

GUIDELINES ON GOOD ANTIBIOTIC PRACTICE

- As little as possible,
but as often as necessary

2013

Manual on Good Antibiotic Practice



”Use antibiotics as little as possible, but as often as necessary”

For years, the use of antibiotics for the treatment of pigs kept increasing. This trend has been successfully reversed, with antibiotic use falling by 18 % between 2009 and 2012. Although antibiotic use is expected to remain at a steady level, veterinarians, farmers and the public in general continue to discuss the causes of development, prevention and improvements. It is crucial that antibiotics for the treatment of animals are used appropriately and responsibly, thereby ensuring effective treatment with the least amount of antibiotics possible. The purpose of antibiotic treatment of pigs is to safeguard the pigs’ health and well-being without creating resistance.

The significant decrease in the use of antibiotics is attributable to the Danish pig producers and the Yellow Card Scheme, which is aimed specifically at pig farms with a high consumption of antibiotics. The Pig Research Centre (PRC) fully supports the scheme and has initiated a range of research activities aimed at reducing and optimising the use of antibiotics. One of these activities is the publication of this manual on Good Antibiotic Practice.

The first edition was published in the spring of 2011 and was revised in 2013.

The purpose of writing this manual was to gather all the relevant knowledge and experience related to reducing the requirement for antibiotics and to present this information in an easily accessible and practical manner. The manual was written by a group of pig experts consisting of pig veterinarians, local pig production advisors and employees from PRC.

The group consists of:

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The group decided to focus primarily on diarrhoea in weaners and finishers, since this is where we find the greatest use of antibiotics in pigs. The principle was: **“Use antibiotics as little as possible, but as often as necessary”**. A series of instructions (fact sheets) were drawn up to be used as a tool in the prevention of diarrhoea outbreaks. In case of disease outbreaks, the herd vet decides whether antibiotic treatment is necessary and, if so, which drug and dose to administer. The group decided to draw up a series of guidelines to help vets provide advice on the correct handling and dosing of antibiotics. All fact sheets have been translated into English and Russian and are available for download at www.vsp.lf.dk.

The group hopes that the material will be a helpful tool for farmers, staff and advisors in their efforts to reduce antibiotic use on their farms.

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Copenhagen



Guidelines on Good Antibiotic Practice

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 - Changing diets without triggering diarrhoea
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Diagnostic and management of antibiotic treatment

- How to diagnose diarrhoea
 - Instructions in correct injection
 - Accurate dosing of antibiotics
 - Stock solution of antibiotics
 - Administering antibiotics with drinking water
 - Administering antibiotics with liquid feed
 - Administering antibiotics with dry feed
 - ADD - Average Daily Dose
 - Yellow card for high antibiotic use
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-

Clean pig facility

Thorough cleaning, disinfection and drying between each batch of pigs will reduce dissemination and infection risks. Disinfection does not replace drying.

Wash

- Warm/cold water are equally good as long as soap is used
- Soaking considerably reduces the time spent on washing and the consumption of water
- The use of soap helps eliminate greasy dirt on pen sides and reduces the time required for fine washing
- Without final drying – only little effect of wash (see “Dry and warm pig facility”)

Order of washing

The washing process is illustrated to the right

1. Floors
2. Walls
3. Pen sides
4. Feeders / pipelines for liquid feed
5. Nipple drinkers and drinking bowls
6. Ventilation funnel
7. Finally, flush everything at low pressure

Disinfection

- Dry for 1-2 hours before disinfecting so that the room is damp, but without blank water on the floor
- Use glutaraldehyde products in empty facilities
- Use oxidizing agents in facilities with pigs

1. Soaking



2. Rough washing



3. Soaping



4. Fine washing



5. Flush at low pressure



7. Drying



Total 32-38 hrs

Dry and warm pig facility

A pig facility must be dry and warm when pigs are transferred. If it is cold and wet, the pigs will use body heat, and thereby feed, to dry the room. This weakens their immune defence, which in turn increases the risk of disease.

Drying

- Remove visible water and turn up the heat after wash and disinfection. Use a heat cannon to supplement room and floor heat
- A heat cannon uses approx. **0.5 litre oil per m²**
- Set the temperature as high as possible, preferably above 30°C
- Set ventilation output to 5-15% of maximum ventilation
- Heat cannon must be equipped with thermostat (set to 1-2°C below room temperature)

Hours for drying (guiding)	Heat cannon (output)	
	25,000 kcal/h 29 kW	38,000 kcal/h 44 kW
300 weaners 160 m ²	20 hrs	13 hrs
400 finishers 300 m ²	36 hrs	24 hrs

Is the facility dry?

- Floor/slat temperature must be identical to room temperature; use a surface thermometer
- Place a piece of plastic on the floor: if the floor underneath is still wet 1 hour later, the room is not dry

Adjust the temperature to the size of the pigs before transfer

Guiding temperatures in weaner accommodation

Weight (kg)	Temperature under cover (°C)	Floor under cover (°C)	Room temperature* (°C)
5.5	31-32	32	25-26
6.0	30-31	32	24
7.0	29-30	32	24
8.5	28-29	32	23
11.0	27-28	32	22
15.0	26-27	-	21
25.0	24-25	-	16-18

* Adjust room temperature to achieve the desired temperature under the cover.



