# AVIAN ZOONOTIC MICROBIAL PATHOGENS WITH SPECIAL REFERENCE TO CAMPYLOBACTER, *E. coli* AND SALMONELLA IN FREE-RANGE CHICKEN

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# AVIAN ZOONOTIC DISEASES

Avian zoonotic diseases can be divided into two major groups

1. Those exclusively from birds
2. Those that can also originate from other animals

# Zoonoses exclusive from birds

| Disease | Aetiology | Transmission |
|---|---|---|
| **Avian influenza** | H5N1 avian influenza virus | Direct contact . Raw or undercooked poultry and poultry products. |
| **Chlamydiosis** | *Chlamydia psittaci*, submicroscopic bacteria . Pigeons and parrots | Inhalation or ingestion especially dry contaminated materials (dust). |
| | | |

| Disease | aetilogy | transmission |
|---|---|---|
| **Histoplasmosis** | Fungus *Histoplasma capsulatum* . *B*ird and bat droppings nutrient for the growth | Spore Inhalation from contaminated soil/material |
| **Newcastle Disease** | *Avian paramyxovirus-1* | Contact – conjuctivitis and flu like symptoms. |
| | | |

| Disease | Aetiology | Transmission |
| --- | --- | --- |
| **West Nile Virus** | genus *Flavivirus*. mosquito vector (*Culex* species). An endemic pathogen world wide | Birds are reservoirs. Other animals are dead-end hosts . Flu-like condition in humans |
| | | |

# Zoonoses not exclusive to birds

| Disease | Aetilogy | Transmission |
|---|---|---|
| **Salmonellosis** | Genus *Salmonella* . All species are susceptible. | Undercooked meat and egg products from infected birds. |
| **Campylobacteriosis** | Mainly *C. jejuni*. Important agent of enteritis and diarrhea in man | *Contact or* ingestion of undercooked, contaminated meat |
| **Colibacillosis** | *E. coli* | fecal/oral route |
| | | |

# Zoonoses not exclusive to birds

| Disease | Aetilogy | Transmission |
|---|---|---|
| **Tuberculosis** | *Mycobacterium avium* complex (MAC), | Inhalation - agent in dried droppings and contaminated soil. |
| P**asteurellosis** | P*. Multocida* in respiratory tract of birds | Wounds , bites or scratches . May cause acute pneumonia |
| **Listeriosis** | *L. monocytogenes* | Oral route. Causes bacteraemia, septicaemia |
| **Erysipelas** | *Erysipelothrix rhusiopathiae* | Cuts or abrasions contact animals, tissues and |

# Campylobacter spp, E.coli 0157. H7 and Salmonella spp in scavenging indigenous chicken value chain

**Background**:

- Free-range chicken play an important nutritional and economic roles in Kenya
- International focus on food safety - requires a higher degree of bio-security along the food chain to assure safety consumers Scavenging chickens may be exposed to zoonotic microorganisms during production and marketing.
- Analysis constitute an assessment of the biosafety quality of the products.
- Prevalence of zoonotic *Campylobacte*r spp, E.coli 0157:H7 and Salmonella spp species along scavenging indigenous chicken value chain
- Raise consumers awareness, inform regulation and policy makers

Methodology

- Free-range chicken from Makueni County-high production
- Assessment at farm level, live bird market and consumer market-ready carcasses.
- Samples - cloacal swabs in live birds and washings from carcasses
- Campylobacter: mCCDA agar → biochemical and DNA molecular analysis.
- *E.coli* 0157 :H7: Sorbitol MacConkey agar ⟶ biochemistry ⟶ serotyping
- Salmonella spp: XLD media ⟶ biochemical tests ⟶ serotyping.

The prevalence of Campylobacter spp, *E. coli* 0157 :H7 and Salmonella spp at three value chain levels

| Organism | Level and %Prevalence | | |
|---|---|---|---|
| | Farm | Bird market | Carcasses |
| ***Campylobacter spp*** | 50.87 | 9.49 | 27.5 |
| ***C.jejuni*** | 36.78 | 3.85 | 7.5 |
| ***C. coli*** | 6.42 | 0.77 | 0 |
| ***C. jejuni and coli*** | 1.78 | 0 | 0 |
| ***E.coli* 0157:H7** | 1.42 | 5.92 | - |
| ***E.coli* 0157:H7** | 1.07 | 5.9 | 11.42 |
| ***Salmonella spp*** | 0.71 | 1.18 | 0% |


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## Conclusions

- The biosafety of free-range indigenous chicken value chain is compromised by presence of important zoonotic agents.
- *E coli* 0157:H7 not previously identified in chickens. Results indicate survival and multiplication in chicken gut
- Interventions at specific points in the chain required to minimise risks to human health and ensure access to high value markets.

# Avian zoonotic microbial pathogens

End

Thank you