The use of vaccination in poultry production

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Summary
Poultry vaccines are widely applied to prevent and control contagious poultry diseases. Their use in poultry production is aimed at avoiding or minimising the emergence of clinical disease at farm level, thus increasing production. Vaccines and vaccination programmes vary broadly in regard to several local factors (e.g. type of production, local pattern of disease, costs and potential losses) and are generally managed by the poultry industry. In the last decade, the financial losses caused by the major epidemic diseases of poultry (avian influenza and Newcastle disease) have been enormous for both the commercial and the public sectors. Thus, vaccination should also be applied in the framework of poultry disease eradication programmes at national or regional levels under the official supervision of public Veterinary Services. This paper provides insight on the use of vaccination for the control of poultry infections, with particular emphasis on the control of transboundary poultry diseases.

Keywords
Avian influenza – Disease control – Newcastle disease – Poultry – Vaccination strategy – Vaccine – Vaccine efficacy.

Introduction

Poultry are kept as a source of animal protein throughout the world. Moreover, poultry are able to adapt to most geographical areas and conditions, they are not expensive to buy, they have rapid generation time and a high rate of productivity, and they do not require large areas of land. Poultry production systems differ, ranging from rural farming to highly industrialised and vertically integrated systems. Backyard poultry production is distributed in most rural and peri-urban areas of the world, and is mainly based on the rearing of domestic poultry, both terrestrial and aquatic. Intensive poultry production is most common in developed countries, but in the last few decades, many developing countries have also adopted this system in order to meet the increasing demand for animal proteins. In recent times, the risk of transmission of certain transboundary poultry diseases to previously unaffected areas has increased as a result of globalisation and the possible persistence and spread of disease agents through domestic and wild reservoirs. The widespread distribution of Newcastle disease (ND) and the epidemics of avian influenza (AI) that have occurred over the last ten years provide examples of the negative impact of such diseases on the poultry producing sector and on society as a whole (8, 9, 12). Different strategies can be implemented to effectively prevent and control the spread of animal diseases at international, national and farm levels and poultry disease control plans often include the use of vaccination. Vaccines are, in fact, an important component of poultry disease prevention and control worldwide. Their use in poultry production is traditionally aimed at avoiding or minimising the emergence of clinical disease at farm level and thus increasing production. Vaccines and vaccination programmes vary widely, depending on several local factors (e.g. type of production, level of biosecurity, local pattern of disease, status of maternal immunity, vaccines available, costs and potential losses). Although poultry vaccination is generally managed by the poultry industry, it has only rarely been applied in the framework of a disease eradication programme at national or regional level to control a few major poultry diseases (e.g. AI and ND) (1, 16). In this paper, the authors provide insight on the use of vaccination for the control of poultry infections in any given country/area/compartment, with particular emphasis on the control of transboundary poultry diseases.

The control of poultry diseases

This paper does not cover all the detailed control measures that can be implemented to contain and eradicate poultry diseases in various farming systems, and only attempts to summarise and illustrate a few fundamental concepts on the use of poultry vaccines. It should be emphasised, however, that under no circumstances must vaccination be regarded as an alternative to good management practice and biosecurity or to the adoption of adequate control policies for the prevention of the introduction and spread of a contagious disease in any given country/area/compartment (10). Vaccines cannot realistically be expected to provide 100% protection for birds/flocks vaccinated under field conditions. Strict application of disease-prevention management techniques and hygienic practices at the farm level are of fundamental importance in minimising the risk of disease introduction and the related economic impact. The poultry industry involves the trade of poultry products and genetic stock between widespread localities and markets, frequently under the management of multinational companies. The regular reporting of World Organisation for Animal Health (OIE)-listed diseases to international bodies and the definition and application of international and national control policies are the prerequisites to minimising disease impact on human health and poultry production and avoiding unjustified barriers to the trade of live poultry and products.