Drying with a heat cannon



When the facility is dry and the temperature right, weaners lie under the cover in one layer facing the pen

A wet floor feels cold

If the pigs lie on a wet floor, temperature must be increased by 5-10°C

Efficient drying

- Warm air holds more water than cold air
- Drying must take place at **high** temperatures and **low** ventilation output

Cleaning of water pipes

Cleaning of water pipes removes dirt, biofilm and calcareous deposits. Clean water pipes ensure optimum effect of drugs administered via drinking water.

Cleaning of water pipes in empty facilities (recommended)

- Clean water pipes after wash and disinfection of the facility
- Use a medicator for correct dosing of disinfectant
- Add fruit colouring; this makes it easy to see when the disinfectant has flowed through the entire water system
- Always use products containing hydrogen peroxide (disinfectant) + peracetic acid (descaling kit)
- Flush the entire water system incl. nipple drinkers
- Avoid blind ends on water pipes. Place a tap or a nipple drinker directly on the water pipeline - see picture

Cleaning of water pipes in facilities with pigs

- May be necessary before and after medical treatments
- Use a medicator for accurate dosing of disinfectant (dose is lower than for empty facilities)
- Clean water pipes over two days
- Clean just before emptying the facility of large pigs

Products allowed in drinking water (pigs in facility)

- Additives and premixes are illegal in drinking water.
- Supplementary feed in drinking water is allowed. Some acid products are registered as supplementary feed.
- Biocides in drinking water are, as a general rule, allowed (product types 5, PT5) with pigs in the facility if this is written in the instructions of the product.
- Always demand documentation of whether a product is allowed in drinking water. Documentation is obtained from the manufacturer.

Facts on biofilm

- More often observed in plastic pipes than in iron pipes
- Adheres in particular to calcareous deposits in water pipes
- May reduce the effect of medication
- May reduce the output of the nipple drinkers



Use a medicator is for cleaning the water system



Activate all valves during disinfection



Water circulates past nipple drinkers (via cross pipe fitting)

A safe water system

- No blind ends on water pipes
- The end of a water pipe must end in a tap or a water valve
- Water pipes should be laid out section-wise

Supply of water and feed

Easy access to water and enough feeding points help ensure a high level of health and a high daily gain among the pigs.

Easy access to water

- Water deficiency increases the risk development of disease
- Initial pressure and location of the nipple drinker must match the size of the pigs
- A water level attracts weaned pigs and may increase water intake

	Drinking bowl	Nipple drinker
Max. pigs per water supply unit	20	10
Min. water output (litre/minute)	1.0	0.5 – 0.8

Easy access to feed

- Upon transfer of pigs, ensure that all pigs are able to reach feed easily
- Most tube feeders serve up to 25 pigs per side
- Simple dry feeders w/snout partition: 5 pigs/feeding point
- Simple dry feeders w/shoulder partition: 7 pigs/feeding point
- It is possible to increase feed intake and help weak pigs by also spreading feed on the floor post-weaning

Requirements for restricted feeding

- All pigs **must** be able to eat at the same time
 - Feeders are therefore not suitable for restricted feeding
- Feeding in long troughs requires:
 - 12 cm feeding space per pig at 7 kg
 - 22 cm feeding space per pig at 30 kg
- Floor feeding: the floor must be clean and feed spread in a way that all pigs can access the feed at the same time
- In old buildings without solid floor, feed can be spread on a square board with edges (approx. 3 cm high)

Prevent floodings in tube feeders

- Problems with flooding of water in feeders can be solved by establishing an overflow valve: drill a hole at the top of the water trough that functions as overflow



Keep water level clean for newly weaned pigs



Nipple drinker by feeder is checked



Newly weaned pigs fed in a long trough



Liquid feeding in long troughs requires a sufficient number of feeding points

Feed and diarrhoea

Weaner feed may trigger diarrhoea depending on the feed's content of:

- St. digestible crude protein per feed unit (FUgp)
- Soybean meal

St. digestible crude protein per FUgp

- Reduce protein content if diarrhoea outbreaks are triggered by the feed - see figure to the right
- Productivity will drop if the content of st. dig. crude protein is reduced below the standard

Low-protein feed for newly weaned pigs

- Drawbacks of a low crude protein content are often offset by improved wellbeing (less diarrhoea)
- Productivity loss often therefore only marginal
- Pigs off to a good start in life start feeding according to the standards sooner

Soybean meal for weaners

- Research has shown that reduced content of soybean meal in pig feed only marginally reduced diarrhoea
- In practice, highly varying effect on diarrhoea of reducing soybean meal content
- Increasing inclusion of soybean meal reduces the feed price and increases gross margin if the pigs are able to digest the feed

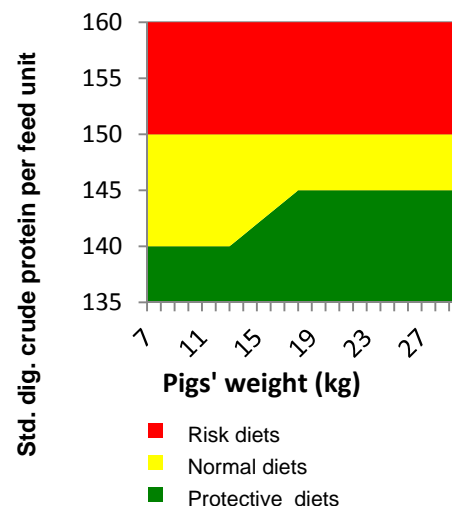
Rules of thumb in evaluation of pig feed

