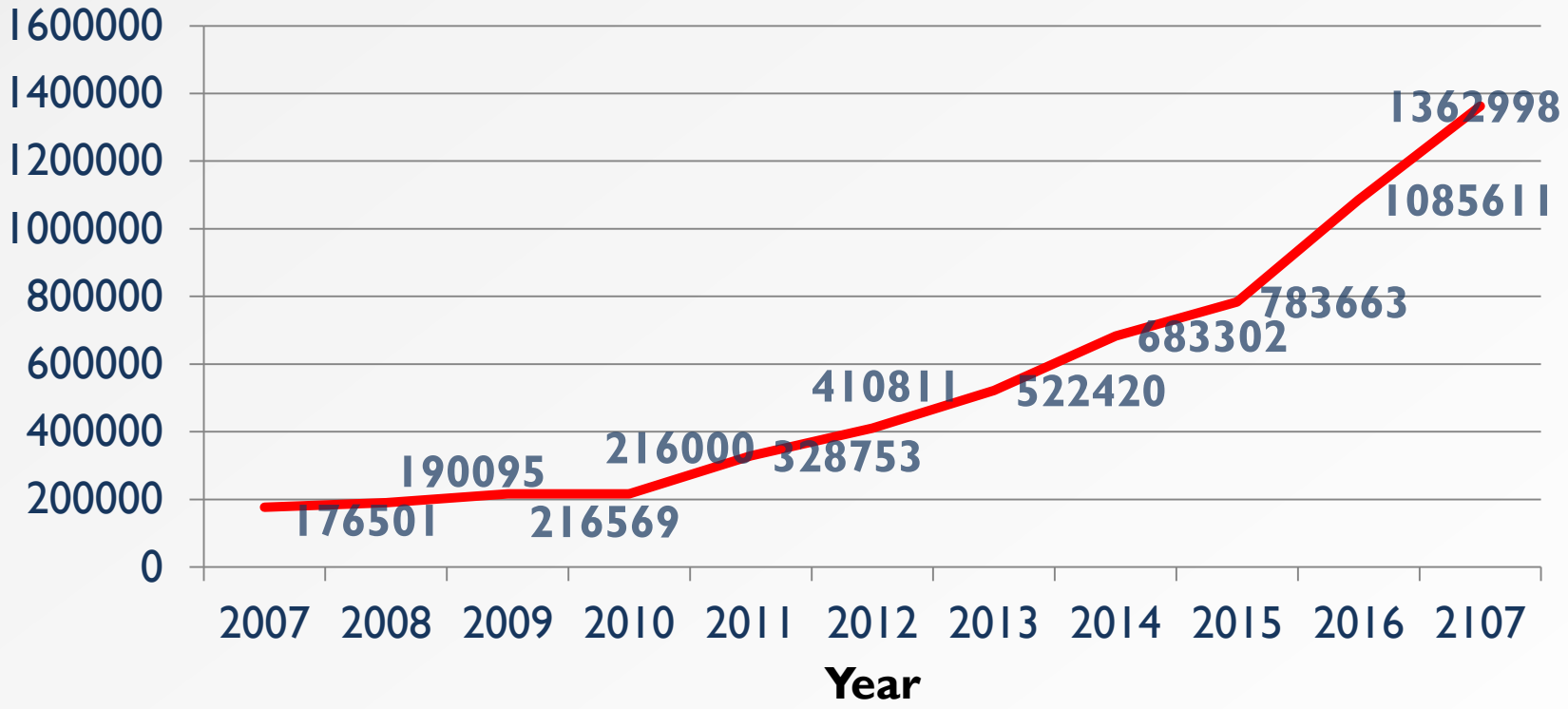
- analysis of the 2,239 suspected rabies deaths from 2008 to 2016 showed no significant decline, and from 2014–16 an average of 8,534 years of life were lost annually

- incidence of rabies deaths from 2014–16 was not clearly related to the provision of ABTCs/100,000 population or human population density

Amparo et al. The evaluation of operating Animal Bite Treatment Centers in the Philippines from a health provider perspective. Plos One July 12, 2018 https://doi.org/10.1371/journal.pone.019918

