PROTECT against ***MYCOPLASMA SYNOVIAE*****,** **PROTECT** bird **PERFORMANCE**

MS-H live Mycoplasma vaccine
for poultry production systems

MYCOPLASMA SYNOVIAE (MS):

AN UNDERLYING CHALLENGE FOR POULTRY PRODUCTION

Modern poultry production is a fully connected system, where breeder and layer status directly influences downstream performance. Pathogens present in breeders can be passed to progeny and circulate across production stages, compromising flock health, welfare, and consistency.

Mycoplasma synoviae is one such bacterial pathogen and it is widely distributed in poultry populations world-wide and has been since its discovery in the 1950s.

MS belongs to the Mollicutes group of bacteria and has numerous biological characteristics that contribute to its persistence:

- **Absence of a cell wall**, allowing close adaptation to host tissues, and facilitating resistance to many antibiotics
- **Continuously evolving surface antigen profile**, helping the organism to evade immune responses of birds
- **Persistent and often undulant colonisation of mucosal surfaces** such as the trachea, air sacs and oviduct

Once infection is established, MS primarily colonises the **upper respiratory tract** and may spread to other tissues depending on the strain, presence of other pathogens and bird management condition, and the age of the bird. As birds reach sexual maturity, the pathogen can also spread to the ovary and oviduct.

Multisystemic impact of MS

After colonising the respiratory tract, MS can affect several tissues and organs in poultry.

Some MS field strains show a stronger respiratory tropism, while others may predominantly affect joints or the reproductive tract, leading to lameness, eggshell abnormalities and reduced egg quality.

Clinical manifestations include:

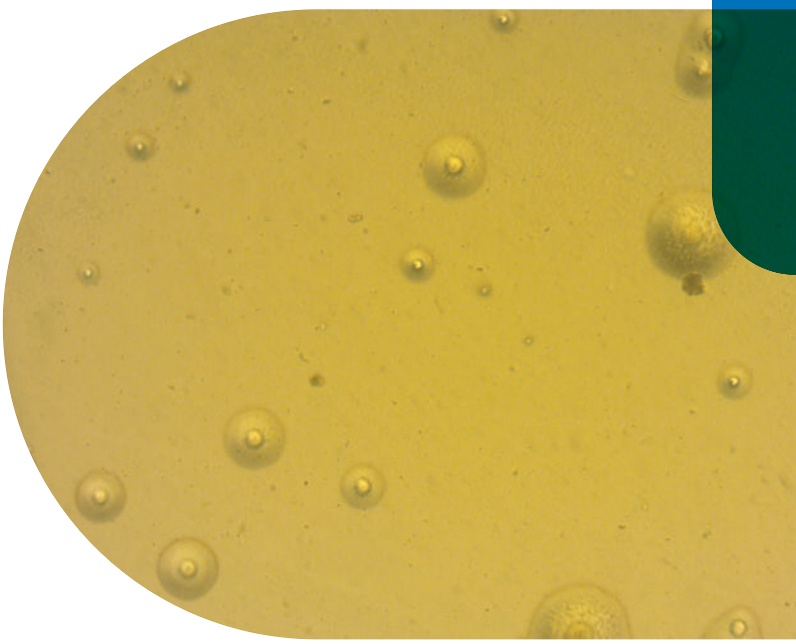
- Respiratory disease, often part of chronic respiratory disease complexes, typically characterised by airsaculitis
- Infectious synovitis, causing joint inflammation, lameness and poor economic performance
- Reproductive tract infection, affecting egg and eggshell formation and overall reproductive performance, including:
  - Eggshell apex abnormalities, also described as EAA / "glass-top eggs"
  - Reduced egg production, typically 5–10 fewer eggs/hen/year
  - Sudden production drops, up to -30% hen-day losses (HD) production
  - Reduced hatchability in breeder flocks
  - Increased egg downgrading and losses
- Vertical impact on progeny, increased condemnations in offspring from infected breeder flocks
- Complicated systemic infection, when secondary pathogens (e.g. *E. coli*) are present, leading to:
  - Systemic disease
  - Increased mortality
  - Fluctuating production performance

MS infection frequently occurs together with other viral and bacterial pathogens. These interactions may increase disease severity and contribute to complex respiratory disease scenarios such as Chronic Respiratory Disease (CRD).