The use of vaccines for the control of poultry diseases

Vaccination should generally be tailored and adjusted according to local factors that may influence the strategy, the design and the effectiveness of the vaccination programme once it has been implemented. Several different factors should be taken into account, including:

– the type of poultry production (e.g. commercial or rural)

– the organisation of the industry (e.g. vertical integration)

– the densities of different bird species

– the prevailing disease situation

– vaccine availability

– the use of other vaccines

– the prevalence of other diseases

– the resources available (e.g. manpower and equipment)

– the costs involved.

The first expected outcome of the administration of a poultry vaccine is that birds will develop immunity to pathogens and thus be protected against disease. The results that may be achieved through the use of vaccination can be summarised as follows:

– protection against the clinical form of the disease

– reduction of susceptibility to infection (a higher infectious dose is required to trigger infection in vaccinated birds than in those unvaccinated)

– reduction of infectivity (e.g. shedding) in case of infection.

Herd immunity

Protection against the clinical form of the disease is effective at an individual level, whereas the reduction of both susceptibility and infectivity also benefits the entire poultry population in the vaccinated flock/area. The positive effect on a vaccinated population known as 'herd immunity' may be defined as the reduced probability of an individual (bird or flock) becoming infected whenever it is part of a vaccinated population (6, 7). Herd immunity is important at two levels:

– flock level: if a single bird in a vaccinated flock is not immunised, it has a chance of becoming infected which is inversely proportional to the level of protection achieved by the other vaccinated and immunised birds in the same flock;

– country/region/compartment level: the higher the prevalence of vaccinated flocks in the vaccination area, the lower the probability of infection in unvaccinated flocks located in the same country/area/compartment.

In order to optimise the 'herd immunity' effect in a vaccination area, it is of the utmost importance to target the bird species with the highest susceptibility to any given infection (e.g. turkeys with regard to low pathogenic AI viruses) (16). The protection of the most susceptible poultry species serves to lower both the risk of disease introduction and the infectious pressure in the environment, thus reducing the risk of a massive spread of the infection to unvaccinated poultry farms situated in the vaccination zone.

Factors which can affect the outcome of a vaccination programme

The most important aspects to be considered in improving the organisation of a vaccination programme and achieving the expected outcomes will be briefly illustrated below.

Poultry sector involved

The practical application of poultry vaccines is highly influenced by the characteristics of the poultry producing system in question. Generally speaking, there are two main types of poultry production: industrially reared poultry and rural poultry. The spread of an infectious poultry disease and the measures to be applied for its control, including vaccination, are clearly related to the structure and organisation of the local poultry sector.

The poultry industry has substantially grown in an often uncontrolled way, particularly since the system has developed through vertical integration (e.g. poultry house owned by the farmer and day-old chicks and feed supplied by private companies) with a concentration of the productive units in certain territorial areas. In these areas, the high density of poultry farms, hatcheries, abattoirs, feed mills, litter processing plants and other establishments – although convenient from an organisational point of view – poses a series of drawbacks in terms of increased risk of major epidemics (11). These characteristics of the commercial poultry sector have a significant effect on disease prevention and control measures, and also on the use of vaccination. The selection of vaccines and proper administration protocols, together with the use of the right antigen combinations and, for live vaccines in particular, the optimal antigen virulence, have all become essential elements in managing risks and optimising costs. Poultry vaccines and vaccination methods have become a fundamental part of the prevention measures applied in industrially reared poultry in order to maximise the biosecurity level of any given poultry compartment or establishment.

Village poultry are an important component of the rural economy, particularly in developing countries. In order to control infections in rural poultry, the awareness of major poultry diseases and the losses they pose should be increased. This implies the education of rural communities and poultry farmers in the basic concepts of biosecurity, farming hygiene, prevention and vaccination techniques, since basic hygienic standards are rarely respected. Vaccination of village poultry should be carried out using appropriate hygienic and logistic/management practices. The basic quality of vaccines must be guaranteed and vaccines must be administered to each group of birds in an appropriate manner. Vaccine delivery is crucial, and the cold chain must be respected in order for the characteristics of the product to be maintained and efficacy ensured. Adequately planned and managed rural poultry vaccination programmes (e.g. against ND and Gumboro disease) can significantly reduce mortality and increase poultry production (3).

