

# 'Pass on the message' – qualitative research to design sustainable community-based surveillance for rabies in northern Australia and Papua New Guinea

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## Abstract

Given the proximity and recent spread of rabies in Indonesia, effective rabies surveillance in dogs is a priority in northern Australia and Papua New Guinea (PNG). Reporting of potential cases requires community engagement; therefore, the value and acceptability of the system is critical to ensure sustainable surveillance. We used qualitative research methods – semi-structured interviews and thematic analysis – to identify factors that influence the acceptability and value of community-based rabies surveillance. Common themes included the importance of verbal communication and the high value of dogs to community members. However, lack of veterinary services in these regions was identified as a major barrier to reporting of clinical signs in dogs. The findings from this study will be used to design sustainable rabies surveillance in northern Australia and PNG by utilising traditional communication channels and existing, valued, animal-management services. The methods and findings of this study complement previous quantitative research to target surveillance to high-risk areas within these regions.

**Keywords:** *Rabies, thematic analysis, surveillance, dogs*

## Introduction

Papua New Guinea (PNG) and northern Australia are considered at risk of a rabies incursion due to the recent spread and proximity of this disease in Indonesia (1, 2). Both Australia and PNG have wild dog populations and free-roaming domestic dogs in indigenous communities. Therefore, rabies endemicity in wild dog populations, as well as an incursion in communities, could have devastating, long-term impacts on human health in these regions. Surveillance that provides timely rabies detection in dogs to maximise the probability of elimination and prevent human deaths is a priority. Globally, effective rabies surveillance in dogs is difficult to achieve. Although index cases are sometimes detected in dogs – for example, in a recent outbreak in Malaysia (3) – commonly the animal surveillance system fails and authorities are alerted to a rabies outbreak following a human death (4).

Traditional methods to develop surveillance systems – for example, risk assessment and evaluation of diagnostic tests – can be used to focus resources on high-risk pathways and address requirements for rapid diagnosis. However, the sustainability of the system must also be considered to ensure high sensitivity and timeliness of disease detection. Key attributes of sustainable surveillance, such as maintenance

of data quality, are more difficult to incorporate because they require an understanding of the acceptability and value of the surveillance to the individuals required to participate in the system. In the case of rabies surveillance, community participation is critical for the reporting of suspect cases; therefore, community acceptability and value of rabies surveillance is crucial. This was demonstrated in a trial of community-based rabies surveillance in Kenya, in which high community engagement led to an increased rate of case detection (5).

The objective of this study was to use qualitative research methods to identify factors that will influence the acceptability and value of community-based rabies surveillance in PNG and northern Australia. As far as we are aware, these methods have not previously been used in the context of biosecurity research; therefore, we also evaluated their use in this context. The findings from this study will be used to enhance sustainable canine-rabies surveillance in PNG and northern Australia.

## Materials and methods

### Overview

Informal, semi-structured interviews were conducted with individual or small-groups (2-6 participants) of informants in their homes and workplaces. Qualitative analysis of transcripts identified themes relevant to the design of sustainable surveillance for canine-rabies.

### Selection of communities

The target population was residents of indigenous communities in northern Australia, the Torres Strait and coastal Western Province, PNG. These regions have been identified to be at high-risk of a rabies incursion in previous risk assessments (Australian Department of Agriculture, 2011, *unpublished*). Fifteen communities were selected in East Arnhem in the Northern Territory, the Northern Peninsula Area in Queensland, the Torres Strait, and coastal Western Province in PNG.

### Selection of informants

Informants were selected purposively to obtain comprehensive information from a range of stakeholder groups. These groups included biosecurity officers, council workers (including environmental health and animal management workers [EHWs and AMWs]), veterinarians, community residents, traditional leaders and elders, health workers (HWs) and teachers. Other perspectives were gained from people who

were selected opportunistically; for example, aircraft pilots, and hospitality, building and retail industry workers.

