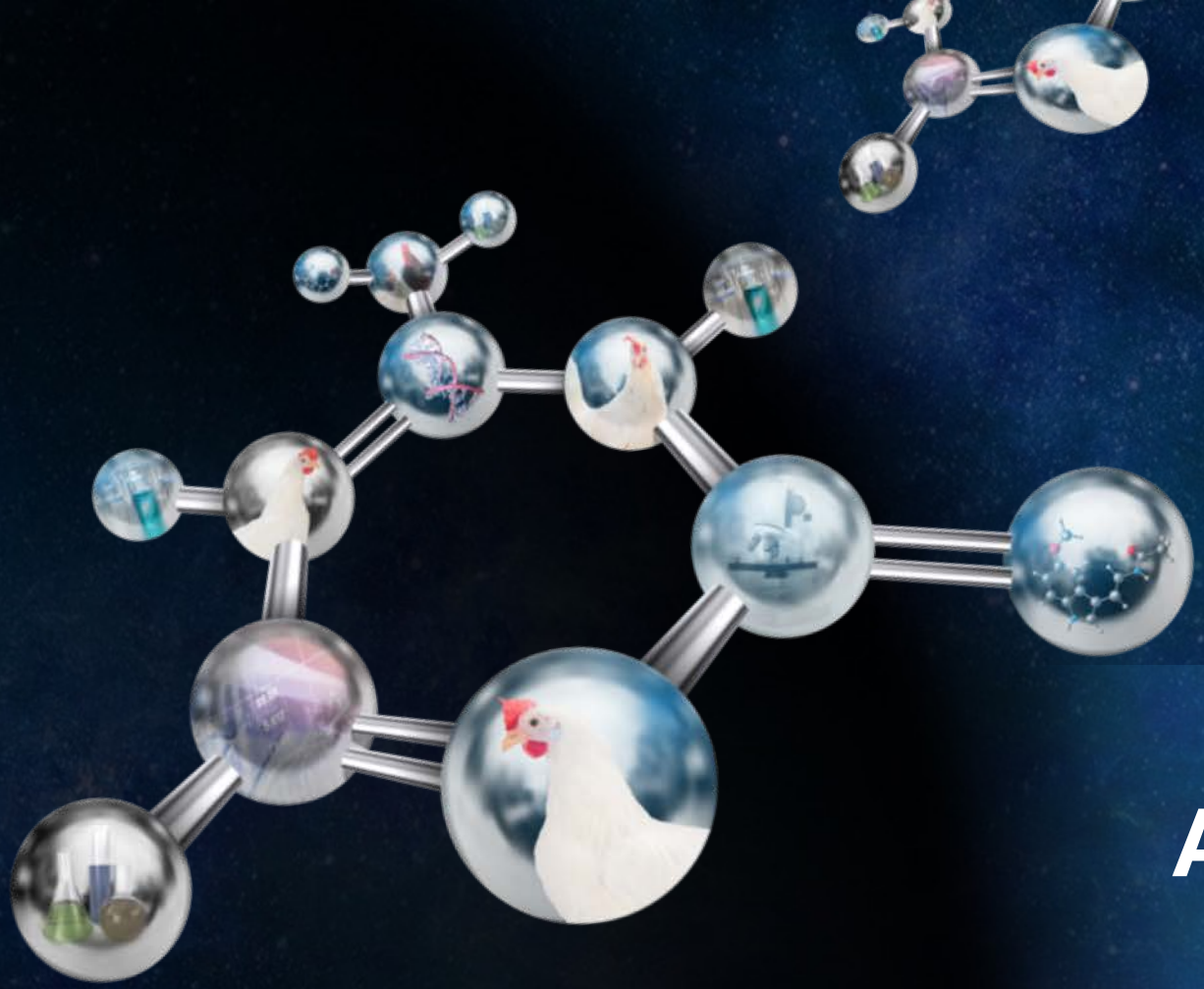


AVIAN INFLUENZA H9N2

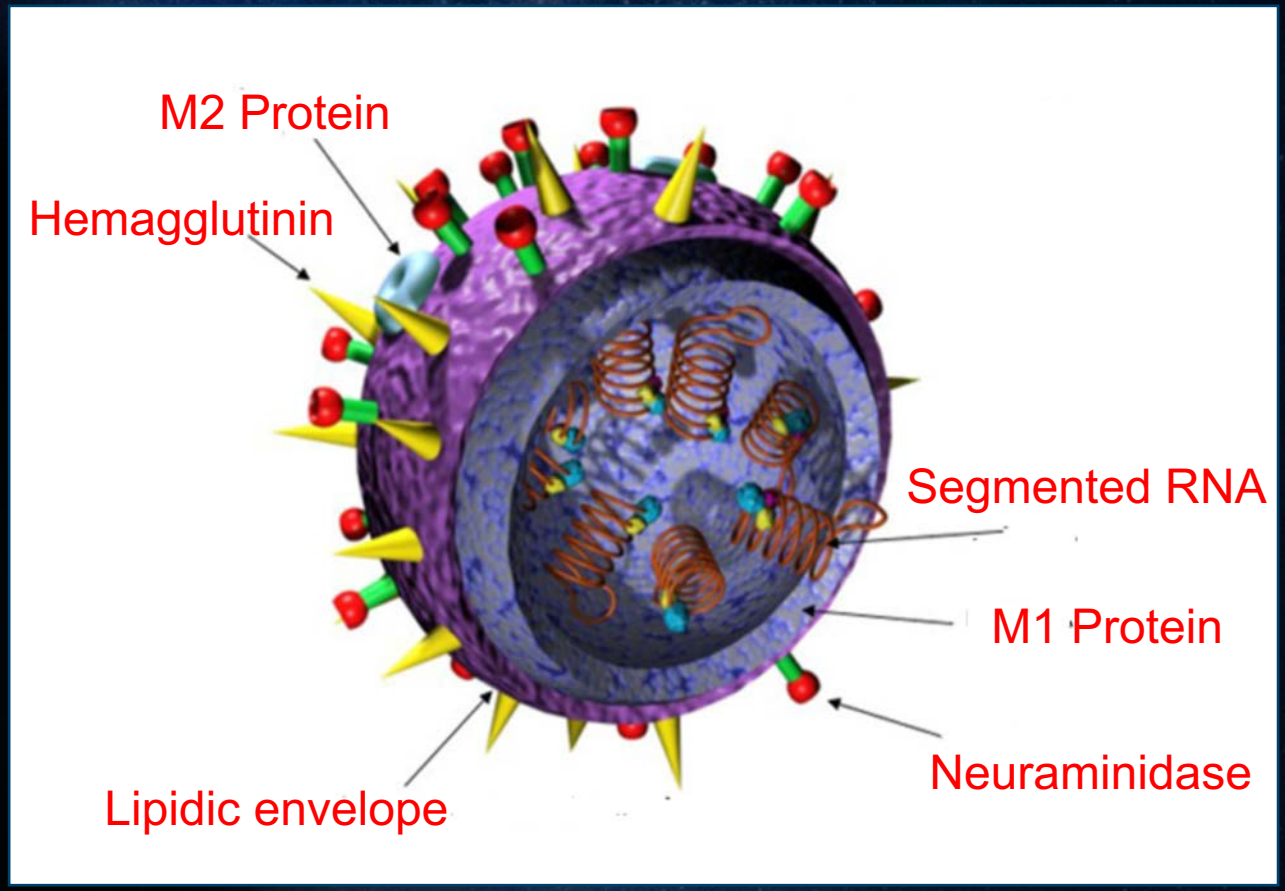
DVM. ABDELRAHMAN MAGDY
KEY ACCOUNT MANAGER AFRICA-MIDDLE EAST

AVIAN INFLUENZA VIRUS

Influenza A viruses are members of the Orthomyxoviridae family

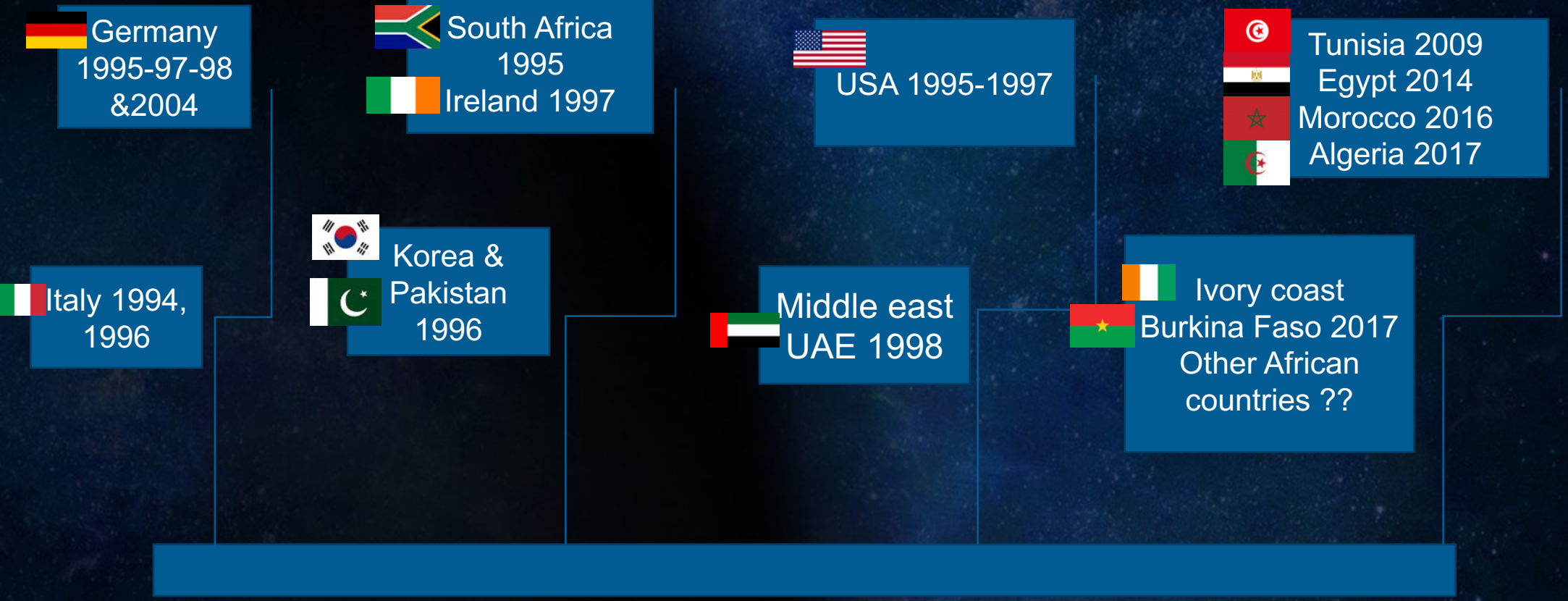
Influenza A viruses are commonly characterised by their combinations of surface proteins, haemagglutinin (HA) and neuraminidase (NA), giving rise to a multitude of different subtypes designated, for example, as H1N1, H5N6, or H9N2.

