



INTERNATIONAL

*The key to your profit!*



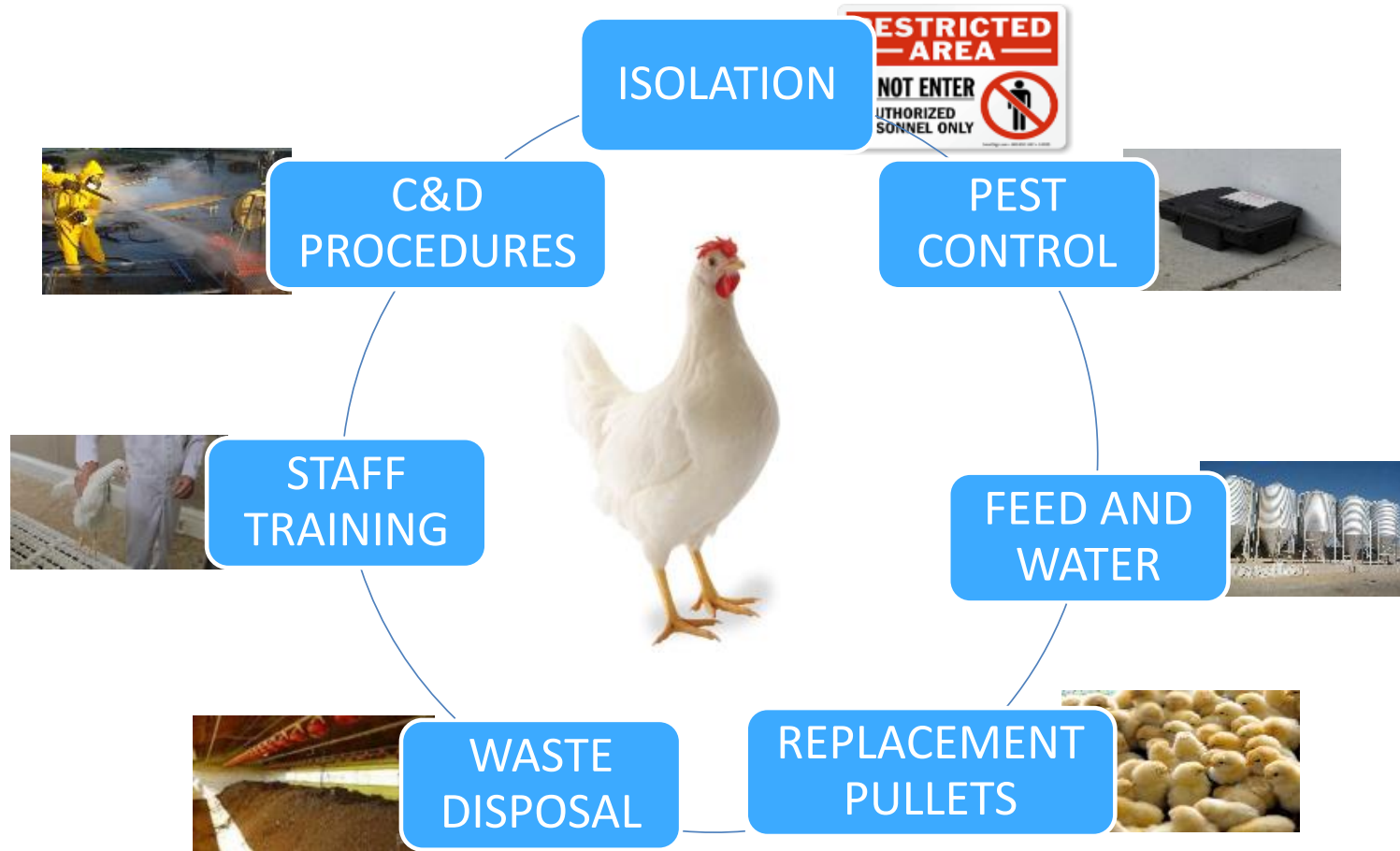
# Vaccination Techniques

# Two remarks before speaking about vaccination



# 1. Improve biosecurity program

## BIOSECURITY PROGRAMS



# 1. Improve biosecurity program



Vaccine program provides a strong protection against diseases





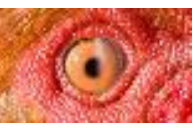

**BUT**

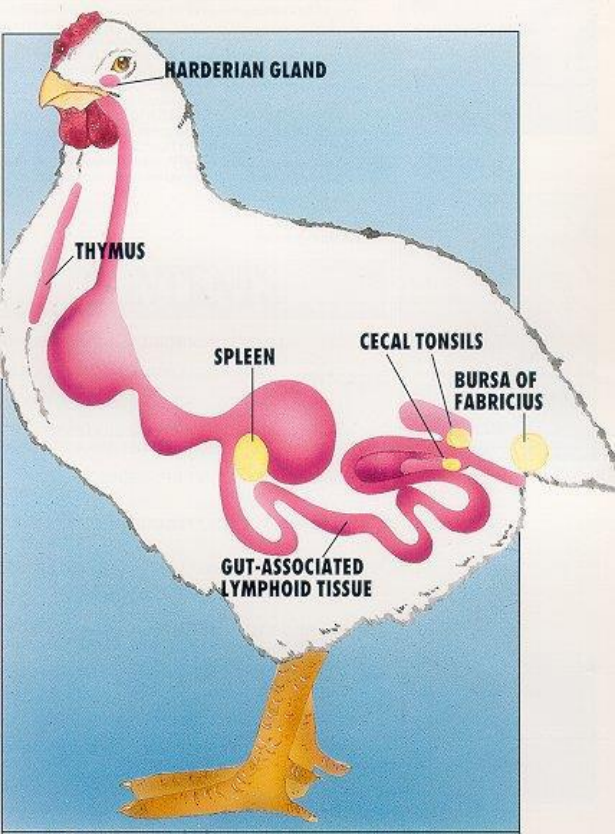


In absence of biosecurity, diseases challenge can overcome this protection

## 2. Improve the immune system

### THE IMMUNE SYSTEM

PRIMARY	
	Bursa of Fabricius
	Thymus
SECONDARY	
	Spleen
	Cecal tonsils
	Harderian gland
	GALT



The diagram illustrates the immune system of a chicken. It shows the Harderian Gland near the eye, the Thymus in the neck area, the Spleen in the abdominal cavity, the Cecal Tonsils in the large intestine, the Bursa of Fabricius in the ceca, and Gut-Associated Lymphoid Tissue (GALT) throughout the digestive tract.

## 2. Improve the immune system



If the immune system is not fully developed, the hens will not take the complete advantage of vaccination

# Vaccines

## Live attenuated vaccines

- Mass or individual administration
- Storage condition are critical (temperature)



## Inactivated vaccines

- Only individual administration (injection)
- Storage condition should be respected



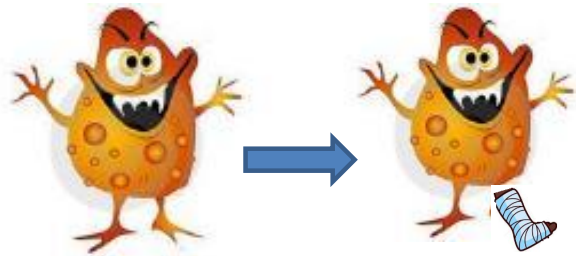
## Vectored vaccines

- Only individual administration
- Storage condition are critical (temperature)



## Others

# Live vaccines



A weakened living pathogen that retains all of its antigenic properties, but can no longer cause a pathological condition

## Advantages

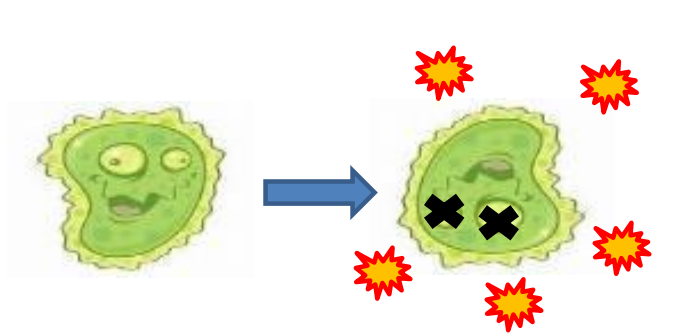
- humoral + cell-mediated immunity
- Rapid onset of protection
- Easy mass application
- No adjuvants needed

## Disadvantages

- Vaccine agent is present in poultry population
- Possibility of shedding of the vaccine agent
- Post vaccinal reactions are more likely



# Inactivated vaccines



A killed pathogen so it cannot replicate at all but remains immunogenic. It requires an adjuvant to induce immune response