Pathogens commonly involved include:

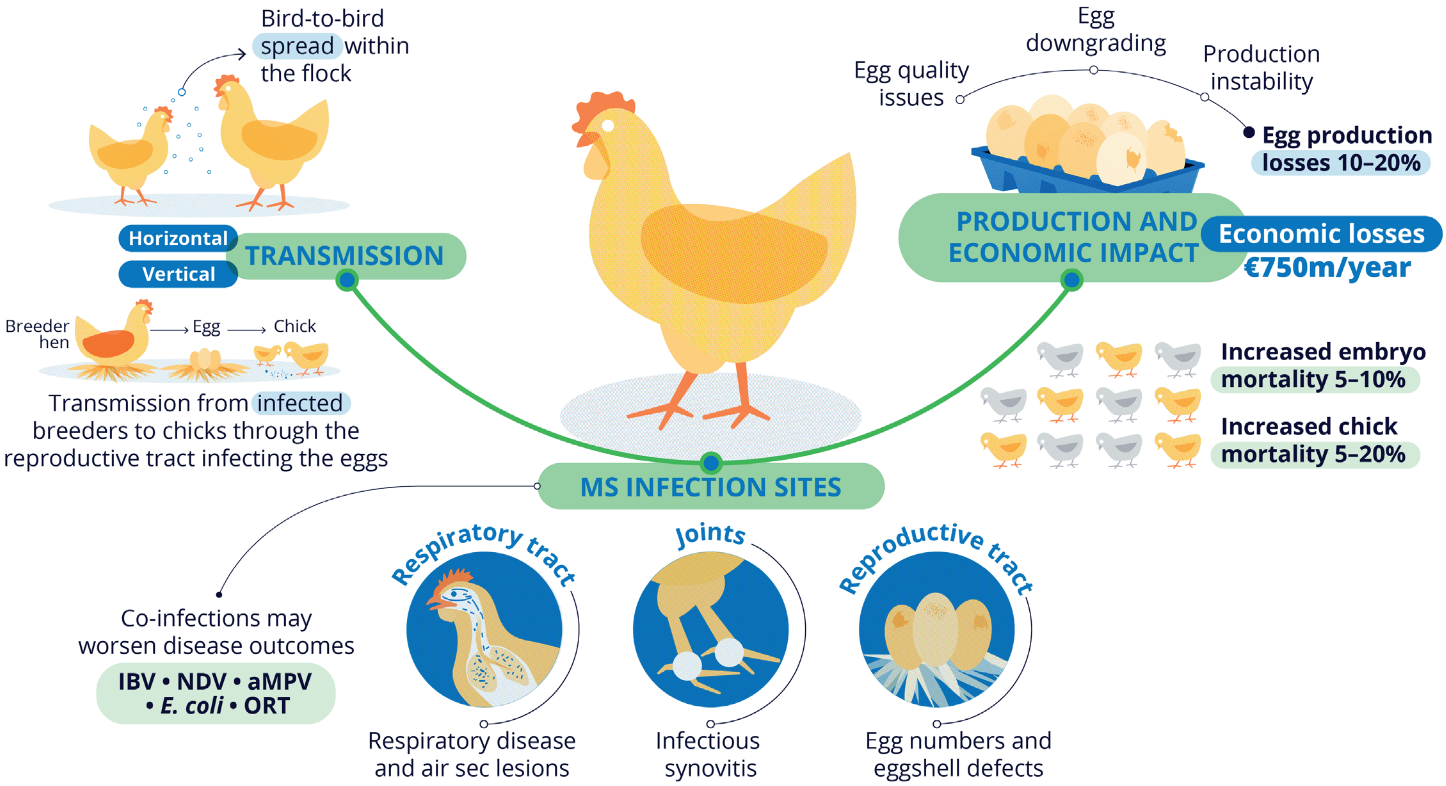
- **Respiratory viruses**: Infectious bronchitis virus (IBV), Avian Paramyxovirus (APV/NDV), low pathogenicity avian influenza (LPAI), infectious laryngotracheitis (ILT) and avian metapneumovirus (aMPV/TRT/SHS)
- **Immunosuppressive viruses:** Chicken anaemia virus (CAV) and infectious bursal disease virus (IBDV)
- **Bacterial pathogens:** *Escherichia coli* (colibacillosis), *Ornithobacterium rhinotracheale* (ORT) and *Avibacterium paragallinarum* (Infectious Coryza)