Low pathogenicity avian influenza viruses (LPAIVs) like H9N2 which still have a high negative economic impact in poultry.



Phylogeography of H9N2

History of H9N2



First appearances of H9N2 in the 90s

The majority of H9N2 viruses found in the Middle East are of the G1 ‘Western’ sub-lineage.

H9N2 PATHOLOGY

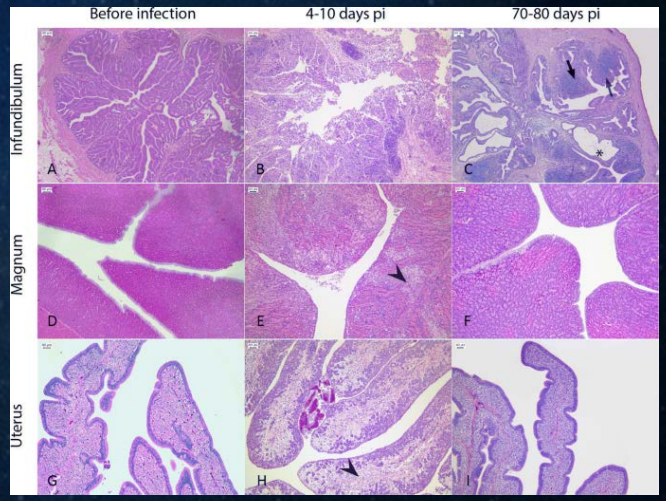
Primary target of the H9N2 LPAIV is the epithelium & lymphoid tissue of the respiratory tract.

Replication causing lesions & local immune suppression.

H9 can not mutate to HPAI !!!? In combination with other agents could be lethal.

Spread to the epithelium of the reproductive tract.