The approximate content of st. dig. crude protein per FUgp based on delivery note can be calculated with this equation:

$$\text{Std. dig. crude protein per feed unit} \approx \frac{\% \text{ crude protein} \times 10}{\text{FUgp per kg}} \times \text{DC}$$

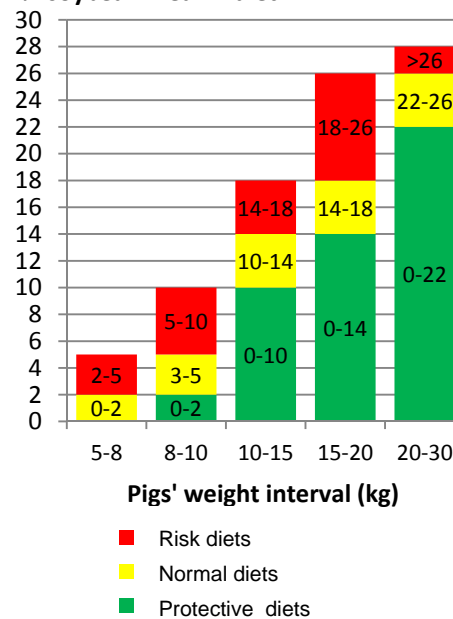
Digestibility coefficient (DC) is based on diet composition:

- DC = 0.85 (more than 10% dehul. soy and less than 5% rapeseed)
- DC = 0.87 (more than 10% dehul. soy and no rapeseed)
- DC = 0.88 (expensive ingredients and less than 10% dehul. soy)



St. dig. crude protein per FUgp. Generally, always use diets in the yellow category

% soybean meal in diet



% soybean meal in the diet. The red area is the economically optimum. In most circumstances, the yellow levels will not cause problems. Only consider the green area if the typical types of diarrhoea have been ruled out.

Preventive steps against diarrhoea

Trials and practical experience have revealed a variety of interventions that can prevent diarrhoea.

Zinc oxide

- Zinc oxide is prescribed by the herd vet and is allowed in the pigs' feed in the period 0-14 days post-weaning
- 3 kg zinc oxide per tonne feed is required

Newly weaned pigs must start eating quickly

- Offer the pigs the same diet in the farrowing facility as at weaning
- Easy access to fresh water via eg. drinking trough, pre-watering or drip watering
- Frequent feedings the first days (min. 4 times daily) in trough/on floor. Possibly along with fresh water
- Floor feeding: the pigs must have eaten the feed within approx. 30 min. after feeding
- Attractive feed with a high content of tasty, easily digestible ingredients (eg. milk powder, dried whey, fishmeal, blood plasma etc.)
- Light in the weaner facility min. 8 hrs a day is a requirement

Restricted feeding

- Room for all pigs to eat at the same time
- Minimum 4 daily feedings - all feed eaten after 15 min.
- Restricted feeding = lower daily gain
- Only practiced in the period when diarrhoea typically causes problems, ie. 4-10 days post-weaning
- For more information see "Supply of water and feed"

Meal feed or expandate vs pelleted feed

- Positive effect on gastric health and diarrhoea
- BUT increased risk of clotting of old feed and feed wastage
- Requires frequent inspection of feeders

Organic acids

- The addition of min. 1 % acid (0.5 % benzoic acid) improves productivity
- Documented effect on diarrhoea if more than 2 % acid is added
- Often pigs can handle more protein in the feed as a result of the addition of acid, which increases productivity

Other interventions:

- Vaccination against Lawsonia
- Vaccination against PCV 2
- Potato starch
- A-38
- Probiotics
- Heat-treated sphagnum



Restricted feeding of newly weaned pigs in long troughs



Meal feed and expandate have a positive effect on diarrhoea

Changing diets without triggering diarrhoea

When you switch gradually from one diet to another, you allow the pigs to adjust to the new diet, which helps prevent diarrhoea.

Gradual transition

- A gradual transition takes min. 4-5 days.
- Mix the two diets. It will not suffice to feed one diet in feeders and the other in troughs or on the floor

Adjusting to soybean meal while the pigs are given VetZink

- Starter feed containing VetZink prescribed by the herd vet can only be used day 0-14 post-weaning
- The transition from starter feed (with VetZink) to weaner feed (no VetZink and more soybean meal) may subsequently trigger diarrhoea – if so, try one of the below proposals:

1. An extra feed cart for diet 2 with VetZink

- Mix VetZink in diet 2 in a feed cart
- Use this cart for feeding the pigs that within 0-14 days post-weaning switch to diet 2
- 14 days post-weaning, switch to diet 2 without VetZink

2. An extra starter diet

- Use an extra starter diet with 5-10 % soybean meal and VetZink as transition diet to diet 2
- Wean the biggest pigs directly on this cheaper diet
- 14 days post-weaning, switch to diet 2 without VetZink

Correct use of VetZink (cross-compliance requirements):

- ✓ Only VetZink is allowed (prescribed by herd vet)
- ✓ Document (in writing) that there is no significant carry-over of VetZink to the subsequent diet (max 150 mg zinc per kg feed) – ask your feed advisor how to do this
- ✓ Check the mixer for carry-over every time you have mixed feed with VetZink



Sudden transition. The pigs have no time to adjust to the new feed, which increases the risk of diarrhoea outbreaks



Gradual transition over a long period of time. The pigs will not notice change in diets



Two feed carts with a starter diet and an extra starter diet ensure a gradual transition



Gradual transition with two feed pipelines and the possibility of manual feeding in feeders

On-farm feed hygiene

Mortality, diarrhoea and rectal prolapse are often attributed to inadequate feed hygiene. The need for cleaning varies – intervals below are guiding.