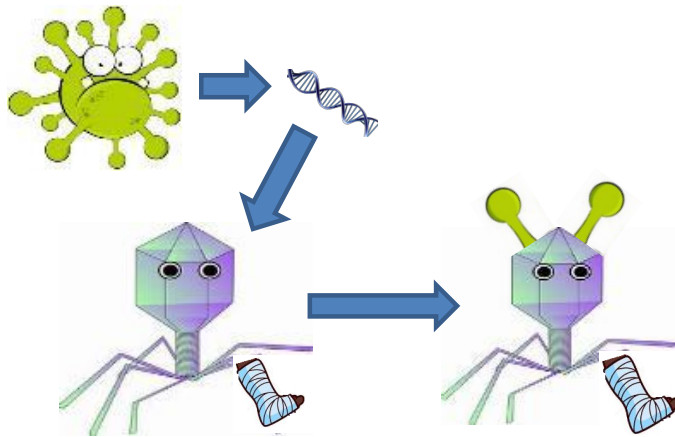
## Advantages

- No introduction of a “new living agent”
- No vaccine reactions
- Accurate individual vaccination

## Disadvantages

- Slow onset of protection
- Humoral immunity only
- High labour costs for application
- Bacterin may cause local reactions

# Vectored vaccines



A weakened living virus (the vector) that is used to express, by insertion of the genes for protection against a second virus (the donor), antibodies also against this donor virus by multiplication

## Advantages

- No shedding of the donor virus
- No vaccine reactions for the donor virus
- It is possible to admister at hatchery

## Disadvantages

- No specific local immunity for the donor virus
- Accurate individual vaccination is essential
- Only one vaccine for vector virus can be applied

# An universal vaccination program ?

Vaccination Program for Commercial Layers <sup>a</sup>			
Age	Vaccine	Route	Type
1 day	Marek's disease	SC	Turkey herpesvirus and SB-1
14-21 days	Newcastle/infectious bronchitis	Water	B1/Mass
14-21 days	Infectious bursal disease	Water	Intermediate
5 wk	Newcastle/infectious bronchitis	Water or coarse spray	B1/Mass
8-10 wk	Newcastle/infectious bronchitis	Water or coarse spray	B1 or LaSota/Mass
10-12 wk	Encephalomyelitis	Wing web	Live, chick-embryo origin
10-12 wk	Fowlpox	Wing web	Modified live
10-12 wk	Laryngotracheitis	Intraocular	Modified live
10-14 wk	<i>Mycoplasma gallisepticum</i> <sup>b</sup>	Intraocular or spray	Mild live strain
or 18 wk		Parenteral	Inactivated
12-14 wk	Newcastle/infectious bronchitis	Water or aerosol	B1 or LaSota/Mass
16-18 wk	Newcastle/infectious bronchitis	Water or aerosol	B1 or LaSota/Mass
Every 60-90 days or 18 wk	Newcastle/infectious bronchitis	Parenteral	Inactivated



Merck veterinary manual

Vaccination program should be tailor-made

# Key points in vaccines administration

1. Respect the timing according the vaccine program

2. Keep records on each vaccine administration

3. Administer vaccines only to healthy flocks

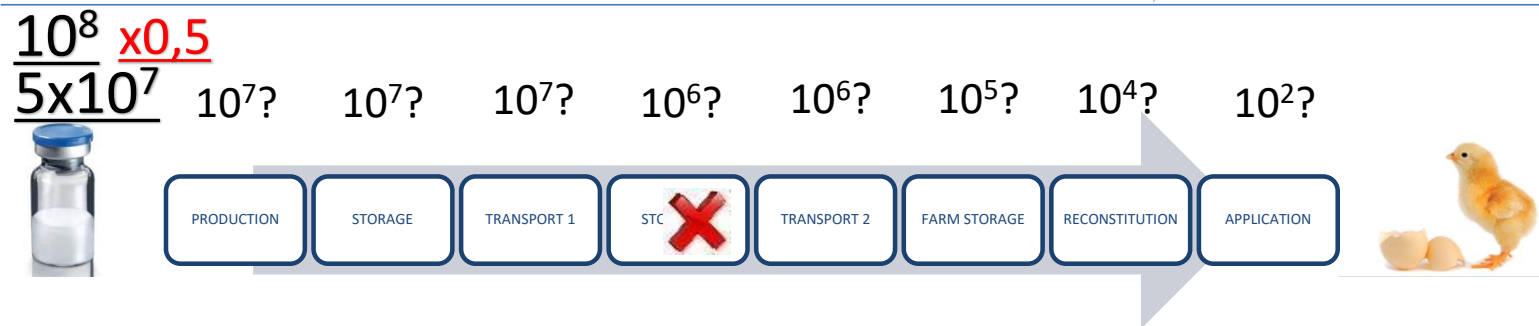
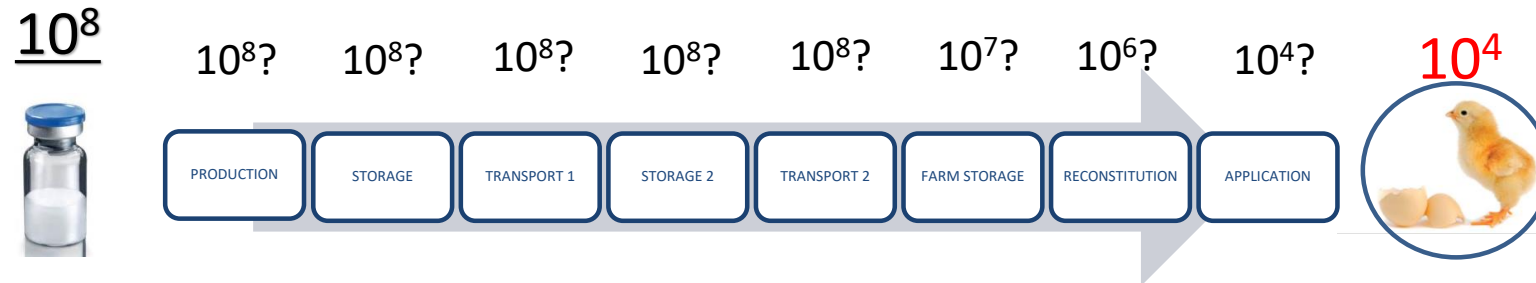
S. No.	Age	Vaccine	Route of administration
1	First day	Marek's disease	Under skin
2	5 <sup>th</sup> day	Raniket disease (F/B)	I/O or I/N
3	7 <sup>th</sup> day	Marek's disease booster	Under skin
4	10 <sup>th</sup> day	Debeaking	-
5	12-14 <sup>th</sup> day	Marek's disease - Intermediate	Eye
6	20-22 <sup>nd</sup> day	IBD Plus	I/O / water
7	27 <sup>th</sup> day	LaSota	water
8	30 <sup>th</sup> day	Infectious Bronchitis(IB)	water
9	42 <sup>nd</sup> day	Fowl Pox	wing
10	47 <sup>th</sup> day	Deworming	water
11	52 <sup>nd</sup> day	LaSota	water
12	64 <sup>th</sup> day	R: B	I/M
14	86 <sup>th</sup> day	Coryza / Fowl Cholera	Under skin
15	93 <sup>rd</sup> day	IB	water
16	100 day	Debeaking (second time)	-
17	110 <sup>th</sup> day	Deworming	water
18	112 <sup>th</sup> day	LaSota	water
19	126 <sup>th</sup> day	RD - Killed	Under skin
20	280 <sup>th</sup> day	Deworming / LaSota	water



- Age of birds
- Date of vaccination
- Route of administration
- Withdraw period
- Prescription order no
- Vaccine type
- Batch number
- Expiration date
- Person administering the vaccine

# Key points in vaccines administration

## 4. NEVER CUT DOSES !!!



### CUTTING VACCINE DOSES CONSEQUENCES:

1. NO SCIENTIFIC EVIDENCE THAT VACCINE WILL PROVIDE PROTECCION
2. NO SAFETY MARGIN IN THE VACCINATION PROCEDURE

# Key points in vaccines administration

## 5. Transport & store vaccines correctly

### Follow strictly the manufacturers recommendations

#### LIVE & LYOPHIZED VACCINES

- ✓ Temperature strictly 2-8 °C
- ✓ Protect from direct sunlight
- ✓ Do not freeze