Drop in production



Transmission of virus & Host range

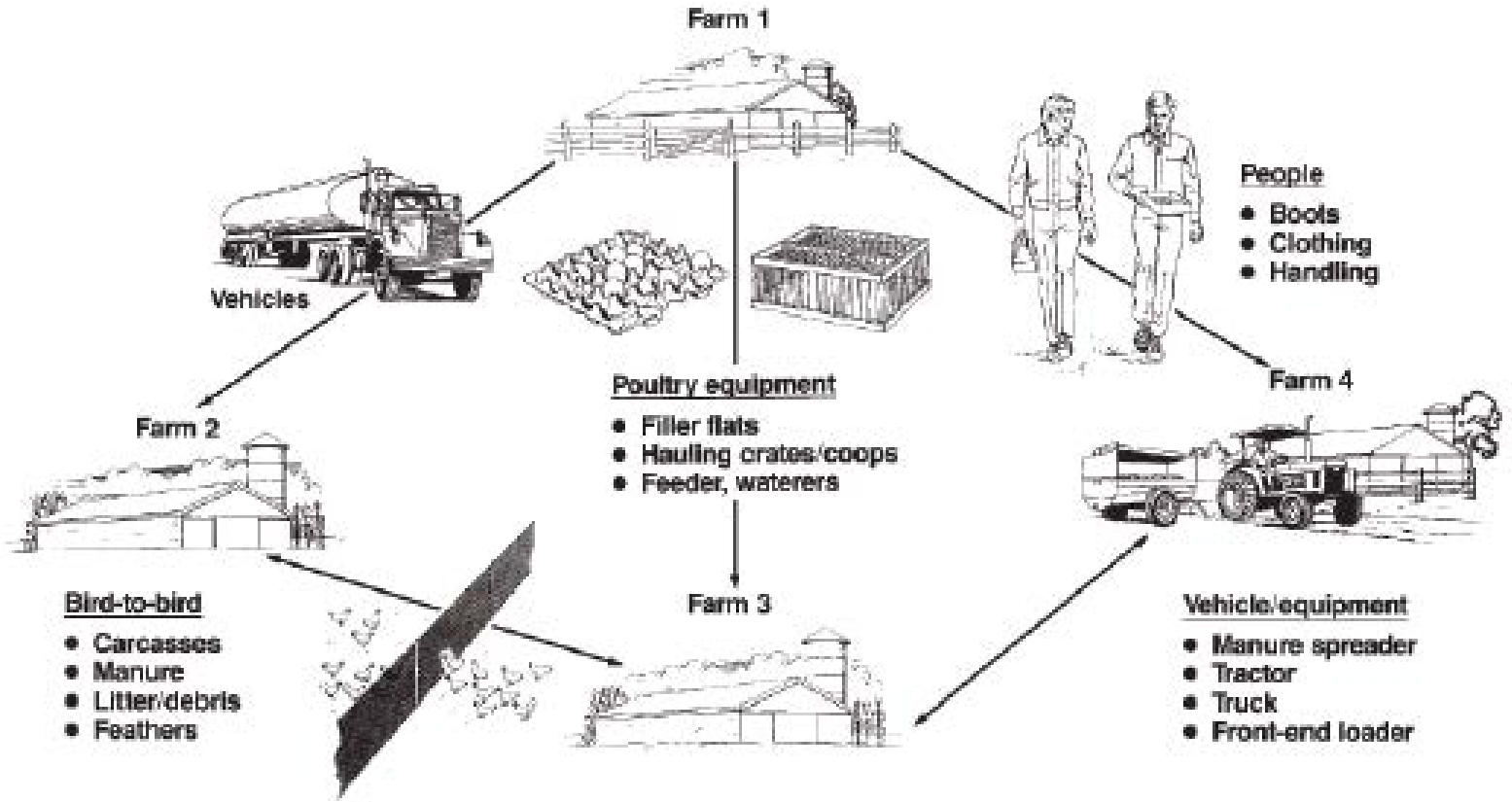
Water fowl (host)

Oral –nasal secretions & fecal oral route

Oral –nasal secretions & fecal oral route

Horizontal transmission (What about vertical transmission !!?)

How Poultry Disease Spreads



Virus survives 35 days at low temps, 6 at warmer temps.

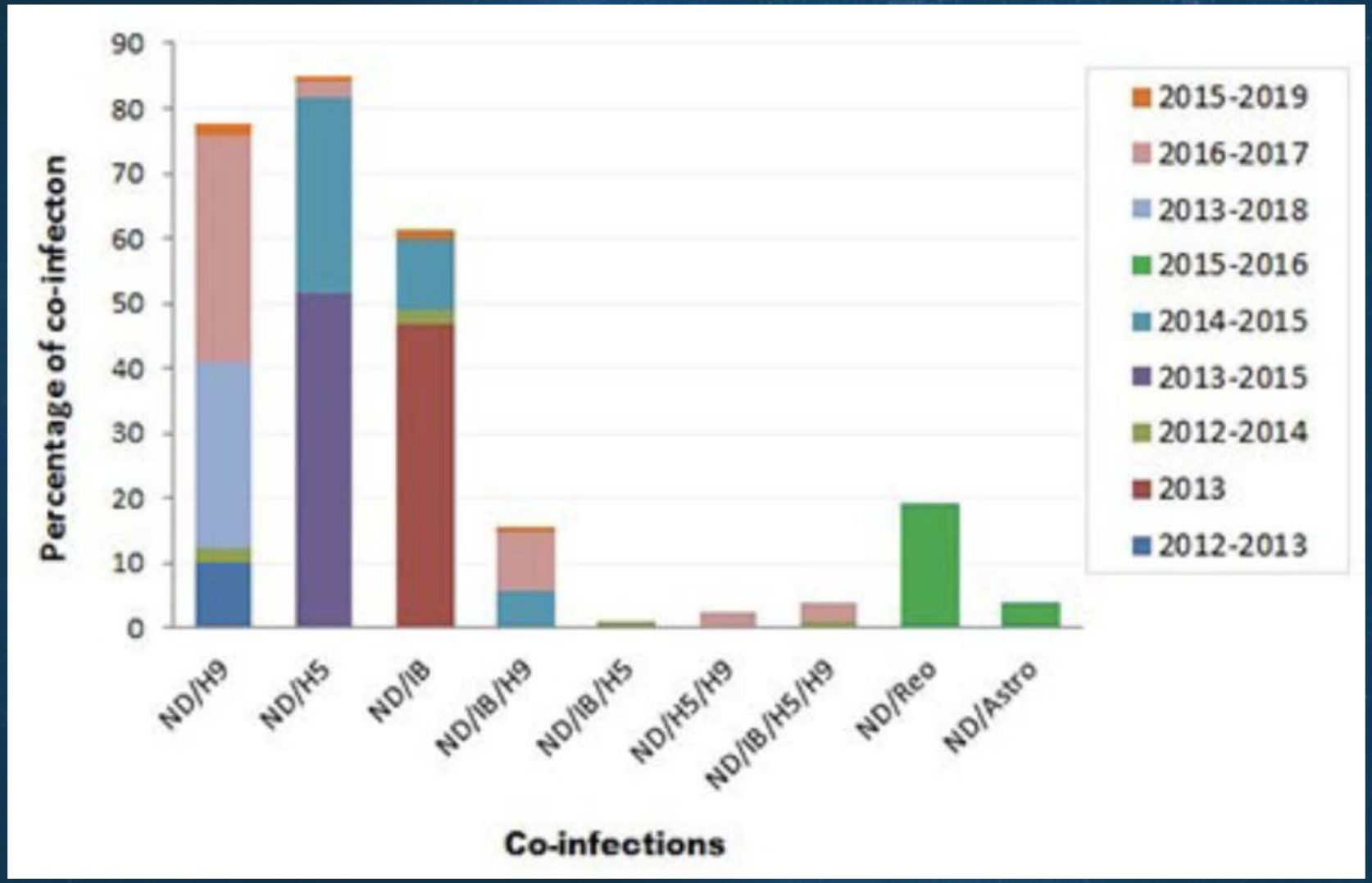
USDA United States Department of Agriculture
Animal and Plant Health Inspection Service