1. Outdoor silos

- Manhole for efficient inspection of hygiene
- Inspect silos once every quarter and clean as required
- Several companies specialize in cleaning of outdoor silos

2. Mill and nozzle filter

- An extractor reduces condensation. Clean filter bags every 1-2 weeks. If necessary, replace with a clean set.
- Inspect and clean mill when changing screen and hammer.

3. Dry feed mixer

- Clean feed pipes (install spring lock). Scrape, sweep or vacuum mixer. Inspect every 14 days.

4. Liquid feed tank

- Fit feed pipes with spring locks and clean weekly. Switch between two sets of feed pipes. Wash mixing tank weekly.
- Liquid feeding without residue: wash mixing tank and the tank for used water.
- Install an acid vaporizer in all mixing tanks – this significantly reduces the need for cleaning.

5. Hoppers for minerals / fishmeal

- Empty and clean every 3 months (more often in humid conditions)
- Cover the hopper with a board to keep out moisture and dirt

6. Fat system

- The fat tank must be equipped with a manhole
- Empty, scrape once a year. More frequently if the tank has a soup and no plug hole. Alternatively, wash at professional cleaner. Dry thoroughly.

7. Silos for finished feed

- Man hole for efficient inspection.
- Inspect every 14 days and clean as required.

8. Trough augers, conveyor equipment and reception units

- Inspect transport equipment/feed pipes **before mill** every six months.
- Inspect transport equipment/feed pipes **after mill** every 14 days. The need for cleaning after the mill is greater as ground products release heat and form condensation.
- Protect reception unit against moisture. Inspect every 4 weeks.

Cleaning plan

A cleaning plan gives overview and systematics.

Clean feed barn thoroughly once year, including attic, windows, outdoor silos and transport equipment



Akku-drill dismantles plate above U-channel



Dirt in rubber sleeves



Pull the plug when cleaning the unit. All units must have a plug.

Be careful!

- ✓ Turn off UV light
- ✓ Turn off electricity
- ✓ Air liquid feed tank
- ✓ Wear a dust mask
- ✓ Turn off acid vaporizer

Feed hygiene – in the pig facility

Attention to feed hygiene does not stop in the feed barn, but continues all the way to the trough. Mortality, diarrhoea, rectal prolapse and clostridium sows are often attributed to inadequate feed hygiene

1. Dry feeding systems

- Inspect reception units once every quarter – particularly if they are placed outdoors or in an uninsulated feed barn

2. Feeders

- Clean pipelines and feeders of dirt and grease
- Brush the feeder and clean pipelines with a chimney brush (see photo)
- If possible, buy an extra set of pipelines and change to a clean set
- Only wash feeders/pipelines if you have enough time to dry them thoroughly!

3. Corners of feed pipelines

- Dismantle once every six months and scrape/vacuum. Be particularly aware of corner wheel devices placed outdoors

4. Buffer silos above housing sections

- Inspect silos every 14 days and clean as necessary. Be especially aware when using high-fat diets (>2.5 %) or wet grain
- Use nozzle filters during grinding to reduce formation of grease and dirt in silos for finished goods - see "On-farm feed hygiene"

5. Transport vehicles and equipment

- Check delivery silos (from which the truck loads)
- The truck must be sealed if feed is transported from one site to another
- Sweep the truck clean before loading a new batch of feed
- Inspect and clean grain pit, augers, and other equipment used for transporting feed from truck to silo
- Check silos for dirt and grease every 14 days and clean as necessary



Chimney brush for cleaning pipelines. Order the brush at eg www.sfv.dk



Regularly check for dirt and grease in pipelines between feeders and troughs in the sow facility as this may lead to sudden deaths and reduced milk yield



Dirt and grease in pipelines can be removed by brushing or washing

Daily routines

Efficient daily routines in facilities and sections ensure that sick pigs are handled in time. Sensible behaviour in pig facilities ensures a high level of hygiene and on-farm infection protection.

Start with the youngest pigs and end with the oldest

- Change boots between each section
 - Use separate tools for each section
 - Always inspect hospital sections last
-

Inspection and treatment

- Inspect the pigs minimum twice a day, also on weekends
 - Note the pigs' lying behaviour when you walk into a section
 - Inspect the pigs 2-3 times a day the first 4-6 days after transfer
 - Supplement water supply with a water level the first days post-weaning
 - Check that **all** pigs are up and walking
 - Locate, mark and treat sick pigs
 - Make a system for marking pigs to administer treatment correctly
 - Remember to record drug use correctly
-

Check and clean

- Troughs and feeders
 - Nipple drinkers and drinking bowls
-

Setting of feeders

- Feeders are set correctly when water troughs in feeders are clean and feed wastage low
 - Use simple feeders in hospital pens. Empty the feeders twice a week
-



Boots ready by every section



Inspection of pigs



Clearly mark treated pigs



Inspect newly weaned pigs 2-3 times a day; remember to adjust feeders



Cleaning and setting of feeders

Thermal environment for the smallest pigs

Weaning is a dramatic change in a pig's life in terms of nutrition as well as immunity, and the smallest pigs have the largest requirements to their immediate environment.