Historically, the clinical expression of MS infections in commercial poultry systems has often been partially **masked by the routine use of prophylactic antibiotics.** Due to the **increased public pressure on antibiotic use** in modern production systems, the true underlying impact of MS on flock health and productivity has become more evident.



MolliScience, Budapest, Hungary

FROM TRANSMISSION TO PRODUCTION LOSSES: THE IMPACT OF MYCOPLASMA IN POULTRY



Transmission and persistence within production systems

Horizontal transmission

Spread within and between flocks

- **Aerosol transmission** through respiratory secretions
- Direct **beak to beak** contact between birds
- **Indirect transmission** via **contaminated materials**, with MS able to persist on surfaces (**fomites**), particularly in organic matter such as **egg debris** and egg contents, where survival may extend up to 30–40 days

Vertical transmission

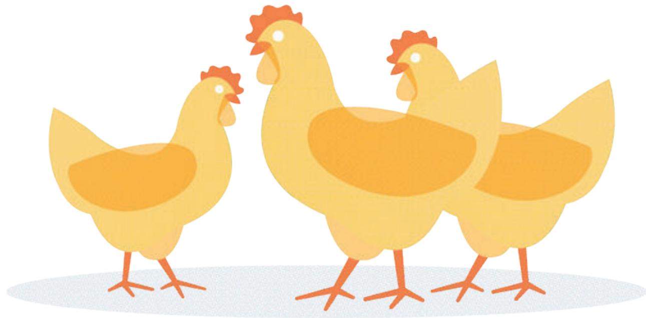
Transmission between generations

- **Infected breeders** may transmit MS through **the reproductive tract, infecting the embryos**
- **Chicks** may already be **infected at hatch**
- MS can enter production systems without **any visible clinical signs**

Together, horizontal and vertical transmission allow MS to persist silently within poultry production systems, making long-term control based solely on treatment particularly challenging.

Economic impact and the changing European control landscape

Although MS infections are often asymptomatic, their cumulative economic impact can be considerable across poultry production systems, for both layer and breeder flocks.



Impact in laying hens

- **Egg production losses** of approximately 5–10 eggs per hen per year (losses estimated between 10–20%)
- **Eggshell abnormalities** and downgraded eggs (including EAA)
- Increased **egg breakage** during handling and transport
- **Additional labour** for egg selection and cleaning
- **Worsened outcomes** in the presence of co-infections, with increased mortality and performance losses.

Impact in breeder flocks (broiler and layer breeders)

- **Reduced hatchability, embryo survival and chick quality** (5–10% embryo mortality and 5–20% chick mortality)
- **Vertical transmission** to progeny, leading to early infection and associated impacts during rearing
- In affected progeny, increased incidence of:
  - **Infectious synovitis**, leg weakness and lameness
  - **Higher mortality** during rearing
  - **Increased susceptibility to respiratory disease**, often in association with viral and bacterial infections
- **Increased incidence of bacterial disease and carcass condemnations** (up to 5-10% meat condemnation)

Production instability and occasional mortality events translate into **economic losses** through:

- **Reduced output**
- **Lower product quality**
- **Increased management and treatment costs**

Why antibiotic treatment alone is not sufficient

As MS lacks a cell wall, several antimicrobial classes are ineffective. Intrinsic resistance mechanisms and emerging mutations further reduce the effectiveness of available treatment options. As a result, antibiotic therapy may reduce clinical signs but does not eliminate infection or prevent transmission within flocks.

