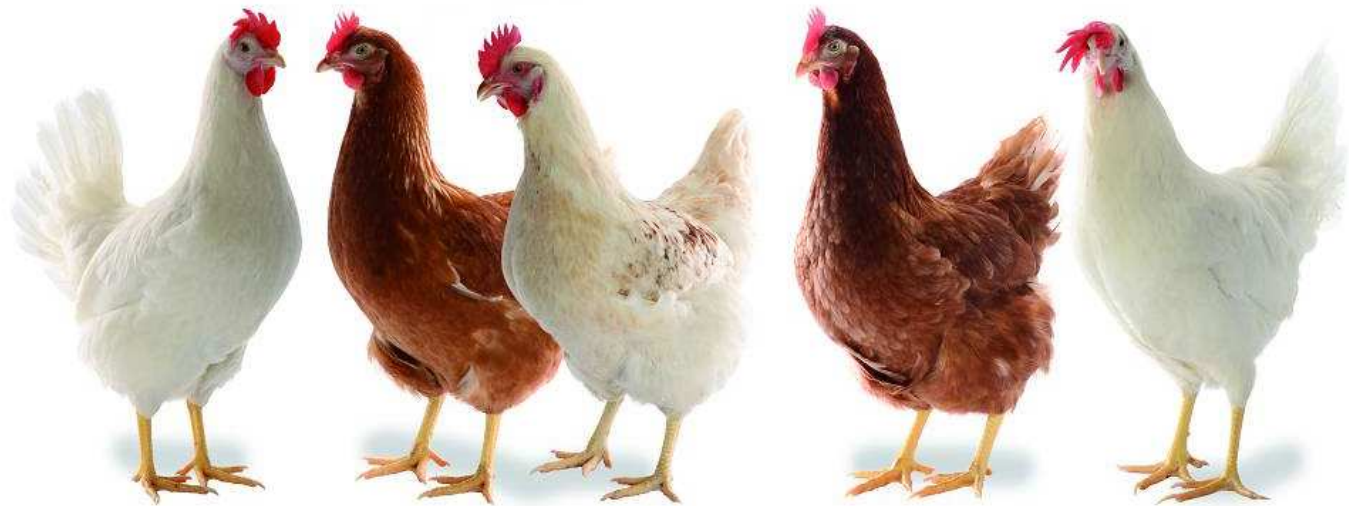


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The specialist for layer breeding.



Biosecurity on Poultry Farms

Atoussa Mazaheri

BREEDING FOR SUCCESS ... TOGETHER



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Definition Biosecurity

= Measures taken to prevent or control the introduction and spread of infectious agents to a flock.

Such Infectious agents reduce

PRODUCTIVITY

PROFITABILITY

LONG TERM FINANCIAL VIABILITY

of a poultry operation

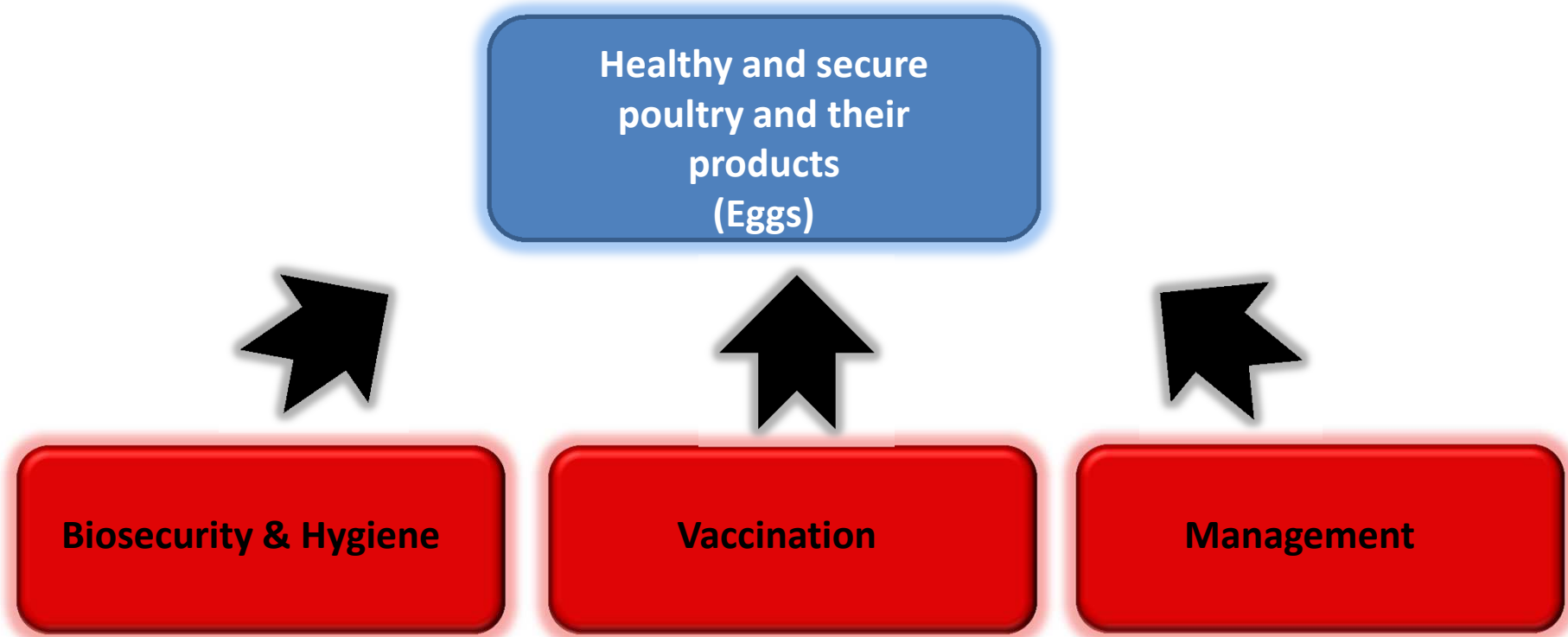
Why is Biosecurity important?

In case of a disease outbreak:

- **Decrease performance/loss of income**
- **May require depopulation**
- **May not meet customer expectations**
- **May affect product quality and performance**
- **May not meet export certification requirements**



Aim of poultry production

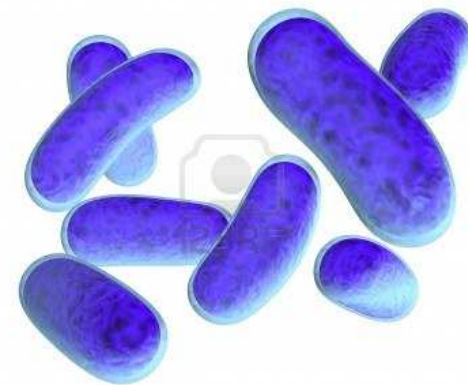
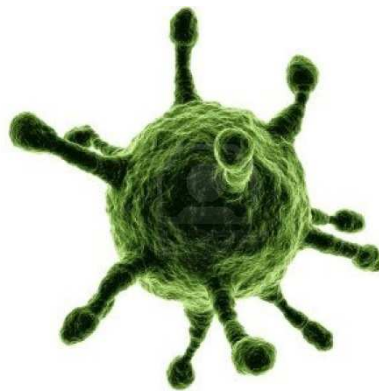


What are we fighting?