Rabies in the Philippines

Animal Bites, 2007 - 2017



NRPCP, Department of Health

Rabies in the Philippines

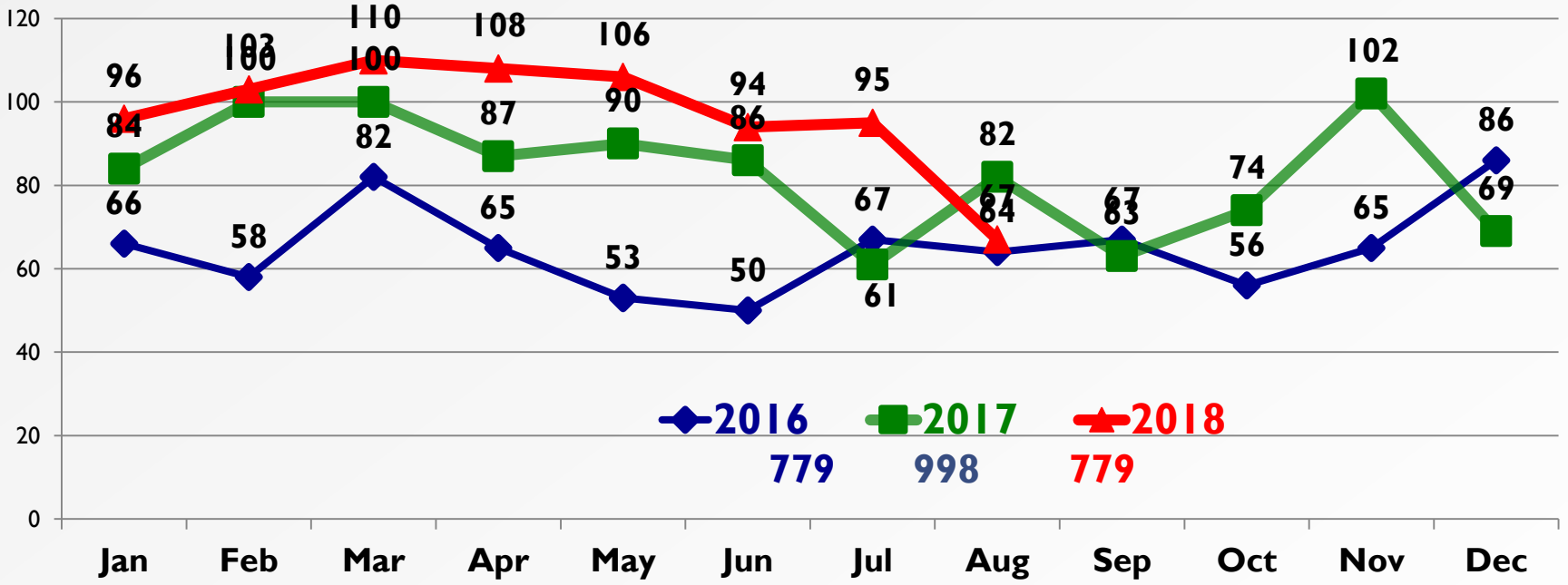
- Average PEP course cost delivered at ABTCs
  - USD 32.91 /patient urban
  - USD 57.21 /patient rural

- PEP provision cost USD 37.6 million in 2016, with a cost per life saved of USD 8,290

Amparo et al. The evaluation of operating Animal Bite Treatment Centers in the Philippines from a health provider perspective. Plos One July 12, 2018 https://doi.org/10.1371/journal.pone.019918

Rabies in the Philippines

Animal Rabies Cases, 2016 – 2018 (Jul)



Bureau of Animal Industry, Department of Agriculture

Rabies in the Philippines

Socio-cultural – public awareness, child education, community engagement and volunteerism

Technical – surveillance, diagnostics, human vaccination (nationwide ABTC network), animal vaccination