The structure, the organisation and the level of biosecurity in the various poultry producing systems all directly influence the risk of introduction and spread of a given disease in each system, and ultimately the measures that must be applied for its control.

Prevailing disease situation

The application of the different vaccination options should be adjusted in diverse conditions according to the local pattern of disease, the level of biosecurity practised in different types of poultry production systems, and the level of challenge for each type of poultry operation. This overall risk assessment should allow for the correct identification of the area/compartment that is to be subjected to vaccination and the optimal vaccination protocol. An ongoing surveillance programme based on reliable diagnostic testing should be implemented in order to adapt the vaccination programme to any possible change in the epidemiological situation and to monitor vaccine efficacy. Furthermore, it is fundamental to monitor the prevalence of infectious agents capable of producing immunosuppression (e.g. infectious bursal disease, infectious anaemia, and Marek's disease in chickens, and haemorrhagic enteritis in turkeys) and to implement specific vaccination programmes for their control. For example, since the immunosuppressive effect of infectious bursal disease virus is extremely relevant at an early age, eliciting a high level of maternal immunity can be very useful in preventing and controlling this disease (13).

Vaccination strategy

Generally speaking, there are three vaccination strategies: routine, emergency and preventive vaccination.

Routine vaccination can be the tool of choice in territorial areas where an infectious disease is endemic. Used properly, routine vaccination is effective in reducing mortality and production losses. In the longer term, it could also lower the prevalence of infection to a level where eradication measures might be applied, if the eradication of the disease is a feasible option. The continued use of routine vaccination can be rendered unnecessary, provided that effective preventive measures are maintained in order to deal with the potential re-emergence of the disease.

Emergency vaccination is an option whenever a new infectious disease is introduced in a previously unaffected country/area/compartment, and the epidemiological situation indicates that there could be massive and rapid spread of infection. The efficacy of a vaccination programme depends on the availability of adequate resources and the prompt deployment of effective vaccines. If the disease becomes endemic, the option of applying vaccination on a routine basis can be considered. This choice should be based on a careful evaluation of the epidemiology of the infection, the economic impact of the disease on poultry production compared to the costs of vaccination, and the effectiveness and cost of other preventive and control measures that might be applied to contain the disease.

Preventive vaccination is a measure that may be applied wherever a high risk of introduction and further spread of a contagious poultry disease has been identified. The scientific basis for the use of this strategy is the generation of a level of protective immunity in the target population that can be boosted in case of immediate risk or evidence of introduction of a field virus. The use of vaccination in the absence of any outbreak of disease, together with the application of effective biosecurity measures, could maximise poultry protection whenever a risk of exposure exists. Preventive vaccination is generally carried out for the prevention of poultry diseases that have a clear impact on the industry. For example, as regards ND control, some countries require the preventive vaccination of all poultry even in the absence of outbreaks due to the perceived threat of the disease. The wide use of ND vaccines throughout the world, in fact, makes assessment of the real geographic distribution of the disease almost impossible (1). Generally speaking, prophylactic vaccination should be applied as long as the risk of infection exists, and could also be used in a targeted manner for limited periods of time. In any case, a clearly defined exit strategy should be formulated before preventive vaccination is undertaken.

Cost/benefit analysis

Before implementing a vaccination programme, an overall cost/benefit analysis should be performed by taking into account the costs of vaccines, vaccine delivery (e.g. labour, equipment), monitoring, laboratory testing, and all other related activities. Vaccination campaigns to control a notifiable poultry disease (e.g. AI) require careful previous consideration of the implications on trade and the impact of both the movement restrictions and biosecurity measures applied inside the vaccination area. The decision to use vaccination in fighting certain avian infections (zoonotic diseases) should also consider the potential implications of these diseases to human health.