The not visible mystery??

- Parasites, Viruses, Bacteria → for human eyes often not visible
- Resistant Agents

Which are not eliminated easily by cleaning and disinfection



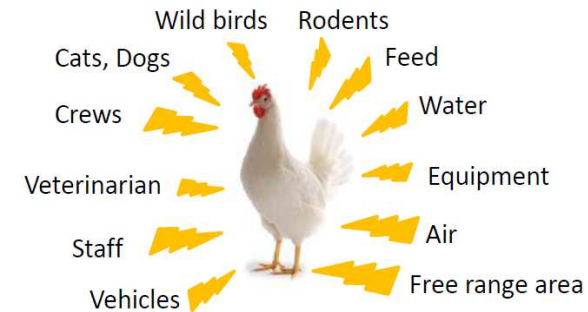
Ways of Transmission



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Direct

From Animal to Animal
From Human to Animal



Indirect

Fecal to oral: pathogens are shed in the feces and are consumed by susceptible chickens

Aerosol: pathogens travel in microscopic droplets of moisture/dust and are inhaled

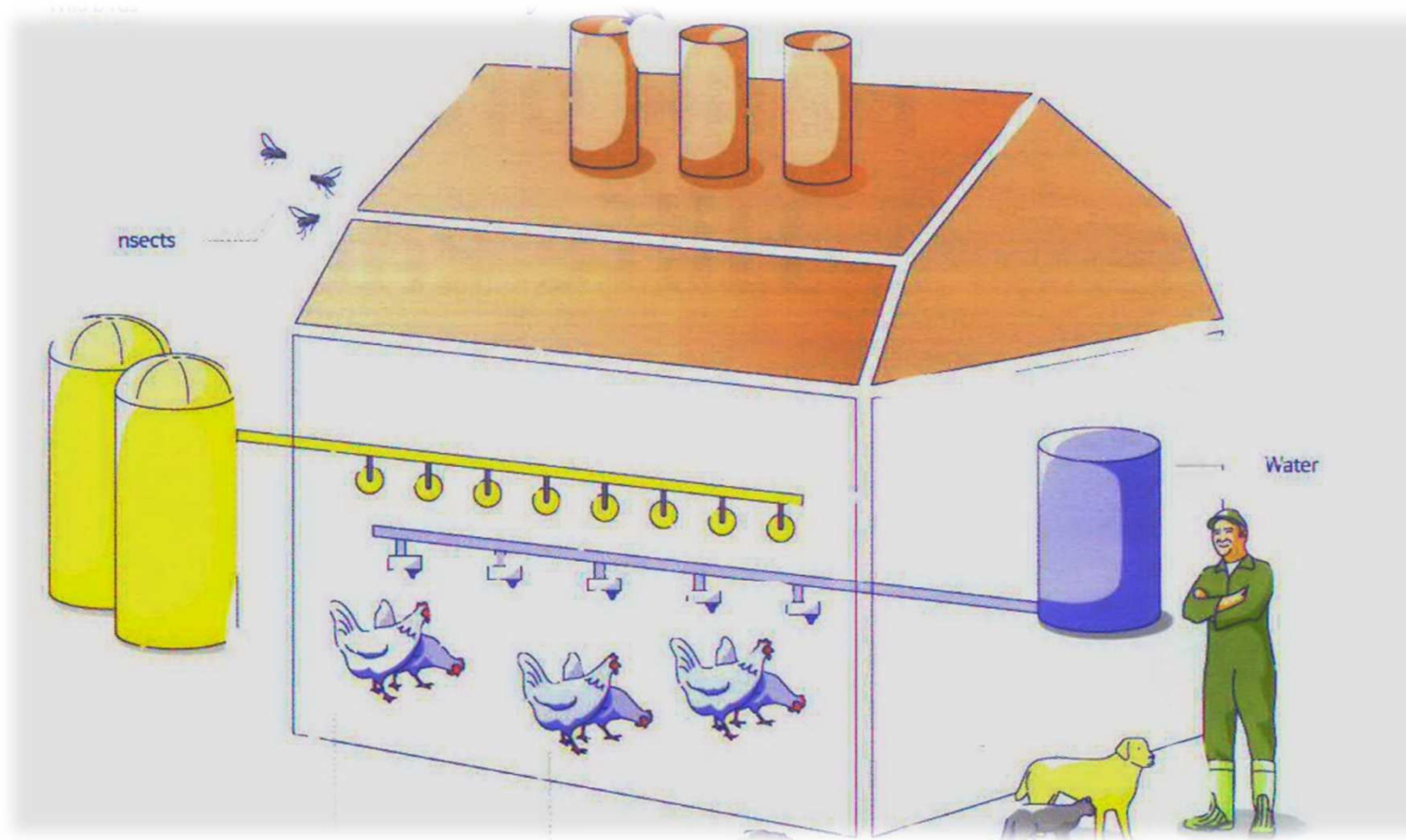
Mechanical Vectors: Pathogens travel on people, insects and brought into physical contact with layer

Biological Vectors: carry pathogens in their body and transmit the disease either by being consumed, by biting or by spread of infectious particles (feces)

Ways of Transmission



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source: Lohmann Animal Health



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Good Biosecurity Practice

Poultry Facilities

- Build the farm **as far as possible** from other farms (Min. 1km)
 - In an area of **low poultry density** and wild and water fowl
- Away from transport routes and **other Livestockes**
 - Prevent entering of wild birds, rodents, parasites
- **Fence** the farm and install Information Signs
- Keep the cars out of premises
- Keep farm area **free of vegetation**
- **All in All out is the best principle!** (Avoid Multiage farms)
- **Chose enough down time between flocks** (the longer the better)
 - Some disease causing organisms will persist longer than others

Good Biosecurity Practice

Poultry Facilities



Table: peristance of Disease-Causing Agents

Disease	Lifespan away from Birds
Infectious bursal disease	Month
Coccidiosis	Month
Fowl Cholera	Weeks
Coryza	Hour to Days
Mareks Disease	Months
Newcastle Disease	Days to weeks
Mycoplasmosis	Hours to days
Salmonellosis	Weeks
Avian Tuberculosis	Years
Avian Influenza	Weeks to Month
Infectious Bronchitis	Weeks to Month

(Bell and Weaver; 2002)

Good Biosecurity Practice

Poultry Facilities



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Good Biosecurity Practice

Poultry Facilities



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Prevent Multi-Age farms if possible!



Good Biosecurity Practice

Farm Design



The farm should be divided into clean and dirty areas

Dirty:

- Manure handling, dead birds disposal,

Clean:

- Egg handling, chick handling, movement of birds, daily activities in contact with the birds

If possible, it is preferable that equipment and personnel not be shared between clean and dirty activities!