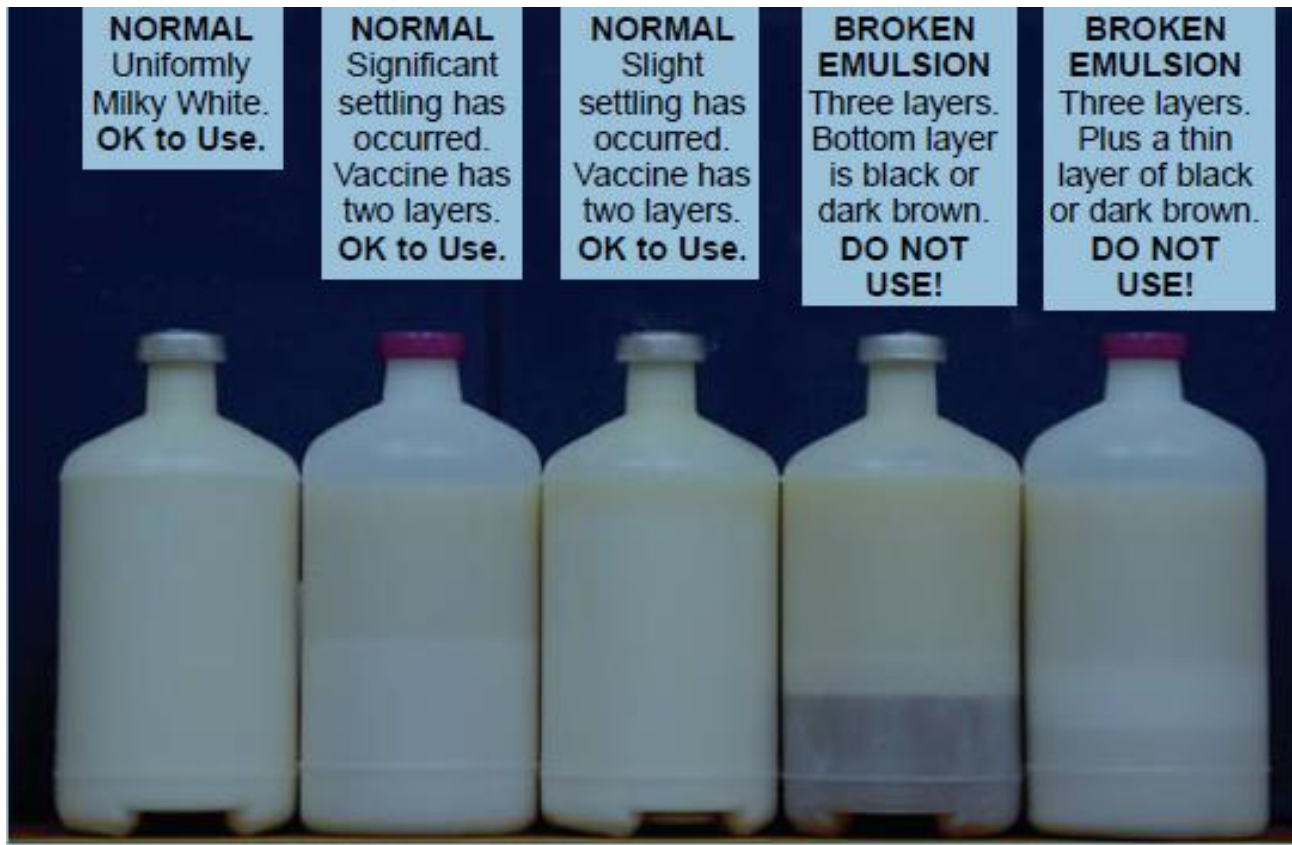
**NEVER BREAK  
THE COLD CHAIN**



#### OTHERS

- ✓ Read manufacturers recommendations first

# Inactivated vaccines storage





# Administration routes

## Mass administration



Drinking water



Spray

Administration route is a essential part of the veterinarian prescription



## Individual Administration



Eye Drop



Injection

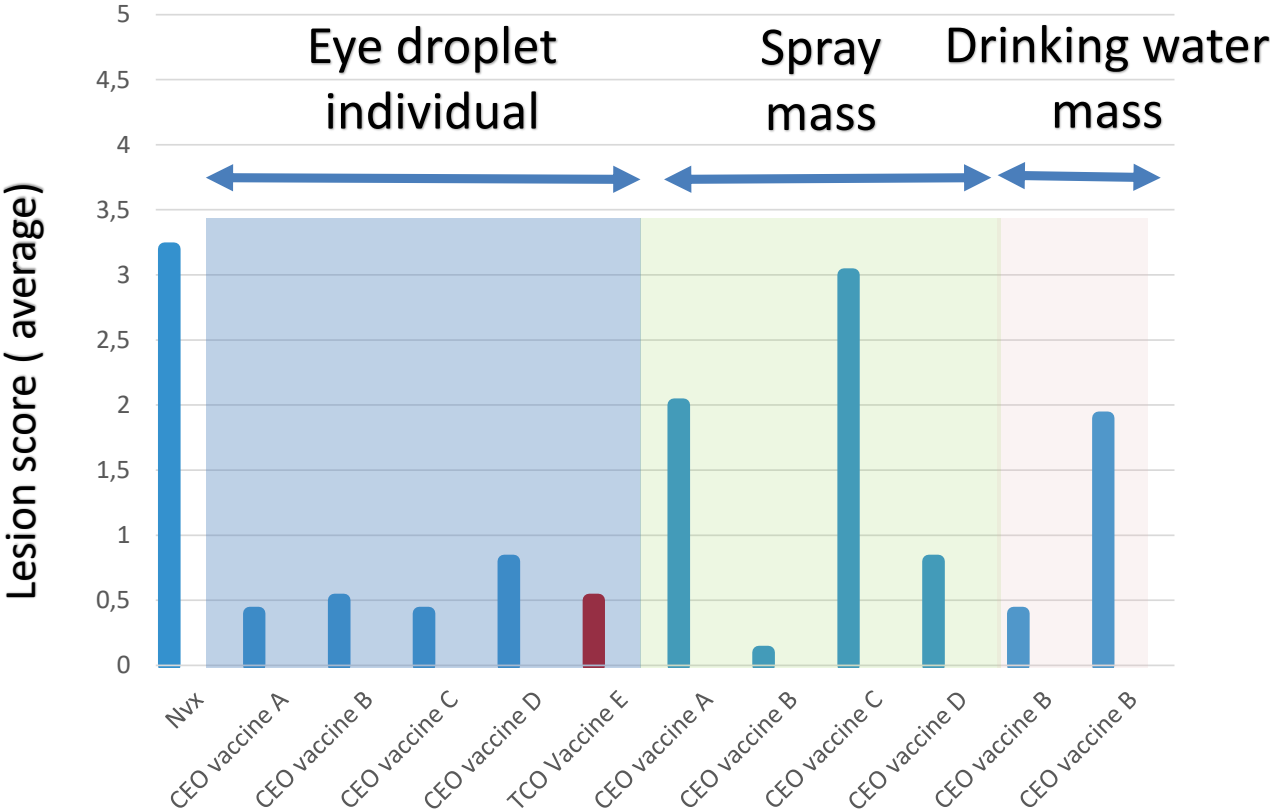


Wing inoculation

**RESPECT IT STRICLY !!**



# Live ILT Vaccine administration



Source: R. Fulton 94





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# Mass vaccination

# Drinking water vaccination

## Available vaccines against:

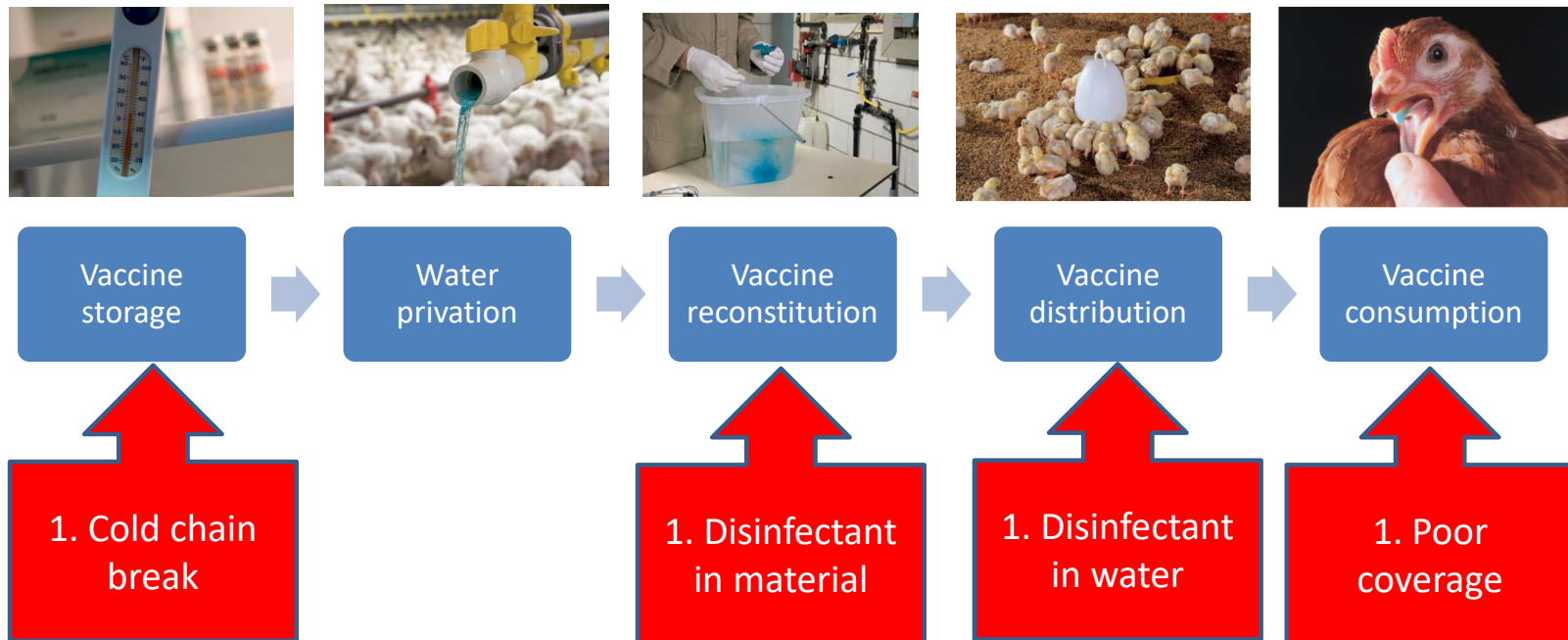
- IB
- ND
- ILT
- AE
- SE
- IBD

- Local protection
  - Digestive tract
  - (Respiratory tract)
- Mass application
- Appropriate method of administration for most live vaccines



# Drinking water vaccination

## VACCINATION PROCEDURES



# Water privation

Objective: make the whole flock to get thirsty

- All the birds feels attired by water and will use the drinker as soon as water will be available again