Routine reliance on antibiotics is not a sustainable solution, contributing to resistance development and offering only short-term control.

At the same time, in many countries regulations increasingly promote **responsible antimicrobial use. For example, in Europe, the One Health framework**, encourages the transition from treatment-based disease management towards non-antibiotic-based based **preventive health strategies**.

MS-H: A LIVE VACCINE

DESIGNED TO PREVENT THE ADVERSE EFFECTS OF MS

MS-H is the only globally available **live, single-dose MS vaccine**, administered through the **oculonasal route** and developed to prevent disease. By stimulating mucosal immunity, it also contributes to reducing infection and transmission at flock level.

Key characteristics

Live attenuated temperature-sensitive strain

- Replication is restricted to only the cooler environment of the upper respiratory tract
- Unable to replicate at bird's core body temperature, therefore unable to be shed vertically in breeders

Safety profile

- EU first authorisation in **2011** and **>15 years** continuous use in EU and **>30 years** worldwide
- No field or experimental evidence of reversion to virulence
- No evidence of tropism for the oviduct or joints
- No clinical signs observed, even under overdose conditions or in combination with IBV co-infection, indicating a high safety margin

Practical considerations for vaccination programs

- Administration before exposure to wild-type strains
- Use of correct oculonasal application technique
- Monitoring approaches adapted to live thermo-sensitive vaccines with PCR-based detection
- Careful management of anti-Mycoplasma antibiotics around vaccination

Proven benefits in poultry production systems

- **Persistence** of the vaccine strain in the **respiratory tract throughout the production cycle**
- Continuous **stimulation of local mucosal immunity** associated with this persistence, supporting sustained control of MS
- Helps **control circulation of wild-type MS strains** within and between poultry farms, and together with biosecurity, supports displacement and eradication of wild-type strains
- **Prevents clinical consequences** of MS infection
- **Improves egg production, eggshell quality**, and production consistency
- **Reduces** or eliminates **EAA**
- **Reduces mortality** associated with MS-related disease complexes
- **Improves feed efficiency** and production consistency
- Improves economic performance on farm, with **increased return on investment (ROI)**
- **Reduces reliance on antimicrobial treatments** in vaccinated systems

How MS-H protects the flock

Early respiratory colonisation and competitive exclusion

Following vaccination, the MS-H strain colonises the **upper respiratory tract**, the natural entry site of MS. By occupying this biological niche early, the vaccine strain **limits the ability of MS field strains to attach to the mucosa, and multiply**. This **biological displacement** helps reduce the establishment of wild MS infection within the flock. Wild strain MS is frequently eradicated from farms which are correctly and continuously vaccinated with MS-H.

Local immune activation

Colonisation by MS-H vaccine provides **continuous immunogenic stimulation in the respiratory tract**, supporting the development and maintenance of mucosal and cell-mediated immune responses. This includes **secretory IgA**, which helps limit bacterial attachment and colonisation at the mucosal surface. Systemic **antibodies** (**IgY**) may also develop, although **local mucosal immunity is key for preventing initial infection**.