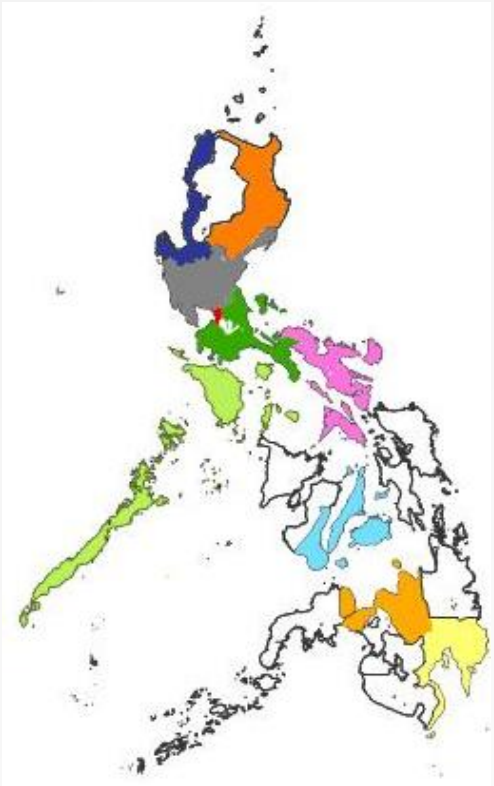
Organization – One Health systems, M&E (annual review, rabies summits, national committee mtgs)

Political – legal framework, local impact demonstration initiatives, international engagement (Tripartite WHO OIE FAO)

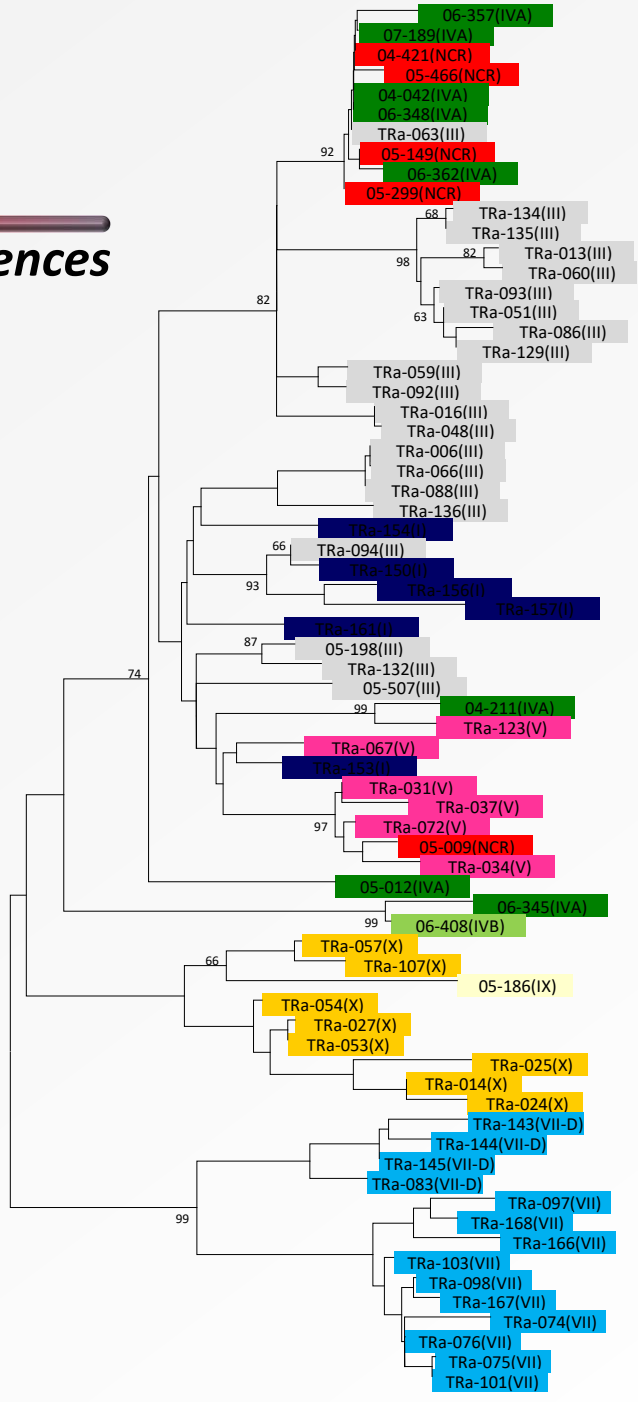
Resources – increase in health budget but not in agriculture sector

Comparison of Representative G Gene Sequences

Phylogenetic analysis of the target in 70 representative samples. Done in MEGA4 and inferred by Neighbor-Joining method at bootstrap value of 1,000 replicates.