Improving the thermal environment for the smallest pigs

The images to the right provide ideas for improving the immediate environment

1. Lower covers in the creep area
2. Temporary curtain made of paper or plastic
3. Front edge all the way down to the floor in part of the pen
4. Heat lamps in the cover of the creep area
5. Bedding
6. Straw board

Temperature requirement of the smallest pigs

Weight (kg)	Temperature under cover (°C)	Floor under cover (°C)	Room temperature* (°C)
5.5	31-32	32	25-26
6.0	30-31	32	24
7.0	29-30	32	24

* Adjust room temperature to reach the desired temperature under the cover.

Housing of the smallest pigs

- House the smallest pigs in warmest pens in the facility
- These are the green pens in the picture
- Do not accommodate the smallest pigs in end pens, in pens under, under ventilation points (●) or in pens with temperature and humidity sensors (☒)

Move weaned pigs to the weaner facility

- The pigs are assured of optimum environment and feeding
- Transmission of disease to piglets is avoided
- If weaned pigs remain in the farrowing house, they must be assured of the same environment and access to water and feed as if they were housed in the weaner house

Modify access to feed and water

- The smallest pig must be able to reach feed as well as water
- Make a pen especially for the smallest pigs



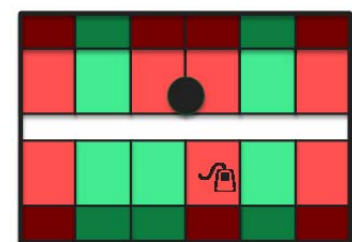
Improving thermal environment with straw board



Improving thermal environment with curtain



Partial closure of cover



Place the smallest pigs in the green pens

Fact:

A simple curtain in front of the cover increases the temperature under the cover by 1-2°C

Transfer and sorting of weaners

Efficient sorting procedures and sectioning prevent disease. When the pigs are sorted at transfer to the weaner facility, it is possible to switch diets pen-wise at the optimum time.

Sectioned management

- Pigs are transferred to an empty, clean and warm facility
- Infection pressure is reduced as all pigs have the same age and level of immunity
- The facility is emptied after each batch

Sort the pigs at weaning

- Place the smallest pigs (approx. 15%) in pens with a superior thermal environment
- Place the largest ones (approx. 15%) in separate pens
- Wean the remaining 70% litter-wise to minimise mixing of litters
- Do not mix pigs already weaned (eg. pigs from nurse sows) with newly weaned pigs. Place them in separate pens.

Limited mixing improves herd health

- Do not move pigs backwards in the system; collect them in individual pens if it is absolutely necessary to move them
- Do not move pigs between pens

Sorting of runts within a section

- Pigs that are unable to keep up with the rest of the pigs in the group must be identified and moved regularly
- Move pigs to sorting pens only as that minimises mixing
- Treat sick pigs and move them to a hospital pen

Emptying a section

- When emptying a section, herd conditions determine how to handle the runts.
- Generally, small sections are preferred for these pigs. These sections are emptied and washed regularly.
- Continuous collection units in which all runts are mixed should be avoided, particular on farms with respiratory disorders.
- Do not move these pigs back to a section with younger pigs



Empty, clean and warm facility ready for a new batch of pigs



Superior thermal environment for the smallest pigs



Treat sick pigs and move them to a hospital pen



A weaner pen is being emptied

Hospital pens

Hospital pens are compulsory, and there must always be one hospital pen ready for pigs with special needs. Experience shows that min. 2% of all place units must be place units for hospital pens.

A hospital pen must

- Have soft bedding in min. 2/3 of the floor area
- Have a heat source and a cooling device
- Be draught-free

Space requirements

Weight interval (kg)	1 pig per pen (m ²)	More than 1 pig per pen (m ²)
7-15	0.41	0.36
15-30	0.69	0.58
30-60	1.14	0.91
60-100	1.70	1.29
100-130	2.05	1.53

Feed and water

- The pig must have easy access to feed and water
- Dry feed is recommended to maintain a high level of hygiene
- Hospital pens for weaners/finishers should be located in a separate section

Examples of soft bedding

- Straw (the pig must not be in direct contact with the floor)
- Woodchips
- Rubber mat

Move a pig to a hospital pen if it needs

- A soft lying area (eg. poor legs/arthritis)
- More heat (eg. cerebrospinal meningitis)
- More space and quiet (eg. large hernia with minor lesions)
- Access to feed and water without competition (eg. tail bites)

How to use a hospital pen

- Move pigs with acute disease, act before it is too late
- Pigs heal faster in good hospital pens
- Move pigs to buffer pens when healed; that frees up space
- Put down chronically unthrifty pigs; that frees up space



Straw used as soft bedding



Soft rubber mat used as bedding



Cover with heat lamps



Buffer pens should be available to accommodate heated pigs moved from hospital pens

Mats for hospital pens

See:
vsp.lf.dk/Viden/Stalde/Sygestier

How to diagnose diarrhoea

It is crucial to identify what triggers diarrhoea in weaners and finishers for treatment to be effective.