Availability of different types of vaccines

Vaccines used in poultry production are classically described as live or inactivated. Table I illustrates the general characteristics of live and killed poultry vaccines (2). The availability of different types of vaccines could be one of the major limits to the implementation of effective vaccination programmes. Different types of poultry production (or bird species) or diverse levels of risk require the application of more than one type of vaccine to obtain a high and long-lasting immunological response. As regards ND control, the immune response induced by live ND vaccines increases as their pathogenicity increases. Vaccination programmes using vaccine strains of different pathogenicity and immunogenicity should be applied in relation to the degree of virulence of the virus in circulation. In order to achieve an optimal level of protection without severe adverse reactions, vaccination programmes should include the sequential use of progressively more virulent live vaccine strains or live vaccines followed by inactivated vaccines (1). Generally, inactivated vaccines induce high and uniform levels of protection after administration of a live vaccine. This type of programme should be considered in the implementation of vaccination programmes for breeder and layer flocks due to the fact that they require high and long-lasting immunity for protection during the entire laying period.

Administration of vaccines

After establishing the type of vaccine to be used, the route, method and frequency of administration must be defined, as well as the proper way to combine all these components in the vaccination programme. Vaccine delivery systems significantly influence the outcome of vaccination. An improper vaccine application is considered one of the most common reasons for vaccination programme failure. Various methods of administration can be applied as required by different types of poultry operations (at the hatchery or farm). The choice of method will also depend upon other factors such as the type of production, bird species, size of the flock, length of the production cycle, general health status, maternal immunity, vaccines to be applied, and costs. The vaccination techniques most commonly used in the poultry sector and their main advantages and disadvantages are illustrated in Table II (2).

Factors affecting vaccine efficacy

Several factors can jeopardise the optimal immunisation of vaccinated poultry. Table III summarises these negative factors, classifying them into three main categories: those linked to the vaccine itself, those regarding vaccine delivery, and those endogenous to the bird (14, 17). Management conditions are also relevant and should be considered the fourth factor. As a consequence of inadequate cleansing and disinfection of poultry premises over successive production cycles, the challenge dose could either be high enough to overcome the level of protection induced by vaccination or infection might occur before vaccination is performed. This series of events can also occur in large multi-flock layer complexes in which the simultaneous presence of multi-age layer flocks has reduced the possibility of applying an effective all-in, all-out system.

Table I
General characteristics of live and inactivated vaccines for poultry (2, modified)

Live vaccines	Inactivated vaccines
Smaller quantity of antigen. Vaccination response relies on multiplication within the bird	Large amount of antigen. No multiplication after administration
Easily killed by chemicals and heat	Easier to store
Relatively inexpensive, easy to administer, and can be mass administered: drinking water, spray	Expensive to produce and to apply, since almost always individually administered
Adjuvanting live vaccines is not common	Adjuvanting killed vaccines is frequently necessary
Susceptible to existing antibody present in birds (e.g. maternal immunity)	More capable of eliciting an immune response in the face of existing antibody
In immune birds, booster vaccination is ineffective	In immune birds, additional immune response is frequently seen
Local immunity stimulated (i.e. trachea or gut)	Local immunity may be restimulated if used as a booster but secondary response is poor or absent
Danger of vaccine contamination (e.g. EDS)	No danger of vaccine contamination
Tissue reactions (commonly referred to as a 'vaccine reaction') are possible and frequently visible in a variety of tissues	No microbe replication; therefore, no tissue reaction outside that which is adjuvant dependent
Relatively limited combinations, due to interference of multiple microbes given at the same time (e.g. IB, ND and LT)	Combinations are less likely to interfere
Rapid onset of immunity	Generally slower onset of immunity

EDS: egg drop syndrome
IB: infectious bronchitis
LT: laryngotracheitis
ND: Newcastle disease

General immune system organisation and mechanisms in avian species are similar to those of mammals; both are extremely complex, with a variety of cells and soluble factors working to produce a protective response (19). The protective efficacy of a vaccine depends on its capability to induce a vigorous and long-lasting response in the immune system. The chicken is the most widely studied avian species, and although vaccines developed primarily for this species can be effectively applied to other birds, some differences in immunological response may appear. Therefore, a number of factors (e.g. vaccine doses, routes of administration and protocols) must be adapted to different species in order to optimise vaccine efficacy. The turkey, for example, generally provides a lower response to AI and ND vaccines, thus creating the need to apply specifically designed vaccination programmes (1, 4, 21).