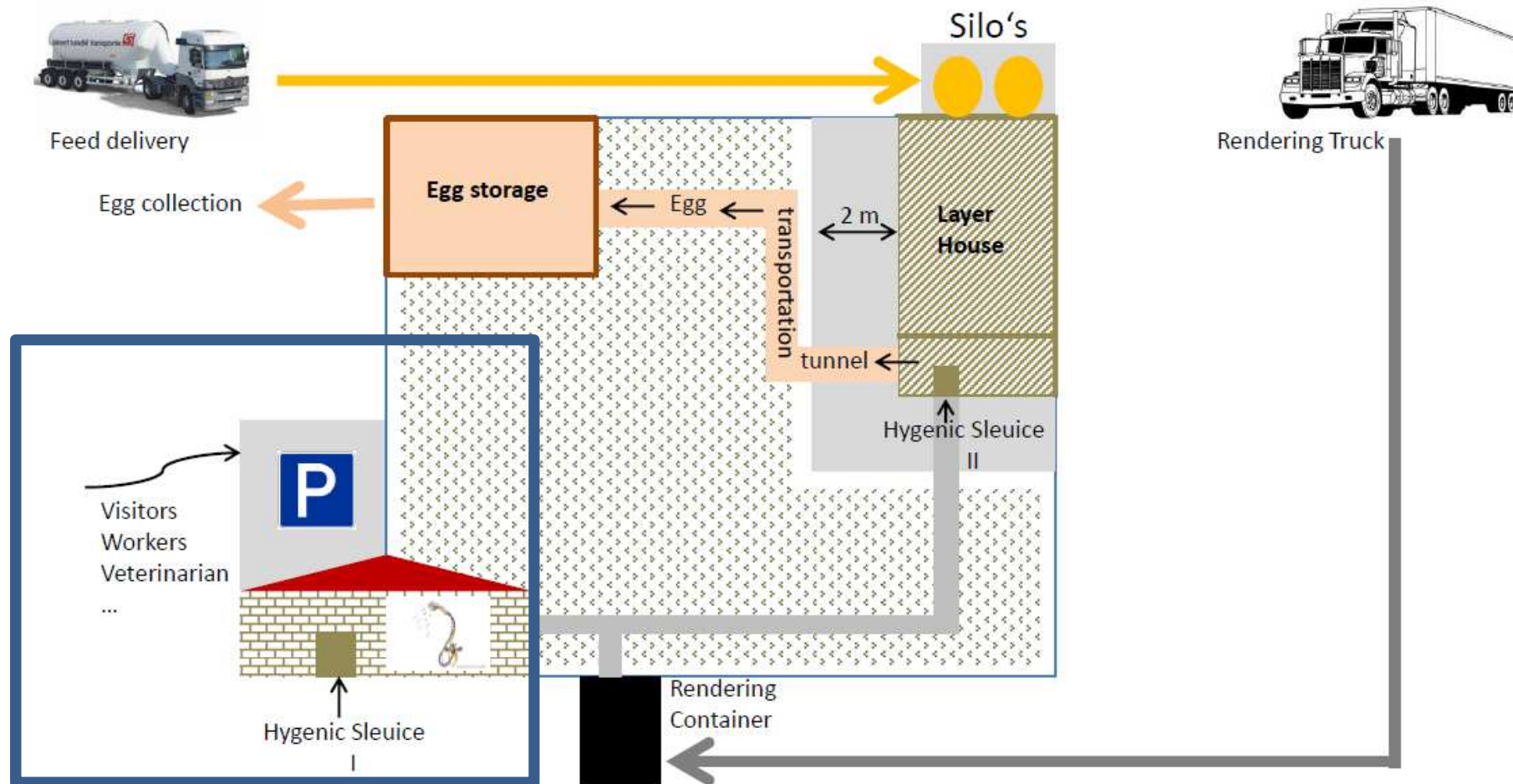
If not possible complete clean activities before undertaking dirty activities

Good Biosecurity Practice

Farm Design



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Good Biosecurity Practice

Barriers Traffic Control

If trucks cannot be avoided on the farm level:

- Clean & disinfect them prior to entrance
- Route: young to old



Good Biosecurity Practice

Barriers Traffic Control

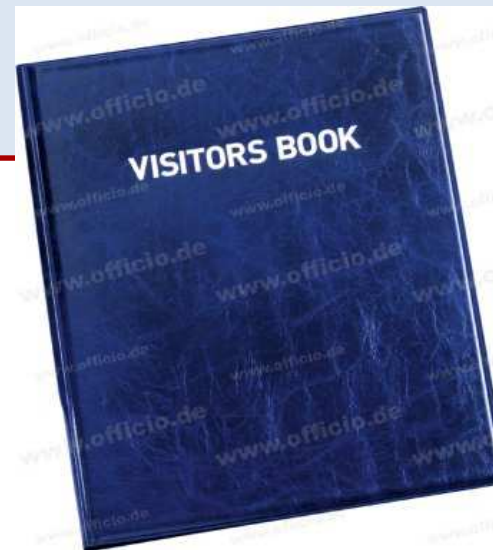


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Keep in Mind

*The most common visitors are the most dangerous ones!
Veterinarians, consultants or feed supplier have mostly been
at other farms before!*

