

## Participatory control of Newcastle disease in village poultry using thermostable vaccines in Uganda

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### Abstract

This study is investigating the limitations and challenges that constrain control of Newcastle disease (ND) in village free-range poultry. The project is implemented in Bulyansime village in Iganga District. Baseline data on knowledge, attitudes and practices, socioeconomic and pre-vaccination sero-status was established before intervention. Vaccination was thereafter undertaken every three months together with data collection on production dynamics and ND antibody status. Four rounds of vaccinations have so far been done and preliminary data shows protective effect of the vaccine and increase in poultry numbers and better health. Emerging challenges and other diseases such as Fowl pox that were never noticed because most birds would be wiped out by ND are becoming more evident. Farmers have also become aware of availability of control measures for ND that they thought never existed and confidence is gradually building that it can be controlled through vaccination. The next efforts of the project will dwell on further building this confidence and community empowerment, bringing all stakeholders on board to ensure easy availability of vaccines and supply mechanisms and other support mechanisms for emerging issues including marketing as well as other opportunities for sustainable control of ND.

**Key words:** Avian paramyxovirus, chicken, diseases, vaccination

### Résumé

Cette étude se penche sur les limites et les défis qui entravent le contrôle de la maladie de Newcastle (ND) affectant dans le village les volailles fermières. Le projet est mis en œuvre dans le village de Bulyansime dans le district d'Iganga. Les données de base sur les connaissances, les attitudes et les pratiques, le statut sérologique socio-économique et de pré-vaccination ont été établies avant l'intervention. La vaccination a été par la suite entreprise tous les trois mois ensemble avec la collecte de données sur la dynamique de production et le statut d'anticorps de ND. Quatre tours de vaccinations ont été fait jusqu'à présent et les données préliminaires montrent un effet protecteur du

vaccin, une augmentation du nombre de volailles et une meilleure santé. Les défis émergents et d'autres maladies telles que la variole aviaire qui n'ont jamais été remarquées parce que la plupart des oiseaux seraient anéantis par ND, sont de plus en plus évidents. Les agriculteurs ont également pris conscience de la disponibilité des mesures de contrôle contre la maladie de Newcastle (ND) qu'ils pensaient n'avoir jamais existée et la confiance se construit progressivement qu'elle peut être contrôlée grâce à la vaccination. Les efforts à venir du projet insisteront en outre sur la construction de cette habilitation de la confiance et de la communauté, ce qui porte toutes les parties prenantes à bord pour veiller à la disponibilité des vaccins et des mécanismes d'approvisionnement et autres mécanismes de soutien pour les questions émergentes, notamment le marketing ainsi que d'autres possibilités pour le contrôle durable de la maladie de Newcastle.

Mots clés: paramyxovirus aviaire, poule, maladies, vaccination

## Background

Although vaccination offers the best control strategy for ND, conventional vaccines are unsuitable for sustained use in village poultry production because of their cost, large dose preparations, thermolability and cold chain requirements (Spradbrow, 1992). Thermostable vaccines, such as V-4 and I-2, are not yet available in Uganda and only limited immunological tests on the I-2 have been done and the challenges for successful and sustainable vaccination strategies were never investigated. Vaccination failures have also been reported in some countries due to differences in the vaccines used and the circulating virulent NDV (Seal *et al.*, 2005). A novel genotype of NDV that does not cluster with any strains in the world, not even in the East Africa region and may also result in vaccine failures has also been reported in Uganda (Otim *et al.*, 2004) although cross-protection of ND vaccines is well known. Little success has been attained in Uganda to contain this disease and farmers continue to incur losses ranging between US\$ 62 million and US\$ 78 million per annum. Besides these technical problems mentioned above, there are also socio-economic issues that have not been well investigated that limit successful and sustainable vaccination programmes. The knowledge, attitudes and practices of the communities with regard to ND vaccination has not been extensively studied. This knowledge gap seriously limits successful and sustainable vaccination programmes of free-range poultry which form 80% of the national flock. The purpose of this study is to identify opportunities for successful and

## Literature Summary

sustainable ND vaccination strategies among communities for the free-range poultry production system in Uganda.

Newcastle disease is a highly contagious disease affecting chickens and other poultry species and wild birds. It often devastates unvaccinated flocks in periodic outbreaks. It usually results in 70-100% mortalities, which is a huge loss to households (Mukiibi-Muka, 1992). It is caused by RNA viruses of the Avian Paramyxovirus serotype 1 (APMV-1), (synonym: Newcastle disease viruses). A novel genotype has been reported among NDV isolates from Uganda (Otim *et al.*, 2004). ND in village chickens is attributed to birds that shed the virus during and after incubation or post vaccination. It has been suggested that outbreaks that occur in the dry season are not because the virus survives better under these conditions but because villagers have more time and move around quite a lot with chickens in markets and to friends carrying the virus with them (Spradrow, 2001). The major source of infection of ND is the introduction of new birds to a flock. Markets also serve as a common source of Newcastle disease infection, sometimes through the random sale of infected birds during outbreaks to salvage those not yet showing clinical signs (Otim *et al.*, 2007). Recent assessment of the effect of vaccination in village poultry in Uganda, showed a significantly higher flock size increase than unvaccinated flocks (Nahamya *et al.*, 2006). Understanding the knowledge, attitudes, and practices as well as involving farmers in solving their problems is critical in successful implementation of programmes in communities, an aspect that has many times been ignored in purely biomedical research.

## Study Description

The study is implemented in Iganga district, employing an Action Research approach. The study involves all stakeholders and actors in Newcastle disease control. The study utilises qualitative, quantitative and experimental data collection methodologies to address the research problem. Qualitative methods are being used to understand the challenges and limitations that constrain effective Newcastle disease (ND) control among village rural poultry in Uganda. A KAP study component was used to establish the basic information of current knowledge, attitudes and practices that will also identify the current challenges and limitations that constrain successful vaccination programmes. Quantitative methods are being used to collect poultry production data both before and after vaccination to evaluate the impact of vaccination. Experimental methods (haemagglutination inhibition) are being used to evaluate

the immunological protection of the vaccinated poultry. The study will evaluate the opportunities for continued and sustained ND control by supporting farmer empowerment through training to enable them understand the value of vaccination and subsequently be able sustainably continue the ND control.

### Research Application

Vaccination is the best tool for controlling ND in poultry. The study hopes to identify the opportunities that exist to control this disease in communities. This is expected to increase poultry production and thus enhance people's livelihoods.

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