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# "Poultry Farming Diseases"

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***Abstract***

Poultry farming is a thriving agricultural sector that involves raising domesticated birds such as chickens, ducks, turkeys, and geese for meat and egg production. With increasing consumer demand for high-protein food sources, poultry farming has emerged as one of the fastest-growing industries, offering significant economic opportunities. Farming systems range from free-range and semi-intensive to intensive commercial setups, each requiring proper management for optimal productiv

The broiler industry (for meat production) and layer farming (for egg production) are expanding rapidly, driven by urbanization and rising dietary preferences. However, disease outbreaks remain a critical challenge, affecting bird health, productivity, and farm profitability. Effective disease management relies on strict biosecurity measures, proper sanitation, vaccination programs, and nutritional support. Regular disinfection of poultry houses, water tanks, and feeding systems using 200 ppm chlorine solution helps prevent bacterial growth. Additionally, herbal antimicrobials like garlic extract, turmeric, and probiotics enhance immunity and reduce dependency on antibiotics

As scientific advancements continue to refine poultry farming, genetic selection, improved feed formulations, and sustainable disease prevention strategies are shaping the future of the industry. Recent genomic research reveals that modern poultry species trace their lineage to wild junglefowl, further reinforcing their adaptability and economic significance. By implementing best farming practices and disease control strategies, poultry farmers can ensure higher productivity, profitability, and long-term sustainability in this vital sector.

As poultry farming continues to evolve, advancements in breeding techniques, nutrition, and disease prevention are shaping the industry's future, ensuring sustainable production to meet the rising global demand

## *INTRODUCTION*

**The Significance of Poultry Farming**

Poultry farming is a crucial sector of animal husbandry that involves raising domesticated birds such as chickens, ducks, turkeys, and geese for meat and egg production. It plays a significant role in meeting global food demands, providing an affordable and high-protein source of nutrition. Poultry farming can be practiced on a small-scale (backyard farming) or large-scale (commercial farming), depending on the purpose and production capacity.

This industry encompasses a diverse range of bird species, including chickens, turkeys, ducks, geese, guinea fowls, quails, pigeons, ostriches, and peafowls, each serving different economic purposes. Poultry farming can be categorized based on utility, such as meat production (broilers), egg production (layers), and dual-purpose breeds. Additionally, some birds are raised for ornamental, game, or research purposes.

The modern poultry industry has evolved significantly, incorporating scientific breeding techniques, advanced nutrition, and disease management strategies to enhance productivity. Poultry birds are reared under various farming systems, including free-range, semi-intensive, and intensive commercial methods, to optimize efficiency and sustainability.With the growing global population and increasing demand for protein-rich diets, poultry farming remains a vital agricultural sector. Its rapid growth is driven by technological innovations, improved breeding practices, and efficient farm management, making it a key contributor to food security and economic development worldwide.Broilers – These birds are primarily bred for meat production. They have a fast growth rate and are ready for market within 5 to 7 weeks. Example: Cornish Cross chickens.

2. Layers – These birds are specifically bred for egg production. They start laying eggs around 18-20 weeks of age and continue for 12-18 months. Example: White Leghorn chickens.

3. Dual-purpose birds – These birds serve both meat and egg production purposes.

They grow moderately fast and lay a reasonable number of eggs. Example: Rhode Island Red and Sussex chickens. Poultry Farming: A Vital Agribusiness

"Poultry" refers to domesticated birds such as chickens, turkeys, ducks, and geese, which are raised for meat, eggs, and feather production. The term also applies to the flesh of these birds used as food.

Poultry farming is one of the fastest-growing agribusinesses in India and across the world. It plays a crucial role in meeting the rising demand for protein-rich food sources. This form of animal husbandry involves the scientific breeding, feeding, and management of poultry to maximize meat and egg production. With technological advancements and improved farming methods, poultry farming has become a highly profitable and sustainable sector within agriculture.


Procedure:

I visited a poultry farm in Nizamabad along with my teacher and friends to gather information about poultry farming. Upon reaching the farm, I observed numerous hens and chicks. Some were active and healthy, while others appeared sick. To gain insights into poultry diseases and their treatment, I consulted a poultry

farm expert. He explained that certain hens were suffering from diseases and provided details on their symptoms, treatment, and preventive measures. This interaction helped me understand the challenges in poultry farming and the importance of proper care and management.

Chick Feeding:

For optimal growth, chicks should be provided with a high-quality starter feed containing at least 18% protein to support their energy requirements.

A well-balanced feed must include essential amino acids for development, prebiotics and probiotics to boost immunity, yeast for digestive health, and vitamins and minerals for strong bone formation. Proper nutrition in the early stages ensures healthy growth and enhances overall productivity in poultry farming. Layer Feeding:

Laying hens require approximately 0.25 pounds (about half a cup) of complete feed daily to maintain optimal egg production. If the birds are free-ranging, it is recommended to offer a balanced layer feed in the morning before they go out. This ensures they consume essential nutrients first, rather than relying on less nutritious insects and plants. A well-formulated layer feed enhances egg quality, shell strength, and overall hen health.

Grower Feeding:

To achieve rapid growth and market weight efficiently, broiler chickens should be given a high-protein grower feed containing 22% protein with essential amino acids. These nutrients support muscle development and overall health. Typically, broiler grower feed is provided for 14 to 16 days before transitioning to the finisher feed for optimal weight gain and meat quality. Possibility of Disease Introduction:

A disease is an abnormal condition that disrupts the structure or function of an organism, independent of external injury. It is characterized by specific signs and symptoms and can result from external agents (such as pathogens) or internal dysfunctions (such as immune disorders).

For instance, internal dysfunctions can lead to various conditions, including immunodeficiency, hypersensitivity, allergies, and autoimmune disorders.

In a broader sense, disease encompasses injuries, disabilities, syndromes, infections, and behavioral disorders. It can impact individuals physically and mentally, altering their overall well-being and perspective on life.

Types of Diseases:

Diseases leading to natural death are classified into four major types: 1.

Infectious Diseases – Caused by pathogens like bacteria, viruses, and fungi.

2. Deficiency Diseases – Resulting from nutrient deficiencies (e.g., scurvy, rickets).
3. Hereditary Diseases – Genetically inherited conditions (e.g., hemophilia, cystic fibrosis).
4. Physiological Diseases – Arising from organ dysfunctions (e.g., diabetes, hypertension).Possibility of Disease

Understanding diseases helps in prevention, early diagnosis, and treatment, improving overall health outcomes.