Disease Alert Number
APHIS 91-55-05
Issued June 2002

Pathogenicity of H9N2

- H9N2 LPAIV infection is a low pathogenic which do not induce obvious clinical signs or death in chickens.
- However, H9N2 infections in poultry increased their susceptibility to secondary infections with other pathogens that could cause high mortality, leading to huge economic losses, Like (ND-IB –CAV and other bacterial infections).
- Low biosecurity measures along with live bird markets as well as the poor management system are the main causes of bad endemic situation of H9N2 in some countries like Egypt and Morocco.
- Several co-infections (viral and/or bacterial), live Vaccines (especially respiratory targeted one as ND &/or IBV) and bad management always lead to significant losses in case of H9N2 infection.

Studies for percentage of disease co-infection in Egypt



Study by department of virology, faculty of vet. Medicine, Zagazig university, Egypt

CLINICAL SIGNS OF H9N2

Incubation period (from few hours to 3 days)

Broilers:

- Swelling of head.
- Respiratory sound.
- Decreased feed in take.
- Intestinal ballooning.
- Pancreatitis.
- Nephritis.

Layers and Breeders:

- Depression.
- Slight to moderate decrease of egg production.
- Intestinal twisting and egg peritonitis.
- Pancreatitis.
- Nephritis.

Organ affinity:

¨ Respiratory

¨ Renal

¨Reproductive

¨ Nervous

PM Lesions

Tracheitis & Thoracic air saculitis

Fibrinous Tracheitis with fibrinous plug on the trachea – tracheal bifurcation and bronchi

Avian Influenza h9n2 pathological signs in chicken

see also other our pictures: Newcastle Disease

bird flu, avian influenza in poultry, patho
symptoms

oviduct, avian influenza h9n2 virus in poultry

Oviduct demage, caseous mass, pathological lesion, avian influenza h9n2 virus

abdominal fat, haemorrhages, avian influenza h9n2 virus in chicken

Avian influenza virus h9n2 in laying chicken, no vaccination, (brown strain), cause severe egg drop production, low mortality, a significant drop in feed intake, less in eggshell color.

Avian Influenza h9n2 virus cause drop egg production in chicken

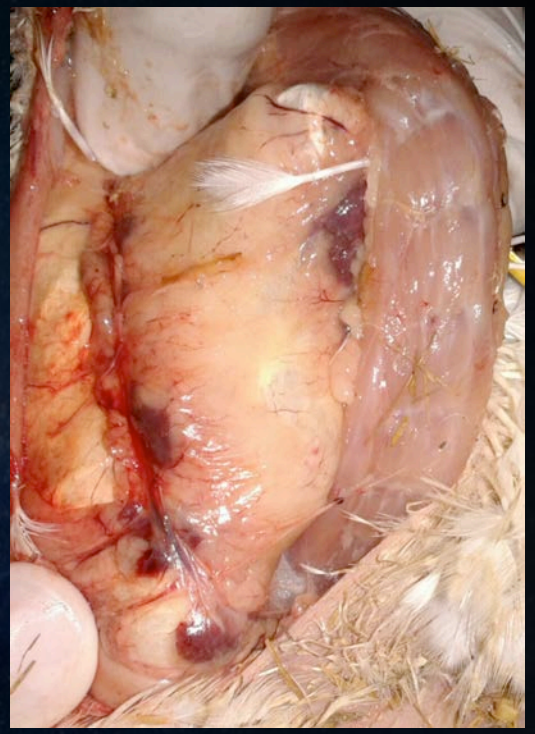
picture above: pattern: drop in egg production

Abnormal eggs, bird flu, h9n2 virus in laying chicken

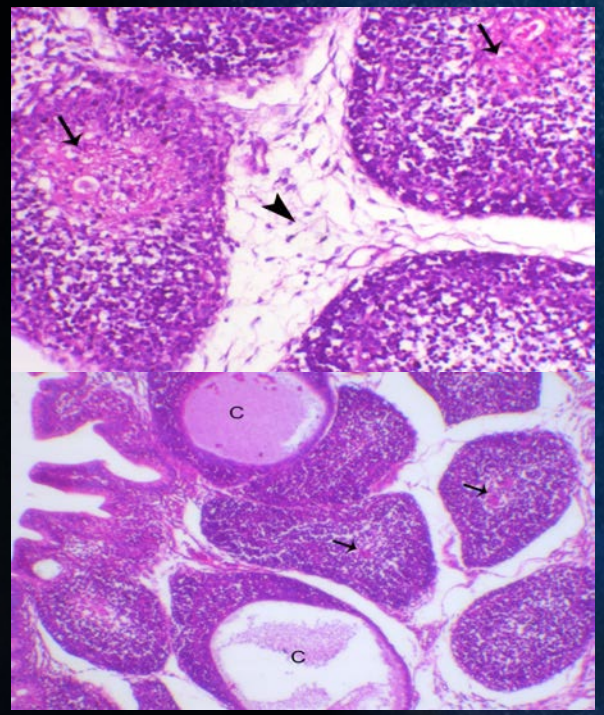
pictures below: Pathology & arts, H9N2 v
infection, signs in chicken