Monitoring vaccination

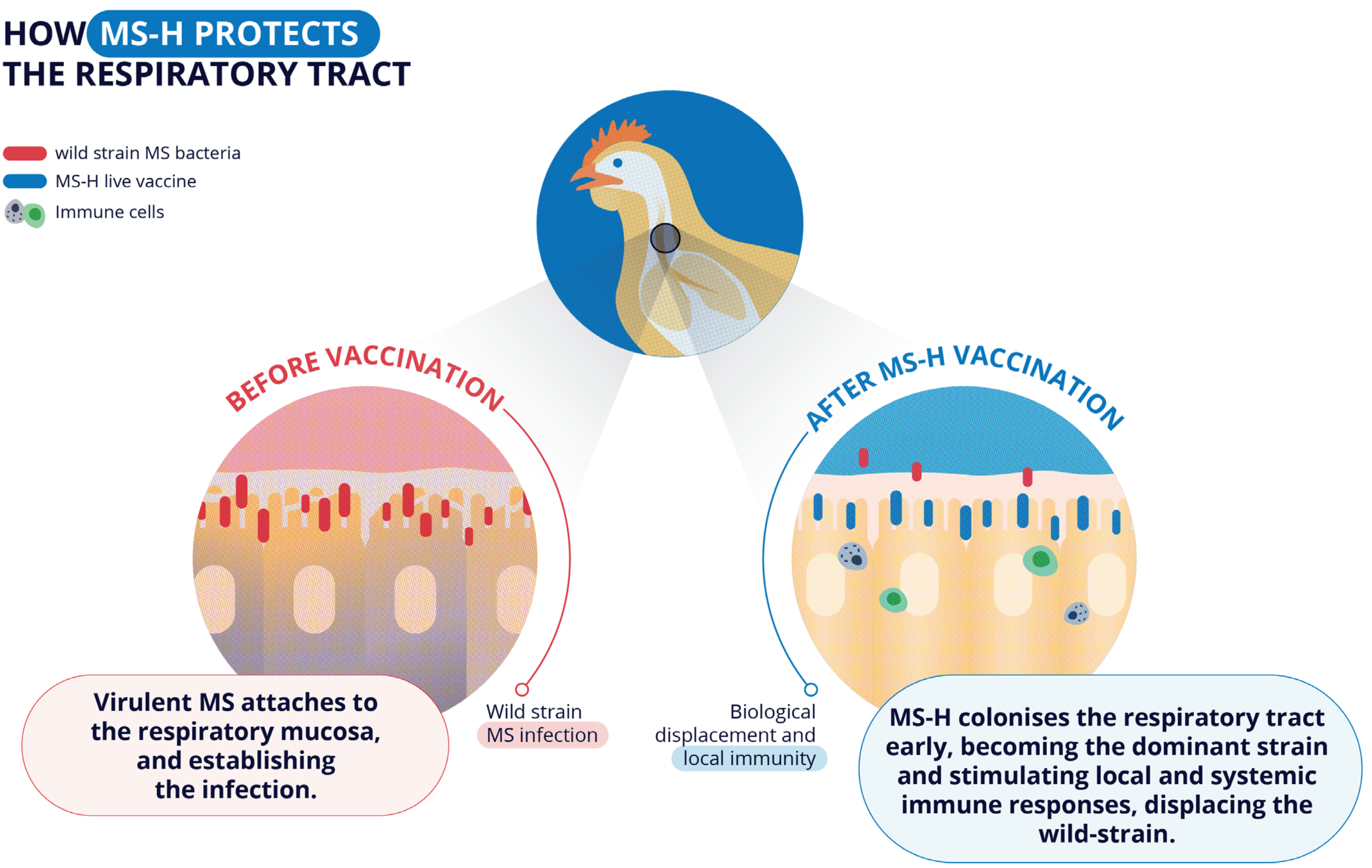
Because live MS-H colonises the respiratory tract, **PCR testing** of palatine/choanal cleft samples is the most reliable monitoring tool.

PCR allows:

- **Detection** of the **vaccine strain**
- **Differentiation** between **vaccine and field strains** (DIVA)
- **Confirmation of successful vaccine colonisation** and exclusion of wild-type infection, which cannot be determined by serology alone
- **High sensitivity** of detection, with the MS-H strain being detectable in the respiratory tract for up to 95 weeks following vaccination

Vaccinated flocks can still have field strains in them, but the field strain's impact is greatly reduced.