***Classification of Diseases***

Diseases can be broadly classified into two categories:

1. Communicable Diseases – Spread from one person to another through air, water, food, or direct contact (e.g., tuberculosis, influenza, COVID-19).
2. Non-Communicable Diseases (NCDs) – Not contagious and often result from lifestyle, genetics, or environmental factors (e.g., diabetes, hypertension, cancer).

Among the deadliest diseases in humans:

Coronary Artery Disease (CAD): Caused by blood flow obstruction in the arteries, leading to heart attacks.

Cerebrovascular Disease: Includes strokes, which occur due to blood supply disruption to the brain.

Lower Respiratory Infections: Such as pneumonia and chronic obstructive pulmonary disease (COPD), significantly impacting lung function.

In developed countries, the most prevalent diseases causing long-term illness and disability are neuropsychiatric conditions, including:

Depression – A mental health disorder affecting mood and behavior. Anxiety

Disorders – Characterized by excessive worry and stress, affecting daily life.

Understanding these disease classifications helps in targeted prevention, treatment, and healthcare planning

***Viral disease***

Caused by viruses, which invade host cells to reproduce.

Examples: Common cold, flu, COVID-19, HPV (warts), herpes simplex (cold sores).

1. Infectious Bronchitis

a) How Does the Disease Occur?

Bronchitis is the inflammation of the airways (trachea and bronchi) leading to the lungs. It occurs when these airways become irritated, swell, and produce excess mucus, causing persistent coughing that may last for days or weeks. Causes:

Viral infections (most common)

Exposure to smoke, pollutants, and other irritants

Underlying respiratory conditions like asthma  Symptoms:

Persistent cough with mucus

Chest discomfort

Shortness of breath

Prevention and Control

To reduce the risk of bronchitis, follow these preventive measures: ✓ Avoid exposure to infections: Stay away from sick individuals, especially in winter when viruses spread more easily.

✔ Protect your lungs: Avoid smoking and exposure to air pollutants. ✓ Strengthen immunity: Maintain a healthy diet, stay hydrated, and exercise regularly.

✔ Manage allergies & respiratory conditions: Avoid known triggers like dust, pollen, and pet dander.Symptoms of Bronchitis

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A persistent cough lasting one to three weeks is the primary symptom of bronchitis. The cough may produce mucus (wet cough), but in some cases, it may be dry. You may also experience:

✔ Wheezing – A whistling or rattling sound while breathing.

✔ Shortness of breath (Dyspnea) – Difficulty breathing, especially during physical activity.

✔ Fever – Mild to moderate fever, often accompanied by chills.

✔ Runny nose – Common in cases of viral bronchitis.

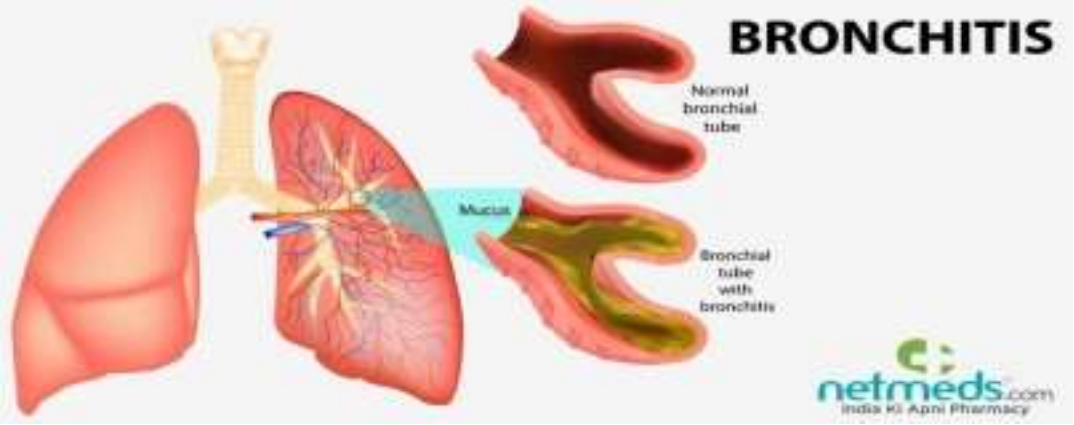
✔ Fatigue (Tiredness) – Weakness due to continuous coughing and breathing difficulties.

Prevention & Control Measures

✔ Maintain Air Moisture – Use a humidifier to prevent lung irritation. ✓ Ensure Proper Rest – Allow your body to recover and boost immunity.

✔ Eat a Healthy Diet – Nutrient-rich foods strengthen immunity.

✔ Practice Good Hygiene – Wash hands frequently with soap and water. Use an alcohol-based sanitizer when soap is unavailable.
✔ Stay Updated on Vaccines – Flu and pneumonia vaccinations reduce the risk of respiratory infections.
By following these preventive measures, you can reduce the chances of developing or worsening bronchitis.




**Medicinal of Disease**
Your healthcare provider probably won't prescribe medications to treat your bronchitis. In some cases, you can use medications to help you with symptoms or to treat the underlying cause, including:
Antiviral medications. If your bronchitis is caused by the flu, your healthcare provider might prescribe an antiviral medication, like Tamiflu®, Relenza®, and Rapivab®. If you start taking antivirals quickly after your symptoms start, you might feel better sooner.
COPD/Asthma Treatment

Purpose: Patients with Chronic Obstructive Pulmonary Disease (COPD) or asthma may need additional treatment for bronchitis.
Treatment Approach:
Long-term medications to control inflammation and prevent flare-ups.
Bronchodilators and inhalers to keep airways open.
Steroids or oxygen therapy in severe cases.
Cough Suppressants
Purpose: Used to reduce persistent or nagging coughs.
Types: Available as over-the-counter (OTC) or prescription medications.
Examples:
Dextromethorphan (commonly found in Robitussin®, DayQuil™, PediCare®) – Helps suppress cough by acting on the brain's cough center.
2. Antibiotics
Purpose: Used only when bronchitis is caused by a bacterial infection.
Prescription Criteria:
Generally, bronchitis is caused by viruses, so antibiotics are not needed. If a bacterial infection is suspected, a healthcare provider might prescribe antibiotics. Unnecessary antibiotic use can lead to antibiotic resistance, which is why they are prescribed cautiously.
Benzonatate (found in Tessalon Perles®, Zontatuss™) – Works by numbing the throat and lungs to reduce the cough reflex
Bronchodilators
Purpose: Help open airways if a patient has trouble breathing due to bronchitis.
How They Work:
Relax the muscles around the airways.
Improve airflow and ease breathing.
Common Types:
Short-acting bronchodilators (used for quick relief).
Long-acting bronchodilators (used for long-term airway management in conditions like COPD).
Anti-Inflammatory Medications
Purpose: Reduce inflammation in the airways caused by bronchitis.
Examples:

