



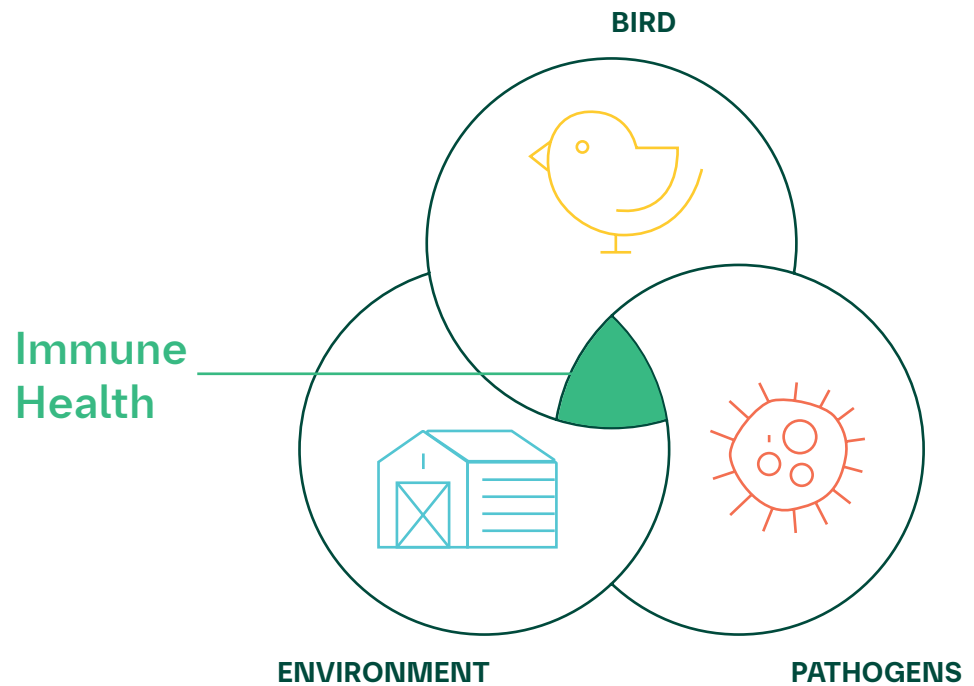
Immune Health: The Core of Poultry Performance

Life Forward



The Triad of Bird Immunity

There are **three elements** impacting poultry immune health and performance.



The **BIRD** and its ability to fend off disease, which is influenced by:

- Genetics
- Primary and secondary immune system organs
- Innate and acquired immunity



The bird's **ENVIRONMENT**, meaning everything around the bird that can impact its health, including:

- Housing, air quality, feed, water, etc.
- Good management practices that limit stress on the bird

