

# The Provision of Annual Subsidized Veterinary Services in Five Remote Communities in the Northwest Territories From 2008-2017: Uptake, Impact, and Lessons Learned



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## A. Introduction

- Dogs share a long history with northern Indigenous people.<sup>1</sup>
- Today, while dogs still play an important role in Indigenous communities, they can also be a public health risk:
  - Rabies virus, endemic in Arctic Fox, poses a risk to dogs and people in the Arctic.<sup>2</sup>
  - Injuries and deaths associated with dog attacks are higher in northern Canada<sup>3</sup>
- Dealing with animal health and welfare concerns and zoonotic disease risks require access to veterinary services<sup>4</sup>, which are very limited in most communities in northern Canada.<sup>2</sup>
- In the Sahtu Settlement Area (Figure 1), subsidized veterinary services have been offered annually by the University of Calgary's Faculty of Veterinary Medicine since 2008.<sup>2</sup>
- On program initiation, only 37% of dogs seen were vaccinated for rabies, 29% had been dewormed, and 20% neutered.
- Our objective was to understand the uptake and impact of 10 years of annual veterinary services in the Sahtu communities.**

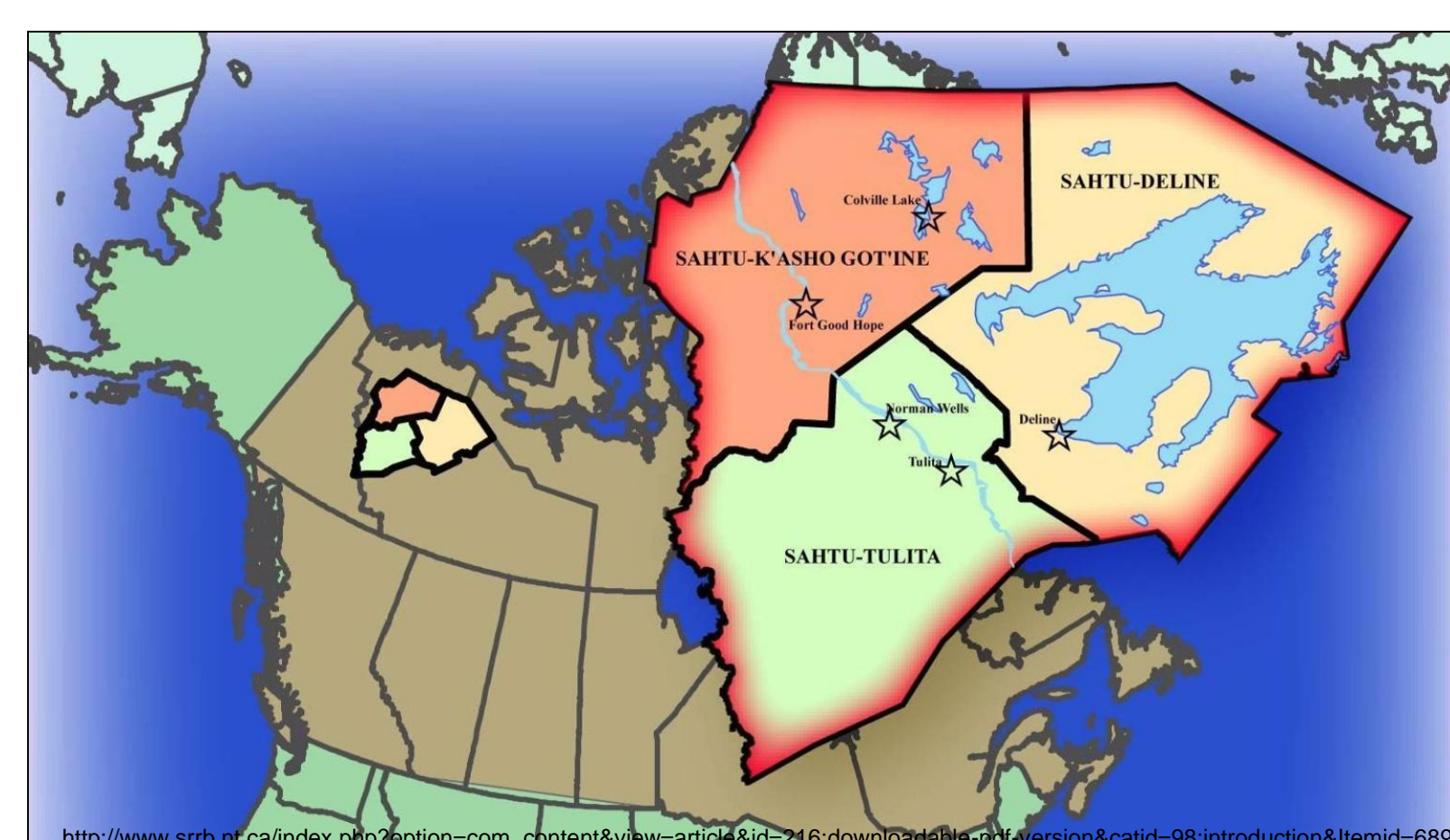


Figure 1. Sahtu Settlement Area, Northwest Territories

## B. Methods

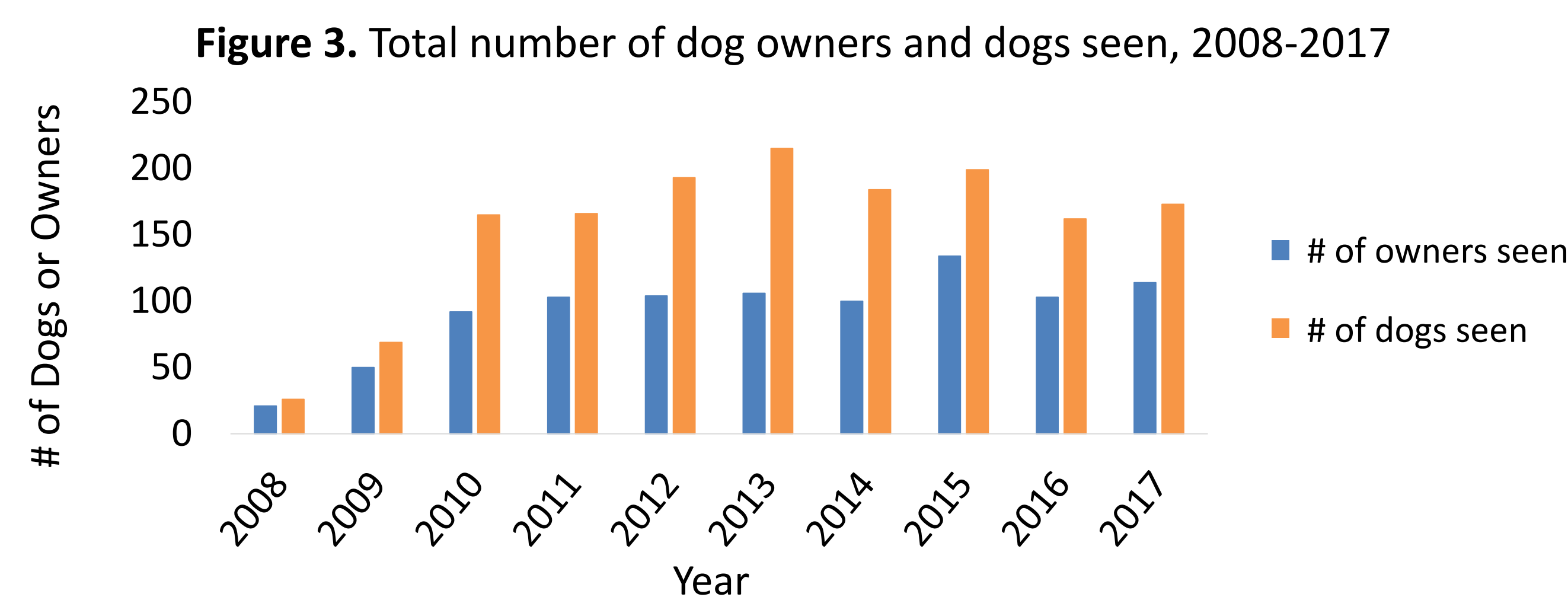
