Epidemiology of Newcastle Disease

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Definition

- The current OIE definition (OIE, 2000a) is:
- *Newcastle disease is defined as an infection of birds caused by a virus of avian paramyxovirus serotype 1 (APMV-1) that meets one of the following criteria for virulence:*
- *a) The virus has an intracerebral pathogenicity index (ICPI) in day-old chicks (Gallus gallus) of 0.7 or greater.*
- *or*
- *b) Multiple basic amino acids have been demonstrated in the virus (either directly or by deduction) at the C-terminus of the F2 protein and phenylalanine at residue 117, which is the N-terminus of the F1 protein. The term 'multiple basic amino acids' refers to at least three arginine or lysine residues between residues 113 to 116. Failure to demonstrate the characteristic pattern of amino acid residues as described above would require characterisation of the isolated virus by an ICPI test.*

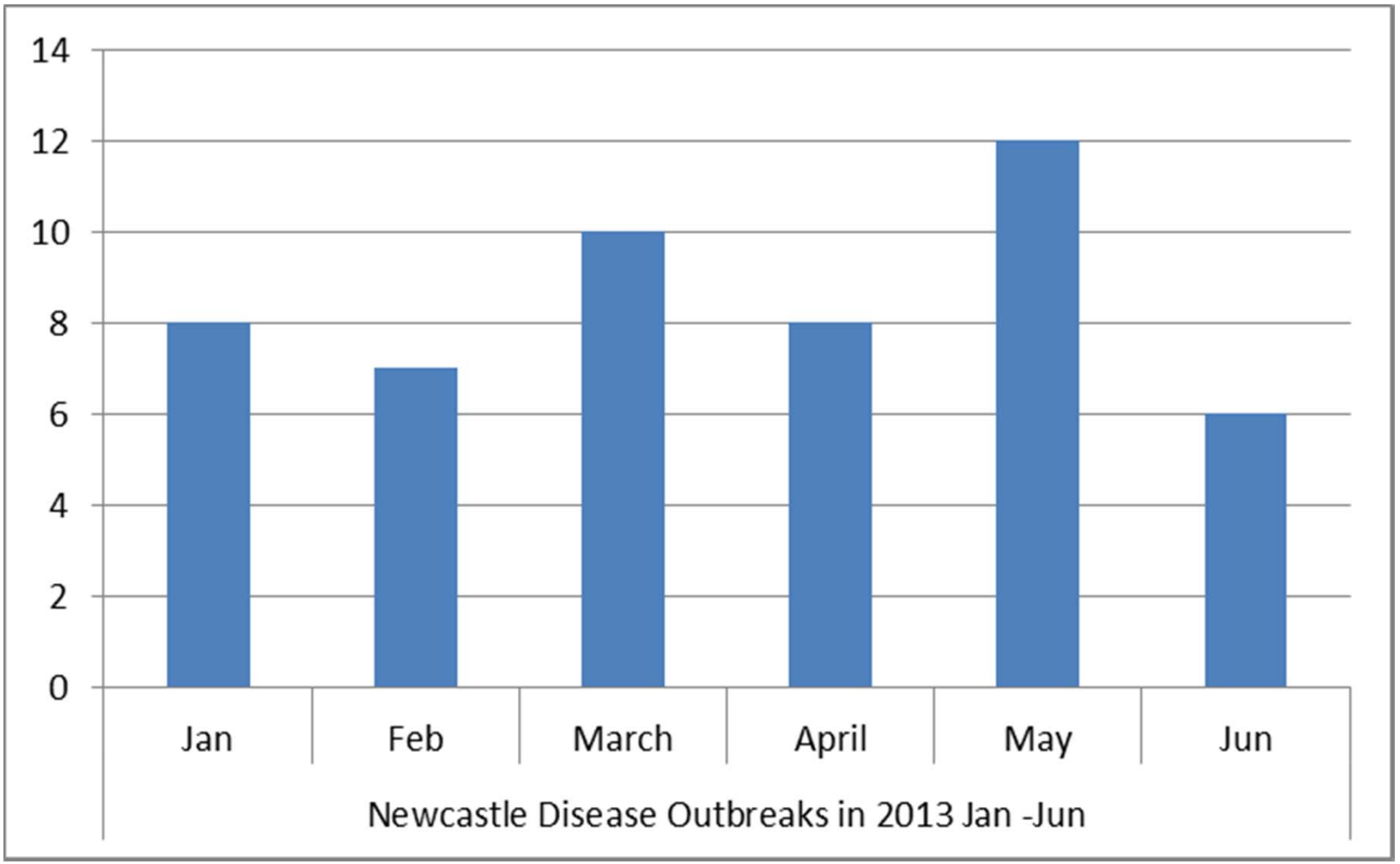
ND AS MAJOR CAUSE OF DEATH IN RURAL CHICKEN