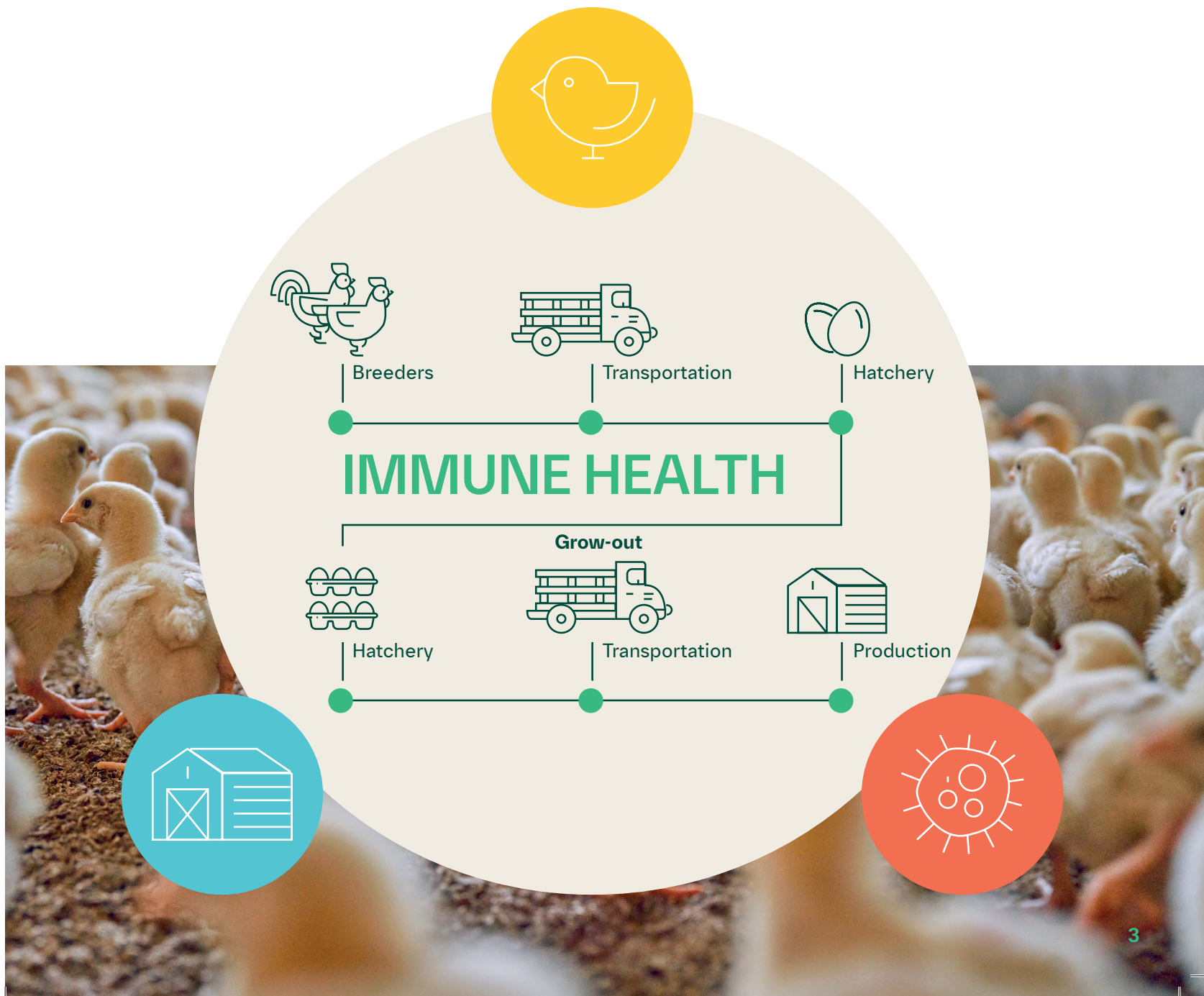


PATHOGENS that target the immune system, meaning:

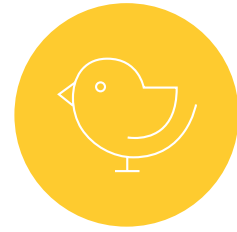
- Pathogens that impact B and T-cells
- Pathogens that inhibit a bird's ability to build up an immune response

Maximize Genetic Potential Through Immunity

Immunity is an essential element to bird health, ensuring birds can handle environmental challenges, fend off disease and perform to their genetic potential. Immunity, however, is impacted by multiple factors at play across all stages of production.



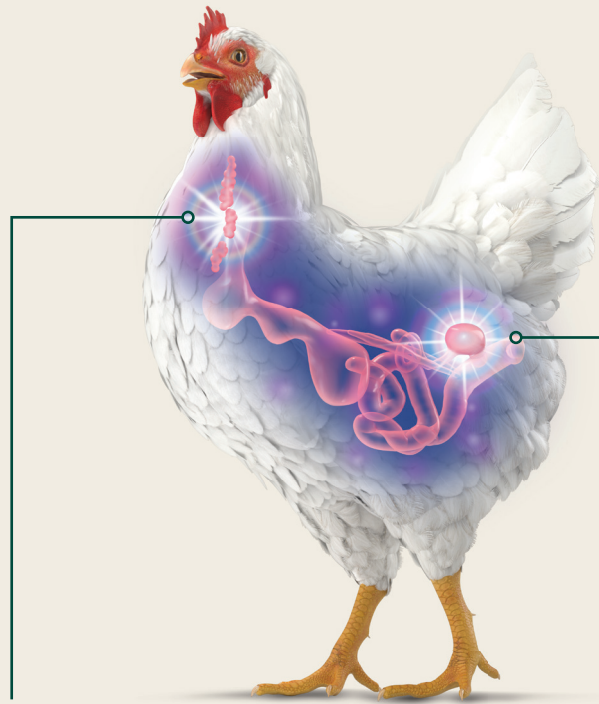
Bird



There are two primary organs in a bird's immune system: the **THYMUS** and **BURSA**.

