THE ROLE AND INFLUENCE OF GOVERNMENT CONTROL PROGRAMS ON RABIES IN KZN

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ABSTRACT.

The observation, that the level of canine rabies in a country or province is directly related to the immunity level of that canine population, should focus our attention on those factors that influence this immunity. The six major outbreaks of rabies in KZN over the past 42 years can all be directly linked to government control programs and the successes and failures of these. Other factors such as virus evolution and ecology of the host species have played a very small role in the progress of the disease. Through molecular biology we know that the canine biotype still dominates with no evidence of a wildlife host in KZN. Many of the original factors that influenced the arrival and establishment of the virus in the canine population remain present, with a large population of owned yet unrestricted and unsterilized dogs still roaming the province. New evidence of a growing stray dog population due to socio-economic factors in the province such as the AIDS epidemic and rising poverty will complicate future control strategies. Analysis of the successes and failures over the past 42 years have highlighted many key issues in canine rabies control such as sustainability, importance of political buy in, constant improvements in control strategies, financial input and the need for champions to drive that process. Rabies in KZN has shown itself to be completely controllable, and with the improvements in control measures and international support canine rabies could be eliminated from the province, in the foreseeable future.

1 INTRODUCTION

For the past forty two years since its reintroduction, rabies has been a persistent intractable scourge on the animal and human populations of KwaZulu-Natal. Over 5556 animals and 303 humans case have been diagnosed in KZN since 1976, however this is still considered a small portion due to under-reporting. Following its reintroduction there have been six distinct outbreaks (Figure 1) progressing to the current record levels of 2007 at 473 cases. This is however not a normal epidemic cycle of an unopposed viral disease such as rabies, and it is obvious that something has had an alternating and significant impact on the disease. Therefore a closer look is required of all the aspects that impact the disease to extract elements that contribute to this intractability.

Figure 1. 42 years of rabies in KwaZulu-Natal

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2 HAS THE EPIDEMIOLOGY OF THE DISEASE CHANGED OVER THE YEARS?

2.1 Agent

The virus responsible for canine rabies in KZN has not exhibited any significant changes and is still the classical canine biotype we started with. (Coetzee et al., 2007) Current typing of cases from KZN i.e. other species, unusual symptoms and geographically important areas, reveals the same virus. In fact on investigation, wildlife and other spill over cases in KZN can be easily explained in terms of their possible contact with domestic dogs, and so ample opportunity exists for this spread. Therefore no evidence exists that the rabies problem of KZN can be blamed on the introduction of other biotypes, or the development of new strains, and therefore the virus is believed to play no role in the fluctuating annual prevalence of the disease which for all intents and purposes it remains the same.

2.2 Host

Historically the main vector species of rabies has been the domestic canine, making up a mean of 86% of the cases reported annually. This has remained unchanged and shows that the domestic dog still plays the major role in the transmission of the disease, and that surveillance also remains consistent. Bovines which play an important role in looking at the commercial affect of the disease, also remains constant at around 7%. There is as yet no substantive evidence of a second host species, and as Fig.2 shows the number of “victim” species is directly related to the level of canine rabies.

Figure 2. Relationship between the level of canine rabies and the number of other species affected.

2.3 Unchanged environmental factors:

a) Unrestrained dogs – Half of the provinces human population (4.5 million) reside in the communal or tribal areas of KZN. In these areas there are no rules regarding the keeping and restraint of animals, despite the fact that they now fall under the municipal laws, which do require the confinement of domestic dogs, the law has not extended its power into these areas and so dogs roam free. It is also not common for rural households to be fenced and so little restricts the free movement of animals. This situation has remained constant and contributes to the spread of rabies in these communal areas which are considered the main source areas for KZN canine rabies.

b) Unsterilized animals – At present there is so little primary health care offered to rural communities that it could be considered non existent. This allows the unrestricted breeding of dogs that have shown themselves to be very capable and productive animals, with 85% of the animals considered to be in good condition(Health survey, 1995). Resulting in not only population growth but also the free social contact that occurs with mating animals.

c) Animal to human spread – Since the reintroduction of rabies into KZN in 1976 there has been a close correlation between the increase of canine cases and the increase in human cases. Despite the fact that PEP has been dramatically improved (The results of which can be seen in Figure 3) the level of animal rabies still directly affects the level of human rabies.
2.4 Future Ecological Aspects:

While most of the factors affecting the disease in KZN remain relatively stable there are serious concerns for the future. These aspects discussed below are emerging factors that threaten the hitherto successful improvements in control measures, as these socio economic factors force more and more animals out of reach of parenteral vaccinations, and could soon create a suitable environment for new vector species to emerge.

a) Stray dogs – Stray dogs were never considered a significant factor in KZN until 2006, when significant increases in calls for removals of problem animals became apparent. This is now considered a potential disaster for rabies control as this population grows alongside the AIDS epidemic in the province (39% of people infected) with rapid increases in human mortalities, and growing poverty levels, the current world wide recession uncared for dogs are set to increase and hamper new control efforts. Below in Figure 4, the yellow areas on the left show the areas described by Carnie (2007) as having the highest HIV/AIDS prevalence in KZN (60-70%), these are also the two areas with the highest levels of rabies cover the past ten years.

b) New reservoirs – Despite no evidence of a second host cycle, every potential exist for the disease to become established in another species, it is just a matter of time. There are reports of a rapidly growing jackal populations in the rural (farming) areas of KZN. This could have the effect of concentrating the jackal close to major source of the disease which could cross the line and become established within these populations. Further reports suggest a rapidly growing Kudu population which could also be laying the foundation for independent species where the disease could move.
struggle with rabies (depicted below – Figure 5) there are many different factors that affect the success of rabies campaigning. These are:

i. 1975 – Mass combined campaigns coupled with stray dog control, and the weight of the law behind it leads to the elimination of canine rabies. (Driven by a highly motivated team.)

ii. 1976-77 – Complacency and drop in vaccinations disease re-enters KZN.

iii. 1979 – Vaccinations falter almost totally and 1st epidemic occurs, followed by concerted efforts which results in decrease.


v. 1987 – Allerton Laboratory starts testing for rabies, and surveillance improves – Resulting in increase disease incidence.

vi. 1990-96 – Animal Health technicians employed and trained, amalgamate with KwaZulu staff, and create one service – Introduce mobile campaigns, improve awareness – Disease drops sharply.

vii. 1997/8 – Enthusiastic manager leaves and service stagnates.


ix. 2003 – Mass campaigns put in place (temporary project leader) – Immediate effect on cases, but campaign stopped after a year due to management changes.

x. 2006 – CSF arrives and again disrupts service, and a new record is reached in 2007.

As can be seen below in Figure 6, the level of vaccination which are influenced by many factors within the Veterinary service have a direct impact on the disease. This correlation can be seen through out the four decades and is the main influencing factor on the disease.

Figure 5. Historical look at factors influencing rabies control in KZN.
4 LESSONS LEARNT AND THE FUTURE:

4.1 Lessons learned

i. Inconsistent effort brings inconsistent results.
ii. Campaigns need to be championed.
iii. Political /Managerial support is critical
iv. Sustainability is crucial
v. Research is a key component of a successful control program.
vi. Control and elimination is possible.

4.2 The future

KZN has had a complete overhaul of its campaign strategy, with a new holistic approach based on research of practical aspects of rabies control. This has taken control efforts from a field officer who in the past had little more than a needle and syringe, to a group of dedicated people equipped to meet any challenge in the field.

The new look campaign include the following:

i. Project champion to coordinate all aspects of rabies control from research to control.
ii. Mobile and House to house campaigns compared to static clinics (accessibility).
iii. Field staff equipped and trained in all aspects of animal handling.
iv. Bait vaccine and remote injection systems to improve percentages of animals vaccinated.
v. Campaigns include removal of problem animals and contraceptive available to breeding females.
vi. Primary Health care campaigns in key areas to clean up and sterilize dogs, this reducing breeding and improve health and so affecting the quality of rabies control efforts.
vii. Improved surveillance through awareness and introduction of field tests for suspect cases.
viii. Most importantly – Advocacy.

5 CONCLUSION

Rabies control in almost exclusively influenced by the effects of government control programs. These control programs are in turn influenced by factors ranging from political climates to individuals whose enthusiasm can vastly influence service. KZN has shown that canine rabies can be eliminated, but is also an example of how programs can fail. A far clearer picture has now emerged on the future re-
requirements for elimination, among which is the need for sustainability, which hopefully be improved through international assistance. However there is also a serious warning as time allows for new avenues and new vectors to arise that could make the control and elimination of this disease very difficult and increasingly expensive.

ACKNOWLEDGMENTS

Author would like to acknowledge efforts and dedication of the field staff of KZN veterinary services for their continued commitment to rabies control under very trying circumstances.

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