Immunocompromised effect of H9N2

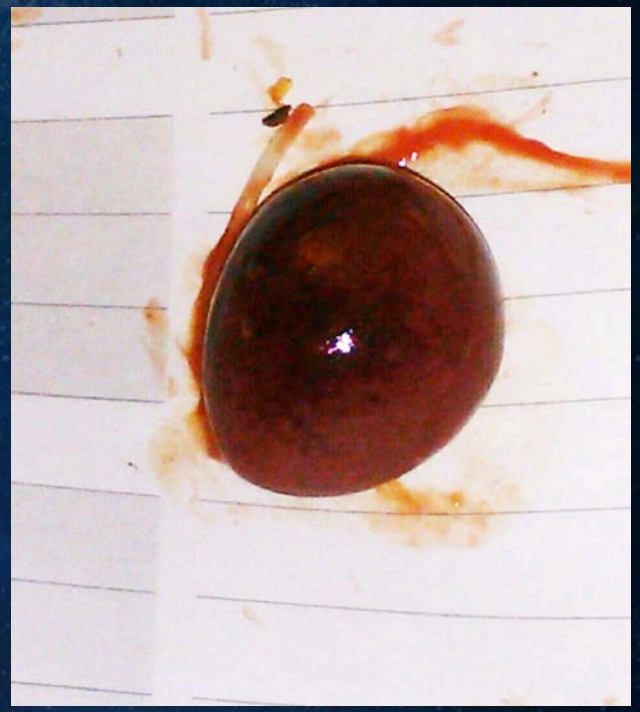
H9N2 affects different Immunity organs causing depression of immunity.



Thymic congestion



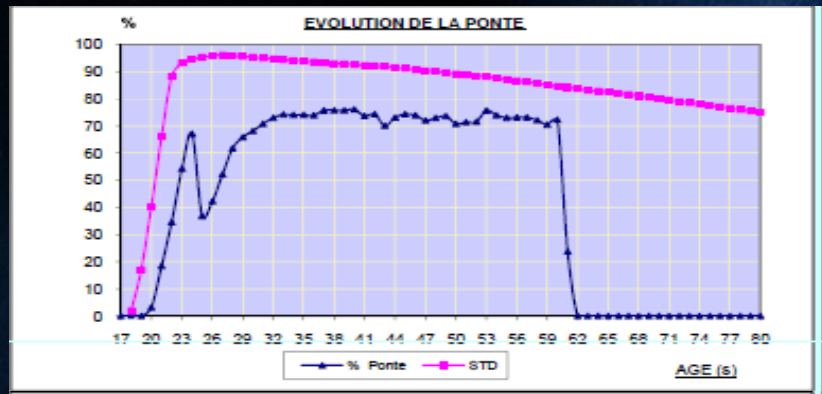
bursa of Fabricius changes

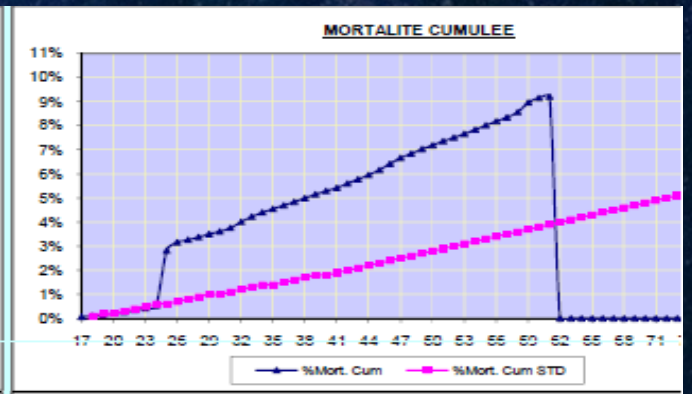


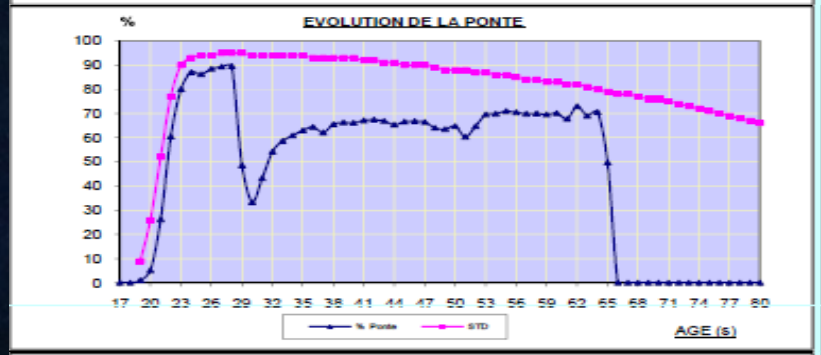
Splenitis

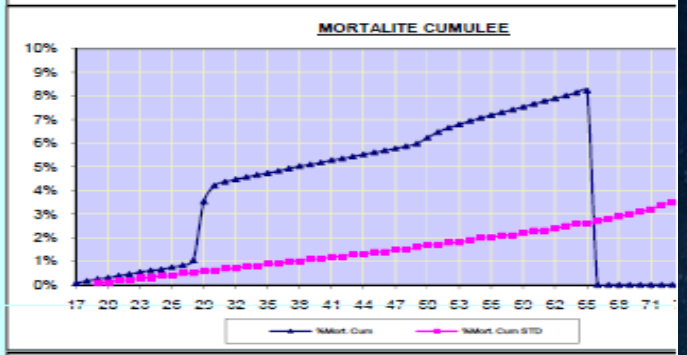
(GADO 2016)