- We did a chart review of 10 years (2008-2017) of dog medical records.
- Data on vaccination, deworming, and sterilization status, and body condition score (BCS) were analyzed using logistic regression with mixed effects. Random effects included community, owner and individual dog.
- Data on age was analyzed using linear regression with the same random effects.
- P-values <0.05 were considered significant.
- Dog censuses were done using local knowledge, visual dog counts (Figure 2), and door-to-door questionnaires.
- Door-to-door household questionnaires were done with both dog-owning and non-dog-owning households on the topics of dog ownership and husbandry and experiences with dogs.



Figure 2. Dogs housed outside one household

## C. Results

- Number of dog owners and dogs seen in clinic increased initially and has stabilized over time (Figure 3).



- Odds of a dog entering the clinic sterilized (Table 1) or up to date on vaccinations (Table 2) increased, as did age, over time (Table 3).

**Table 1. Odds of a dog of either sex, a female dog, or a male dog entering the clinic sterilized**

Year	Either Sex	Spayed Female	Neutered Male
2008-2009	Reference	Reference	Reference
2010-2012	3.67*	1.31	5.76
2013-2015	12.70*	5.75*	10.58~
2016-2017	185.10*	47.84*	226.83~

\*Significant: all other year intervals significantly different from each other; ~Significant: all other year intervals significantly different from each other except 2010-2012 from 2013-2015.