Symptoms

- Agree with the herd vet which symptoms of diarrhoea to look for
- Agree with the herd vet when to administer injection and when to treat all pigs in a pen
- Daily note the symptoms observed among the pigs

On-farm post-mortem examinations

- May give an outline of the pathological status and facilitate immediate intervention
- Material can be submitted for further laboratory analyses

USK pig

- A large number of pigs are subject to post-mortem examination at the Laboratory for Pig Diseases according to agreement and at an agreed price

Cultivation of bacteria at the Laboratory

- Resistance determination of E.coli problem
- Analyses for dysentery and hemolysing spirochaetes

PCR gastric package

- Examination revealing viruses in faeces; Lawsonia, E.coli, PCV2 and B. pilisicoli also examined
- Samples must be taken of watery diarrhoea
- Price: DKK 3,875 for 4 samples (January 2013)

Blood samples

- Antibodies against Lawsonia
- Detection of PCV2 virus

USK weaner at the Laboratory for Pig Diseases in Kjellerup

- Post-mortem examination of 10 weaners as agreed
- Price: DKK 1,945 (January 2013)

Contact your herd vet in case of disease outbreaks with increased mortality



Pig with faeces on hind part



Watery faeces on slats



On-farm post-mortem examination



Post-mortem examination at lab

Instructions in correct injection

Correct injection techniques are essential when administering vaccines, iron, pain-relief or antibiotics to pigs via injections.

Correct injection technique

The method is described on the label of medicine bottle

- **i.m.:** intramuscular injection in the neck musculature
- **s.c.:** subcutaneous injection under the skin
- Only use traceable hypodermic needles (DANISH approved)
- Bent needles **must** be discarded
- Discuss injection techniques and hygiene with your herd vet

Correct needle size

- Piglets: 0.9 mm x 13 mm (20G)
- Weaners: 1.2 mm x 20 mm (18G)
- Finishers: 1.6 mm x 25 mm (16G)
- Sows: 1.6 mm x 38 mm (16G)

Change needles after

- Each litter of piglets, eg. iron injection
- 10-15 weaners or finishers
- 1-2 sows

If a needle breaks

- Mark the pig with a special ear-tag in the same side as the broken needle (see fact box below for more info)
- Notify haulier
- Notify slaughterhouse

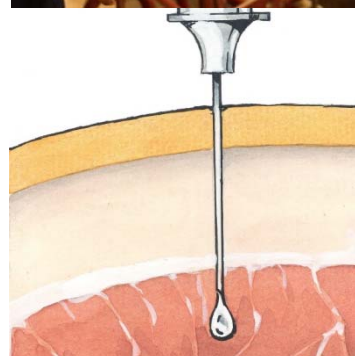
Personal safety

There is a risk of allergic reactions upon contact with antibiotics. Wear gloves or wash your hands after contact.

A pig with a broken needle can be slaughtered as long as the slaughterhouse has been notified

Remember to mark the pig with ear-tags

- Call DC at 8919 1920. DC will send applicator and ear-tags
- Call Tican at 9919 2310 / 5117 8289. Tican will send ear-tags



Administer antibiotics in the neck muscle
IM = intramuscular injection



Different needle sizes



Injection in the neck muscle

Accurate dosing of antibiotics

Accurate dosing is based on the pig's weight. Treatment will be ineffective if the dose is too low. If the dose is too high, an unnecessarily large amount of antibiotics is used.

Always know kg pig to be treated

- All drugs are dosed according to kg pig and not according to inclusion rates in water or feed

Calculation of dose required

- Dose in **ml** = dose in ml antibiotic/kg × kg liveweight
- Dose in **gram** = dose in g antibiotic/kg × kg liveweight

Treatment administered by injection

- A pig of 30 kg is treated with antibiotic A
- Dose (example): 1 ml per 15 kg pig

$$\text{Dose} = \frac{30\text{kg}}{15\text{kg/ml}} = 2 \text{ ml}$$

Treatment administered via drinking water or feed

- A section of 500 weaners of av. 15 kg is treated with antibiotic B
- Dose: 40 g per 100 kg pig

$$\text{Kg pig} = 500 \text{ pigs} \times 15 \text{ kg} = 7500 \text{ kg}$$

$$\text{Dose} = \frac{7500 \text{ kg}}{100\text{kg}} \times 40 \text{ g} = 3000 \text{ g}$$

Personal safety:

- There is a risk of allergic reactions in case of contact with antibiotics
- Wear gloves
- Wear P2 mask when mixing antibiotics
- Avoid dust production when mixing antibiotics and feed



Know how much the pig weighs



Antibiotics for injection



Weighing of antibiotics for treatment in feed or drinking water

Stock solution of antibiotics

A stock solution is the mixture of drugs and water from which the medicator draws. To be able to administer correct antibiotic treatment through the pigs' drinking water, it is important that the stock solution is mixed correctly.

Measure the stock solution required before treatment

- Set the medicator to 2 %
- Monitor the consumption of water for a group of pigs by letting the medicator draw from a container of clean water for 20 hrs
- Note litres of water used

Correct stock solution

The amount of drugs required is calculated according to the instructions of the herd vet. See guidelines in fact sheet "Correct dosing of antibiotics"

- Mix the stock solution
 1. Fill a clean container with tepid water
 2. Add drugs
 3. Mix drugs and water thoroughly
 4. Fill up to the level noted the day before
 5. Wear gloves and mask when handling drugs

Rule of thumb if water consumption is not known

Medicator is set at 2 %

- $\text{Kg animals to be treated}/600 = \text{Litres stock solution}$
- 300 pigs of 15 kg = 4500, ie. $4500/600 = 7.5$ litres

Pigs drink approx.
1 litre water
per 10 kg pig a day

Pigs drink approx.
2.5 litres water
per 1 kg feed a day



Weighing antibiotics



Set medicator at 2 %



1 litre water per 10 kg
pig/day

Administering antibiotics with drinking water

Antibiotics for group-treatment can be administered via the pigs' drinking water.