- Water consumption is augmented during vaccination

- Too thirsty: bird will contest for water and drink in excess.
- Not enough thirsty: bird will be not specially attired by water

Privation time

Flock age

Temperature

# Drinking water vaccine preparation



OR

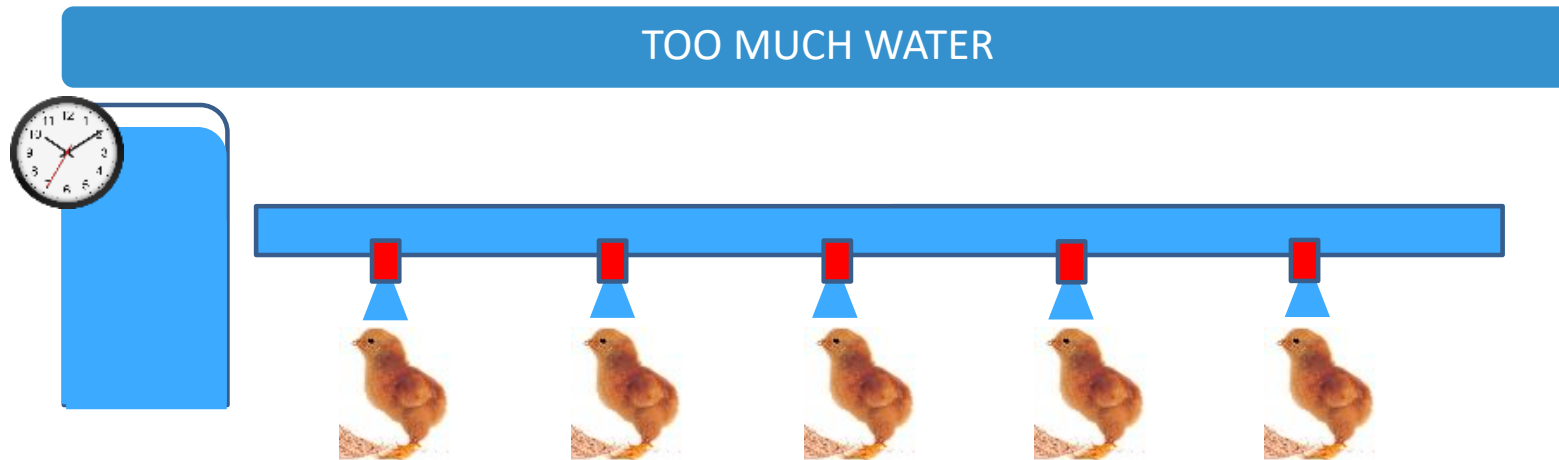


USE DYE FOR BETTER  
MONITORING

NO CHLORINE  
(OR ANTIBIOTICS) IN  
THE WATER

USE WITHIN 2 HOURS

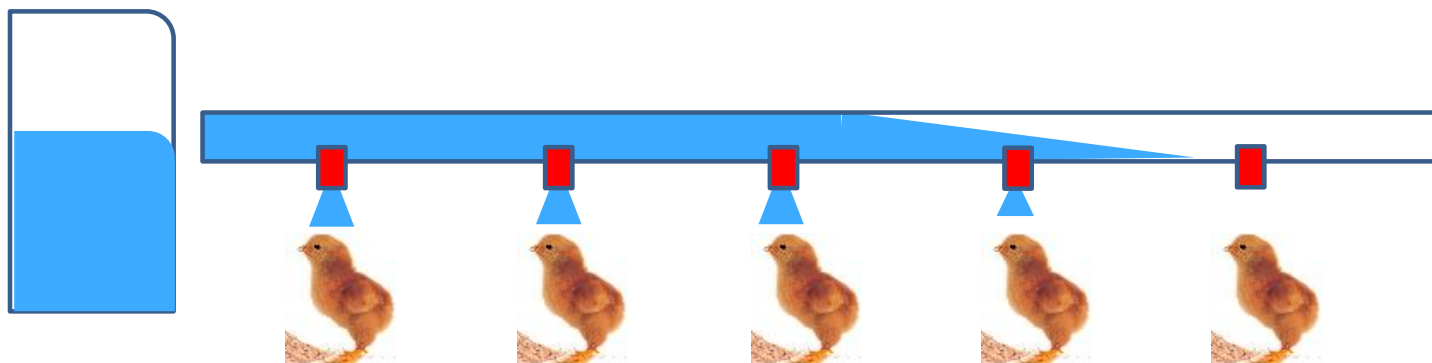
# Drinking water vaccination failures



<b>CONSEQUENCE</b>	Vaccine is not taken within 2 hours
<b>EXACERBATING FACTORS</b>	Young chicks, short privation time
<b>CORRETIVE MEASURES</b>	Calculate accurately the water volume
<b>WARNING LOG</b>	Vaccine intake time

# Drinking water vaccination failures

TOO FEW WATER



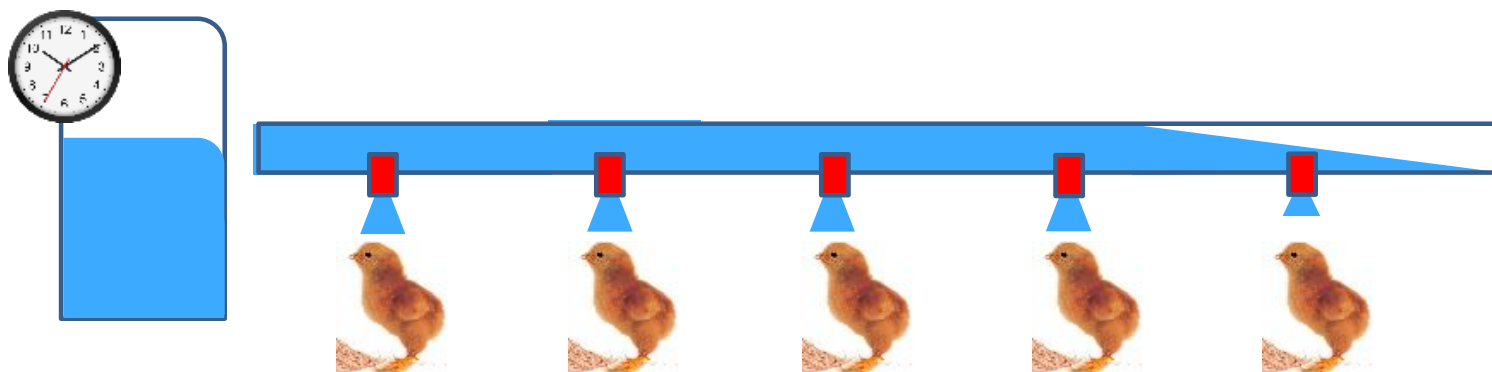
<b>CONSEQUENCE</b>	Poor coverage
<b>EXACERBATING FACTORS</b>	Old chicks, Long privation period, High temperatures, High stock density
<b>CORRETIVE MEASURES</b>	Calculate accurately the water volume, Shorten privation period, Temperature
<b>WARNING LOG</b>	Dye control