Vaccination programme monitoring

An evaluation of the efficacy of a vaccination programme essentially involves the overall assessment of the health conditions of the flocks vaccinated. The results of the evaluation should indicate when changes in the programme must be made based on the facts. Many poultry flock health status and performance parameters can be compared to existing standards or comparative histories (e.g. feed conversion efficiency, rate of gain, average weight at the time of slaughter, mortality rates, serological profiles, etc.). Such standards have been established in various geographical areas through the collection and analysis of data obtained during the production cycles for different poultry species and types of production. A vaccination programme can be evaluated by taking these parameters as reference points during the consideration of the aspects discussed below.

Vaccination programme effectiveness

An effective vaccination plan should result in a general improvement of the health status and the productive performance of the vaccinated population. Useful measurable and comparable indicators to judge the overall health status of a flock are the morbidity and mortality rates, and other performance parameters, such as feed conversion, egg production and egg quality. The efficacy of vaccine administration and the level of immunological response in vaccinated birds can be serologically monitored (5, 20). If vaccination is routinely applied, data on the antibody response elicited in vaccinated birds should be collected and analysed in order to define the baseline of the antibody titre in different bird species and types of production. This serological monitoring can provide useful information whenever adequate samples have been analysed over time for each vaccination programme. The serological baseline obtained should be

Table II
Vaccine delivery systems commonly used in the poultry industry: main advantages and disadvantages

Type of operation	Vaccination route	Disease	Type of vaccine	Advantages	Disadvantages
Hatchery	In ovo	Marek's disease, infectious bursal disease	Live and live cells mediated vaccines	Early protection; both the innate and adaptive immune responses are stimulated, 20,000-30,000 eggs per hour	Expensive equipment; training needed; poor early liveability due to possible fungal or bacterial contamination through the open hole in the egg
	Spray	IB, ND, coccidiosis	Live vaccines	Minimised handling, good mucosal immunity, inexpensive	Possible respiratory reaction (very small particles), particle size depends on relative humidity, temperature and hygiene
	Subcutaneous/ intramuscular	Marek's disease	Live cell-mediated vaccines	Absence of respiratory reaction, uniform level of immunity, 1,600-2,000 chicks per hour	Regular equipment sanitisation required; possible localised tissue damage; birds are stressed
On-farm	Drinking water	Infectious bursal disease, IB, ND	Most common route for live vaccines	Labour-saving, easy administration in drinking water	Improper/unequal distribution; inconsistency and variability of water quality; inactivation by impurities or residues; birds are stressed by water starvation
	Spray	Infectious bursal disease, IB, infectious LT, ND	Live vaccines	Good mucosal immunity, mass application, minimised bird stress, inexpensive	Possible inconsistencies of vaccine dosage; possible respiratory reaction (in relation to particle size); need to target tissues that stimulate immunity
	Intraocular/ nasal drop	Infectious LT, ND, infectious bursal disease	Live vaccines	Effective and accurate vaccination type for live vaccines, uniform humoral and local immunity	Labour-intensive (individual handling); need to verify vaccine coverage
	Wing web	Fowl pox, avian encephalomyelitis, fowl cholera	Live vaccines	May result in 95%-100% protection	Labour-intensive (individual handling); need to verify the 'vaccine take'; possible contamination at the injection site
	Subcutaneous/ intramuscular	Avian influenza, Marek's disease, ND, salmonellosis	Most common route for inactivated vaccines	Use of inactivated vaccines (no spread of virus, no risk of residual virulence, stable), uniform levels of immunity, low level of adverse reactions	Labour-intensive (individual handling), possible localised tissue damage; use of inactivated vaccine (high costs); regular equipment sanitisation required

IB: infectious bronchitis
LT: laryngotracheitis
ND: Newcastle disease

used only to compare similar species and production types. Deviation above or below the established baseline permits the identification of flocks with possible field exposure or poor protection, respectively.