- In Ghana, the total poultry population is estimated to be over 20 million with 80% of this being rural scavenging chicken. Out of this population, 80% is lost annually due to outbreaks of Newcastle disease and a number of other causes like pox parasites and poor management practices.

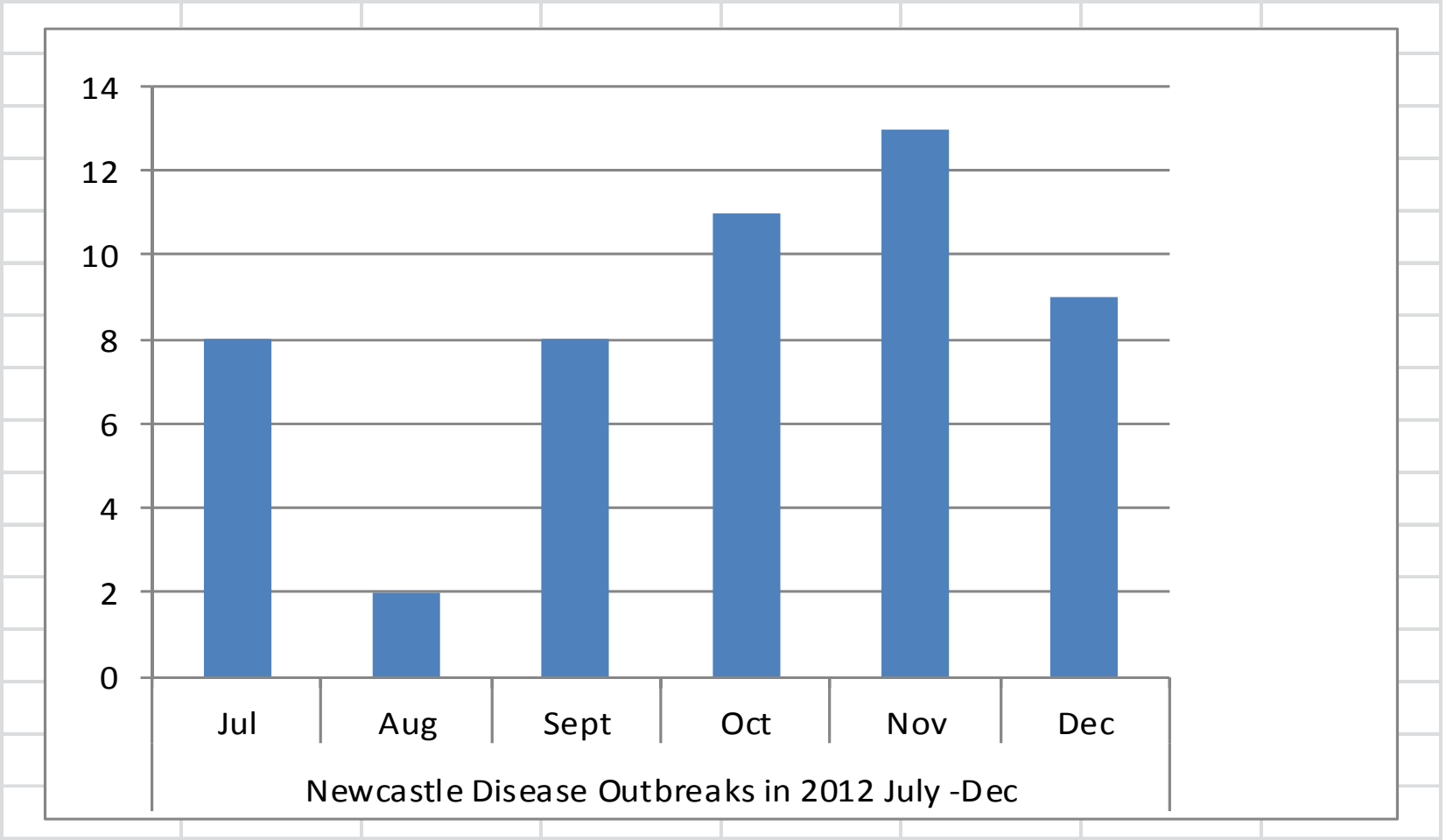
NO. OF OUTBREAKS IN GHANA

- There were 51 outbreaks reported from three out of a total of 10 regions from July to December 2012.
- A similar number of outbreaks (51) were reported from January to June 2013.
- Since the disease is endemic in Ghana, outbreaks in rural chickens are not frequently reported.

NEWCASTLE DISEASE OUTBREAKS



Newcastle Disease Outbreaks