Prepare a visitors book

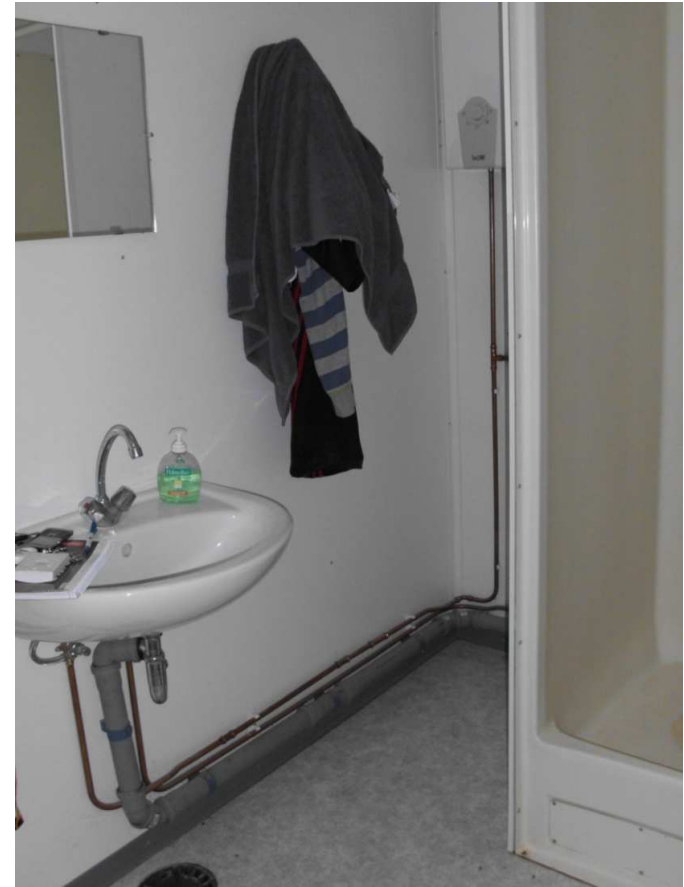


Good Biosecurity Practice

Barriers on Farm level



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Good Biosecurity Practice

Barriers on Farm level

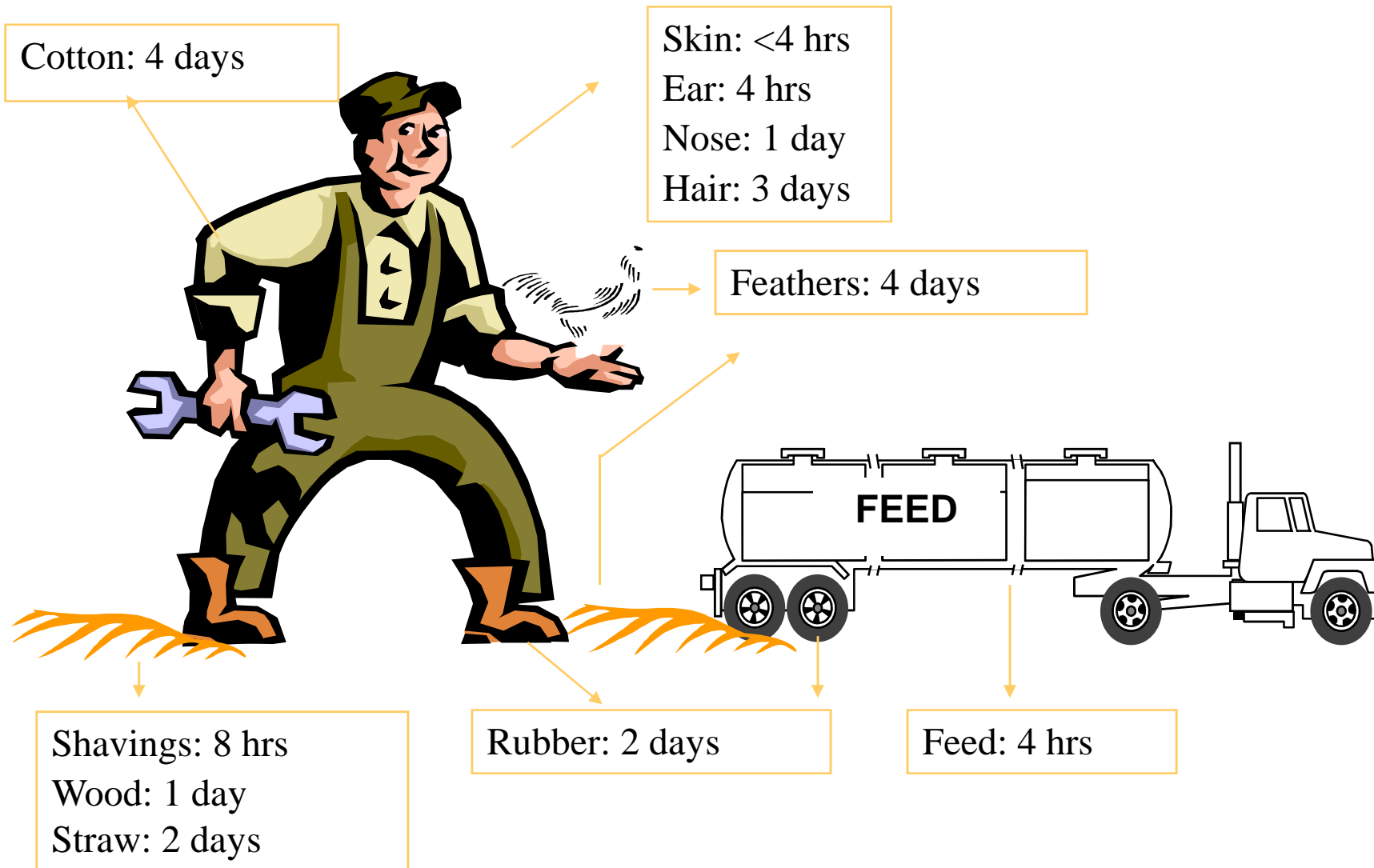


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The best and most effective
method for staff disinfection
is a complete shower in facility!

Survival of MG



Good Biosecurity Practice

Hand disinfection



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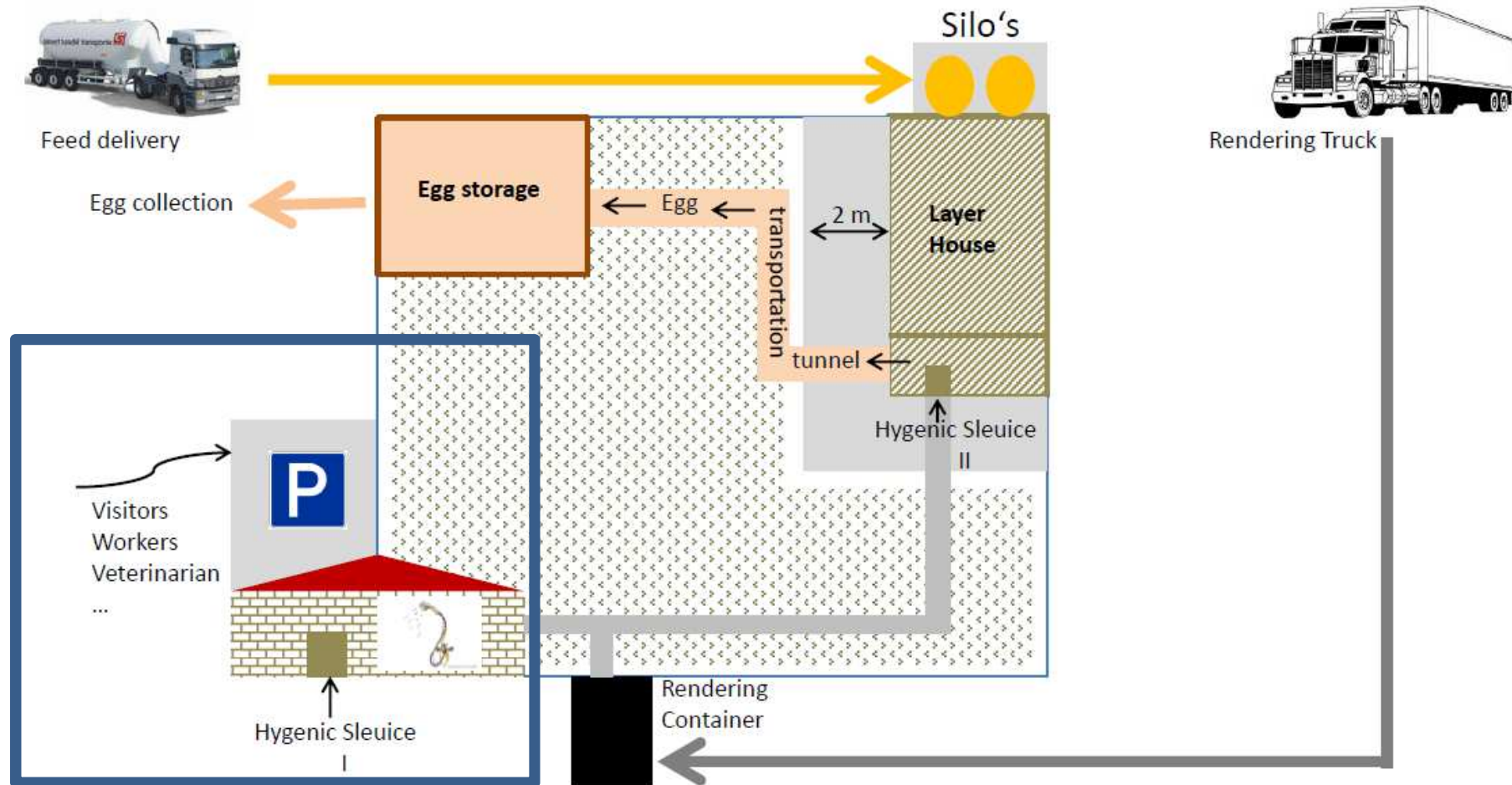