Field exposure: differentiating infected from vaccinated animals

In order to eradicate major infectious poultry diseases like AI, which have such a negative impact on poultry production and human health, the vaccination system must permit the detection of field exposure in vaccinated flocks. The differentiation between exposed/unexposed vaccinated birds and flocks requires the application of a suitable 'marker' vaccine and a companion discriminatory test. Since this condition is not always fulfilled, a monitoring programme that includes the use of (unvaccinated) sentinel birds could also be set up. In order to assess the possible exposure to other infections not included in the vaccination programme, a regular monitoring programme targeted to the detection of other diseases (e.g. immunosuppressive infections) might be implemented. This could also allow for the detection of new or re-emergent pathogens.

Table III
Factors which interfere with vaccine efficacy in poultry

Type of factor	Impact on vaccine efficacy
Factors associated with the vaccine itself	
Virus serotype	Many infectious agents (e.g. infectious bronchitis virus) have different serotypes, and vaccine antigens do not provide protection against all field strains
Level of protection	Field strain of very high virulence, and/or highly attenuated vaccine strains
Factors associated with vaccine administration	
Handling	Certain live vaccines (e.g. live cell-mediated Marek's disease vaccines) are easily killed if mishandled
Diluent used	Viable vaccines administered in drinking water are destroyed if water sanitisers are not removed
Route	Vaccines administered by injection fail if vaccinators do not deliver the vaccine to the appropriate vaccination site
	Mass vaccination (drinking water and aerosol) tends towards lower uniformity than individual administration
Associations	Administration of certain combinations of live virus vaccines affects the single virus response if they have the same target tissues
Factors associated with the bird/flock	
Maternal immunity	In presence of high levels of maternal antibodies, live vaccines administered during the first two weeks of life may be neutralised
Immunosuppression	Stress, certain infectious agents (e.g. infectious bursal disease, infectious anaemia and Marek's disease in chickens, haemorrhagic enteritis in turkeys), mycotoxins (in particular aflatoxins) impair immune response
Sanitary status	The birds are already infected (incubation period) with the pathogen against which the vaccination is directed
Genetic factors	Different vaccine responses with respect to species or commercial hybrids
Management conditions	
Hygienic practices	Without clean-out and disinfection over successive flocks, the challenge dose might be too high or infection might occur too soon

It is more difficult to assess the efficacy of a vaccination programme conducted in a rural poultry farm because reference data or standards are often unavailable. In this case, evaluation should be based on disease reporting, and a comparison of the situation in the vaccination area before and after the implementation of the vaccination plan. This implies the presence of a surveillance system capable of detecting the disease and providing comparable historical information on its frequency.

Controlling major poultry diseases: mass vaccination versus stamping out

The major poultry epidemic diseases (e.g. AI and ND) have caused enormous financial losses in both the private and public sectors (8, 12, 15). These diseases are difficult to control and the enforcement of eradication measures based on the depopulation of affected and at-risk farms could make poultry farming unsustainable in the long term. Furthermore, the killing of large numbers of birds and the destruction of carcasses is increasingly perceived as being unacceptable by the public on ethical, social, environmental and economic grounds. In developing countries, where adequate compensation measures are often lacking, the use of stamping out measures to control major poultry diseases has had a clearly negative social effect on smallholder livelihood (18). In these countries, in fact, village poultry represent a significant part of the population's intake of dietary protein, particularly for women and children. In order to identify the appropriate strategy to adopt, an accurate cost/benefit evaluation of all the control options available should be conducted while considering different scenarios. This cost/benefit analysis should take into account a number of factors: the pathogenicity/virulence of the virus strain involved, poultry densities, bird species, type of poultry production, organisation of veterinary services, and the impact on trade. In this context, vaccination should be considered as an additional means of increasing the capacity to control the major poultry diseases and should be implemented along with other disease control and eradication measures.