#### Interview structure and data collection

Informants were interviewed in their homes or workplaces. Interviews were semi-structured so that informants could talk freely and about topics that they considered important. This flexibility also allowed researchers to investigate themes more thoroughly, dependent on informant experiences and perspectives. Interviews were guided by selecting open-ended questions relevant to stakeholder groups from a list of pre-prepared topics (Table 1). Time for each interview was determined by the informants' willingness to talk and was not limited by the researchers. Researchers were accompanied by community-members who translated interviews when informants preferred to talk in languages other than English.

**Table 1.** Topics and example questions used in semi-structured interviews in a study to identify themes relevant to sustainable surveillance for canine-rabies in northern Australia and Papua New Guinea.

Topic 1: Effective modes of communication within and between communities
Topic 2: Motivation and barriers to report concerns about dogs to other community members or organisations. For example: <ul style="list-style-type: none"> <li>• What is the cultural connection to dogs?</li> <li>• Why do you value your dog?</li> <li>• How do you get help for a sick dog?</li> </ul>
Topic 3: Current levels of expectations about dog health. Including: <ul style="list-style-type: none"> <li>• General observed level of dog health</li> <li>• Informants' descriptions of clinical signs associated with endemic differential diagnoses of rabies (for example, snake envenomation and cane-toad intoxication)</li> </ul>
Topic 4: (Specific to health workers) Healthcare seeking behaviour for bite wounds, and efficacy of existing health messages. For example: <ul style="list-style-type: none"> <li>• Leaflets about Dengue control</li> </ul>

#### Data analysis

Interview transcripts were collated and thematic analysis was performed using qualitative data analysis software (NVivo; QSR International Pty Ltd. Version 11, 2015). Themes were triangulated between communities and regions to identify consistent or divergent themes and also compared with peer-reviewed literature. Themes were used to inform the design of a sustainable rabies surveillance system in northern Australia and PNG.

#### Results

Thirty-two semi-structured interviews were conducted with community members. Interview duration ranged from 20 minutes to 1.5 hours. All informants were willing to talk about their personal and workplace experiences related to dogs.

The strongest and most consistent theme for effective modes of communication both within and between communities was verbal communication. Informants commonly described

this as "passing on the message." Verbal communication was particularly important from elders, village leaders or councillors to other community members and children. Specific modes of verbal communication included direct conversation, listening to the radio or attending community meetings. Social media (for example, Facebook) was also mentioned as potentially useful in some regions (East Arnhem) and with some participant groups (young adults in the NPA and Torres Strait). Teaching in schools and delivery of messages via written media (for example, leaflets and posters in health clinics) were considered less effective communication strategies. This theme was corroborated by HWs and teachers. Language was also important – informants stated that messages to enhance rabies surveillance should be delivered in local languages because English is not the first language of many residents. For example, most Torres Strait islanders speak at least three languages (their local indigenous language, Torres Strait Creole and English).

Dog value was a potential motivator to report health concerns about dogs. In the NPA and PNG, dogs are valued for hunting because they provide an important source of cheap protein (feral pigs, deer or cattle). In East Arnhem, the cultural value of dogs was strong – informants described how harm to dogs can cause tangible pain to individuals for whom the dog is their totem. Informants in this region often noted that "dogs are part of family;" some dogs had "skin names" and were included in the kinship system. Although the cultural value of dogs was more abstract in other regions, dogs were totems for individuals throughout the study regions (including PNG). Dogs were also valued as companions in all regions. This was particularly apparent in the Torres Strait, where residents were sometimes keen to acquire particular breeds of dog from the Australian mainland.

Informants stated that lack of veterinary services in most regions was the greatest barrier to reporting health concerns in dogs. Animal health care is limited to services provided by AMWs and EHWs such as supply of parasiticides and disposal of dead dogs (in some regions). Informants were aware of potential zoonotic disease transmission (another potential motivator) – for example, dogs with skin disease such as mange and ticks were seen as a risk to family health. In northern Australian regions cane-toad poisoning and snake envenomation, which are both differential diagnoses for rabies, are sufficiently common in dogs that informants could describe clinical signs. However, informants explained that there was no incentive to report these concerns if treatment was not available. This led to acceptance that unhealthy dogs are a normal, daily occurrence. Consistent with this theme, researchers observed that dogs appeared generally healthier in regions in which veterinary services were available intermittently (Torres Strait islands) or continuously (Yirrkala, East Arnhem).