Good Biosecurity Practice

Farm Design



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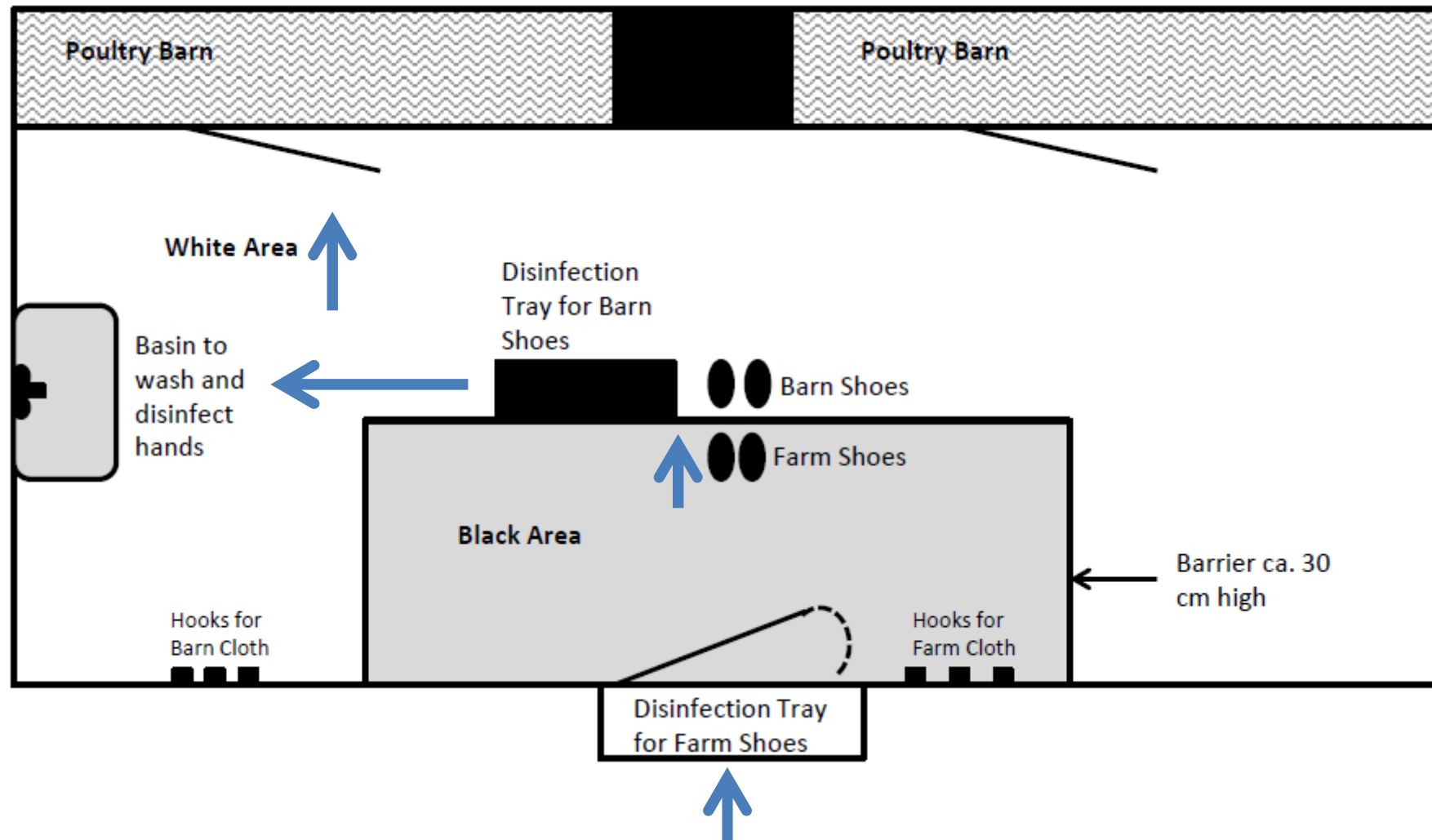


Good Biosecurity Practice

Barriers on Farm level



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Good Biosecurity Practice

Barriers on Farm Level



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Disinfect Farm Shoes



Wash and disinfect Hands



Take a barn own overall



Change Shoes

Sanitation

Daily



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Sanitation

Daily



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Sanitation

Daily



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Chlorine Foot Pan Powder:

- The powder is not slippery and it leaves a much cleaner residual.
- The powder is changed approx. every two weeks
- The liquid had to be replenished daily.

Sanitation

Daily



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Sanitation

Daily



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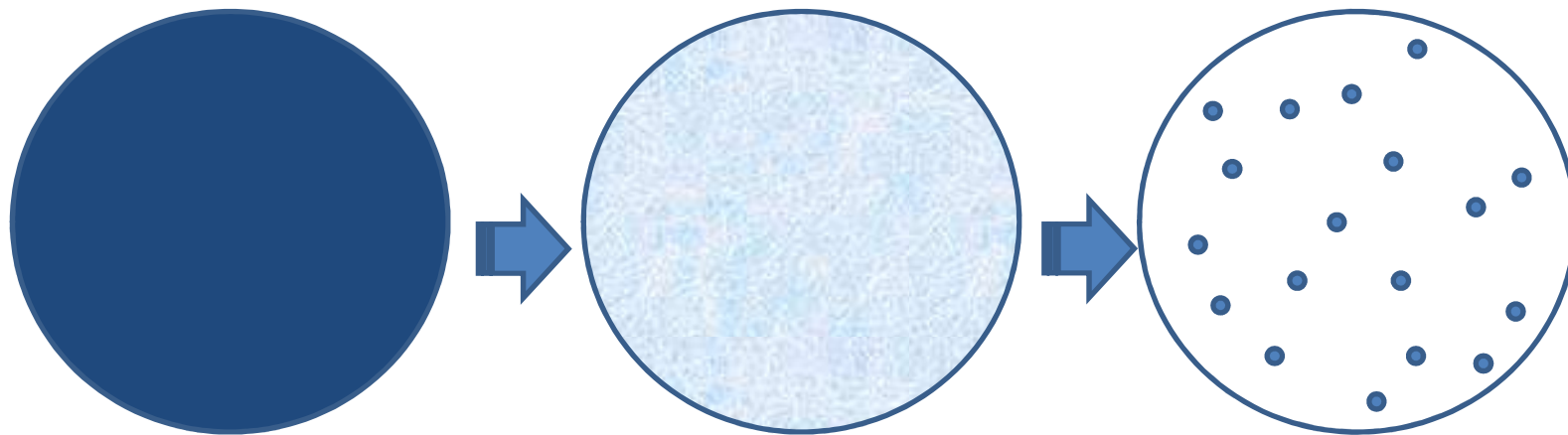