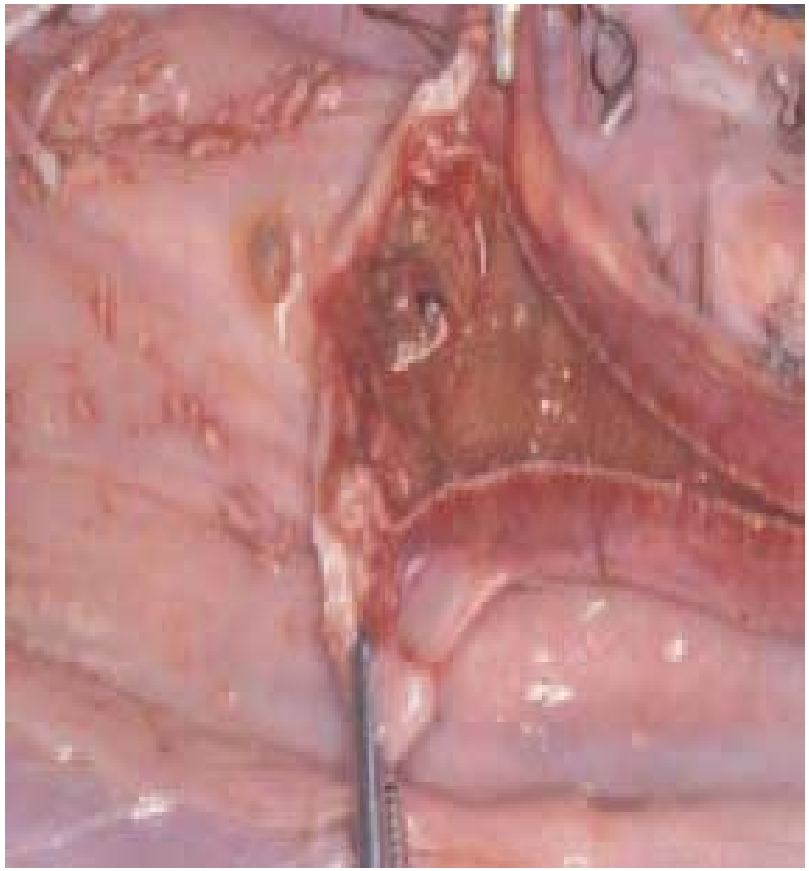


Types of Newcastle Disease

- **Viscerotropic velogenic**: viruses responsible for disease characterised by acute lethal infections, usually with haemorrhagic lesions in the intestines of dead birds.
- **Neurotropic velogenic**: viruses causing disease characterised by high mortality which follows respiratory and neurological disease, but where gut lesions are usually absent.
- **Mesogenic**: viruses causing clinical signs consisting of respiratory and neurological signs, with low mortality.
- **Lentogenic**: viruses causing mild infections of the respiratory tract.
- **Asymptomatic enteric**: viruses causing avirulent infections in which replication appears to be primarily in the gut.

