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Certified Specialist Programme in Poultry Health (Ireland)

## Poultry Disease Epidemiology

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### Aflatoxin mycotoxin

Related terms: mycotoxin, feed contamination

Explanation: Aflatoxins are toxic metabolites produced by *Aspergillus* species that can contaminate poultry feed, leading to immunosuppression, reduced egg production, and increased susceptibility to infectious diseases.

### Avian Influenza viral disease

Related terms: H5N1, H7N9, zoonosis

Explanation: A highly pathogenic viral infection that spreads rapidly among poultry flocks, causing severe respiratory distress, high mortality, and potential transmission to humans, requiring strict biosecurity and surveillance.

### Biosecurity preventive measure

Related terms: quarantine, sanitation, farm hygiene

Explanation: A set of practices designed to prevent introduction and spread of pathogens in poultry operations, including controlled access, disinfection protocols, and separation of bird groups.

### Campylobacteriosis bacterial infection

Related terms: *Campylobacter jejuni*, foodborne illness

Explanation: A gastrointestinal disease caused by *Campylobacter* species, often transmitted through contaminated poultry meat, leading to diarrhoea in humans and serving as an indicator of flock health.

### Case Fatality Rate epidemiologic metric

Related terms: mortality, morbidity

Explanation: The proportion of birds that die among those diagnosed with a specific disease, used to assess severity and guide control strategies within a flock.

### Clostridial Enterotoxemia bacterial toxin disease

Related terms: *Clostridium perfringens*, necrotic enteritis

Explanation: A toxin-mediated condition caused by overgrowth of *C. Perfringens* in the gut, resulting in sudden death, especially in rapidly growing broilers under stressful conditions.

### Clinical Surveillance monitoring method

Related terms: field observation, symptom reporting

Explanation: Ongoing collection of observable disease signs and morbidity data from farms to detect emerging health issues and trigger timely investigations.

Co-Infection multiple pathogens

Related terms: synergism, secondary infection

Explanation: Simultaneous infection of poultry by two or more pathogens, which can exacerbate disease severity and complicate diagnosis and treatment plans.

Contact Tracing epidemiologic tool

Related terms: outbreak investigation, transmission chain

Explanation: The process of identifying and documenting all birds, personnel, and equipment that have interacted with an infected flock to limit further spread.

Control Zone geographic restriction

Related terms: restricted area, disease containment

Explanation: A defined radius around an outbreak where movement of birds, products, and equipment is limited to prevent dissemination of the pathogen.

coccidiosis protozoal disease

Related terms: Eimeria spp., Intestinal parasites

Explanation: An intestinal infection caused by Eimeria species, leading to reduced feed conversion, weight loss, and increased mortality in intensive poultry systems.

Cross-Protection immunological concept

Related terms: vaccine efficacy, heterologous immunity

Explanation: Immunity conferred against one pathogen strain that partially protects against another related strain, influencing vaccine design and deployment.

Cutaneous Lesion Scoring diagnostic method

Related terms: lesion index, necrotic dermatitis

Explanation: A standardized system for evaluating skin lesions on poultry, aiding in the assessment of disease prevalence and severity in field surveys.

Diagnostic Sensitivity test characteristic

Related terms: true positive, assay performance

Explanation: The ability of a diagnostic test to correctly identify infected birds, crucial for early detection and accurate prevalence estimates.

Diagnostic Specificity test characteristic

Related terms: true negative, false positive

Explanation: The capacity of a test to correctly exclude non-infected birds, reducing unnecessary interventions and economic losses.

Direct Transmission pathogen spread

Related terms: contact infection, aerosol

Explanation: Transfer of disease agents from an infected bird to a susceptible bird without an intermediate vector, commonly occurring through droplet or feather contact.

Egg Drop Syndrome viral disease

Related terms: adenovirus, production loss

Explanation: A condition characterized by a sudden decline in egg production and quality, caused by an adenovirus that affects the reproductive tract of laying hens.

Environmental Persistence pathogen survival

Related terms: soil reservoir, fomites

Explanation: The ability of a disease agent to remain viable outside the host for extended periods, influencing outbreak duration and control measures.

Epidemiologic Curve graphical representation

Related terms: outbreak pattern, temporal distribution

Explanation: A visual plot of case numbers over time that helps identify the source, spread dynamics, and effectiveness of interventions during a disease event.

Epidemiologic Triad framework

Related terms: host, agent, environment

Explanation: A model describing the interaction of a susceptible host, a pathogenic agent, and environmental factors that together determine disease occurrence.

Fecal-Oral Route transmission pathway

Related terms: ingestion, contamination

Explanation: The primary route by which many enteric pathogens spread among poultry, involving ingestion of contaminated feed, water, or litter.

Feed Withdrawal management practice

Related terms: pre-slaughter, stress reduction

Explanation: The temporary cessation of feed before processing to reduce gut contents, which can also affect disease dynamics by altering gut flora.