# Drinking water vaccination failures

LOW SPEED IN WATER DISTRIBUTION THROUGH PIPELINES



<b>CONSEQUENCE</b>	Vaccine is not taken within 2 hours Poor coverage
<b>EXACERBATING FACTORS</b>	Old chicks, Long privation period, High temperatures, High stock density
<b>CORRETIVE MEASURES</b>	More pressure in the pipeline, shut down lights when distributing the vaccine
<b>WARNING LOG</b>	Dye control, Vaccine intake time

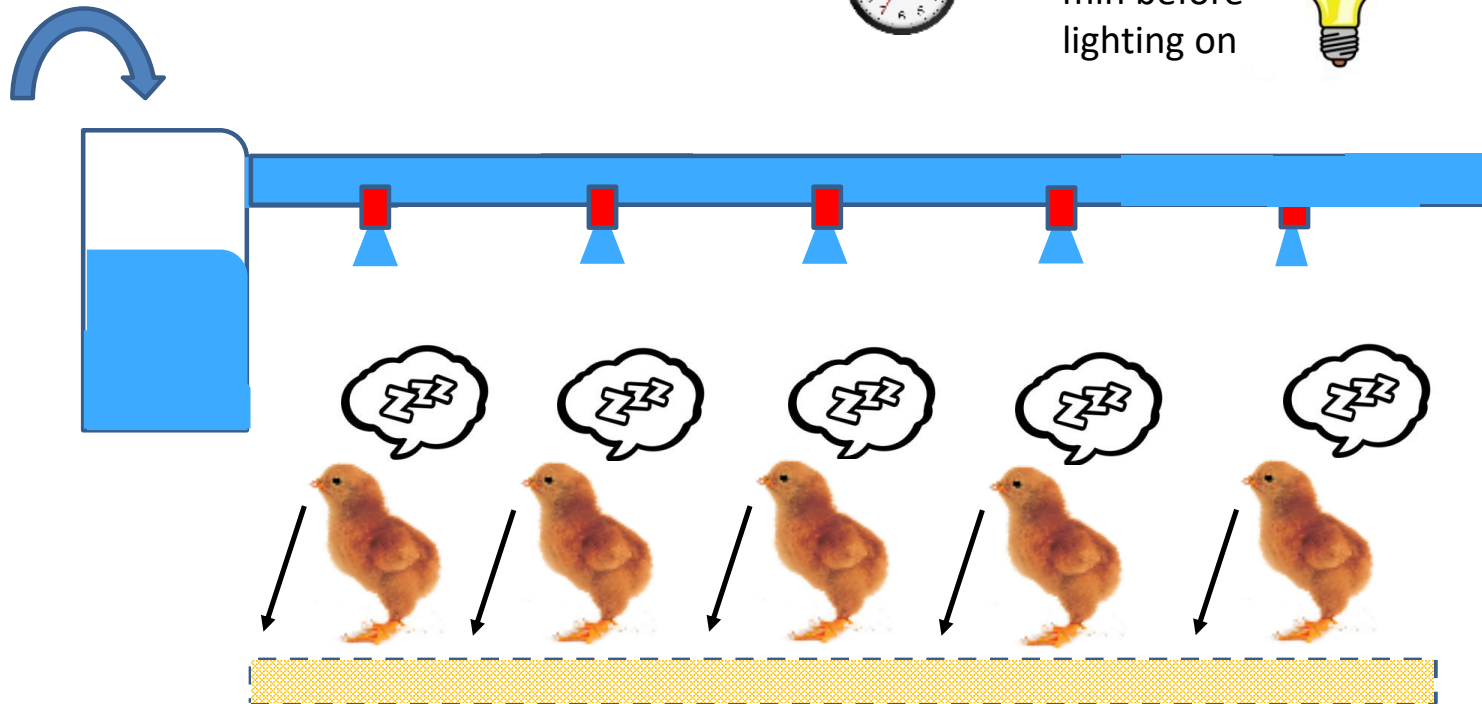


# Water vaccination

50 % vaccine doses  
90 min water consumption



Around 30  
min before  
lighting on



# SPRAY VACCINATION

Available vaccines against:

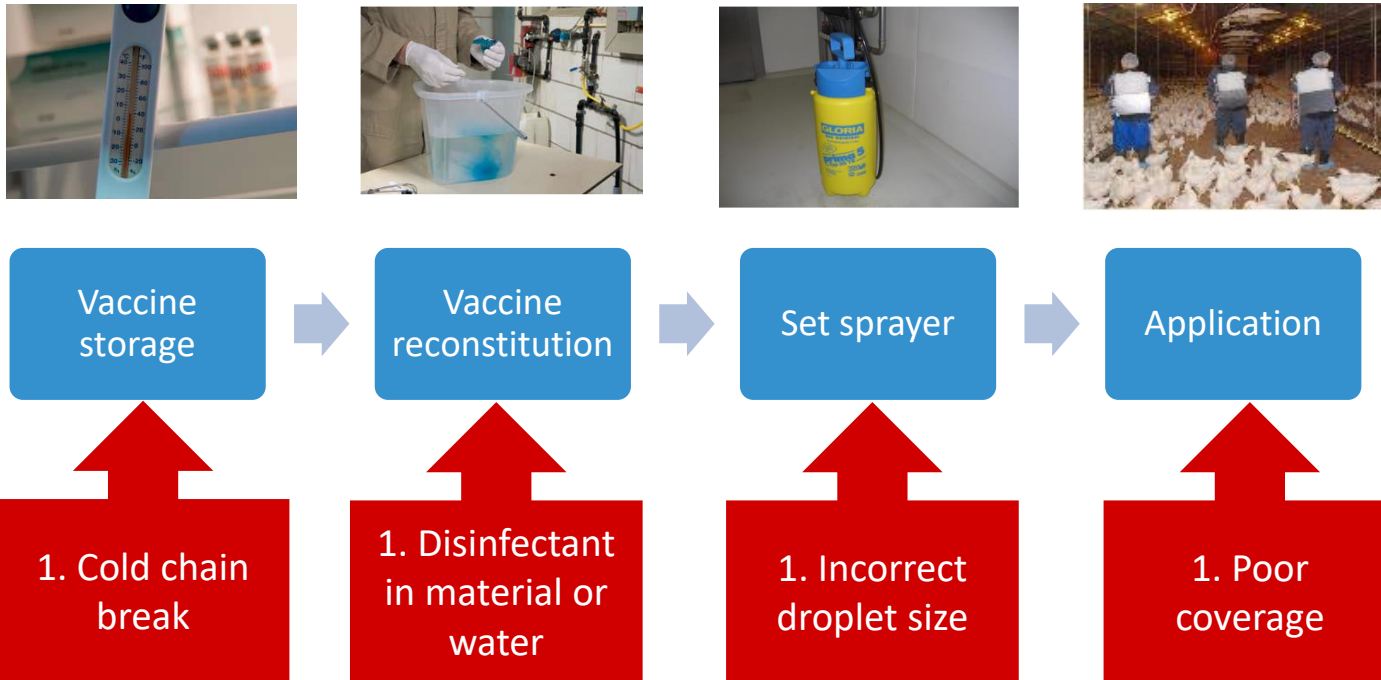
- IB
- ND
- ILT
- MG
- MS
- AMPV

- Local protection
  - Respiratory tract
- Mass application
- Used for vaccines that should replicate in the respiratory tract