Water system requirements

- It must be possible to administer antibiotics only to the pigs to be treated
- The system must be equipped with a non-return valve to prevent medicated water from flowing back in the system

Practical procedure

1. Connect the medicator to the section or pen accommodating the pigs that require treatment
2. Number of pigs and their weight are used for calculating the dose of antibiotic required
3. Make a stock solution (see fact sheet on stock solution)
4. Set the medicator at 2 %
5. Treatment generally lasts 16-20 hrs unless otherwise agreed with the herd vet

Cleaning water pipes after mixing antibiotics with drinking water

1. 24 hrs with clean water in the water pipes after antibiotics
2. Clean water pipes with biocide
3. Clean drinking water once again

Rule of thumb:

- Pigs drink approx. 1 l water per 10 kg pig a day

Be careful with antibiotics

- Even small amounts of disinfectants/biocide/acid can destroy the effect of the antibiotic added
- Mixing of antibiotics with other may block nipple drinkers



Medicator is connected to the section/pen housing pigs to be treated



Stock solution must be used over 16-20



Antibiotics may give the water an unpleasant taste

Administering antibiotics with liquid feed

Group-treatment is administered directly in the trough on farms with liquid feed. Do **not** mix antibiotics in the liquid feeding system.

Options for group-treatment via liquid feed

Antibiotic solution can be administered at pen level:

- In a bucket
- With Medliq® (in feed pipes)
- Cart with tank and pump etc.

Procedure

1. Number of pigs per trough and their weight are used to calculate the dose required
2. Estimate litres of water required for the solution to be evenly distributed in the entire trough
3. Prepare an antibiotic solution by mixing the calculated amount of antibiotics in water
4. Use a clean bucket or cart
5. Pour the antibiotic solution into the trough **just before feeding**

Medliq® in feed pipes

1. Make an antibiotic solution matching the weight and number of pigs to be treated that day
2. Check that the container is empty the next day
3. Clean the container when treatment is complete

Personal safety

There is a risk of allergic reaction in case of contact with or inhalation of antibiotics. Wear gloves and mask when handling antibiotics.

Cross-compliance requirements for treatment with antibiotics in feed:

- Do **not** mix antibiotics in the liquid feed mixer
- Do **not** transport feed with antibiotics in the feeding system
- Comply with the slaughter deadline after antibiotic treatment



Measure out ml antibiotic required for treatment



Pour antibiotic solution into the trough just before feeding



Antibiotics can be administered in feed pipes with Medliq®

Administering antibiotics with dry feed

Group-treatment can be administered via the pigs' feed. Do not mix antibiotics in the feed mixer or feeding system.

The amount of antibiotics required for treatment depends on

- Number of pigs per feeder
- Weight of the pigs
- Kg dry feed consumed per day/feeder

Mixing antibiotics with dry feed

- Use a cement mixer or a feed cart
- Cement mixer and feed cart must be clearly labelled "Only feed with antibiotics"
- Mix thoroughly to obtain a uniform mixing of feed and antibiotics

Treatment with antibiotics in dry feed

- Feed with antibiotics is released only in the feeders of the pens with pigs to be treated
- Feed with antibiotics can be fed on solid floor

Personal safety

- There is a risk of allergic reactions in case of contact with or inhalation of antibiotics
- Wear gloves and mask when mixing antibiotics in feed
- It is recommended to wear a mask when using feed containing antibiotics
- Limit dust production during mixing of antibiotics in feed – use a cover on the cement mixer

Cross-compliance requirements for treatment with antibiotics in feed:

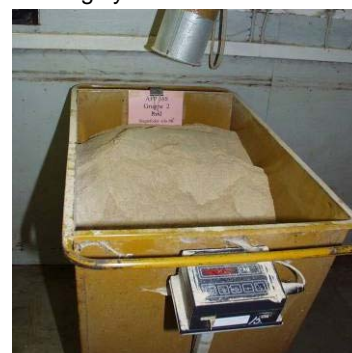
- Do **not** mix antibiotics in the feed mixer
- Do **not** transport feed with antibiotics in the feeding system
- Comply with the slaughter deadline after antibiotic treatment



Wear mask and gloves when weighing out dry antibiotics



Mix antibiotics and feed very thoroughly



Feed cart labelled "Only feed with antibiotics"



Only give feed with antibiotics to the pigs requiring treatment

ADD - Average Daily Dose

ADD - average daily dose - is defined as the daily amount of antibiotic required for antibiotic treatment of a standard pig. ADD is used to monitor the number of standard treatments administered on a pig farm.

How is ADD calculated?

For calculation of ADD, the below standard weights are used for each age group:

- 1 sow: 200 kg
- 1 weaner: 15 kg
- 1 finisher/gilt: 50 kg

Weaners ADD - example

- Antibiotic A: 1 ml is administered per 15 kg pig:
- 100 ml antibiotic A may treat 100 pigs weighing 15 kg = 100 ADD
- 100 ml antibiotic A may treat 50 pigs weighing 30 kg = 100 ADD

Finishers ADD - example

- Antibiotic A: 3.3 ml are administered per 50 kg pig:
- 100 ml antibiotic A may treat 30 pigs weighing 50 kg = 30 ADD
- 100 ml antibiotic A may treat 15 pigs weighing 100 kg = 30 ADD

How is ADD determined?