Corticosteroids (like prednisone) – Reduce swelling and mucus production. Other anti-inflammatory drugs – Used for managing chronic respiratory conditions
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***.Avian Encephalomyelitis (AE)***
Cause: A viral infection affecting the central nervous system (CNS) of birds.
Symptoms:
Tremors
Ataxia (lack of muscle coordination)
Weakness
Paralysis
Diagnosis:
Clinical signs
History and histopathological findings
Virus isolation
Detection of the virus genome using RT-PCR assay

**Prevention & Control:**
Live vaccines are available to prevent transmission and reduce egg losses in poultry farming.

**Etiology of Avian Encephalomyelitis**
The causative agent of avian encephalomyelitis is avian encephalomyelitis virus (AEV), a non-enveloped RNA virus (family Picornaviridae, genus Tremovirus, species Tremovirus A).
Natural field strains are enterotropic, multiplying in the intestine.
Infected birds shed the virus in feces for days to weeks, transmitting the infection to hatchmates.
Epidemiology of Avian Encephalomyelitis AEV has a worldwide distribution.
Natural infection occurs in chicks, turkey poults, quails, pheasants, and pigeons.
Turkeys are less susceptible and show milder symptoms than chickens. Ducklings and guinea fowl are highly susceptible to experimental infection. AEV does not affect humans or other mammals.

**Transmission**
Vertical transmission: From infected breeder flocks to offspring during egg production.
Horizontal transmission: Through fecal contamination, spreading the virus within flocks.

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Horizontal transmission: Through fecal contamination, spreading the virus within flocks.

**Clinical Findings for Avian Encephalomyelitis**
**Tremor**
**Progressive weakness leading to paralysis and recumbency**
Avian encephalomyelitis primarily affects the nervous system, displaying distinct neurological symptoms. The severity of clinical signs varies based on the bird's immune condition, infection route, and whether the virus is wild-type or an embryo-adapted strain.Chicks infected vertically (from the parent) typically exhibit nervous system symptoms within the first week post-hatching, though a few may show signs immediately after birth. Those infected horizontally (via fecal-oral transmission) display symptoms later. A combination of vertical and horizontal transmission often results in a biphasic mortality pattern.The primary symptoms of avian encephalomyelitis include ataxia and leg weakness, which can range from difficulty standing to complete paralysis and recumbency.
Some birds exhibit fine tremors of the head and neck, a hallmark of the disease, often referred to as epidemic tremor.
Tremors differ in severity and are most noticeable when birds are startled or handled. A simple test involves placing the bird on its back—if affected, it will struggle to right itself. Holding the bird may also reveal a buzzing sensation due to rapid tremors. In severe cases, birds may lie on their side, showing intermittent tremors in the head, neck, and legs.
Chicks infected horizontally typically show symptoms between 2 to 4 weeks of age, with the disease spreading within the flock. By 4 weeks of age, most outbreaks subside.

By this stage, chickens develop resistance to the disease but may still carry the virus. However, in immunocompromised older chickens, sporadic cases can occur. In laying hens, an infection can lead to a 5%–10% drop in egg production for up to two weeks, before normal levels resume. Eggshell quality remains unaffected.

**Hatchability and Embryo Adaptation**

Egg hatchability can drop by up to 5% due to late embryonic mortality. This decline often occurs when infected eggs are laid during viremia, a condition that typically lasts 1–2 weeks.

The virus can undergo embryo adaptation if it repeatedly passes through chicken embryos. This phenomenon has been noted in vaccine production, although no recent cases have been recorded. Certain single nucleotide polymorphisms (SNPs) in the VP2 and VP3 genes are linked to embryo adaptation.

Strains that adapt to embryos tend to be highly neurotropic, meaning they primarily affect the nervous system. When administered parenterally, they can trigger disease symptoms. Birds infected with these strains display neurologic signs similar to those seen in young chicks.

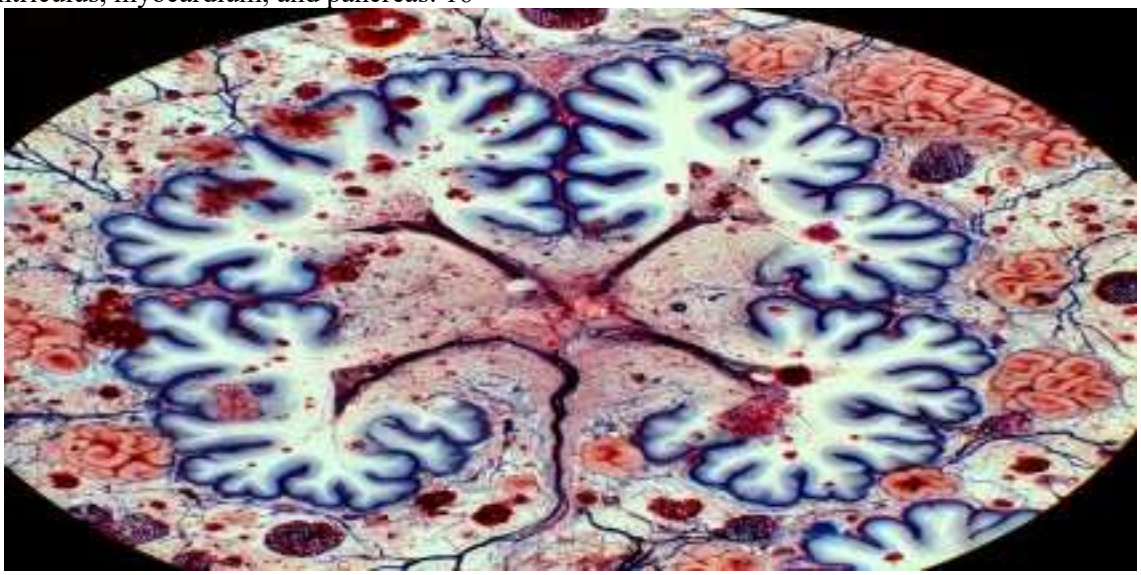
Lesions: Avian Encephalomyelitis, brain lesions, histopathology

Avian Encephalomyelitis brains lesions, histopathology

CNS Lesions: Found in the brain (cerebral peduncle, cerebellum, brainstem) and spinal cord, with neuronal degeneration, necrosis, perivascular lymphocytic cuffing, and gliosis with glial nodules.