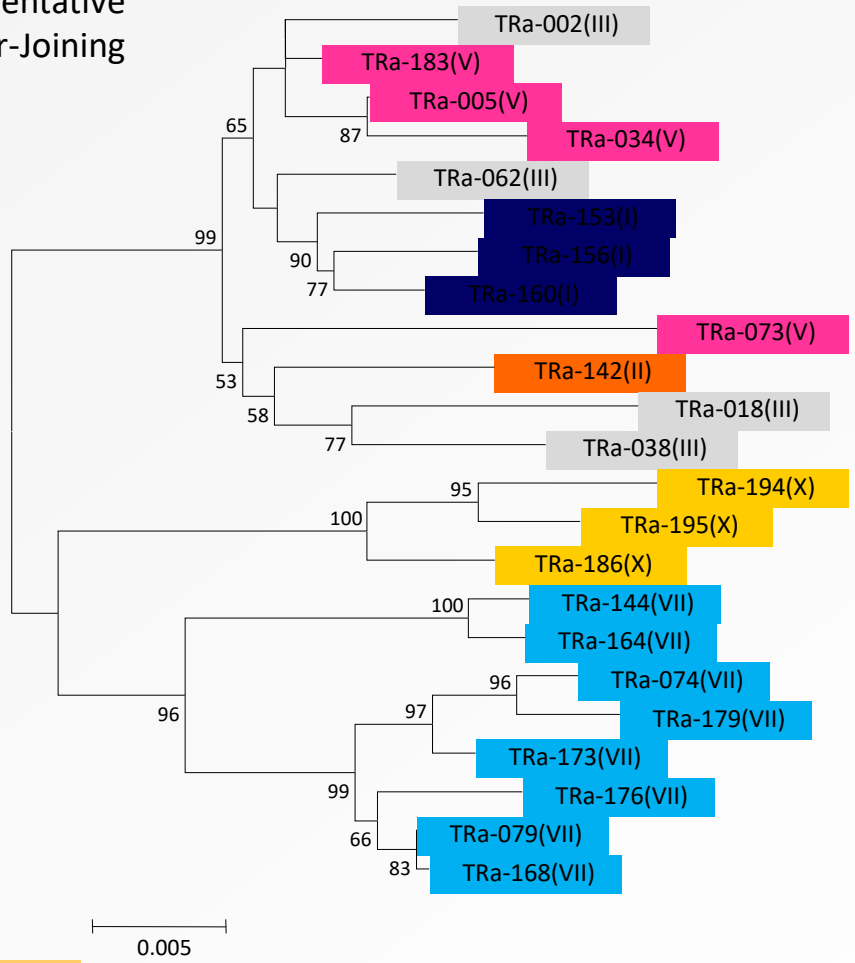


NCR | I | II | III | IVA | IVB | V | VII | X | XI



Comparison of Representative N Gene Sequences

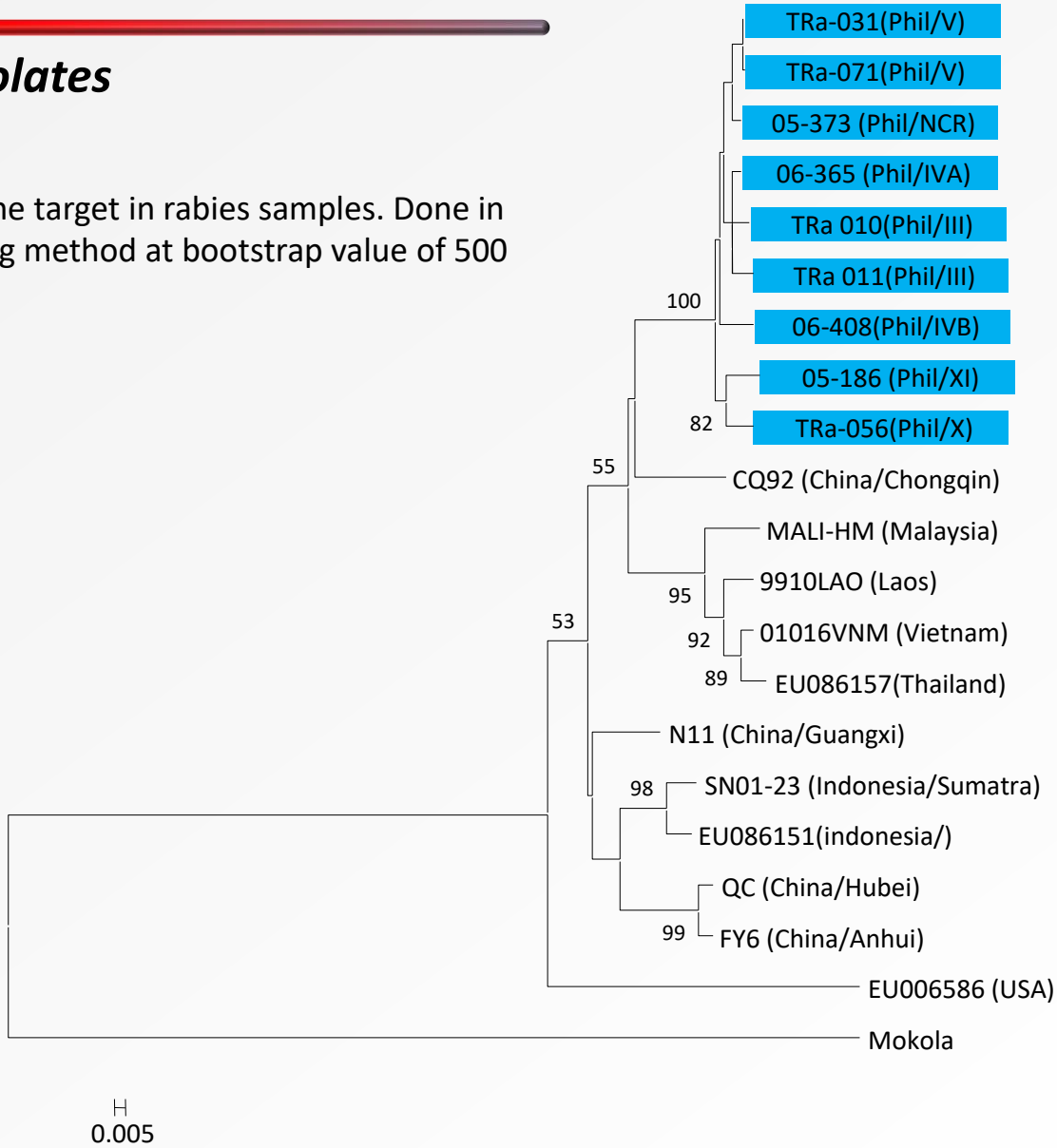
Phylogenetic analysis of the target in 23 representative samples. Done in MEGA4 and inferred by Neighbor-Joining method at bootstrap value of 1,000 replicates.



NCR | I | II | III | IVA | IVB | V | VII | X | XI

Comparison of Philippine Isolates With Other Countries

Phylogenetic analysis of the 865bp G gene target in rabies samples. Done in MEGA4 and inferred by Neighbor-Joining method at bootstrap value of 500 replicates.



Current and future strategies

- A national program aligned with the regional Asian roadmap towards rabies control and elimination - regional political & financial support
- Promoting community efforts with harmonized practices to improve the chances of success
- Practical steps to overcome challenges of actual implementation of rabies prevention control
- School children education and awareness campaigns in the wider context
- Promote rabies prevention as a Global Public Good related to Sustainable Development Goals

Current and future strategies

- To increase rabies surveillance

  Collection of national, regional and more local data

  Should include both human and animal cases plus data on rabies exposures and human post-exposure prophylaxis, and dog bite injuries

- To enhance laboratory diagnosis and increase laboratory-based surveillance
- Enhance surveillance essential to generate data on the progress and cost-effectiveness of the program
- Continue to use highly successful bottom-up approaches that entails collaboration across various sectors

  - animal and human health
  - community-based NGOs
  - education
  - environment
  - trade and industry
  - local government units -provincial, commune/village levels

In sum…

With a comprehensive and integrated approach, it is expected that dog rabies will be eliminated and there will be eventual decline and disappearance of human rabies cases

Countries still endemic for dog rabies, as well as those that are rabies free, will gain from elimination and the resilience of communities in confronting the threat of other zoonotic diseases will be strengthened

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