Serology may vary and should always be interpreted within the context of flock history. Serology cannot differentiate vaccine reactions from field strain effects. Its use in unvaccinated flocks is reliable (testing flock freedom before vaccination for example).



REAL-WORLD PERFORMANCE

OF MS-H VACCINATION IN EUROPE

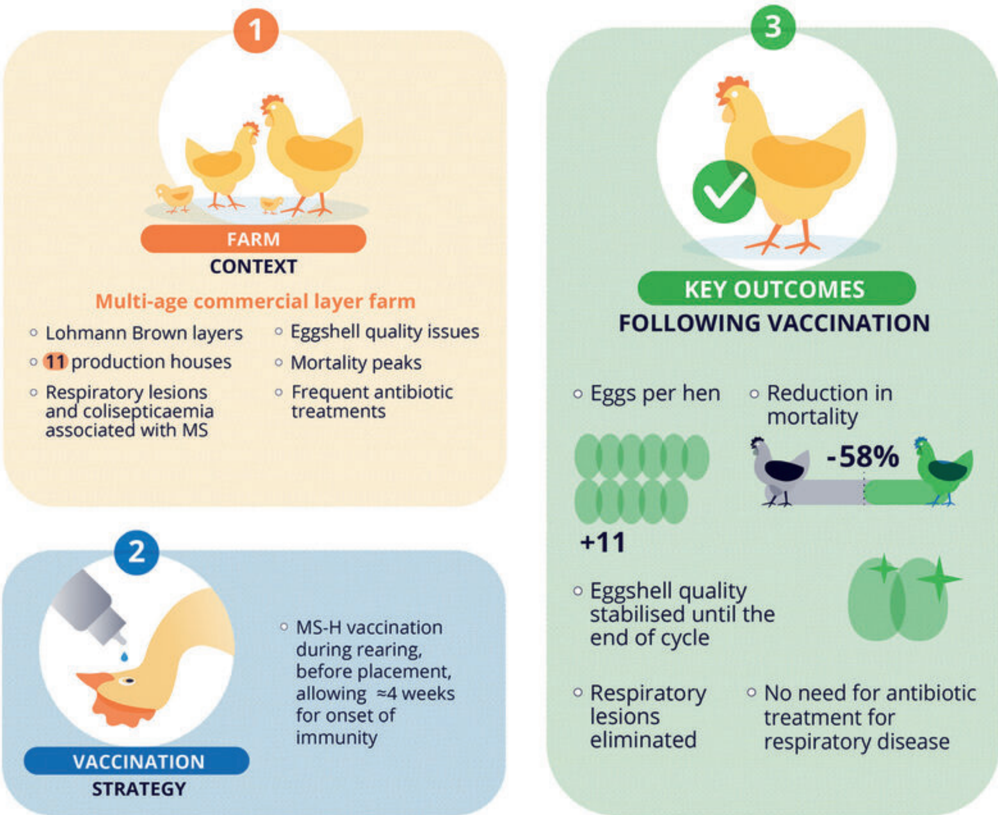
MS-H vaccination improves flock health welfare and production performance under commercial farm conditions. Field trials and farm case studies conducted in Europe demonstrate the practical benefits of MS-H vaccination in controlling MS, improving flock health, and supporting consistent egg production.

Farm A

A commercial layer farm experiencing **recurrent respiratory disease** evaluated the impact of **MS-H vaccination under high pathogen pressure**.

The farm had previously reported respiratory disease outbreaks associated with MS, ORT and *E. coli*, leading to mortality peaks and frequent antimicrobial treatments.