The primary immune system organs set a foundation for a bird's immune health and seed the secondary organs, including the spleen and all secondary lymphoid tissue.

These primary organs are **critical to providing comprehensive acquired immunity**, defending poultry against disease and infections.



THYMUS

Produces T-cells which monitor for antigens and help fight them off.



T-CELL

BURSA

Produces B-cells, which create antibodies that bind to antigens to neutralize them.



B-CELL

There are two different types of immunity:

- **INNATE IMMUNITY** is a chick's first line of defense. It is derived from existing, physical elements of a chick that prevent infection, including components of the respiratory and enteric systems, and other physical barriers like skin, feathers, as well as secretions and mucus.



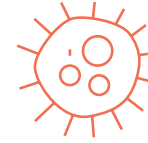
- **ACQUIRED IMMUNITY** is derived from external factors. Maternal antibodies from the hen (passive immunity) are contained in the egg yolk. Chicks develop their own immunity (active immunity) after an infection or vaccination.



The **BIRD** itself has innate and acquired immunity. The environment and pathogens that target the immune system can cause immunosuppression.



The **ENVIRONMENT** can cause stress to birds, like when they are wet, cold, or challenged by other environmental factors. This stress leads to transient immunosuppression.



PATHOGENS that target the immune cells themselves cause permanent immunosuppression.

All three elements of the Triad impact immune health.

Passive Immunity vs. Active Immunity

Passive maternal antibodies (MAB)

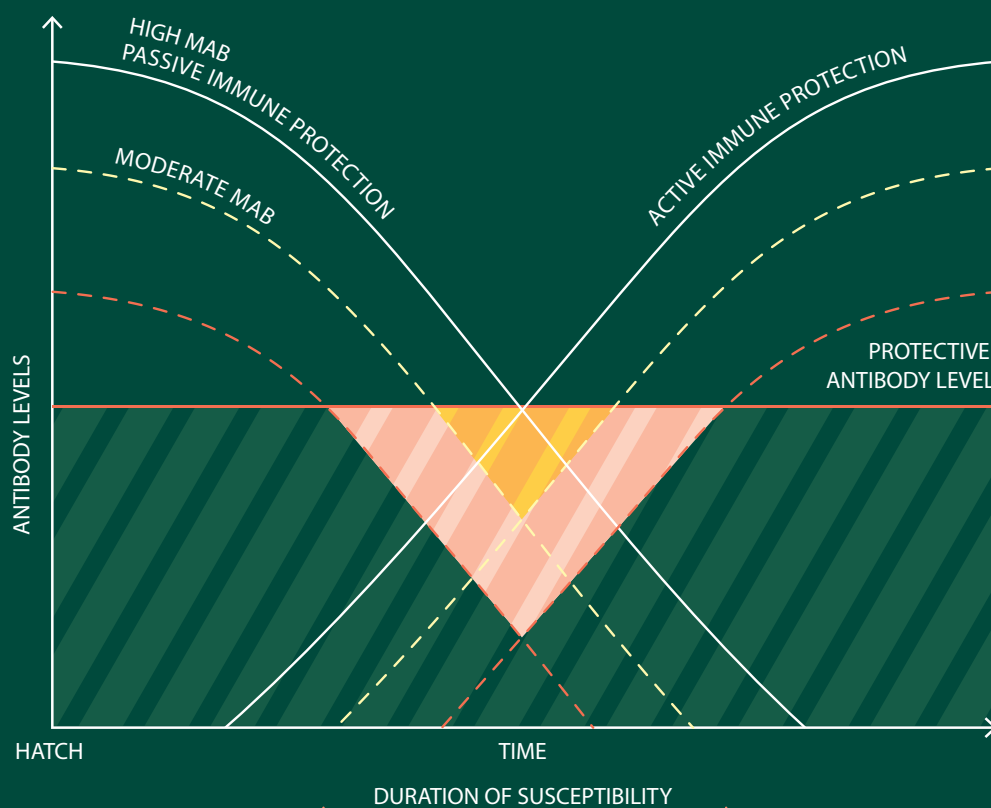
MAB are absorbed from the yolk. The quality of MAB transferred to the chick depends on:

- Quality of breeder vaccinations
- Amount of antibodies in yolk
- Proper absorption of yolk by chick

Active chick acquired antibodies (Ab)

Antibodies develop after exposure to infection or vaccination. The quality of Ab response depends on:

- Health of birds at time of exposure/vaccination
- Presence of immunosuppressive disease agents
- Level of MAB protection at time of exposure



As maternal antibodies wane and before active immunity sets in, chicks are very susceptible to disease.

Managing Triad elements like environmental stressors and pathogen exposure to limit immunosuppression is critical to help chicks maintain immune health.

Environment



The **ENVIRONMENT** in which embryos develop and chicks grow directly impacts a bird's immune health. Proper management of the hatchery and house, focusing on best husbandry practices, reduces the potential for transient immunosuppression due to stress.



FEED
formulation, form, quality, availability



SPACE
bird density management, and attention to turnout timing



LIGHT
appropriate for the age of the bird, to ensure maturity and growth



BIOSECURITY
safeguarding the farm and houses from external biological risks



LITTER
clean, dry, and with proper downtime



SANITATION
cleaning and disinfecting of houses including waterlines, feed-pans, and anterooms between flocks



AIR QUALITY
ventilation, temperature, humidity, drafts, ammonia, etc.



HUSBANDRY
chick quality, proper vaccination, caregiving



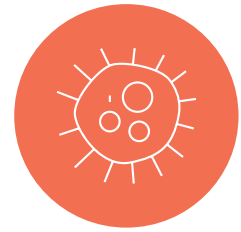
WATER
quality and availability



MICROORGANISMS
secondary, potentially disease-causing agents that can be kept under control with good management practices, but can become primary disease concerns if not managed properly

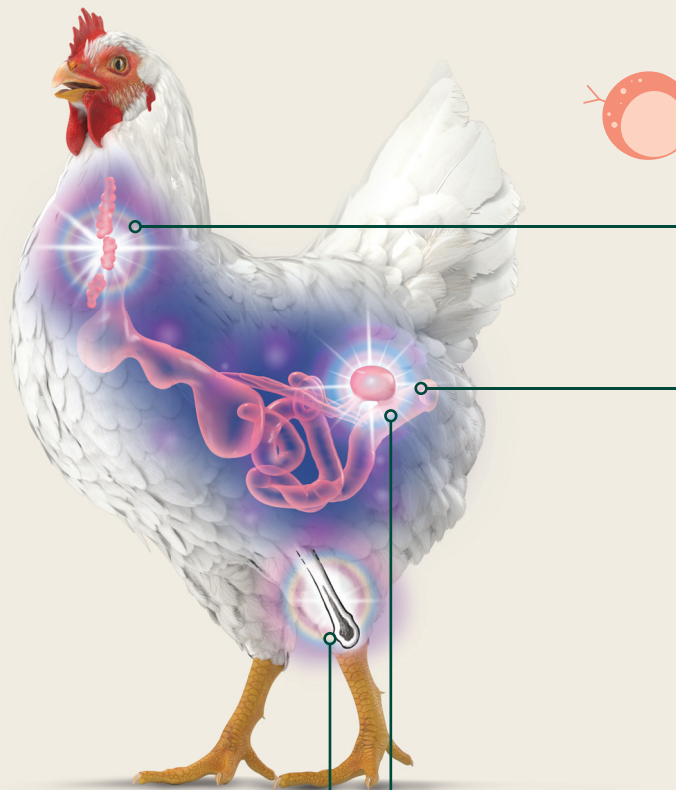
These 10 items identify the critical factors of poultry production to ensure a systematic approach for instituting best practices, which, when managed daily, tend to the needs of flocks throughout their growing period.

