

SPEEDIER - SURVEILLANCE INTEGRATING PHYLOGENETICS AND EPIDEMIOLOGY FOR ELIMINATION OF DISEASE: EVALUATION OF RABIES CONTROL IN THE PHILIPPINES

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Implementing Agency: Field Epidemiology Training Program Alumni Foundation, Inc.

BACKGROUND

- Rabies kills over 200 people annually in the Philippines
- Outbreaks and disease incursions to rabies-free areas occur despite the PH government efforts to eliminate the disease by 2030 through mass dog vaccination and provision of post-exposure prophylaxis (PEP) to bite victims
- Costly PEP still given to almost all dog bite victims, causing strains in local and national healthcare budgets
- Rabies surveillance still not sufficiently sensitive for international agencies to verify rabies freedom with limited sharing of information between sectors
- A One Health approach is needed to enhance rabies surveillance, to improve rabies prevention and control and to accelerate rabies elimination

OBJECTIVES - to develop and implement a cost-effective, epidemiologically robust, enhanced surveillance and response package to guide and sustain elimination of rabies in the Philippines

Specifically,

1. Develop enhanced surveillance and response protocol integrating IBCM and rationalized PEP use;
2. Train frontline human and animal healthcare workers on SPEEDIER and facilitate their adoption in two provinces in the Philippines;
3. Assess the impact of SPEEDIER on outcomes, costs and process indicators, including the timeframe over which benefits are achieved; and
4. Determine whether SPEEDIER can be implemented as intended in different local contexts, identifying facilitators and barriers to successful implementation and sustainable roll out.

PARTNERSHIP - combines expertise in rabies epidemiology, control and surveillance with interdisciplinary approaches to developing and evaluating complex interventions.

- Field Epidemiology Training Program Alumni Foundation, Inc.
- Research Institute for Tropical Medicine - Department of Health
- University of Glasgow
- University of Cambridge



Local Government Partners

- Romblon Province – had been locally declared rabies-free, but improved surveillance is required to be able to verify disease freedom to international standards and for effective response, should an incursion occur
- Oriental Mindoro – rabies endemic, with human rabies cases reported annually. Dog vaccination coverage is very low (<30%) and detection of dog rabies cases requires improvement

METHODS

INTEGRATED BITE CASE MANAGEMENT (IBCM)

The World Health Organization (WHO) advocates the use of IBCM as a potential way to:

- Improve rabies surveillance
- Rationalise use of PEP
- Operationalise One Health ways of working

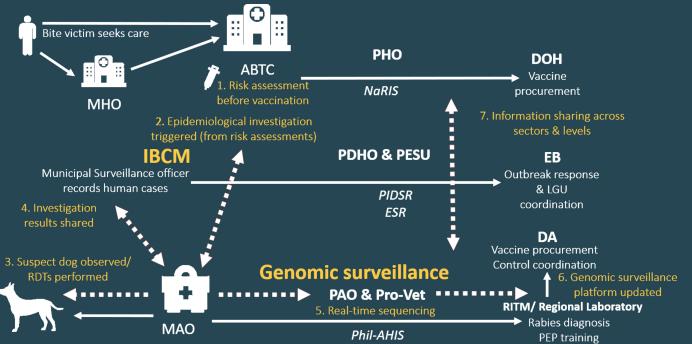


Figure 1. Proposed augmentation of current rabies surveillance and prevention through SPEEDIER, including IBCM and genomic surveillance

GENOME SEQUENCING

To identify the origins of incursions and discriminate co-circulating lineages; a real-time genomic surveillance platform being developed using the latest sequencing tools (i.e. multiplex/ MinION)



TRAINING AND RESOURCES

Local government staff are trained in the following key components of IBCM and supported to implement them:

- Risk assessments of bite patients by health workers based on the biting animal history
- Investigations of high risk biting animals by Municipal Agriculture Offices
- One Health communications to share reports of high-risk bites and outcomes of investigations
- Use of a mobile application to report rabies surveillance data
- Genomic surveillance pipeline