Cerebellum: Necrosis or loss of Purkinje cells, replaced by glial nodules extending into the molecular layer.

Neuronal Changes: Central chromatolysis, satellitosis, neuronophagia, and shrinkage in affected neurons, mainly in the brainstem, cerebellum, and spinal cord. Dorsal Root Ganglia: Show multifocal nodular lymphocytic collections. Outside CNS: Lymphocytic infiltrates found in gizzard muscle, esophagus, proventriculus, myocardium, and pancreas. 16



Brief Diagnosis of Avian Encephalomyelitis (AEV) Key Diagnostic Methods:

Clinical Signs: Tremors, ataxia, paralysis in young chicks.

Histopathology: Neuronal degeneration, gliosis, perivascular lymphocytic cuffing.

Virus Isolation: From brain, duodenum, and pancreas.

RT-PCR: Detects viral RNA, but primer variability affects results.

ELISA: Detects AEV antibodies, useful for monitoring vaccination.

Differential Diagnosis:

Bacterial/Mycotic Encephalitis

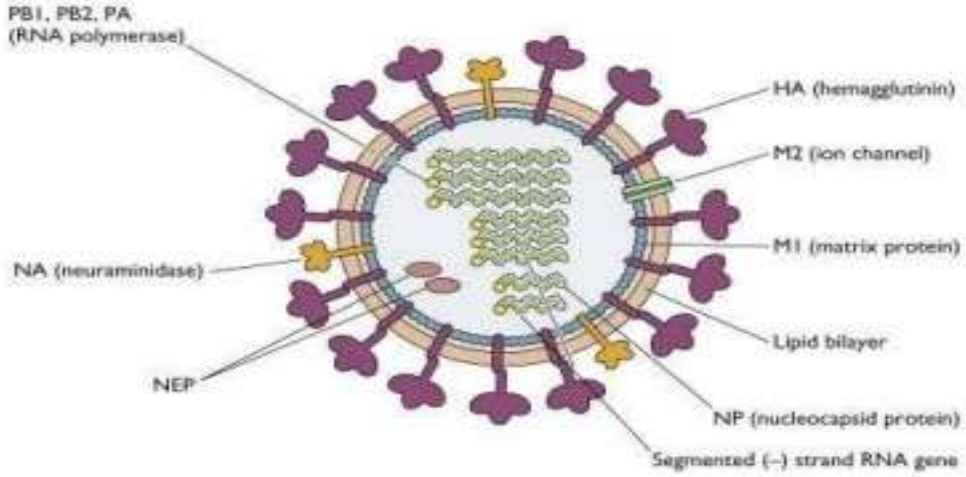
Neurotropic Virulent Newcastle Disease

Pathogenesis

Once the AEV virus enters the body, it primarily targets the central nervous system (CNS), leading to inflammation and degeneration of neurons. The virus replicates in the intestinal tract before spreading through the bloodstream (viremia) to the brain and spinal cord. Infected neurons undergo chromatolysis (dissolution of Nissl bodies), necrosis, and gliosis, contributing to the neurological symptoms. The virus can also cause immune-mediated damage, further worsening neuronal function.

Alternative Vaccination Strategies
Autogenous Vaccines: In some cases, where commercial vaccines do not provide full protection against circulating AEV strains, custom-made (autogenous) vaccines are developed using local virus isolates.In-Ovo Vaccination: Experimental studies are evaluating in-ovo vaccination (injecting the vaccine into the egg before hatching) toAlternative Vaccination Strategies
Autogenous Vaccines: In some cases, where commercial vaccines do not provide full protection against circulating AEV strains, custom-made (autogenous) vaccines are developed using local virus isolates.
In-Ovo Vaccination: Experimental studies are evaluating in-ovo vaccination (injecting the vaccine into the egg before hatching) to improve early immunity. 2. Biosecurity
Measures for Prevention
Farm Management: Since AEV spreads through fecal contamination, regular cleaning and disinfection of poultry houses, feed, and water sources is essential. Quarantine: New birds should be quarantined and observed for signs of disease before introducing them to the flock.
Rodent and Insect Control: These pests can act as mechanical carriers of the virus, so proper pest control is necessary.
3. Experimental Treatments
Antiviral Research: Although no specific treatment exists, studies are exploring antiviral agents that could reduce viral replication in infected birds.
Immunomodulators: Some researchers are testing the use of immune-boosting compounds, such as probiotics, prebiotics, and herbal extracts, to enhance resistance in poultry.
4. Global Surveillance and Control Efforts
Molecular Epidemiology: Ongoing surveillance helps track mutations and emerging AEV strains to update vaccine formulations.
International Trade Regulations: Countries with strict poultry import policies monitor and regulate AEV-free certification for breeder flocks.

***Avian Influenza (AI) – Bird Flu***
Avian Influenza (AI), commonly known as bird flu, is a contagious viral disease affecting domestic and wild birds, caused by the Influenza A virus. It can sometimes infect mammals, including humans. AI is classified based on pathogenicity and the hemagglutinin (H) and neuraminidase (N) subtypes of the virus.
Types of Avian Influenza
AI is categorized into two forms based on severity:
Low Pathogenic Avian Influenza (LPAI): Mild disease with respiratory symptoms, reduced egg production, and low mortality.
Highly Pathogenic Avian Influenza (HPAI): Severe disease with high mortality, affecting multiple organs, causing hemorrhages, neurological signs, and rapid death. Common HPAI subtypes include H5N1, H7N9, and H5N8, which are of global concern due to their zoonotic (human-infecting) potential.