Flock Immunity herd immunity concept

Related terms: vaccination coverage, resistance

Explanation: The level of collective immunity in a poultry population that reduces the likelihood of disease spread, achieved through vaccination or natural exposure.

Fowl Pox viral disease

Related terms: poxvirus, skin lesions

Explanation: A poxvirus infection causing proliferative skin lesions and diphtheritic forms affecting the respiratory tract, controlled by live attenuated vaccines.

#### Genetic Susceptibility host factor

Related terms: breed resistance, lineage

Explanation: Inherent differences among poultry breeds or lines that influence their vulnerability to specific pathogens, informing breeding strategies for disease resilience.

#### Heterologous Vaccine vaccine type

Related terms: cross-protection, antigenic drift

Explanation: A vaccine formulated with antigens from a different strain than the circulating pathogen, used when a homologous vaccine is unavailable.

#### Host-Pathogen Interaction biological relationship

Related terms: immune response, virulence

Explanation: The dynamic processes through which a pathogen invades, replicates, and evades the host's defenses, determining disease outcome and transmission potential.

#### Incidence Rate epidemiologic measure

Related terms: new cases, population at risk

Explanation: The number of new disease cases occurring in a defined flock during a specific time period, expressed per 1,000 birds, useful for trend analysis.

#### Infectious Dose pathogen threshold

Related terms: minimum inoculum, exposure level

Explanation: The smallest quantity of a pathogen required to establish infection in a susceptible bird, guiding biosecurity and dosing strategies.

#### Infectious Period temporal factor

Related terms: contagiousness, shedding

Explanation: The time span during which an infected bird can transmit the pathogen to others, critical for determining isolation duration.

#### Isolation Unit containment facility

Related terms: quarantine, disease control

Explanation: A dedicated area where infected or suspect birds are housed separately to prevent pathogen spread while diagnostic work is performed.

#### Latency Period time interval

Related terms: incubation, subclinical phase

Explanation: The interval between infection and the appearance of clinical signs, during which the bird may still shed the pathogen.

#### Live-Attenuated Vaccine vaccine type

Related terms: attenuation, immunogenicity

**Explanation:** A vaccine containing weakened but viable pathogens that stimulate robust immunity without causing disease, commonly used for Newcastle disease and fowl pox.

**Logistic Regression statistical model**

**Related terms:** risk factor analysis, odds ratio

**Explanation:** A method for evaluating the relationship between multiple variables and the probability of disease occurrence, aiding in identification of significant risk factors.

**Mortality Rate outcome metric**

**Related terms:** death proportion, flock loss

**Explanation:** The proportion of birds that die from a disease relative to the total population, informing economic impact assessments.

**Mycoplasma gallisepticum bacterial pathogen**

**Related terms:** MG, chronic respiratory disease

**Explanation:** A cell-wall-less bacterium causing chronic respiratory infections, leading to reduced growth, egg production losses, and heightened susceptibility to secondary pathogens.

**Nephropathogenic Avian Influenza virus subtype**

**Related terms:** H9N2, kidney lesions

**Explanation:** A low-pathogenic avian influenza strain with a propensity for causing kidney damage, resulting in decreased feed intake and increased mortality in layers.

**Outbreak Investigation response process**

**Related terms:** case definition, source tracing

**Explanation:** A systematic approach to identify the cause, source, and spread of a disease event, involving data collection, laboratory testing, and control recommendation.

**Pathogenicity Index virulence measure**

**Related terms:** LD50, disease severity

**Explanation:** A quantitative assessment of a pathogen's ability to cause disease, often expressed as the lethal dose required to kill 50% of exposed birds.

**Penicillin-Resistant Salmonella antimicrobial resistance**

**Related terms:** multidrug resistance, treatment failure

**Explanation:** Strains of Salmonella that have acquired resistance to penicillin-class antibiotics, complicating therapeutic options and increasing public health concerns.

**Performance Indicators management metrics**

**Related terms:** feed conversion ratio, lay rate

**Explanation:** Quantitative measures used to evaluate flock health and productivity, where deviations may signal underlying disease problems.

Phylogenetic Analysis genetic study

Related terms: sequence alignment, evolutionary relationships

Explanation: The examination of pathogen genetic sequences to determine lineage, track transmission pathways, and detect emerging variants.

Poultry Disease Surveillance monitoring system

Related terms: reporting network, early warning

Explanation: Ongoing collection and analysis of health data from poultry farms to detect trends, emerging threats, and inform policy decisions.

Prevalence population measure

Related terms: existing cases, disease burden

Explanation: The proportion of birds within a flock that are infected at a given point in time, providing a snapshot of disease impact.

Prophylactic Vaccination preventive strategy

Related terms: immune priming, herd protection

Explanation: Administration of vaccines to healthy birds before exposure to a pathogen, aiming to reduce incidence and severity of disease outbreaks.

Quarantine restriction practice

Related terms: isolation, movement control

Explanation: The temporary separation of new or suspect birds from the main flock to monitor for signs of disease before integration.