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MEASURING OUTCOMES

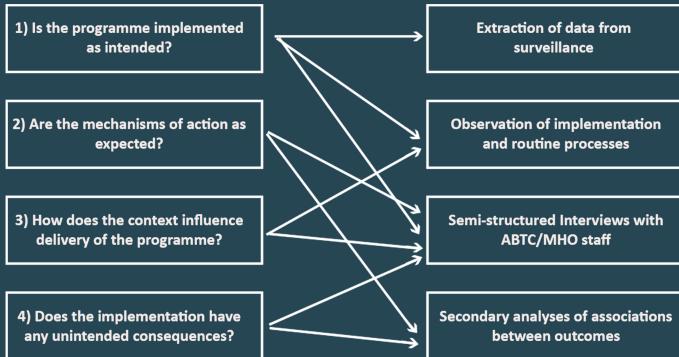


Figure 2. Process evaluation objectives and methods

The project employs an embedded mixed-methods process evaluation to address and understand (1) implementation, (2) mechanisms of impact, and (3) context that lend themselves to the research objectives.

Surveillance data – will be used to assess key features of SPEEDIER implementation by identifying frontline human and animal health workers surveillance activities, and assessing their proficiency and routine adoption of SPEEDIER in daily activities

Observation of patient referrals, risk assessments, PEP use and epidemiological investigations – multi-sited and outbreak response-led observations in MHOs, ABTCs and MAOs of routine practice, taking note of barriers and facilitators to implementation and features that influence delivery

Semi-structured interviews – cover barriers and facilitators to implementation of personal experience of change, and any unexpected outcomes experienced

Analyses – qualitative data collected over the whole duration of the program will be analyzed thematically using a framework approach guided by the Normalization Process Theory

CURRENT PROGRESS // FINDINGS

IBCM Training – Face to face pre-pandemic and currently on virtual platforms taking place across Oriental Mindoro and Romblon



Genome Sequencing

- 1st SAR-CoV2 genomes from Philippines were sequenced at RITM using MinION; SPEEDIER facilitated the transfer of all available animal rabies samples in the regional lab to RITM
- RITM PhD researcher currently sequencing rabies viral genomes archived at RITM and samples from Oriental Mindoro collected through IBCM

• Lineage designation tool applied to publicly available rabies virus genomes

Epidemiological Situation ORIENTAL MINDORO

- Endemic: confirmed and probable rabies across province, 15 deaths (none lab confirmed) and high bite patient incidence (around 400/100,000/y)
- Timely accurate patient risk assessments submitted show >80% of bites by healthy animals, with a small proportion (<5%) by probable rabid dogs
- Timely IBCM records reliable for monitoring PEP use
- ABTC staff responsible only for bite patients facilitating complete risk assessments
- Minimal intersectoral communication with an average of less than 10 animal investigations monthly; investigations usually performed too late for sample collection and carcasses are sent to lab
- Investigations have nevertheless improved fourfold in 2021 (from 45 compared to 12 in 2020)
- More cases have been confirmed, showing how One Health communications have improved enabling better sample collection

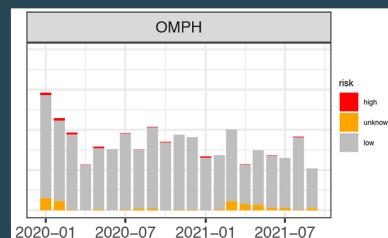


Figure 3. Example of timely & complete risk assessments from 1 main ABTC showing high incidence & identifying high risk bites

ROMBLON

- No evidence of rabies in most of province but re-emergence on Romblon Island: 2 suspect human rabies deaths in July & Aug, 2020
- Very high bite patient incidence (around 1500/100,000/y)
- Investigations are also increasing (102 vs 96 last year) even with restrictions
- Good engagement on rabies peer support group & over 200 animal investigations completed
- Contributing factors to health workers not doing credible risk assessments include: ABTC staff work overload (other responsibilities), overconfidence in rabies-free status, complacency about re-introduction risks, lack of training reinforcement (due to COVID-19)
- National guidelines also do not indicate the importance of determining the status of the biting animal - a new set of training sessions are being designed to address this

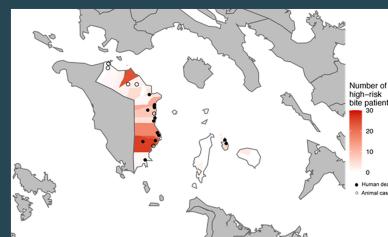


Figure 4. Human rabies deaths (black dots) & high risk bites (red shading) in Oriental Mindoro and Romblon Provinces