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Cleaning and Disinfection

Bacterial contamination after cleaning and disinfection



Bevor cleaning

1.000.000.000

Bacteria / cm³

After cleaning

1.000.000

Bacteria / cm³

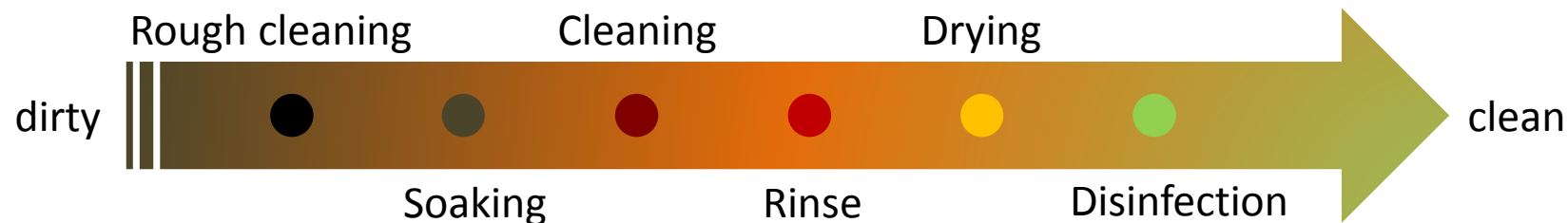
After disinfection

< 1.000

Bacteria / cm³

Cleaning and Disinfection

6 Steps of good cleaning procedure



Keep in Minde

Disinfection without a proper cleaning has no effectivity. Increasing the concentration of disinfectant is never a substitute for thorough cleaning!

(DLG; 2010)

What can go wrong...

Protein Error

occurs if in an unclean barn the disinfectant reacts with faeces and other dirt before it can actually react with bacteria or other infectious agents

Soap Mistake

Disinfectants can be inactivated if they react with residues of cleaning agents. Therefore, it is important to rinse the facility with clear water after cleaning and dry it properly

Temperature Mistake

Some substances like Aldehydes do not work with temperatures which are below 10°C. The activity of many disinfectants improves significantly, as temperature rises.

Cleaning and Disinfection

Which Disinfectant?

- Choose those with a broad range of efficacy
- Should be effective against viruses and bacteria as well as against fungi

Group of active agents	Example
Aldehydes	Glutaral, Formalin
Chlorine releasing agent	Active chlorine
Oxygen derivatives	Hydrogen peroxide
Iodine compounds	
phenols	
Quaternary ammonium compounds	



Cleaning and Disinfection

Quality Control



Control the effectiveness of the cleaning and disinfectant measures:

this should be done by your veterinarian, farm quality manager or an external specialist

Table: Microbial contamination of surfaces before and after cleaning and disinfection (benchmarks)

Point in time	Cfu* / cm ³ surface in animal house
Prior to cleaning	1.000.000.000
After Cleaning	1.000.000
After disinfection	1.000
After 2 nd disinfection	100

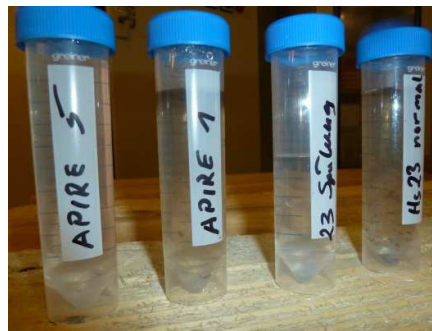
* Colony forming units

(Source: Lohmann Animal Health)

Water

The Distribution Systems or water itself are carriers for pathogens

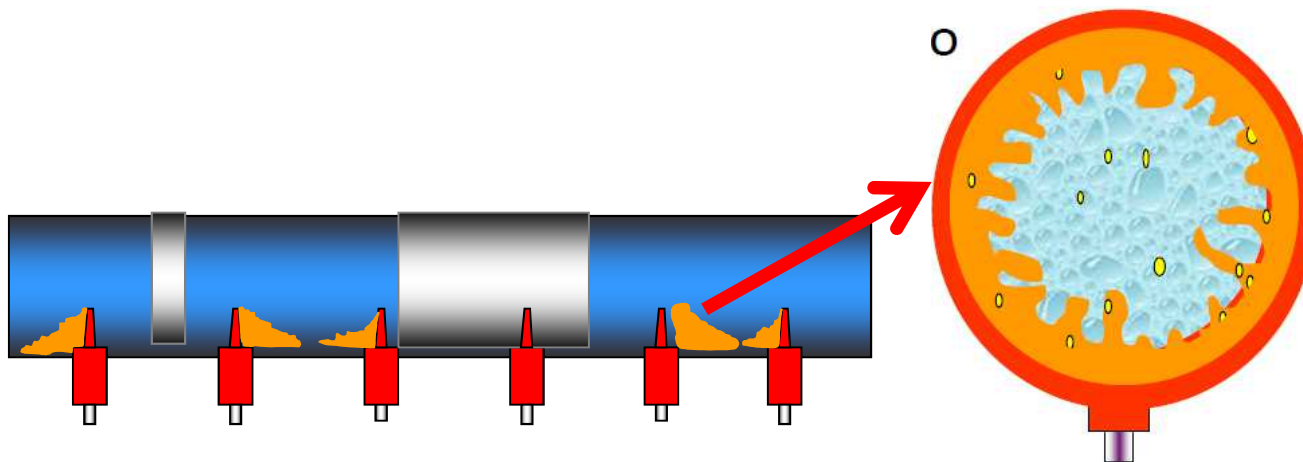
- Check water quality regularly. If well water is used, make sure that samples of water are submitted at least twice a year
- Nippledrinker are preferable over open water sources
- In terms of hot weather conditions flush the line every hour
- Clean and disinfect water lines regularly. At least before and after Vitamin treatment, Vaccination, medication



Biofilm in Water Lines

Biofilm = thin layer of organic and inorganic material adhering to the inside surface of water lines

- Host for pathogens like E.Coli and Salmonella
- Impacts Vitamines, Vaccines and Medications



Ways to control biofilm

Chemical free

With pulsed water

Can be used during service period, before and after each medication or vitamin treatment