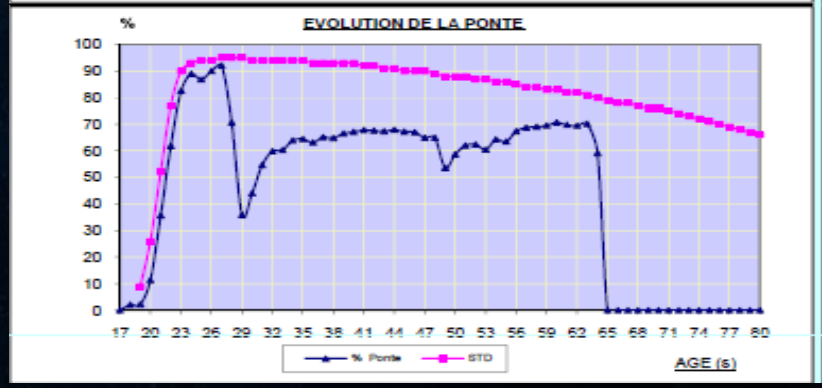
H9N2 cases in Morocco

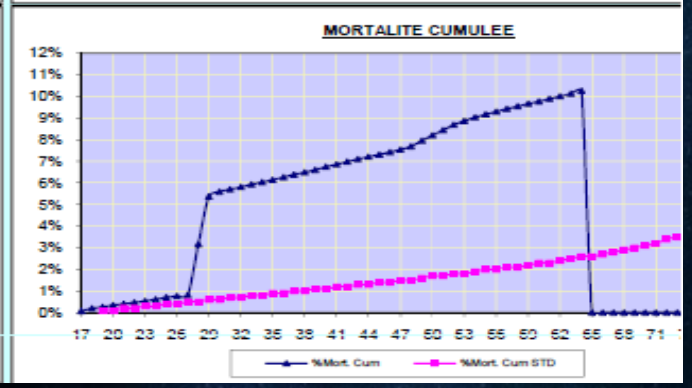








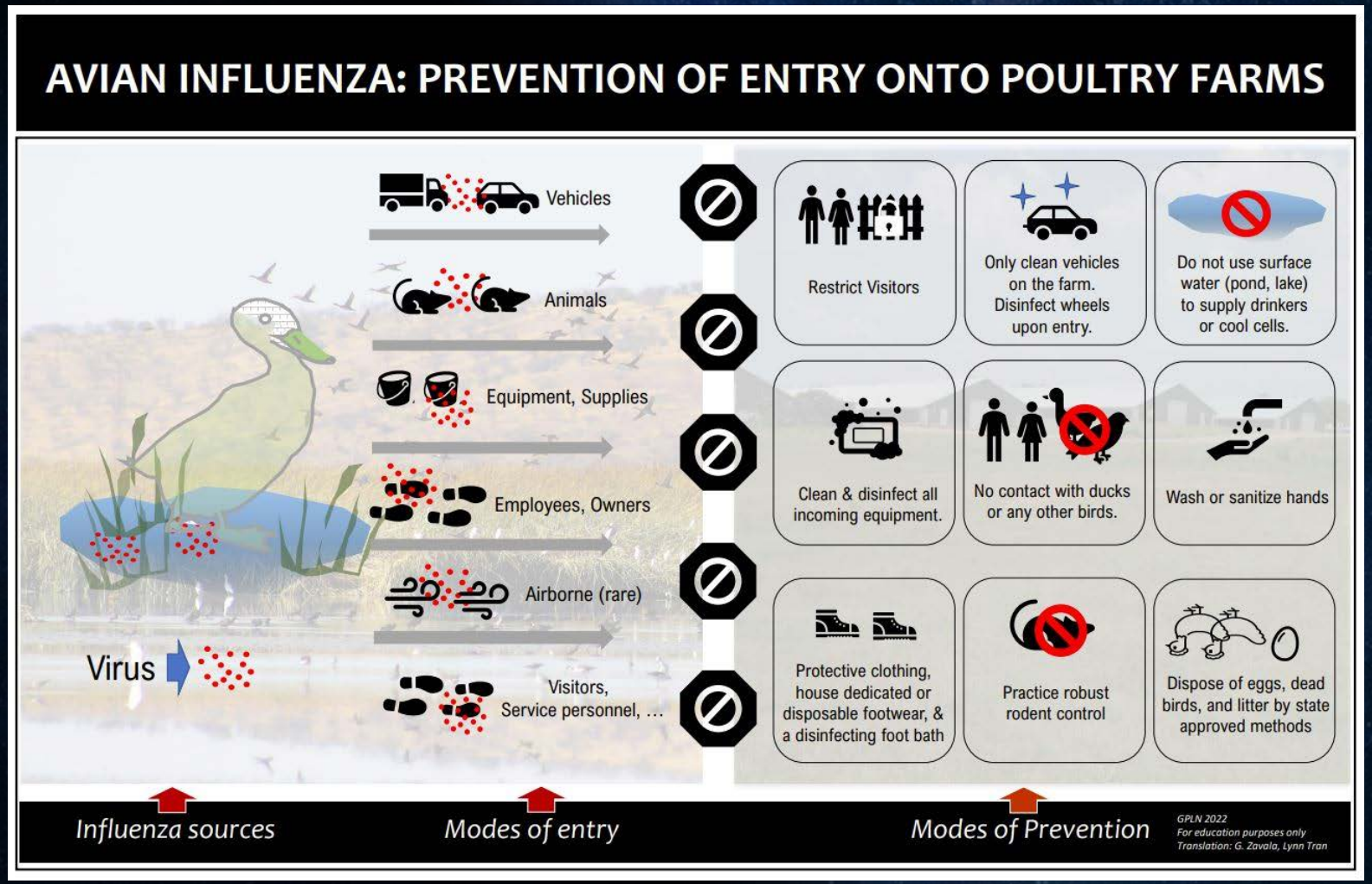




Prevention & control

1. Education
2. Biosecurity
3. Diagnostic & surveillance
4. Stamping out
5. Vaccination

Education


AVIAN INFLUENZA: PREVENTION OF ENTRY ONTO POULTRY FARMS
Vehicles
Animals
Equipment, Supplies
Employees, Owners
Airborne (rare)
Virus
Visitors, Service personnel, …
Restrict Visitors
Only clean vehicles on the farm. Disinfect wheels upon entry.
Do not use surface water (pond, lake) to supply drinkers or cool cells.
Clean & disinfect all incoming equipment.
No contact with ducks or any other birds.
Wash or sanitize hands
Protective clothing, house dedicated or disposable footwear, & a disinfecting foot bath
Practice robust rodent control
Dispose of eggs, dead birds, and litter by state approved methods
Influenza sources
Modes of entry
Modes of Prevention
GPLN 2022
For education purposes only
Translation: G. Zavala, Lynn Tran