# Spray vaccination

## VACCINATION PROCEDURES



# Drinking water vaccine preparation

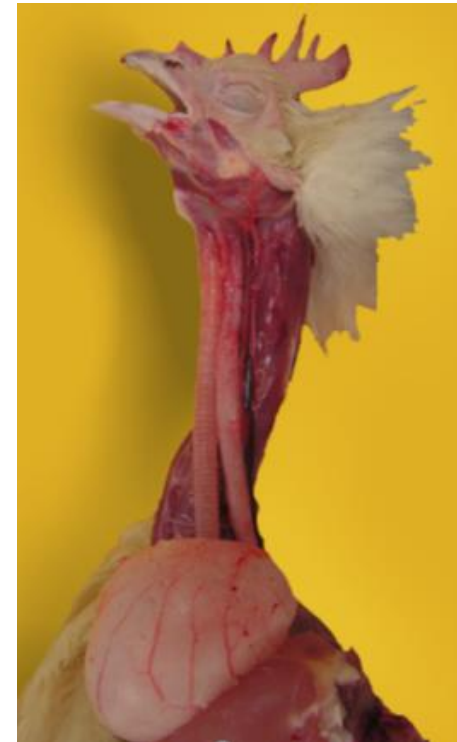
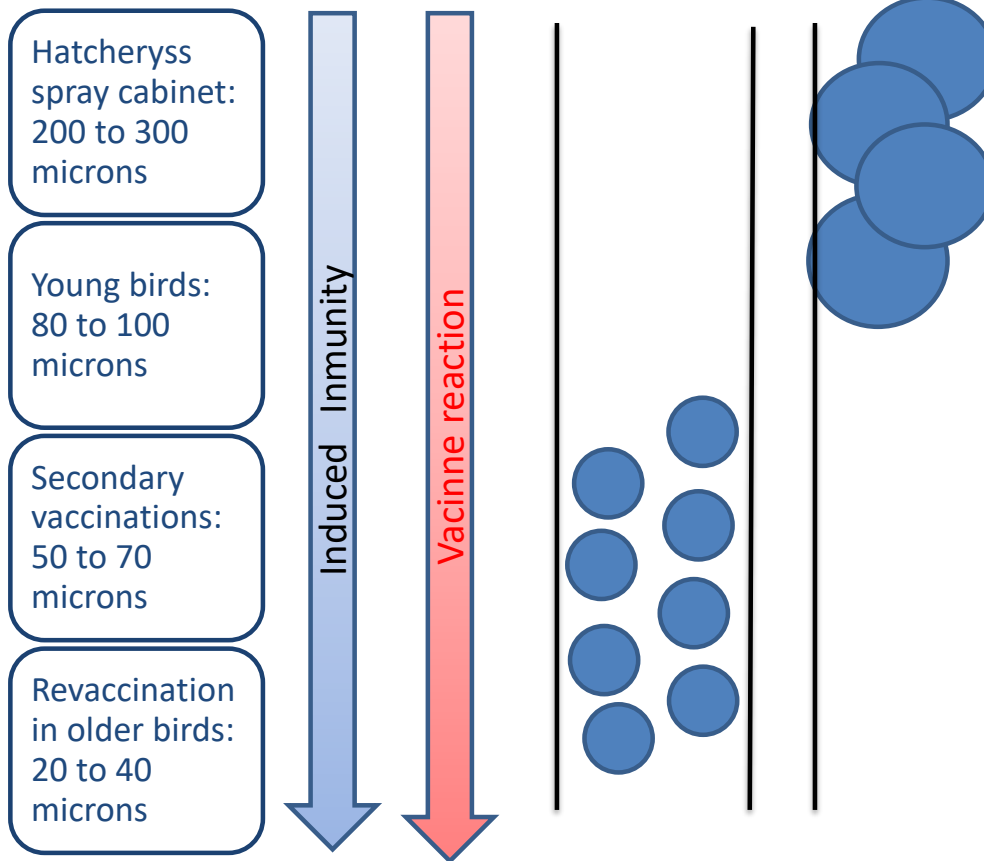


NO CHLORINE  
( OR ANTIBIOTICS) IN  
THE WATER

USE WITHIN 2 HOURS

# Droplet size

## DROPLET SIZE IN SPRAY VACCINATION



Source: Eric Betti

# Droplet size



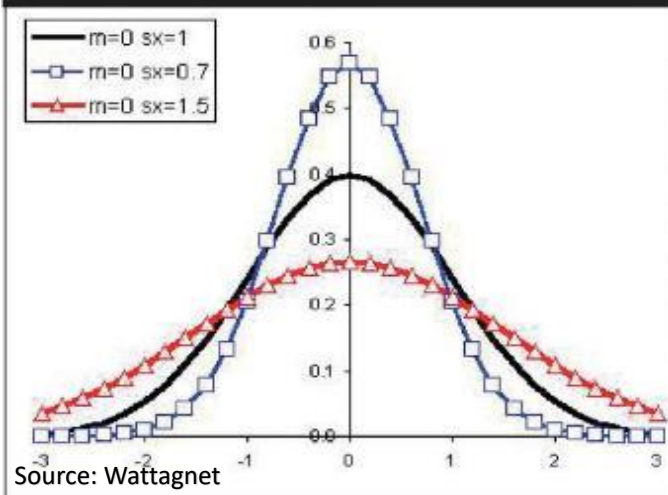
Droplet size mainly depends on

- Pressure
- Nozzle

Pay attention not only in the droplet average size but:

- the droplet homogeneity
- Droplet size variation during the vaccination time

Examples of spray distribution curves



# Poor Coverage ( Vaccines losses)

1. Turn of the ventilation during spraying



Losses by drift



Losses by evaporation



Emission

2. Group the birds together before vaccination ( when possible)  
3. Direct correctly the nozzles



Losses by settlement

4. Use droplets as coarse as possible  
5. Vaccinate during the cool part of the day



Impact

VACCINE VOLUME

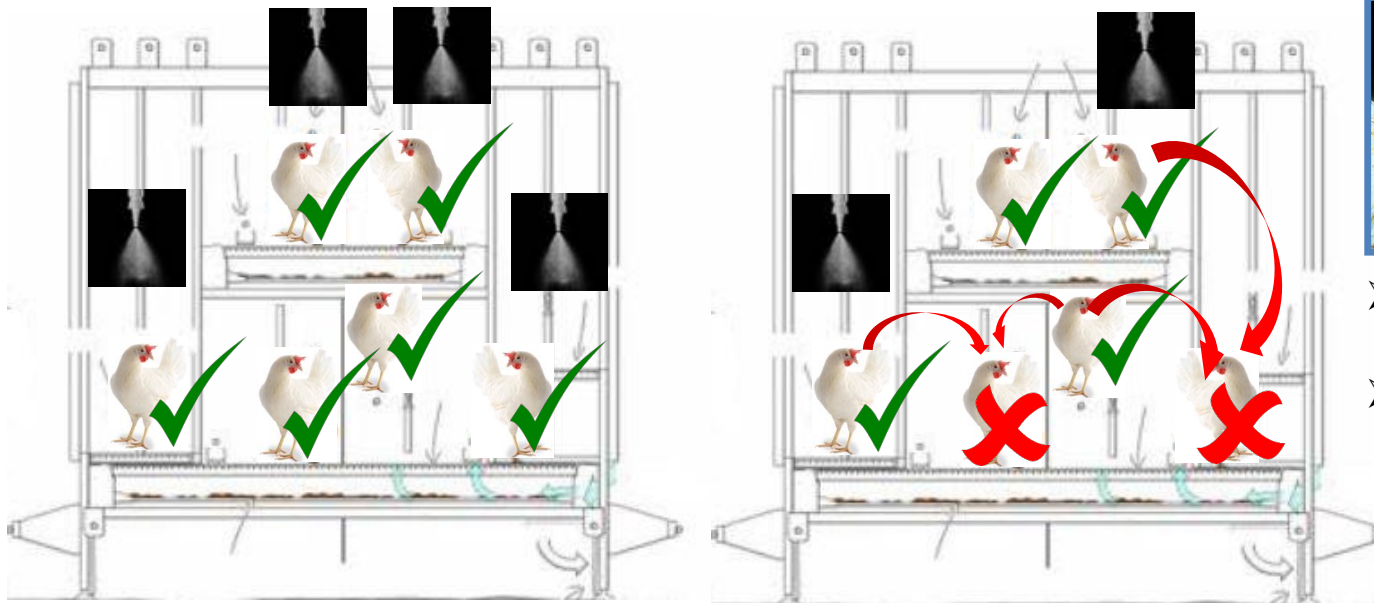
Total

Jet emitted

Useful fraction



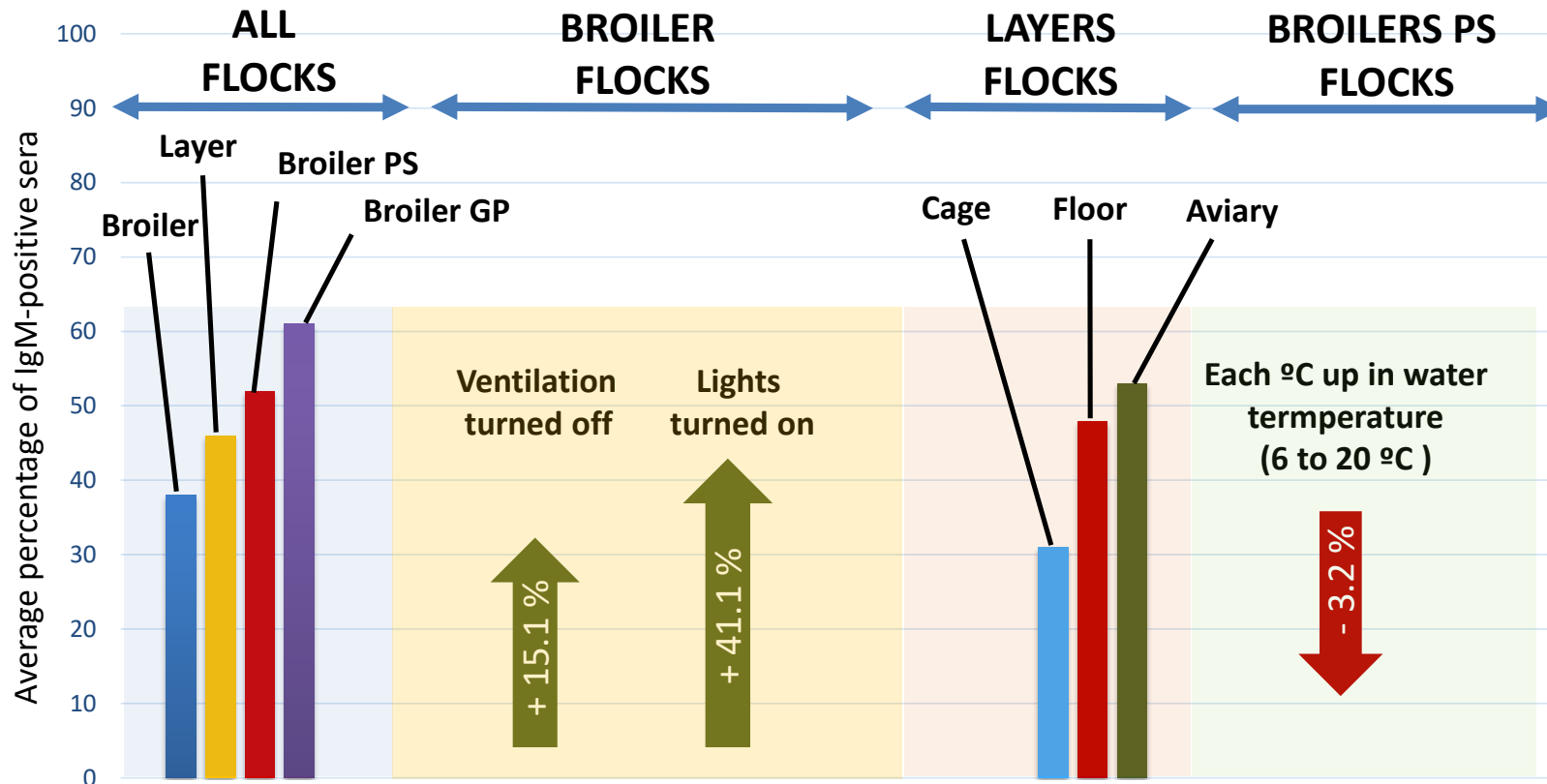
# Poor Coverage ( Poor distribution)



- Rolling reaction
- Post vaccinal reaction.

6. Use enough amount of vaccine dissolution ( min 450 - 1000 ml / 1000 birds)
7. Distribute correctly among all the birds
8. Hold the nozzle about 40 cm above the birds' head
9. Reduce the light intensity as much as possible

# Spray vaccine administration



De Witt, 2010



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## Individual vaccination

# Eye drop vaccination

## Available vaccines against:

- IB
  - ND
  - ILT
  - MG
  - MS
- Individual application
  - Local protection
    - Respiratory tract
  - Each bird receives a full dose of vaccine.
  - Both local and humoral immunity due to the presence of the Harderian gland behind the third eyelid.



# Eye drop vaccination

## EYE DROP PROCEDURES



Vaccine storage

Dissolve vaccine in the applicator

Administration

1. Cold chain break

2. Vaccine not used immediately

3. Missing Birds

# Eye drop vaccine preparation



USE DYE TO ASSESS  
THE EFFICIENCY OF  
ADMINISTRATION

PREPARE ONLY THE  
VIALS FOR THE USE IN  
THE NEXT HOUR

USE WITHIN 1 HOURS

# Eye drop vaccination

## EYE DROP APPLICATION



Ensure that the fluid does not 'roll off' the eye.



Each bird should be held until it blinks after the droplet is applied



Birds dosed effectively will show staining at the nares after vaccination.

# Wing web vaccination

Available vaccines against:

- POX
- POX + AE

- Individual vaccination
- Only available for POX vaccination
- delivers the vaccine into the skin thickness





# Web wing vaccination

## VACCINATION PROCEDURES



Vaccine storage

1. Cold chain break



Disolve vaccine in the applicator

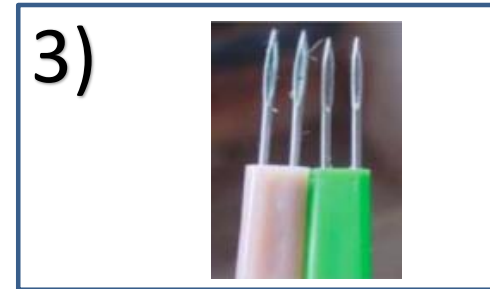
1. Vaccine not used immediately



Application

1. Birds not vaccinated

# Wing Web vaccine preparation



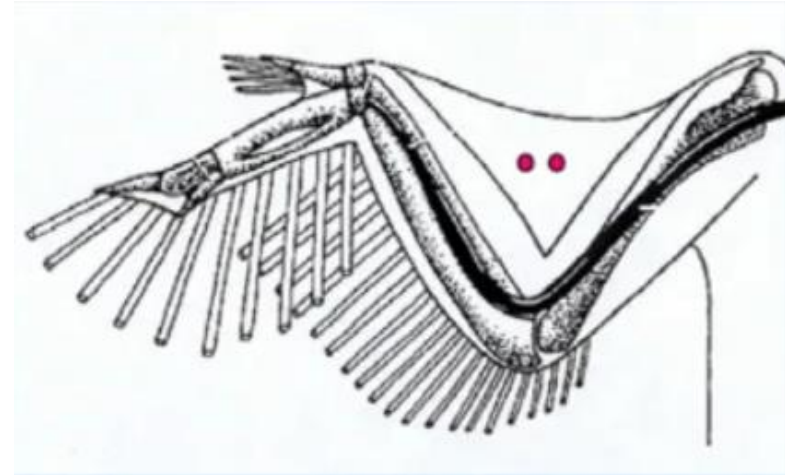
OR



PREPARE ONLY THE  
VIALS FOR THE USE IN  
THE NEXT HOUR

USE WITHIN 1 HOURS

# WEB WING



Fill the needle slot with vaccine dissolution



Apply the vaccine by the needle running wing web through

# WING WEB

## VACCINE REACTION



Pea-shaped reaction in the inoculation point



Appears 5-10 days after vaccination

Check it at day 7 post vaccination



It ensures a correct vaccination:

- >90%: OK
- 80-90%: Doubts
- <80%: failure

# Injection administration

- IB
- ND
- MG
- MS
- EDS
- AMPV
- SE
- FP
- Coryza
- ...

- Only systemic immunity
- Individual vaccination
- Two types
  - Intramuscular ( IM)
  - Subcutaneous (SC)



# Injection administration

## INJECTION PROCEDURES



Vaccine storage

Prepare automatic syringe

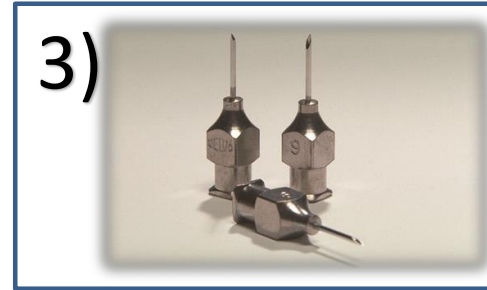
Application

1. Broken emulsion
2. Vaccine contamination

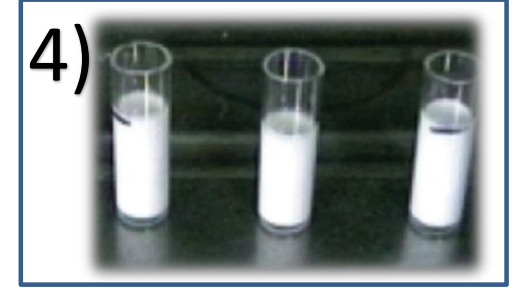
3. Non sterile syringe
4. Incorrect setting