Ways to control biofilm

Chemical

Chlorination

- Eliminates bacteria and many viruses
- Most effective in warm water ($> 18\text{ }^{\circ}\text{C}$)
- Negative impact on medication and vaccines
- Concentrations $> 5\%$ can harm metal equipment and gaskets

Clorine dioxide

- No interactions known with medication
- Use mixture of about 500 ml / 1000 l water depending on product (once a week, preferable on day of manure removal)
- „Improves digestive health of the flocks“

Ways to control biofilm

Chemical

Organic acids

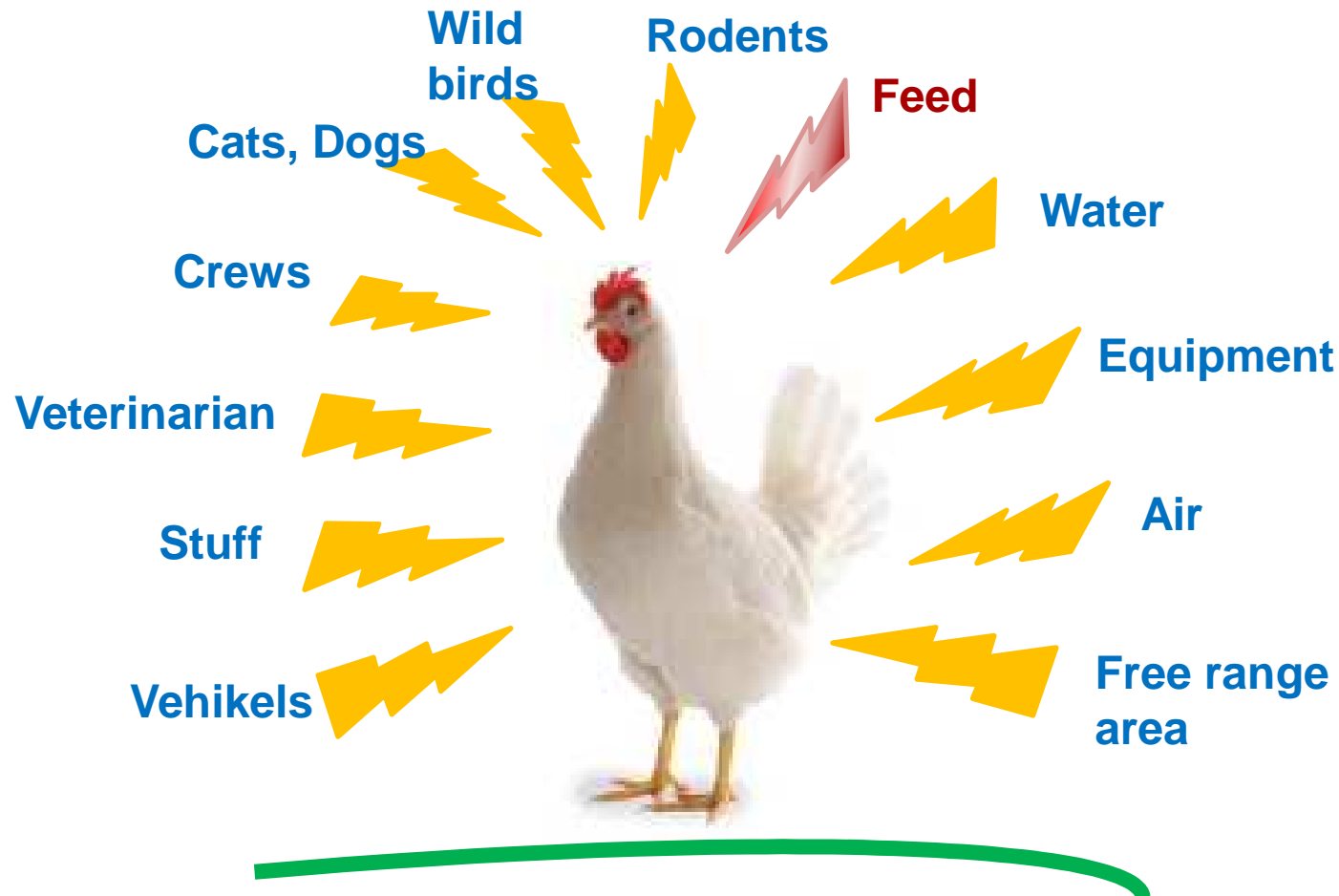
- Formic acid, citric acid, acetic acid, hydroxypropionic acid, propionic acid
- Reducing pH-Value of the water
- Improves intestinal health of the birds
- Use right dosage

Example

*Use 1- 5 l citric acid / 1000 l water
(Ensure to get the hens used to it, otherwise
they avoid drinking)*

Caution: if pH-level of water drops **below 4**, this will have a negative impact on water intake and can effect equipment negatively

What about feed?



Vertical or horizontal transmission

What about feed?

- Always provide **best quality** raw materials
- Perform quality **monitoring program** for nutrient content, microbial and mycotoxin contamination
- **Store** supplements **hygienically**
- Use feed suppliers which are **certified** and controlled
- **Heat treatment** is a tool for sanitation (But: too high temperature may impact quality)
- **Organic acid** are good tools to reduce bacterial load
- **Retain sample** and bill of each delivery
- **Keep** Silos **clean** (in- and outside, Install Silos at shady place)

Keep in Mind

Clean feed can always be contaminated during transport and storage. Include the trucks into the biosecurity regime!

What about feed?



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Rodent Control



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Prolific:

1 rat produces 118 rats / year

1 mouse produces 50 mice / year

Eats feed:

1 rat eats 9 – 18 kg. of feed / year

Spreads disease:

salmonellosis, mycoplasmosis, colibacillosis, coryza, pasteurellosis

Damaging:

Constant gnawing damages wires, insulation, wood structure

Range:

Mice usually within 30 feet of food source; does not need water source

Rats travel many kilometers to find feed; drinks 20 ml water/day



How to fight rodents



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Not a good Idea!!!



How to fight rodents



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First Rules

- Keep interior and exterior of the Building clean
- Remove spilled feed immediately
- Remove dead birds and broken eggs at least once a day
 - Place them in secured containers
- Establish a professional control program



Rodent Control Program

Non-Chemical



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If they don't wear a helmet, this is a possibility!



Rodent Control Program

Chemical



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First Rules

- Use baits which are accredited
- Don't place baits within reach for the layers
- Change active component regularly to avoid resistancy



Did you know?

*It can take a week or more until
mice and rats accept baits...*

Insects control

- Transmission of diseases:
 - Mosquitoes : Fowlpox virus
 - Fowl ticks : Pasteurella.
 - Black beetles (Alphitobius): MD, IBD
- Remove the manure all 3-4 days
- Reduce water losses to avoid wet manure
- Optimal feed formulation to avoid diarrhoea

Flies need moisture for development



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Example of how a GP-farm was kept safe from disease contamination!