Rapid Diagnostic Test field assay

Related terms: point-of-care, lateral flow

Explanation: A quick, often immunochromatographic, test that provides results within minutes, enabling immediate decision-making during an outbreak.

Re-emergence disease phenomenon

Related terms: resurgence, endemic

Explanation: The return of a previously controlled or low-incidence disease, often due to lapses in biosecurity, vaccine failure, or pathogen evolution.

Reference Laboratory diagnostic center

Related terms: confirmatory testing, standardization

Explanation: A specialized facility with advanced capabilities for definitive identification of pathogens, providing authoritative results for surveillance programs.

Reservoir Host carrier species

Related terms: asymptomatic, wildlife

**Explanation:** An animal species that harbors a pathogen without showing disease, serving as a source of infection for domestic poultry.

**Reverse Zoonosis transmission direction**

**Related terms:** anthroponosis, human-to-animal

**Explanation:** The spread of pathogens from humans to poultry, a concern for certain viral and bacterial agents in intensive production settings.

**Risk Assessment evaluation process**

**Related terms:** hazard analysis, probability

**Explanation:** Systematic analysis of the likelihood and consequences of disease introduction, informing mitigation strategies and resource allocation.

**Salmonella Enteritidis foodborne pathogen**

**Related terms:** egg contamination, zoonosis

**Explanation:** A serovar of Salmonella frequently associated with contaminated eggs, causing gastroenteritis in humans and indicating flock health issues.

**Sampling Strategy methodology**

**Related terms:** random sampling, stratified design

**Explanation:** The planned approach for selecting birds, litter, or environmental specimens to obtain representative data on disease presence.

**Seroconversion immune response marker**

**Related terms:** antibody titre, exposure

**Explanation:** The development of detectable antibodies in a bird's serum following infection or vaccination, used to assess immunity levels.

**Serotype antigenic classification**

**Related terms:** O antigen, variant

**Explanation:** A subdivision of a bacterial species based on distinct surface antigens, critical for epidemiological tracking and vaccine selection.

**Shedding pathogen excretion**

**Related terms:** viral load, environmental contamination

**Explanation:** The release of infectious agents from an infected bird via feces, respiratory secretions, or skin, contributing to transmission dynamics.

**Spillover Event cross-species transmission**

**Related terms:** zoonotic jump, wildlife reservoir

**Explanation:** The occurrence where a pathogen moves from its natural host into poultry, often leading to novel disease emergence.

Standardized Case Definition diagnostic criterion

Related terms: surveillance protocol, uniformity

Explanation: A set of specific clinical and laboratory criteria used consistently across investigations to identify cases of a particular disease.

Statistical Power study attribute

Related terms: sample size, detection probability

Explanation: The likelihood that a study will correctly detect a true association between risk factors and disease occurrence, influencing research design.

Stochastic Model simulation tool

Related terms: randomness, epidemic forecasting

Explanation: A mathematical model incorporating random variation to predict disease spread under uncertain conditions, useful for scenario planning.

Susceptible-Infected-Recovered (SIR) Model epidemiologic framework

Related terms: compartmental model, disease dynamics

Explanation: A classic model dividing a bird population into susceptible, infected, and recovered groups to simulate outbreak progression and intervention impact.

Swab Sample specimen type

Related terms: oropharyngeal, cloacal

Explanation: A collection method using a sterile swab to obtain material from bird mucosal surfaces for laboratory testing of respiratory or enteric pathogens.

Synanthropic Species human-associated wildlife

Related terms: pigeons, rats

Explanation: Animals that thrive in human-dominated environments and may act as vectors or reservoirs for poultry diseases.

Temporal Cluster time-based grouping

Related terms: epidemic curve, outbreak period

Explanation: A concentration of disease cases occurring within a defined time frame, suggesting a common exposure source or rapid transmission.

Transmission Coefficient parameter

Related terms: beta, reproduction number

Explanation: A value representing the rate at which a pathogen spreads from infected to susceptible birds, influencing the basic reproductive number ( $R_0$ ).

Vector-Borne Disease transmission type

Related terms: mosquito, mite

Explanation: Diseases transmitted by arthropods such as mosquitoes or mites, exemplified by avian malaria and certain viral encephalitides.

Virulence Factor pathogenic trait

Related terms: toxin, adhesion molecule

Explanation: A component of a pathogen that enhances its ability to cause disease, including enzymes, toxins, or immune-evading structures.

Viral Load quantitative measure

Related terms: PCR, shedding intensity

Explanation: The concentration of virus particles in a biological sample, indicating infection severity and potential for transmission.

Welfare-Based Surveillance holistic monitoring

Related terms: behavioral indicators, stress markers

Explanation: The collection of data on bird behavior, health, and environmental conditions to detect early signs of disease and improve overall flock wellbeing.

Zoonotic Potential human risk factor

Related terms: spillover, public health

Explanation: The capacity of a poultry pathogen to infect humans, influencing risk assessments and the need for integrated One Health approaches.