Immune System Pathogens



PATHOGENS targeting the immune system may cause immunosuppression. With proper management of Triad elements, preparing chicks with strong passive immunity from their hens, generating active immunity from appropriate and timely vaccination, and maintaining a supportive environment with good husbandry, the impact of endemic immune targeting pathogens can be minimized or even eliminated.

Primary Pathogens that Target the Immune System



MAREK'S DISEASE VIRUS (MDV)

This virus causes major immunosuppression by attacking the immune cells of the Thymus and Bursa (T-cells and B-cells). Immunosuppression continues for the life of the chicken because of the depletion of immune cells needed to seed secondary immune organs. Of note, tumors may not be seen with immunosuppression.



INFECTIOUS BURSAL DISEASE VIRUS (IBDV)

This virus destroys B-cells in the bursa, which are critical for antibody development and the ability to fight disease.

INFECTIOUS CHICKEN ANEMIA VIRUS (CAV)

This virus causes thymus depletion, bone marrow atrophy, anemia, and severe immunosuppression due to the direct effect on immune cells in the blood.

SUMMARY



Top Influencers of Immune Health

- **Two primary organs impacting immunity:** THYMUS and BURSA
- **Two types of immunity:** INNATE and ACQUIRED
- **Two types of acquired immunity:** PASSIVE IMMUNITY (derived from maternal antibodies from the hen) and ACTIVE IMMUNITY (derived from exposure to pathogens or vaccination)
- **Two main influencers on immune health:** ENVIRONMENTAL (causing transient immunosuppression) and immune system targeting PATHOGENS (causing permanent immunosuppression)
- **The primary pathogens** directly and permanently debilitating the key immune organs responsible for chick immune health - MDV, IBD, CAV

Managing all factors is **essential** to maximizing the genetic potential of your flock.

Primary breeders have even more specific direction for helping birds reach their full genetic potential. Refer to the below materials for more information on the topics listed.

AVIAGEN

- [Ross Parent Stock Management Handbook](#)
- [Ross Broiler Management Handbook](#)
- [Ross Broiler Nutrition Specifications](#)
- [Hatchery Tips](#)
- [How To... Broiler Management](#)
- [How To... Broiler Breeder Management](#)
- [Best Practice on the Farm: Alternative Water Disinfection Methods](#)
- [Essential Ventilation Management](#)
- [Aviagen™ Brief Water Utilization in broilers](#)

HUBBARD BREEDERS

- [Breeder Management Manual](#)
- [Husbandry Guidelines Premium Chickens](#)
- [TB Water Quality for Breeders and Broilers](#)
- [Poster Breeder Management Brooding the Chicks](#)
- [Poster Broiler Management Brooding the Chicks](#)

COBB

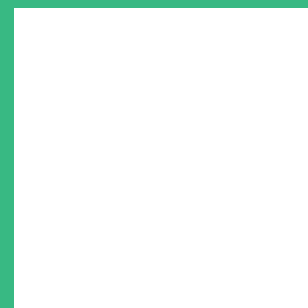
- [Breeder Management Guide](#)
- [Broiler Management Guide](#)
- [Hatchery Management Guide](#)

HY-LINE

- [Cage-Free Leghorn Management Guide](#)
- [Technical Update Brooding Management](#)
- [Technical Update Growing Management of Commercial Pullets](#)
- [Technical Update Heat Stress in Layers](#)
- [Technical Update Understanding Poultry Lighting](#)
- [Technical Update Understanding Nesting Behavior](#)
- [Technical Update Understanding the Role of the Skeleton in Egg Production](#)

HENDRIX

- [Commercial Management Guide for alternative housing systems](#)
- [Commercial Management Guide cage housing](#)
- [Commercial Management Guide Hot & Tropical Climates](#)
- [Management Guide Parent Stock](#)
- [Hatchery Management Guide](#)
- [Nutrition Guide](#)



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Life Forward