Other barriers were region specific or less common. Lack of trust of authorities and fear of shame or recrimination within the community were both barriers to reporting concerns

about dogs in East Arnhem. This was attributed to historical experiences such as inhumane dog control. Throughout regions there was also an apparent lack of concern for dog welfare by some community members, attributed to insufficient connection to culture and knowledge that dogs are part of family.

HWs (most of whom were non-indigenous) estimated that the majority of people with dog-bite wounds would seek medical attention. HWs' perceptions and level of acceptance of dogs in community were variable; some recognised dogs as part of the family and acknowledged and treated unhealthy dogs. Other HWs felt threatened by community dogs in public places, were unaware that free-roaming dogs in northern Australia are owned, were not interested in dog health and perceived unhealthy animals as an indicator of lack of concern for dog welfare by indigenous community residents. This variability was also found in other groups of non-indigenous informants such as teachers and hospitality industry workers.

## Discussion

The importance of verbal communication that was identified in this study is consistent with cultural background in northern Australia and PNG. Aboriginal and Torres Strait islander lore has been passed down generations by elders for tens of thousands of years through stories, ceremonies, dance and art. Story-telling (such as "sing-sings") is also fundamental in PNG culture. For example, Mercer *et al.* (6) found that the impacts of a tsunami in 1930 on the north coast of mainland PNG were mitigated because residents knew stories – which had been passed down verbally through generations – that described warning signs and evacuation to higher ground. Therefore, contrary to Western culture in which information is commonly disseminated in written form and directed at children, we suggest that messages to enhance rabies surveillance in northern Australia and PNG should be verbal and use traditional communication channels by engaging elders and councils to "pass on the message". These strategies also build on connection to culture and encourage traditional values such as care for dogs in community. Messages should also be delivered in local languages. This has also been recognised as important for effective communication in sectors other than biosecurity. For example, the Queensland Government Department of Health provides an interpreter service which includes Tok Pisin, the PNG equivalent of Torres Strait Creole.

This study highlighted important challenges that could arise if residents are asked to report clinical signs associated with rabies in northern Australia and PNG. Although dogs are valued and are integral to communities (consistent with findings of Constable *et al.* (7)), the lack of veterinary services means that reporting of clinical signs is unlikely to be sustainable. Also, the specificity of clinical signs for rabies is low due to common endemic syndromes with similar clinical signs. This also has implications for messaging about surveillance; community-wide surveillance for rabies-associated clinical

signs should be carefully considered so as not to induce panic about dogs with clinical signs which currently are more likely to indicate non-zoonotic syndromes. Currently, we believe that unless veterinary services can be improved throughout this region, community-wide surveillance of dog mortality and training of selected community leaders and workers to identify clinical signs is likely to be more acceptable. This builds on the already valued service to dispose of dead dogs provided by EHWs and AMWs in some regions.

We also identified a potential gap in community engagement for rabies surveillance. Indigenous communities in northern Australia have an extensive network of human health care facilities and schools, and residents in PNG villages adjacent to the TS have access to emergency healthcare in the TS. However, HWs and teachers were sometimes unaware of the value of dogs to communities or the risk of rabies to the region. Improved understanding of these factors by these stakeholders is likely to enhance sustainability and community-wide coverage of rabies surveillance.

Limitations of this study included potential selection bias of communities and individuals. Triangulation indicated that most themes were consistent between communities (for example, verbal communication) or with literature (for example, value of dogs).

The qualitative methods used in this study provided important insights about the acceptability and value of rabies surveillance for indigenous communities in northern Australia and Western Province, PNG. These methods complement the quantitative methods used in previous studies that identified the comparative risk of regions in northern Australia and PNG. Together, the findings of these studies can be used to design sustainable, targeted surveillance strategies to high-risk regions and increase the probability of effective surveillance – limitation of outbreak size, and detection of disease in dogs before a human death occurs.

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