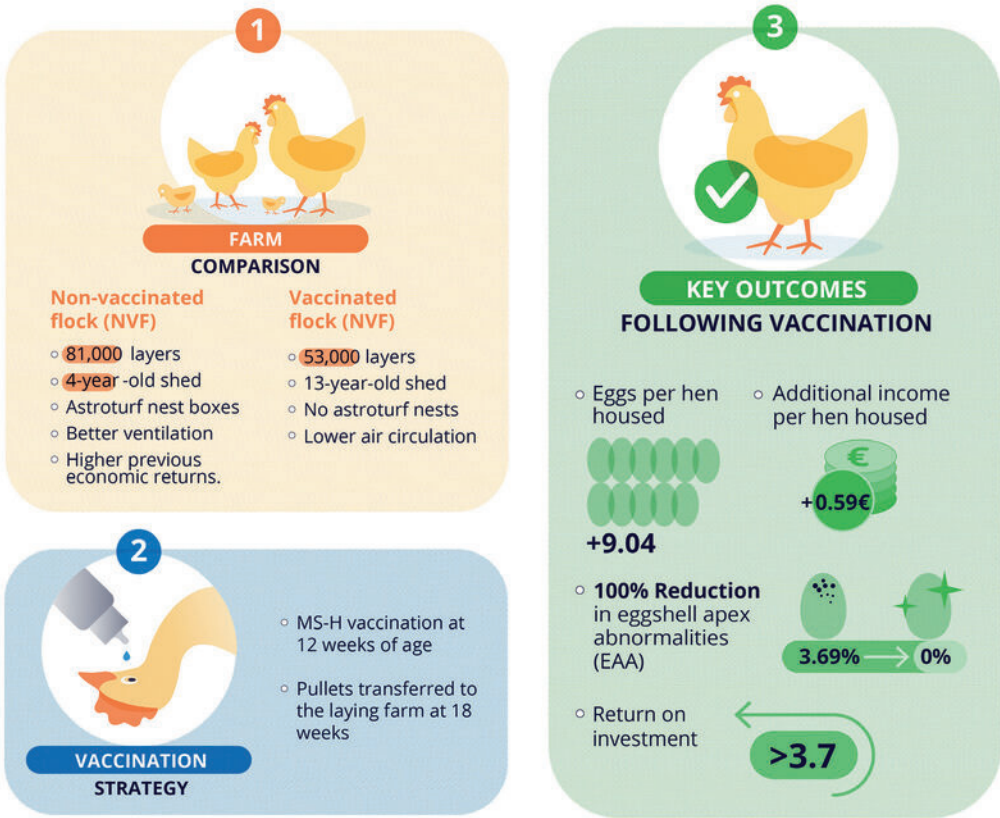
Following MS-H vaccination, the flock showed clear **improvements in health and production stability**.



Farm B

A French commercial layer farm compared MS-H vaccinated and non-vaccinated flocks under natural MS exposure. Two sheds containing birds of the same genetic strain, feed and flock age were monitored. However, the vaccinated flock was housed in older facilities with less favourable ventilation, creating a conservative comparison.

Despite this disadvantage, **MS-H vaccination improved flock performance** and **economic return** during the production cycle.