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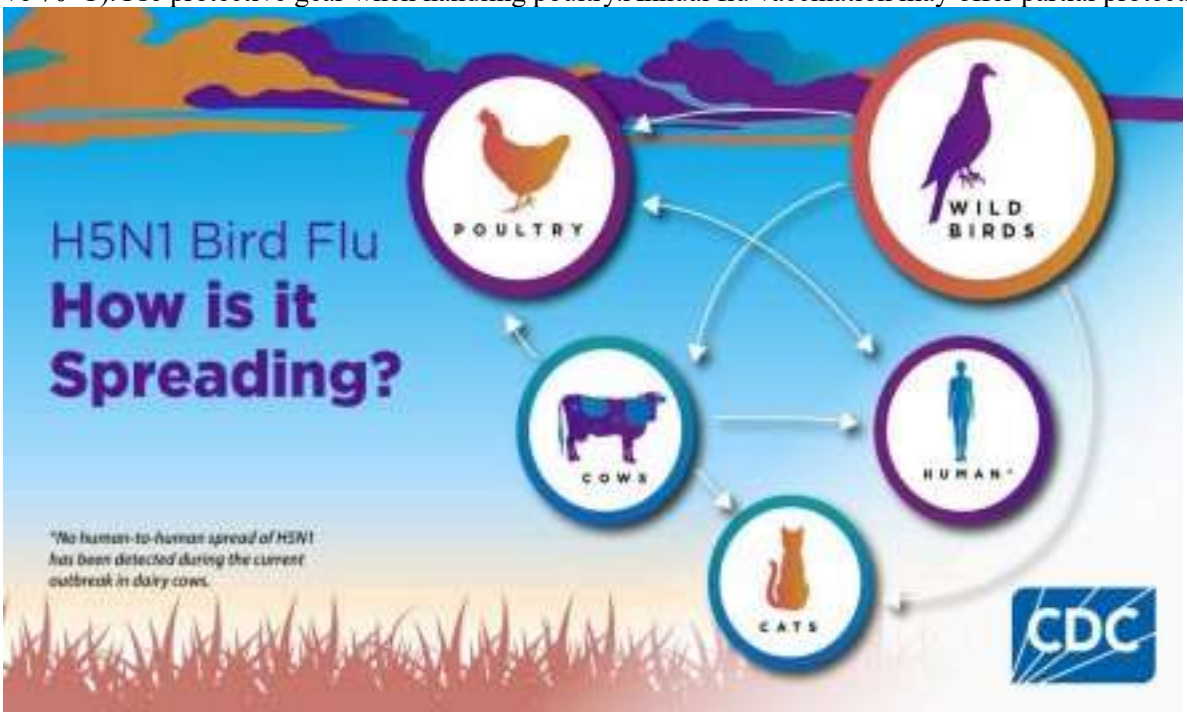
Direct Contact: Infected birds shed the virus through saliva, nasal secretions, and feces.
Indirect Contact: Contaminated feed, water, equipment, and clothing spread the virus.
Wild Birds: Migratory birds, especially waterfowl, act as reservoirs, spreading AI across continents.
Zoonotic Potential: Certain AI strains can jump to humans through close contact with infected birds or contaminated environments, leading to flu-like symptoms or severe respiratory illness. Control and Prevention
Biosecurity Measures:
Restricting farm access to minimize contamination
Disinfecting poultry houses and equipment regularly Preventing contact between domestic and wild birds
Vaccination:
AI vaccines are used in high-risk regions to prevent outbreaks.
Vaccination policies vary by country due to concerns about masking infections.
Culling & Quarantine:
Infected flocks are culled (mass euthanization) to prevent spread. Quarantine measures are enforced in outbreak zones.
Zoonotic Risk & Human Health Concerns
Some AI strains, such as H5N1 and H7N9, have caused severe respiratory infections in humans, with a high fatality rate. Symptoms in humans include:
Fever, cough, sore throat
Severe pneumonia
Multi-organ failure in severe cases
Precautionary Measures for Humans:Avoid contact with sick or dead birds.Properly cook poultry and eggs (above 70°C).Use protective gear when handling poultry.Annual flu vaccination may offer partial protection.




Infectious Laryngotracheitis (ILT) in Poultry
Infectious Laryngotracheitis (ILT) is a highly contagious respiratory disease in chickens caused by Gallid herpesvirus 1 (GaHV-1).
It primarily affects the trachea and larynx, leading to severe breathing difficulties. The disease can cause significant economic losses
in the poultry industry due to high mortality rates, reduced egg production, and slower growth in broilers.
Causes and Transmission
Causative Agent: Gallid herpesvirus 1 (a DNA virus from the Herpesviridae family).
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Spread:

Direct contact with infected birds
Airborne transmission (through respiratory secretions)
Contaminated equipment, feed, and water
Farm workers, rodents, and wild birds acting as carriers  Incubation Period: 6–12 days after exposure.
Symptoms
Mild Form: Slight coughing and sneezing.Reduced egg production
Clear nasal discharge
Severe Form:Open-mouthed breathing, gasping for air.Coughing up bloody mucus.Swollen and watery eyes.Caseous (cheesy) exudate blocking the trachea.High mortality (up to 50% in severe outbreaks

**Figure 1. Chickens suffering from mild ILT have swollen, watery eyes**

Symptoms in Birds  LPAI Symptoms:
Mild respiratory distress (coughing, sneezing)
Decreased egg production
Ruffled feathers, lethargy  HPAI Symptoms:
Sudden death without signs
Swelling of the head, neck, and comb.Purple discoloration of the comb, wattles, and legs.Greenish diarrhea
Neurological symptoms (tremors, paralysis)
Diagnosis
Virus Isolation: Samples from infected birds are tested in laboratories.
RT-PCR: Detects AI virus RNA in bird samples.
ELISA & Hemagglutination Inhibition Test: Identifies AI antibodies in poultry flocks. Histopathology: Examines tissue lesions in affected birds.
Diagnosis
Clinical Signs: Bloody mucus, respiratory distress  Laboratory Tests:
PCR (Polymerase Chain Reaction) – Detects viral DNA
Virus Isolation – Confirms the presence of Gallid herpesvirus 1
Histopathology – Examines tracheal tissue damage
Treatment & Control
No specific antiviral treatment – Supportive care helps reduce mortality.
Biosecurity Measures:
Strict hygiene in poultry farms
Preventing contact with infected birds.Proper cleaning and disinfection of farm equipment
Vaccination:Live attenuated ILT vaccine (administered via eye drops or drinking water)
Should be given to birds at 4–6 weeks of age in endemic areas.
Necropsy Findings in Infectious Laryngotracheitis (ILT)