Haemorrhages of gizzard epithelium & oedematous mucous coat covered with thick mucus and mottled

Haemorrhagic necrotic and focal diphtheroid lesions



Haemorrhages of caecal tonsils & the neurotropic form of the disease

Host range

- ND as a clinical entity is most important in domestic chickens. However, most avian species appear to be susceptible to infection, although few develop clinical signs.
- Turkeys and pigeons may also develop generalized disease, but clinical signs are rarely reported in geese and ducks

Introduction and spread

Transmission between birds

- Contaminated faeces
- Movement of live birds
- Trade in backyard flocks or keeping of backyard flock
- Movement of village chickens from one village to the another whether directly or through live bird markets

Movement of village chickens from one village to the another

Indigenous chicken in broiler farm

Introduction and Spread (cont'd)

- Movement of people and equipment resulting in transfer of infective poultry faeces from one site to another via clothing, footwear, crates, feed sacks, egg trays or vehicles.
- Airborne spread where climatic conditions are right at night .Cold harmattan winds that can carry the virus up to 40km (estimates by P.B. Spradbrow)
- Mechanical transfer of infective faeces by insects, rodents or scavenging animals

Introduction and Spread (cont'd)

- In hot countries like Ghana, reptiles enter and reside in poultry houses and are likely to spread ND virus.
- Visits by personnel such as vaccinators, veterinarians, veterinary drug peddlers and women who move from farm to farm buying eggs and spent layers

Endemic form of ND

- In Ghana an endemic form of ND occurs, with the virus being maintained in a partially immune population.
- The virus spreads slowly among the susceptible portion of the flock, and the occasional deaths are not stressful to the flock owners, nor sufficiently serious to attract official attention.
- Clinically healthy chickens that are incubating the disease cannot be detected as potential killers of other flocks.

ND PEAKS IN RURAL POULTRY

- Major peaks are observed in December and April corresponding to the period of climatic changes and intensive works in rural areas.
- The first is linked to harvests and festivals at year-end and the second at the beginning of field works where birds are congregated at markets and sold in order to buy food and seeds for the planting season.
- The period from July to October appears as a lull or low infection. This is the period of restocking.

PREVENTION AND CONTROL

- No treatment.
- ***Sanitary prophylaxis***
- Bird-proofing houses, feed and water supplies
- Proper carcass disposal
- Pest control in flocks; insects and mice
- Avoidance of contact with birds of unknown health status; including newly acquired domesticated poultry, pet birds and wild or feral birds

Prevention and control (cont’d)

- Control of human traffic; facility employees should not have contact with outside birds and
- consideration of a policy of shower-in with dedicated clothing
- Control of vehicular traffic; strict disinfection of conveyances and equipment
- One age group per farm ('all in-all out') breeding is recommended; disinfection between groups

During outbreaks:

- Effective quarantines and movement controls
- Destruction of all infected and exposed birds; 21 days before restocking
- Thorough cleaning and disinfection of the premises
- In the villages, extension messages should include the segregation of unhealthy birds and the proper disposal of dead birds, viscera and feathers that remain if the birds are eaten.

Regulatory Aspects

- In Ghana, importation of day-old chicks, hatching eggs and veterinary vaccines for food animals is done only after obtaining permit from Veterinary Services Directorate.
- The Directorate issues these permits based on OIE regulations
- However, permits for importation of pet vaccines and veterinary drugs are issued by VSD only after the product has been registered with the Ghana Food and Drugs Board

THANK YOU FOR YOUR ATTENTION