**Table 2. Odds of a vaccinated dog entering the clinic**

Year	Rabies	Combination
2008-2009	Reference	Reference
2010-2012	4.67*	6.41*
2013-2015	20.15*	22.23*
2016-2017	29.35*	28.05*

\*Significant: all other year intervals significantly different from each other, except 2013-2015 from 2016-2017

**Table 3. Change in dog age**

Year	Coefficient
2008-2009	-1.62 (cons)*
2010-2012	2.26*
2013-2015	4.69*
2016-2017	6.95*

\*Significant: all other year intervals significantly different from each other

- There were increased odds of seeing a sterilized dog in Communities A (OR<sup>†</sup> 19.8), B (OR 13.4), and D (OR 23.4), compared to C. No community differences were found in vaccination rates over time. <sup>†</sup>OR: odds ratio
- Number of dogs and percent of dog-owning households, varied by community (Table 4).
- Rabies vaccination and female dog sterilization rates in some communities met the World Health Organization recommendations of >70% (Table 4).

**Table 4. Census data, rabies vaccination and deworming coverage, and sterilization status, 2017**

Community	% of Households With Dog(s)	Dog Census #	% of Dogs Vaccinated <sup>†</sup>	% of Dogs Dewormed	% of Spayed Female Dogs	% of Neutered Male Dogs
A	32.5	79 Dogs	82.3	82.3	95.8	51.2
B	66.3	89 Dogs	47.7	48.3	92.3	53.3
C	56.8	40 Dogs	92.5	92.5	61.5	10.0
D	17.6	47 Dogs	78.7	72.3	50.0	60.0

<sup>†</sup>This is a minimum estimate as it does not include the 3-year vaccinates that were not seen at this year's clinics

- Dogs with an ideal BCS (Figure 4b) were more likely to enter the clinic than those with a thin or emaciated BCS (Figure 4a) in 2010-2012 (OR<sup>†</sup> 4.4), 2013-2015 (OR 17.6), and 2016-2017 (OR 22.42) than in 2008-2009, as well as in 2013-2015 (OR 4.0) and 2016-2017 (OR 5.1) compared to 2010-2012. <sup>†</sup>OR: odds ratio



Figure 4. Dogs with thin BCS (a) were seen less in later years than those with ideal BCS (b)

Images from: <http://catsonnature.com/wp-content/uploads/2015/02/Body-Condition-Score-Chart-dog-and-cat1.jpg>

## D. Discussion

- Uptake of the program increased over 10 years, which may be attributed to the program continuity and commitment.
- The age of dogs and their BCS improved over the years, indicating an improvement in animal health and welfare (Figure 5).
- Sterilization of dogs increased over time, especially for females, improving dog population control and stability.
- Rabies vaccination rates in 3 of 4 communities have increased to the point that in 2017 they were greater than the 70% minimum recommended by the World Health Organization to prevent canine and human cases.<sup>5</sup>
- Community differences in service uptake were evident. These disparities may be due to differences in community priorities, bylaws, other competing community issues, and the presence or absence of a local 'champion' for the program.
- The ability to do an effective program evaluation is similarly affected by these issues.



Figure 5. Veterinary student with the oldest dog in community C.

## E. Implications

- Improvements in animal health and welfare measures benefit both dogs and communities.<sup>6,7</sup>
- The significant increase in dog rabies vaccination coverage in the Sahtu region has important implications for public health response to dog bites<sup>8</sup> and for public health resource costs.
- In addition to zoonotic disease prevention, annual subsidized veterinary services, outreach, and education in underserved communities improve animal health and welfare and can reduce injuries related to dog bites.<sup>9</sup>
- Successful programs need to acknowledge differing communities needs, priorities, and resources and adapt programs accordingly.

## F. References

- <sup>1</sup>Tester, 2010. Mad dogs and (mostly) Englishmen: Colonial relations, commodities, and the fate of Inuit sled dogs. *Études/Inuit/Studies* 34: 129-147. <sup>2</sup>Brook et al., 2010. Evaluation and delivery of domestic animal health services in remote communities in the Northwest Territories: a case study of status and needs. *Can Vet J* 51: 1115-1122. <sup>3</sup>Raghavan, 2008. Fatal dog attacks in Canada, 1990-2007. *Can Vet J* 49: 577-581. <sup>4</sup>OIE, 2016. *Terrestrial Animal Health Code*, OIE. <sup>5</sup>WHO and OIE, 2016. *Rabies Global Conference*, Geneva, pg27. <sup>6</sup>Salb et al., 2008. Dogs as sources and sentinels of parasites in humans and wildlife, northern Canada. *Emerg Infect Dis* 14: 60-63. <sup>7</sup>Schurer et al., 2015. Stabilizing dog populations and improving animal and public health through a participatory approach in indigenous communities. *Zoonoses Public Health* 62: 445-455. <sup>8</sup>Rock et al., 2017. Dog-bites, rabies and One Health: Towards improved coordination in research, policy and practice. *Soc Sci Med* 187: 126-133. <sup>9</sup>Pike et al., 2014. Developing injury indicators for First Nations and Inuit children and youth in Canada: a modified Delphi approach. *Chronic Dis Can* 34: 203-209.

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