During a necropsy of birds affected by ILT, characteristic lesions are found in the larynx, trachea, and upper respiratory tract. The severity of these lesions depends on the virulence of the virus and the stage of infection. Gross Lesions (Macroscopic Findings) Trachea & Larynx:
Hemorrhagic tracheitis (trachea inflamed with blood).
Blood-tinged mucus or caseous exudate in the trachea.
Severe cases: Tracheal blockage due to necrotic debris and fibrin plugs.
Lungs & Air Sacs:
Congestion and edema (fluid accumulation).
Secondary bacterial infections may cause air sacculitis.
Conjunctiva & Sinuses:
Swollen eyelids with conjunctivitis.Excessive lacrimation (tear production).
Microscopic Lesions (Histopathology)
Tracheal Epithelium:
Epithelial necrosis & sloughing.
Intranuclear inclusion bodies in affected cells (diagnostic feature of herpesvirus infections).
Lymphocytic infiltration around tracheal mucosa.
Larynx & Bronchi:
Fibrinohemorrhagic inflammation (fibrin deposition + bleeding).
Destruction of ciliated epithelial cells, leading to impaired respiratory clearance.
Secondary Infections:
Severe cases may show secondary bacterial pneumonia due to impaired lung defenses.
Confirmation of ILT Diagnosis
While necropsy provides strong evidence, ILT should be confirmed through:
PCR (Polymerase Chain Reaction): Detects ILT virus DNA.
Histopathology: Identifies intranuclear inclusion bodies.
Virus Isolation: Confirms Gallid herpesvirus 1 presence.


(a) (b)

***Newcastle Disease (ND)***
Newcastle Disease (ND) is a highly contagious viral disease affecting domestic and wild birds, caused by Avian Paramyxovirus-1 (APMV-1). It can lead to severe economic losses in poultry farms due to high mortality rates, decreased egg production, and respiratory and neurological symptoms.
Causes & Transmission:
Caused by Newcastle Disease Virus (NDV), a member of the Paramyxoviridae family.
Transmitted through direct contact with infected birds, contaminated feed, water, equipment, and human clothing.
Spreads via aerosol (airborne particles) and fecal-oral routes. Wild birds can act as carriers and spread the virus.
Symptoms
Symptoms vary depending on the virus strain (velogenic, mesogenic, or lentogenic) and the affected organ system:

☑ Respiratory Symptoms:
Sneezing, coughing, gasping for air Nasal discharge.Swelling of the face and eyes
☑ Digestive Symptoms:
Greenish watery diarrhea.Loss of appetite.Dehydration ☑ Nervous System Symptoms:
Twisted neck (torticollis).Paralysis of wings and legs.Tremors and convulsions.Loss of balance
☑ Reproductive Symptoms:
Drastic drop in egg production.Soft-shelled, deformed, or discolored eggs Types of ND Strains:
Velogenic (Highly Virulent): Causes high mortality, severe respiratory and neurological symptoms.
Mesogenic (Moderate Virulence): Causes mild respiratory symptoms and moderate egg production losses.
Lentogenic (Mild or Asymptomatic): Mild respiratory symptoms, often used in vaccines.
Diagnosis:
Laboratory tests such as RT-PCR, virus isolation in embryonated eggs, and hemagglutination inhibition (HI) test confirm the disease.Post-mortem findings:
Hemorrhages in the intestines, trachea, and proventriculus (glandular stomach).
Prevention & Control:
Vaccination:
Live attenuated vaccines (LaSota, B1, Hitchner) for young birds.
Inactivated vaccines for breeding and layer flocks.
Biosecurity Measures:
Isolating new birds before introduction.
Disinfecting farm equipment and limiting visitor access.
Preventing contact with wild birds.
Zoonotic Risk:
NDV can cause mild conjunctivitis in humans but does not pose a serious public health risk.

***Fowlpox (FPV) –***
Fowlpox is a highly contagious viral disease affecting chickens, turkeys, and other birds. It is caused by the Fowlpox virus (FPV), a member of the Avipoxvirus genus under the Poxviridae family. The disease can lead to skin lesions, respiratory distress, and decreased productivity in poultry.
Causes & Transmission
Direct contact with infected birds, contaminated equipment, or wounds.Mosquitoes and other biting insects act as vectors.The virus remains infectious in scabs and the environment for months, making it difficult to eliminate.
Types & Symptoms
☑ Cutaneous (Dry) Form – Affects the skin
Wart-like nodules on comb, wattles, eyelids, legs, and beak
Scabs that dry and fall off in 2–3 weeks.Low mortality, but affected birds may have reduced growth and productivity
☑ Diphtheritic (Wet) Form – Affects the mucous membranes
Yellowish-white lesions in the mouth, throat, and upper respiratory tract
Difficulty in breathing, eating, and drinking Higher mortality compared to the dry form
☑ Ocular Form
Affects the eyes.Swollen, watery eyes.Vision impairment
Diagnosis
Clinical signs: Presence of wart-like lesions on the skin and oral cavity. Laboratory tests: Histopathology, PCR, and electron microscopy for virus detection. Prevention & Control
✔ Vaccination – Live fowlpox vaccines are effective and usually given at 4–6 weeks of age.
✔ Vector control – Reduce mosquito populations and insect breeding sites. ✓ Biosecurity – Isolate infected birds and disinfect farm equipment.
✔ Nutritional Support – Provide vitamins (A & E) to boost immunity.
Treatment
No specific antiviral treatment.
Supportive care: Antibiotics (to prevent secondary bacterial infections), iodine-based antiseptics for skin lesions, and soft food for birds with mouth sores.
Infectious Bursal Disease (IBD/Gumboro)

Infectious Bursal Disease (IBD), also known as Gumboro Disease, is a highly contagious viral infection in young chickens, primarily affecting the bursa of Fabricius
(an immune organ responsible for B-cell development). It leads to immunosuppression, making birds vulnerable to secondary infections.
Causative Agent
Caused by Infectious Bursal Disease Virus (IBDV), a Birnavirus Two major strains:
Classic strain – Moderate to severe disease.Very virulent strain (vvIBDV) – Highly lethal, causing up to 100% mortality.
Transmission
Direct contact with infected birds, contaminated feed, water, litter, and equipment
Fecal-oral route – Virus is shed in droppings
Resistant virus – Can survive in the environment for months.
Subclinical Form (Mild cases):
No visible symptoms, but weak immune system
Increased susceptibility to other infections (e.g., E. coli,
Mycoplasma) Poor growth and reduced vaccine response.