5. IM / SC application not respected

# Syringe setting



0.8 – 1.1 x 10 mm



CONTAMINATED  
SYRINGES

VACCINE TOO COLD  
(4-8 C) OR TOO WARM  
(> 37° C)

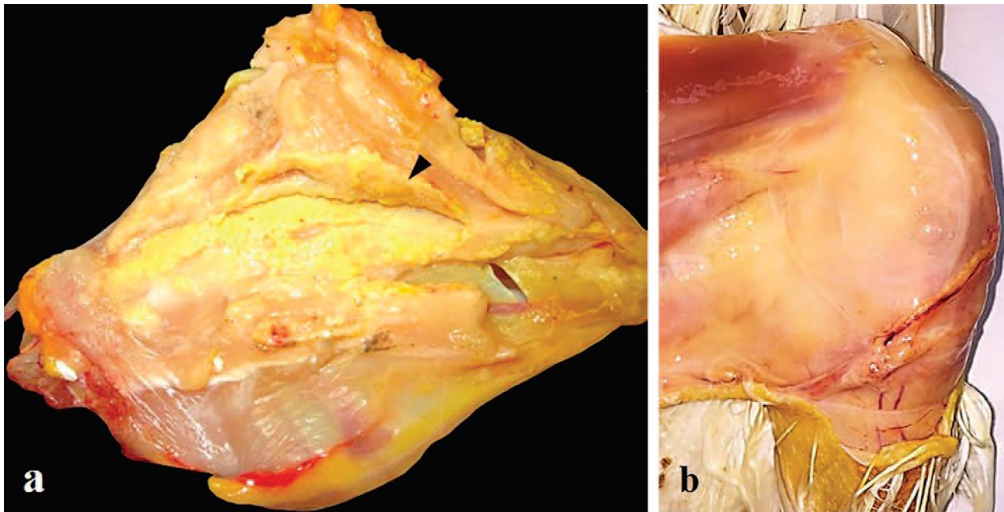
NEEDLES NOT  
CHANGED REGULARLY  
OR WRONG NEEDLE

INCORRECT DOSING



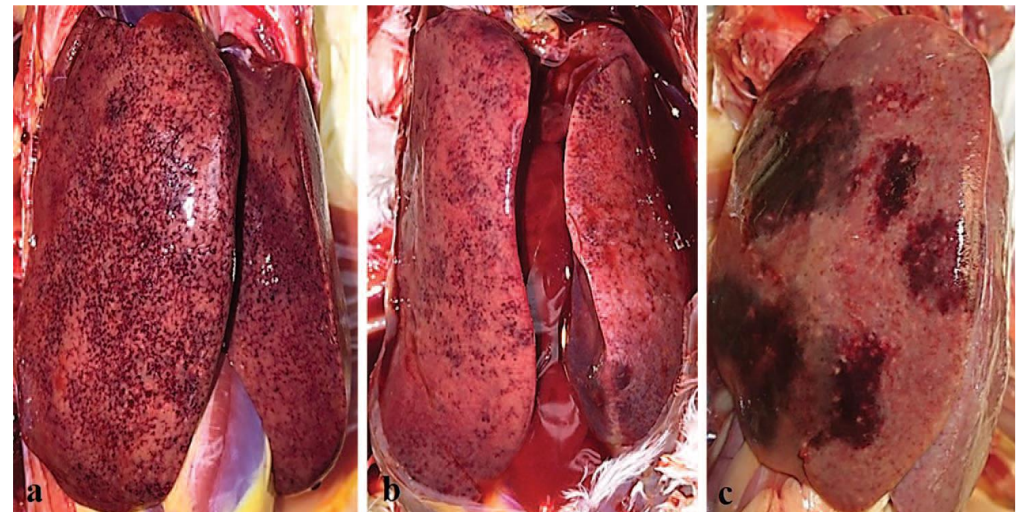
# Adverse reaction

## Vaccine Contamination



Severe caseonecrotic local reactions at the site of injections

## Post-Bacterin Hemorrhagic Syndrome



Related to a reaction to the endotoxin of some bacterins

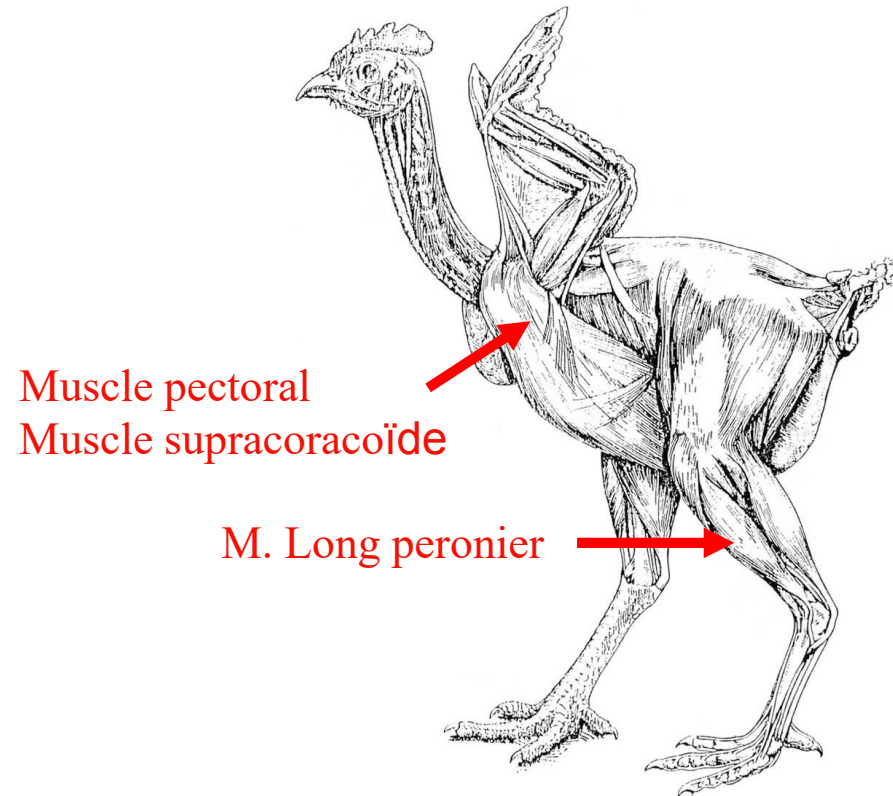
Pictures: Carnaccini et al



# Intramuscular injection

## INTRAMUSCULAR INJECTION VACCINATION

- Injection should be strictly intramuscular
- Two possibility of application:
  - Breast
  - Leg
- Bacterin reactions can cause issues
  - Leg → lame birds



# Intramuscular injection

Correct double breast injection



# Breast IM Injection

Correct injection in the breast

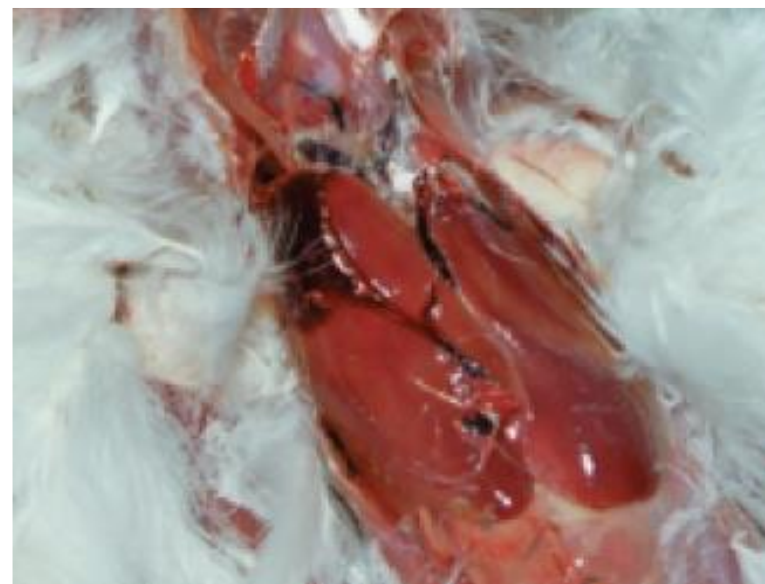


# Failures in breast IM injection

Injection in abdomen



Injection in liver



Birds will die in hours

# SUBCUTANEUS INJECTION

## INTRAMUSCULAR INJECTION VACCINATION

- Injection should be applied under the skin of the neck
- Do not damage the nerves, muscles or other structures in the area.
- Used also for live vaccines



# SUBCUTANEUS INJECTION

Correct injection in the neck



# Failure by SC Injection

Edema



Damage in the neck





THANK YOU **FOR** YOUR INTEREST



Any  
question?