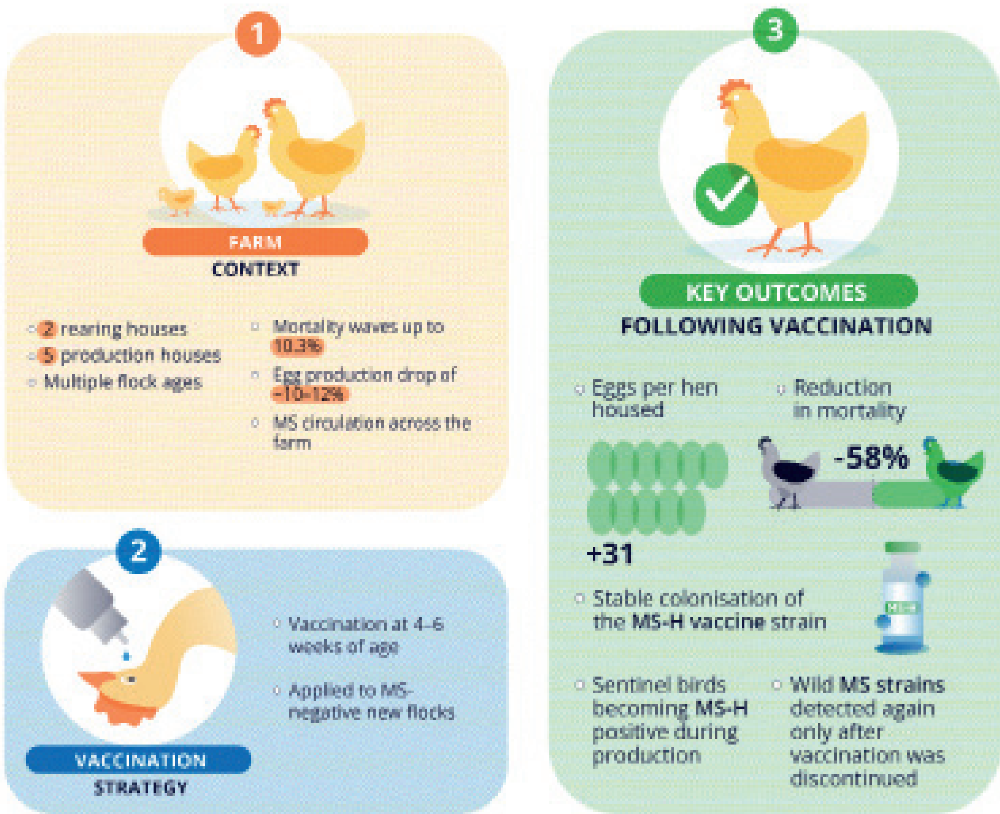


Farm C

A **multi-age commercial layer** farm experiencing recurrent health and production problems, evaluated the impact of MS-H vaccination as part of its disease control strategy.

A 38-week-old flock showed mortality peaks and a decline in egg production. Necropsy examinations revealed **air sacculitis, pericarditis and perihepatitis**, frequently associated with secondary *E. coli* septicaemia, indicating a **complex respiratory disease scenario**. Subsequent laboratory investigations confirmed circulation of MS on the farm.

Following MS-H vaccination in newly placed flocks, the farm observed substantial **improvements in mortality and egg production**, supporting the **restoration of production stability** under commercial conditions.



PROTECTING FLOCK HEALTH STARTS WITH PREVENTION

Prevention is the most effective strategy to control MS and safeguard long-term flock performance. As commercial laying cycles extend towards **100 weeks of production**, the impact of MS becomes increasingly significant, with egg quality issues and production losses compounding over time. Producers require solutions that support **consistent and sustained control throughout the production cycle**, helping maintain flock performance as birds age.

MS-H has been used in commercial poultry production in Europe and elsewhere around the world for more than 30 years (first used in the field in 1994), supporting a well-established safety and field experience profile.

Egg Quality
Reduction or elimination of EAA and improvements in egg quality

MS Disease Control
Reduction of clinical consequences associated with MS infection, including secondary respiratory disease and infectious synovitis

Economic Value
Protection of production performance contributing to positive return on investment under field conditions (ROI > 3.7)

Production Consistent with Breed Targets
Improvement in flock performance and egg and chick production consistency

Responsible Antibiotic Use
Lower disease pressure supporting reduced reliance on antimicrobial treatments in vaccinated poultry systems

MS-H vaccination supports sustained control of MS through persistent respiratory tract colonisation and continuous mucosal immune stimulation, helping protect flock performance throughout extended production cycles.

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Find out more about MS-H vaccination and how it can support your flock health programme.

Scan the QR code to access additional information

UPD

Local distributors

MS-H is a prescription-only veterinary medicinal product. Please consult your veterinarian and use in accordance with the product label.

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