Symptoms & Clinical Signs

☑ Acute Form (Severe cases):
Sudden onset of disease in 3-6 week-old chickens.Depression, ruffled feathers, huddling.Watery diarrhea (white or yellow).Swollen, hemorrhagic bursa (seen in post-mortem).Tremors, ataxia (lack of coordination) in some cases.Mortality rate:
10–50% (higher in vvIBDV strains).
Diagnosis
Clinical signs and age of affected birds
Post-mortem findings:Swollen, hemorrhagic, or atrophied bursa of Fabricius.Muscle hemorrhages in the thighs and breast
Laboratory tests: RT-PCR, virus isolation, ELISA for antibody detection.
Prevention & Control ✓ Vaccination:
Live and inactivated vaccines are used
Live vaccines: Given at 2–4 weeks (mild, intermediate, or strong strains) Inactivated vaccines: Given to breeders to transfer maternal immunity to chicks.
7. Treatment
No specific antiviral treatment
Supportive care: Electrolytes, vitamins (especially Vitamin E, Selenium) Antibiotics to prevent secondary bacterial infections.

***Bacterial diseases***
***Fowl cholera***
Fowl Cholera is a highly contagious bacterial disease that affects chickens, turkeys, ducks, and other birds. It is caused by Pasteurella multocida and can lead to high mortality, respiratory distress, and septicemia. The

disease occurs in both acute (sudden) and chronic (long-term) forms, causing severe economic losses in poultry farming.

Causes & Transmission

☑ Causative Agent: Pasteurella multocida (Gram-negative bacteria) ☑ Transmission:

Direct contact with infected birds, contaminated feed, water, and equipment

Aerosol transmission (airborne spread)

Carriers (chronic birds, rodents, and wild birds) can spread the infection.

Entry via wounds, respiratory tract, or ingestion of contaminated material.

Symptoms & Clinical Signs

☑ Acute Form (Severe and Rapid Spread)

Sudden high mortality (up to 100%)

Severe respiratory distress (coughing, gasping, nasal discharge) 29

Watery, greenish diarrhea

Swollen wattles and face due to bacterial infection

Cyanosis (bluish-purple discoloration of comb and wattles) due to septicemia

High fever and lethargy

Prevention Strategies

☑ Biosecurity Measures:

Isolate new birds for at least 2 weeks before introducing them to the flock. Restrict farm access to outsiders and disinfect footwear before entry. Control rodents and wild birds, which can carry the bacteria.

Farm Hygiene:

Clean waterers and feeders daily with disinfectants.

Dispose of dead birds properly to prevent disease spread.

Use dry, well-ventilated housing to reduce bacterial survival.

☑ Vaccination:

Live and killed vaccines are available.

First dose at 6–8 weeks of age, with booster doses as recommended.

☑ Balanced Nutrition:

Provide a nutrient-rich diet to boost immunity.

Include probiotics and vitamin supplements (especially Vitamin A, C, and E). Treatment and Control ☑ Antibiotics:

Tetracyclines, sulfonamides, penicillins (but antibiotic resistance is a concern). Treatment should be under veterinary guidance to prevent resistance.

***Salmonellosis***

Cause: Salmonella species, notably Salmonella Pullorum (Pullorum Disease) and Salmonella Gallinarum (Fowl Typhoid).
Transmission: Spread through contaminated feed, water, equipment, or vertically (from hen to egg). Wild birds and rodents can also introduce it.
Symptoms:
Chicks: White, pasty diarrhea, weakness, huddling, and high mortality within the first 2 weeks.
Adults: Depression, reduced egg production, poor hatchability, and occasional swollen joints.
Impact: Zoonotic potential (e.g., S. Enteritidis in eggs affects humans); causes trade bans and flock culling.
Diagnosis: Bacterial culture from organs (liver, spleen) or serology (e.g., rapid whole-blood agglutination test).
Treatment: Antibiotics like amoxicillin or fluoroquinolones, though resistance is a concern; culling is often preferred in outbreaks.
Prevention: Strict biosecurity, sourcing Salmonella-free chicks, regular testing of breeder flocks, and heat treatment of feed.

***Colibacillosis***

Cause: Escherichia coli, typically a secondary invader following stress or viral infections
Transmission: Inhalation of dust with fecal matter, contaminated water, or unabsorbed yolk sacs in chicks.
Symptoms:
Chicks: Omphalitis (yolk sac infection), lethargy, and septicemia. Older birds:
Airsacculitis, pericarditis, swollen joints, and respiratory distress. Impact:
Widespread in intensive systems; reduces weight gain and egg quality. Diagnosis: Culture from affected tissues (lungs, liver); necropsy shows lesions like airsac opacity.
Treatment: Antibiotics (e.g., enrofloxacin, amoxicillin) based on sensitivity testing; improving husbandry conditions.
Prevention: Clean hatching environments, adequate ventilation, and reducing stressors like overcrowding.

***Fowl Paratyphoid***

Fowl Paratyphoid is a bacterial disease in poultry caused by motile Salmonella species, primarily affecting young chicks but also posing a zoonotic risk to humans. Unlike the host-specific S. Pullorum and S. Gallinarum, paratyphoid Salmonella strains have a broader host range and are significant in poultry farming due to their prevalence and public health implications.
Cause
Pathogen: Non-host-adapted Salmonella species, such as Salmonella Enteritidis, Salmonella Typhimurium, and over 2,500 other serotypes.
Characteristics: Gram-negative, motile bacteria that survive in the environment (soil, water, feed) for weeks to months.
Transmission Routes:
Horizontal: Contaminated feed, water, litter, or equipment; spread by wild birds, rodents, insects, or human traffic.
Vertical: Transovarial transmission from infected hens to eggs, leading to infected chicks at hatching.
Sources: Poorly sanitized hatcheries, infected breeder flocks, or environmental reservoirs.
Symptoms
Chicks (Acute Phase):
Weakness, depression, and reluctance to move.
White, pasty diarrhea or vent pasting.
High mortality (up to 20-80%) within the first 2-3 weeks of life.
Dehydration and poor growth in survivors.
Adults (Chronic/Carrier State):
Often asymptomatic but may show reduced egg production or fertility. Occasional diarrhea or lethargy during stress (e.g., molting, transport). Note: Symptoms are less specific than Pullorum Disease or Fowl Typhoid, making diagnosis challenging without testing.
Diagnosis
Clinical Signs: Non-specific; requires lab confirmation.