Conclusions

Vaccines are widely applied in all the various poultry producing systems. The global biologics market for these species accounted for total sales of US$ 585 million in 2002, which were almost equally divided between live (45%) and inactivated (55%) vaccines (Wood and

MacKenzie, unpublished data). Vaccination programmes can be successfully implemented in diverse conditions if they are tailored to the local conditions and take into account factors such as the characteristics of the poultry producing sector, the eco-epidemiological situation, and the availability of adequate resources. Although the application of poultry vaccines is a well-established practice at the farm/flock level, vaccination programmes for the control and eventual eradication of poultry diseases are not always properly implemented at the national level. This can be problematic, particularly during the implementation of emergency vaccination programmes, the effectiveness of which depends mainly on the level of preparedness, the capacity of the veterinary infrastructure, and the level of cooperation with poultry farmers and the other stakeholders. Vaccination is more effective to the extent that the target population (bird species and type of production) is homogeneous. Unfortunately, field conditions are often dissimilar and characterised by many different bird species, various rearing practices, and different levels of disease risk. Effective vaccination and monitoring programmes therefore demand considerable effort and high levels of organisation.

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La vaccination dans les élevages de volailles

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Résumé

Les vaccins aviaires sont couramment utilisés pour prévenir et maîtriser les maladies infectieuses qui affectent les volailles. Leur utilisation dans les élevages de volailles vise à prévenir ou à limiter l'émergence d'infection clinique dans les exploitations, ce qui favorise une meilleure productivité des élevages. La production de vaccins et les programmes de vaccination sont généralement assurés par la filière avicole et varient d'un endroit à l'autre en fonction de facteurs locaux, notamment le type de production, les caractéristiques de la maladie sur le terrain et les prévisions en termes de coûts et de pertes. Depuis une dizaine d'années, les pertes financières imputables aux principales épizooties affectant les volailles (à savoir l'influenza aviaire et la maladie de Newcastle) ont été extrêmement lourdes pour le secteur privé comme pour le secteur public. Il serait donc souhaitable que la vaccination soit appliquée dans le cadre de programmes d'éradication des maladies aviaires à l'échelle nationale ou régionale, sous la tutelle des Services vétérinaires officiels. Les auteurs donnent quelques éclaircissements sur la vaccination visant à contrôler les maladies aviaires, en mettant un accent particulier sur la prophylaxie des maladies aviaires transfrontalières.

Mots-clés

Efficacité vaccinale – Influenza aviaire – Maladie de Newcastle – Prophylaxie – Stratégie de vaccination – Vaccin – Volaille.

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Vacunación en establecimientos avícolas

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Resumen

Las vacunas para aves de corral se utilizan comúnmente para prevenir y controlar las enfermedades contagiosas. Los productores avícolas las emplean para evitar o reducir al mínimo la aparición de enfermedades clínicas en las granjas y, de ese modo, incrementar la producción. Las vacunas y programas de vacunación varían mucho en función de distintos factores locales (tipo de producción, comportamiento de la enfermedad, costos y pérdidas potenciales, etc.) y, por lo general, son los representantes de la industria avícola quienes deciden su administración y aplicación. En la última década, las grandes epidemias que afectaron a las aves de corral (influenza aviar y enfermedad de Newcastle) causaron enormes pérdidas económicas, tanto en el sector privado, como en el público. Por ello, la vacunación también debería administrarse en el marco de programas nacionales o regionales de erradicación de las enfermedades, bajo la supervisión oficial de los Servicios Veterinarios públicos. En este artículo se analiza la utilización de la vacunación para luchar contra las infecciones de las aves de corral, haciendo un particular hincapié en el control de las enfermedades transfronterizas.

Palabras clave

Ave de corral – Control de enfermedades – Eficacia de la vacunación – Enfermedad de Newcastle – Estrategia de vacunación – Influenza aviar – Vacunación.

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