Biosecurity

Design

Structures

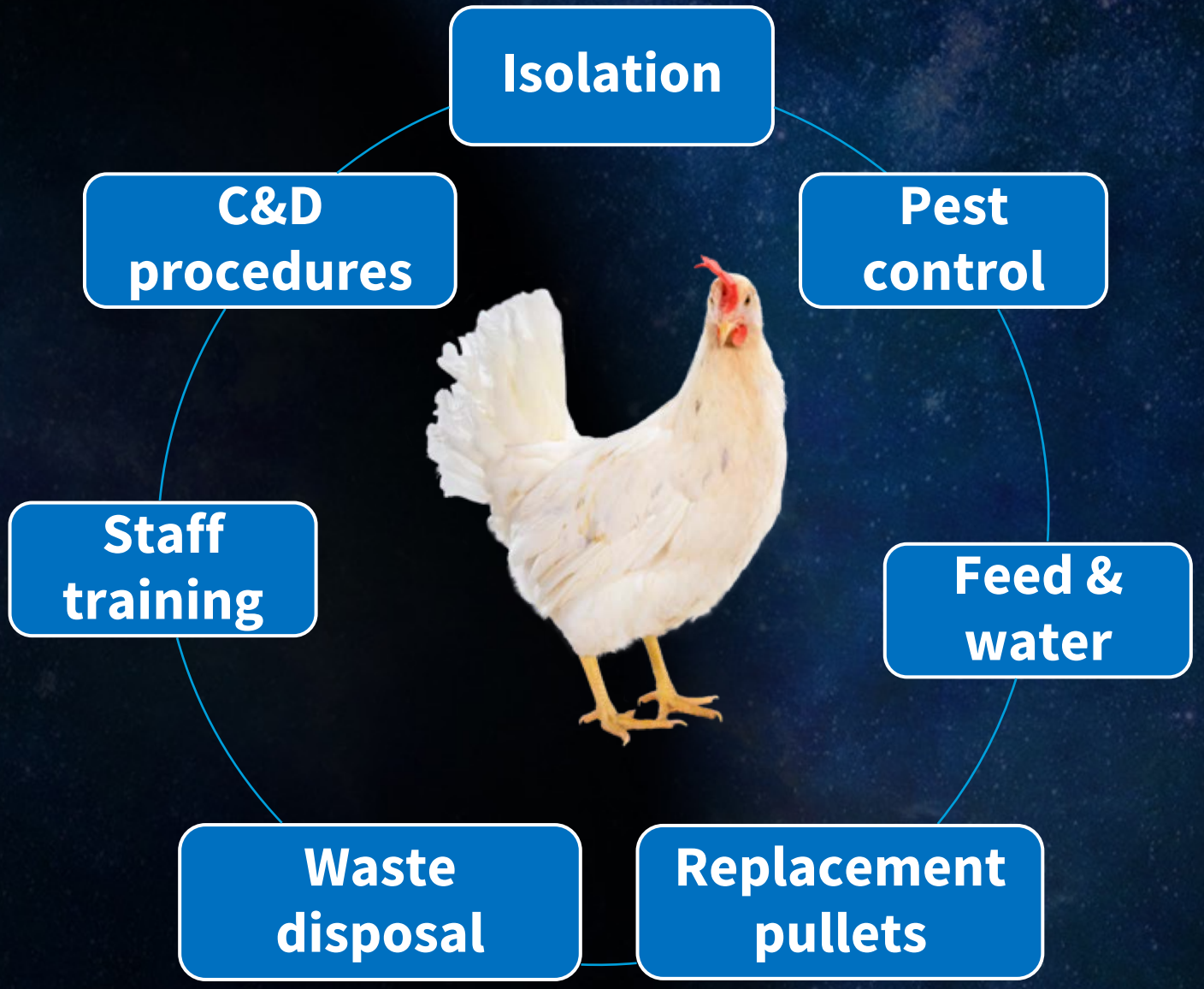
Operations

Country level

County level

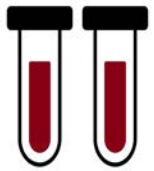
Farm level

Biosecurity programs



Diagnostic and Surveillance





Blood

@Flock Surveillance

Serology
- ELISA
- HI (H1 - H16)
- NI (N1 - N9)

LPAI infections monitoring programs

Vaccination monitoring

Tracheal swabs

Caecal tonsils

Cloacal swabs

@Suspected flock

Virology
- SPF chicken embryos
- Tissue cultures

Case confirmation

Clade determination

Molecular biology
- RT- PCR
- Sequencing

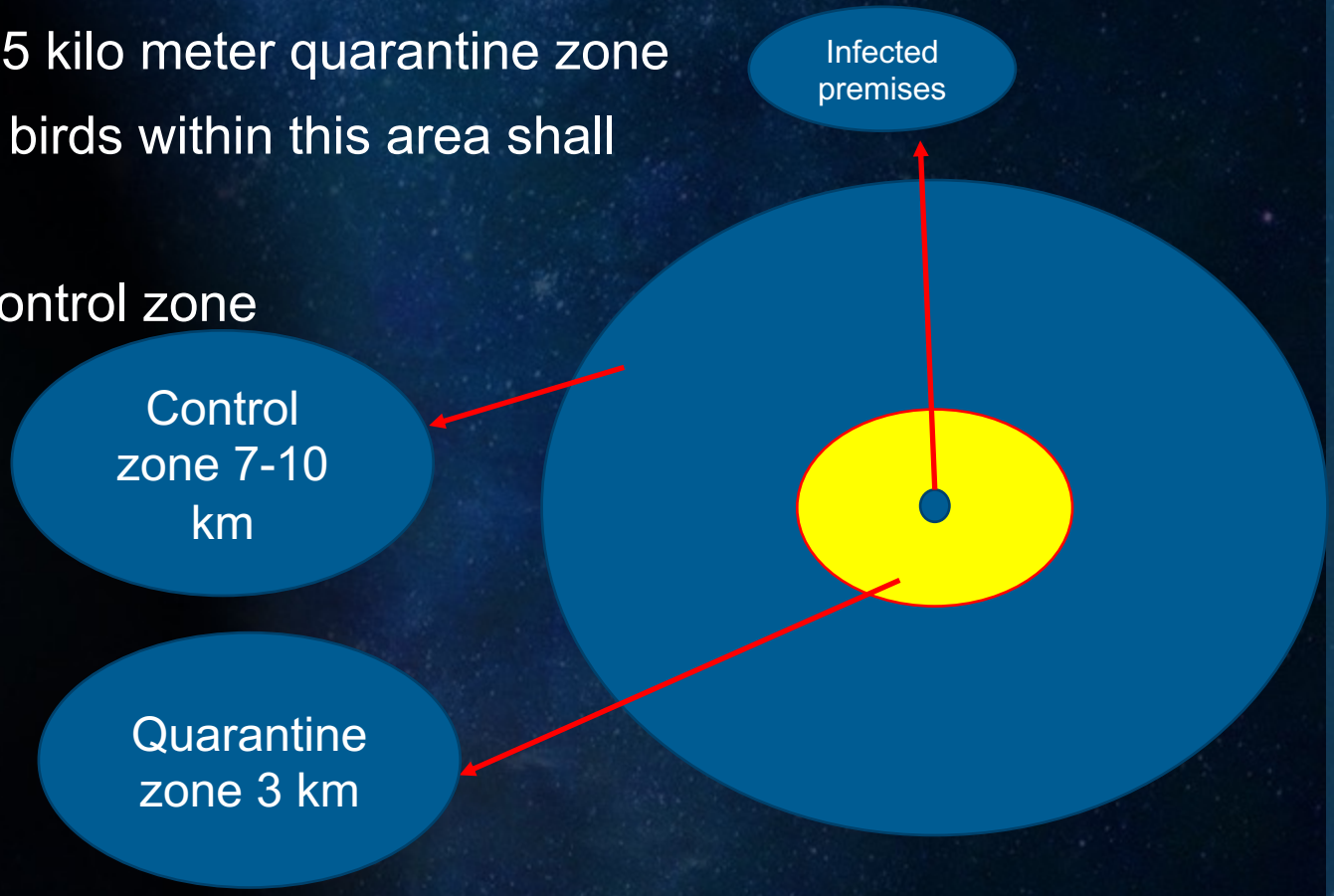
Epidemiology studies

Stamping-out policy (1992)