Laboratory Methods:
Bacterial culture from intestines, liver, spleen, or yolk sac of dead birds.
Serotyping to identify specific Salmonella strains.
PCR for rapid detection of Salmonella DNA.
Serology (e.g., ELISA) to detect antibodies in flocks.
Necropsy: Lesions include enteritis, congested organs, and unabsorbed yolk sacs in chicks.
Treatment
Antibiotics:
Options: Amoxicillin, enrofloxacin, or trimethoprim-sulfa (based on sensitivity testing). Limitation: Treatment reduces symptoms but rarely eliminates carriers; antibiotic resistance is a growing issue.
***Pullorum***
Pullorum Disease is a highly contagious bacterial infection in poultry, primarily affecting young chicks and occasionally turkeys. Caused by Salmonella Pullorum, it was once a devastating disease in the poultry industry but has been largely controlled in many regions through eradication programs. However, it remains a concern in some areas due to its ability to persist in flocks and environments.
Cause
Pathogen: Salmonella Pullorum, a non-motile, gram-negative bacterium.
Characteristics: Host-adapted to poultry (especially chickens and turkeys), unlike the broader-host-range paratyphoid Salmonella strains.
Transmission Routes:
Vertical: Primary mode; transmitted from infected hens to chicks via eggs (transovarial).
Horizontal: Contaminated hatchery equipment, litter, feed, water, or contact with infected birds.
Carriers: Adult birds can be asymptomatic carriers, shedding the bacteria intermittently in feces or eggs.
Carriers: Adult birds can be asymptomatic carriers, shedding the bacteria intermittently in feces or eggs.
Environmental Persistence: Survives in soil or litter for weeks to months.
Symptoms

Chicks (Acute Phase):
Onset within 5-10 days of hatching.White, chalky diarrhea or vent pasting.Weakness, huddling near heat sources, and high mortality (up to 90% in severe outbreaks). Labored breathing and shrill chirping.
Adults (Chronic/Carrier State):
Often asymptomatic but may show reduced egg production, poor hatchability, or occasional arthritis.
Stress (e.g., cold, transport) can trigger symptoms or shedding.
Note: Symptoms peak in chicks under 3 weeks; older birds rarely show acute signs.
Diagnosis
Clinical Signs: Suggestive but not definitive due to overlap with other diseases (e.g., Fowl Typhoid, Paratyphoid).
Laboratory Methods: Bacterial culture from yolk sac, liver, spleen, or intestines of dead chicks.
Serology: Rapid whole-blood agglutination test (on-farm) or ELISA for flock screening.PCR for rapid, specific detection.
Treatment
Antibiotics:
Options: Sulfonamides, amoxicillin, or fluoroquinolones (based on sensitivity). Limitation:
Does not eliminate infection; treated birds often become carriers. Practical Approach:
Treatment is rare; culling infected flocks is preferred to prevent spread.
Supportive Care: Electrolytes and warmth for affected chicks, though survival rates remain low.
Prevention
Eradication Programs:
Test and cull infected breeder flocks (e.g., U.S. National Poultry Improvement Plan - NPIP). Source Pullorum-free chicks from certified hatcheries.
Biosecurity:
Disinfect incubators, equipment, and housing between batches. Limit farm visitors and control wild birds/rodents.
Prevention
Biosecurity:
Restrict farm access to prevent introduction by wild animals or humans. Disinfect equipment, vehicles, and footwear.

Hatchery Management:
Use Salmonella-free breeder flocks (regular testing).
Fumigate eggs and sanitize incubators.

**Feed and Water:**
Heat-treat feed to kill Salmonella.
Provide chlorinated or clean water sources.
Monitoring: Routine flock screening and removal of carriers.
Vaccination: Available for some strains (e.g., S. Enteritidis, S. Typhimurium) in layers; reduces shedding and egg contamination.
Rodent/Insect Control: Eliminate vectors that spread the bacteria.
Management:
Avoid mixing age groups to prevent carrier-to-chick transmission. Monitor breeder flocks with regular serologic testing.
Vaccination: Not typically used, as eradication is the goal rather than control.

***Discussion***

The common bacterial diseases affecting poultry, such as Fowl Cholera, Pullorum Disease, Avian Colibacillosis, and Necrotic Enteritis. Some of them, who have a background in life sciences, shared their thoughts on how these diseases impact poultry farms, leading to high mortality rates and economic losses. Others were more curious about how farmers manage these diseases and what preventive measures are taken to ensure the safety of poultry products. Bacterial diseases are a major threat to poultry farming, leading to economic losses and health risks. Biosecurity measures and vaccination are the most effective ways to prevent bacterial infections. The overuse of antibiotics can lead to antibiotic resistance, which is a growing concern in poultry farming. Alternative treatments, such as probiotics and herbal medicine, could be explored as potential solutions. Early disease detection through proper diagnostic methods is essential for effective disease control. Understanding the economic impact of these diseases will provide a more comprehensive view of their significance.

**Result:**

Among the various bacterial diseases affecting poultry, Fowl Cholera, Pullorum Disease, and Avian Colibacillosis have had significant impacts on poultry farms worldwide. Efforts to control these diseases through vaccination, improved biosecurity measures, and better farm management practices have shown promising results.
One of these, Pullorum Disease, caused major losses in poultry farming, prompting strict control measures such as regular screening and culling of infected birds. Government programs like the National Poultry Improvement Plan (NPIP) have played a crucial role in eradicating this disease in several regions. As a result, the occurrence of Pullorum Disease has significantly declined, improving poultry health and farm productivity.

**Conclusion**

Poultry farming plays a crucial role in the global food industry, but bacterial and viral diseases continue to pose significant threats to productivity, bird health, and economic stability. Diseases such as Fowl Cholera, Pullorum Disease, Avian Influenza, and Newcastle Disease have caused widespread outbreaks, leading to high mortality rates and economic losses for poultry farmers. Over the years, advancements in disease control strategies, including vaccination, strict biosecurity measures, and improved farm management, have significantly reduced the impact of these diseases. However, challenges such as antibiotic resistance and emerging viral mutations remain a major concern. Government policies and global initiatives like the National Poultry Improvement Plan (NPIP) have played a key role in controlling certain bacterial diseases, while continuous scientific research and technological advancements are essential for combating evolving viral threats.The future of poultry farming depends on the adoption of sustainable disease prevention strategies, including the use of alternative treatments, early disease detection, and genetic improvements in poultry breeds to enhance resistance against infections.A collective effort from scientists, veterinarians, policymakers, and poultry farmers is required to ensure a disease-free and productive poultry industry, ultimately contributing to food security and economic growth worldwide.

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