- **7 km** away from main highway / private road to compound
- **No vehicle** is allowed to enter the compound
- Transport vehicles for birds and raw materials are just allowed to enter the compound as far as to the main building after being **washed and disinfected**
- Onward transport by **farms' own vehicle**, which never leaves the compound
- **First shower** and **wearing protective clothes** and **shoes** at main building
- **No foreign objects** such as mobile phones or writing pads are allowed to be taken into compound (exceptions such as glasses and cameras will be fumigated)
- The feed mill is located on the compound producing just for GP flock



Main entrance and Gray zone



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Special car wash for transport vehicles



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**Main Building and 1st hygiene station
including office, staff room, sanitary and shower rooms**



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Every hygiene station consists of disinfection tray, changing room, showers and hand disinfection with its own protective clothes, shoes and towels with specific colors!

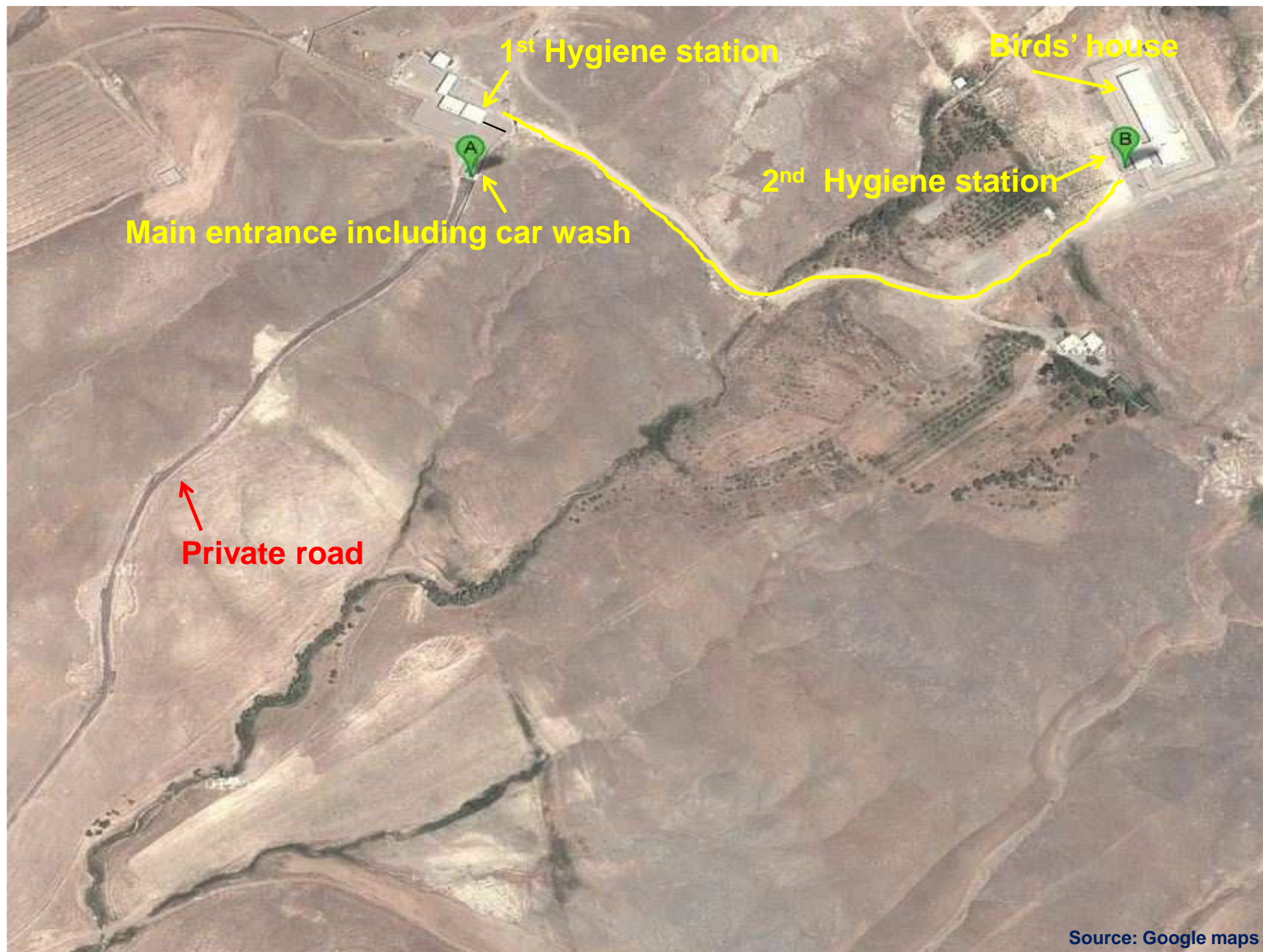


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Every hygiene station has its own protective clothes, shoes and towels with specific colors!





Arriving at second Hygiene Station before getting inside the Birds' house



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Every hygiene station consists of disinfection tray, changing room, showers and hand disinfection with its own protective clothes, shoes and towels with specific colors!



Changing protective clothes and shoes one more time at birds' house entrance!



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Biosecurity key factors

- Education
- Communication
- Record keeping
- Working relationship with other poultry companies

To be successful, Biosecurity measures must be consistently applied. Discipline & commitment are needed from each individual associated with poultry!

Record keeping

- Time consuming but is the best way to trace back events that may have contributed to a breakdown in biosecurity
- Logbook of people & vehicles movements
- Rodent & fly control records
- Vaccination program, details of vaccine used
- Sanitation records

Biosecurity Checklist

Cleaness / Biosecurity Check List					
Time Period _____		Cooperator _____			
E = Excellent		S = Satisfactory		U = Unsatisfactory	
		NA = Not Apply			
		E	S	U	NA
1	Office doors locked				
2	Office clean and neat				
3	Shower: working properly and soap available				
4	Towels, coveralls, boots and hairnets: clean and available				
5	Hand and boot disinfectant: availability and evidence of usage				
6	Bacterial surface counts results reported				
7	Air sampling for fungi and bacteria: frequency and results				
8	Cooler, floor, walls, carts and gathering tables kept clean				
9	Flock health problems reported				
10	Daily production sheets filled out and available for pick-up				
11	SOP's available and updated				
12	Nest tops clean, walls dusted, cob webs removed, etc.				
13	Egg trays or belts clean				
14	Eggs graded, broken eggs properly disposed of				
15	Eggs gathered on time				
16	Minimum feed wastage				
17	Feeders working				
18	Waterers working, Filters clean (records)				
19	Minimum wet spots in manure / litter				
20	Rodent bait boxes filled				
21	Pit doors sealed and rodent proofed				
22	Exterior wild bird nests removed				
23	3 ft. rock border outside building kept properly				
24	Grass mowed 20 ft. out from rock border				
25	Fence and gate in good condition				
26	Vehicule disinfection system working properly (maintainance records)				
27	Fan louvers dusted				
28	Air quality acceptable				
29	Daily removal and disposal of mortality to incinerator				
30	Fans and vents operational				
31	Generators operational and tested				

Evaluated by _____

Remarks:



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THANK YOU VERY MUCH
FOR YOUR ATTENTION!