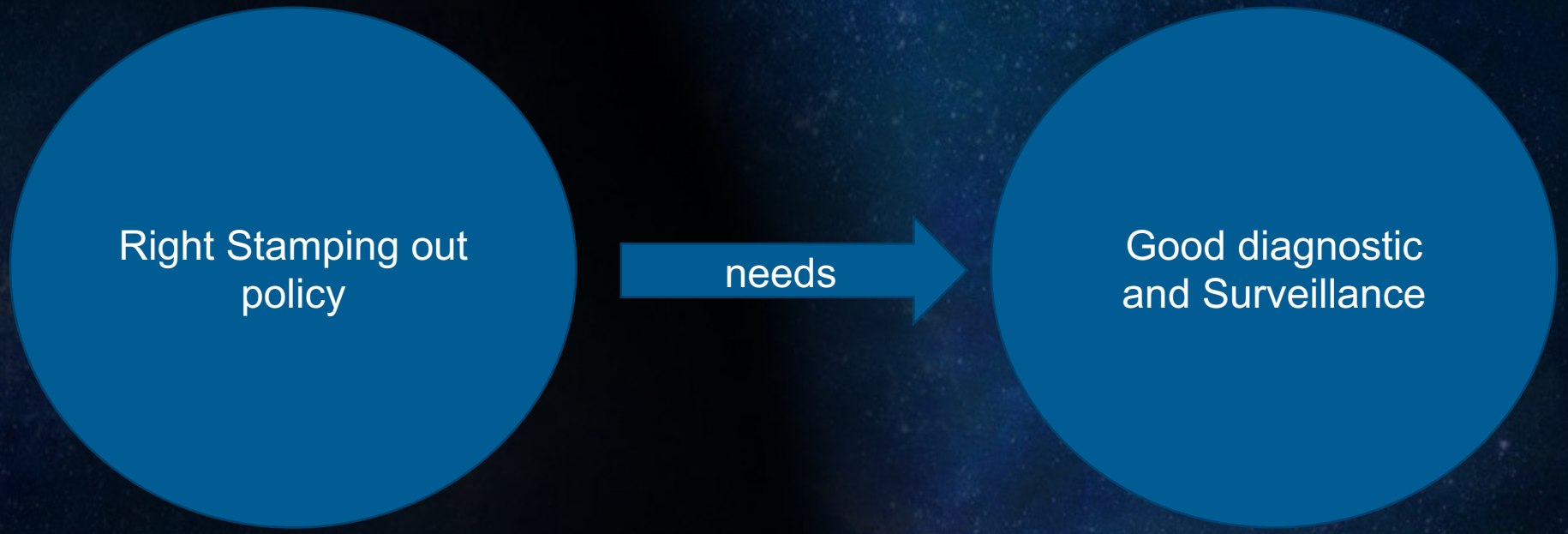
Killing to avoid the spread of the infectious agents to the environment and allow cleaning and disinfection of the place.

In case of an outbreak, a 3-5 kilo meter quarantine zone shall be established and all birds within this area shall be stamped out.

Moreover, a 7– kilo meter control zone shall be secured so that intensive surveillance can be conducted to detect further outbreaks.



Stamping out policy



Vaccination

Inactivated vaccines

- Should be Autogenous (Country/regional variation)
- Administration S/C lower back of the neck .
- Age of vaccination with a dose of 0.5 ml/bird.
- Broiler one Dose at 3-10 days old
- Breeder & layer:

  1st Dose 10 days old

  2nd Dose 50 days old

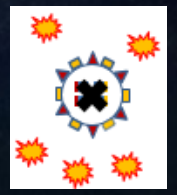
  3rd Dose 17 wks old

A new vector vaccine now has been Produced and started to been used in Some areas with good results.

Vaccination against H9N2

Vectored HVT-AI @hatchery !?

Inactivated Whole AIV @ week 1-2



Inactivated Whole AIV @ week 6-7

Inactivated Whole AIV @ week 16-17

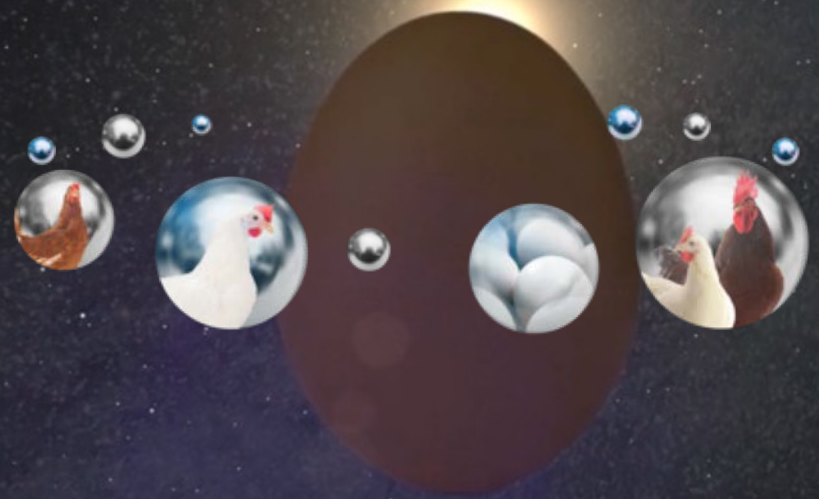
Objectives of Used Vaccines AI

1. Protection against mortality and clinical signs.
2. Increase resistance of chickens to infection, minimizing the economic losses.
3. Reduction in the number of chickens infected.
4. Reduction the quantity and duration of challenge virus shed from respiratory and intestinal tracts.
5. Reduction in environmental contamination of the virus which will ultimately reduce transmission and spreading.
6. Reduce the risk of human exposure.

Ideal AI vaccines requires

- Adequate Quantity of Antigen.
- Proper Adjuvant.
- Correct Age of Birds for Optimal Immunization.
- Proper Route and Site of Administration.
- Vaccine Strain With Sufficient Amino Acid Sequence Similarity to The Challenge Virus (HA-epitopes and NA).
- Updating the vaccine strain with that of the field virus is essential.

Thank you for your attention!



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