- The amount of antibiotic in an ADD is determined on the basis of the approved dose
- If the approved dose is defined as an interval, eg. 30-40 mg/kg pig, ADD is the average of this (35 mg/kg)

The concentration of different antibiotics varies

- Antibiotic B (1 ml/20 kg) for 100 kg finishers, 5 ml = 2 ADD
- Antibiotic C (1 ml/10 kg) for 100 kg finishers, 10 g = 2 ADD

Included in ADD:
Antibiotics

Not included in ADD:
Vaccines
Pain-relieving drugs
Vet-Zinc, iron, vitamins



Antibiotics for piglets are included the use for sows



ADD for weaners is a dose for 15 kg pig



ADD for finishers is a dose for 50 kg pig



ADD for sows is a dose for 200 kg

Yellow card for high antibiotic use

The Danish Veterinary and Food Administration has laid down limit values according to which a pig producer receives a yellow card if antibiotic use for treatment of pigs is above the values for a period of 9 months.

Limit values (June 1, 2013)

- Average for 100 weaners a day: max. 25 ADD
- Average for 100 finishers a day; max. 7 ADD
- Average for 100 sows a day: max. 5 ADD

Yellow card

- A pig producer receives yellow card if the use of antibiotics is above the limit value for one or more age groups on the farm (same CHR)

Calculation of antibiotic use

- Is based on this equation:

$$\frac{\text{Av. ADD over 9 months in Vetstat} \times 100}{\text{Pigs in the age group in CHR register in that period}}$$

Consequences of a yellow card

- Only one re-prescription of antibiotics for group treatments
- All herd owners with a yellow card will be audited
- The antibiotic use of the farm must be reduced
- The yellow card is re-evaluated after 9 months

Special health-related conditions

- The herd owner may object to a yellow card under special health-related conditions. This must be documented.

Form an outline with data from Vetstat

- You and your herd vet can form an outline of antibiotic use with prints from Vetstat (examples to the right)

REMEMBER

- Correct recordings in CHR are crucial to the calculation of antibiotic use

Check your own Vetstat data

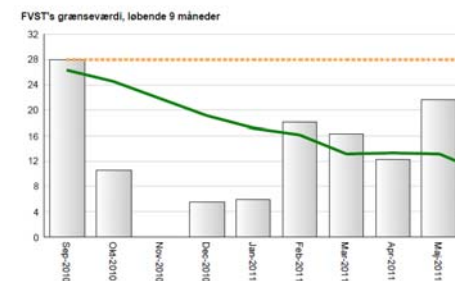
Herd owners can access their own Vetstat data at www.vetstat.dk - requires a password
Call Logica at tel.: 7021 1321 to get a password.



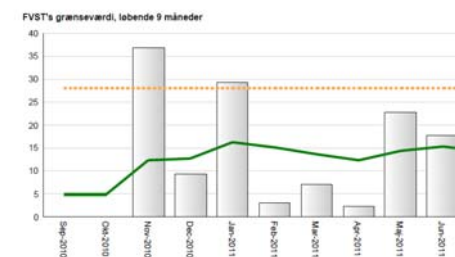
Prints from Vetstat of antibiotic use. The limit value is the orange broken line.

The herd average is the green line

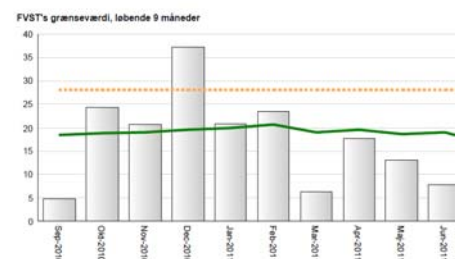
Dyreart : 15 - Svin
Aldersgruppe : 56 - Smågrise mellem 7 og 30 kg
Region : Fødevarerregion Vest



Dyreart : 15 - Svin
Aldersgruppe : 56 - Smågrise mellem 7 og 30 kg
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Dyreart : 15 - Svin
Aldersgruppe : 56 - Smågrise mellem 7 og 30 kg
Region : Fødevarerregion Vest



Vetstat prints of weaner ADD on 3 farms all below the yellow card limit value in 2011 and 2012 of 28 ADD.

Antibiotics and pick-up for slaughter

Slaughter pigs must not contain any residue of antibiotics
Sows and finishers must not be slaughtered within the retention time

Check before pick-up

- Retention time is met for all animals
- **Remember 30 days' retention time for all treatments with tetracycline***

*Remember to update your PDA if you use it for recordings

Pay extra attention

- Pick-up of sows for slaughter: greater risk of errors
- If antibiotics with different retention times are being used
- If antibiotics are administered in drinking water or feed
- If several staff members are responsible for pick-up for slaughter

Recording

- Record sow number. Note the date when the sow is eligible for pick-up
- Growing pigs: pen/section number and number of treated animals
- For all treatments
 - Why (diagnosis)
 - When (date)
 - What (drug and dosage)
 - Who (initials of the person administering treatment)

Good rules of conduct to prevent errors

- Make a list of retention times for all the antibiotic products you use
- Remember: retention time of 30 days after treatment with tetracycline
- Clearly mark treated animals
- Consult your vet if you are uncertain of retention times
- Make clear agreements with the person in charge of loading pigs for slaughter

Call before it is too late

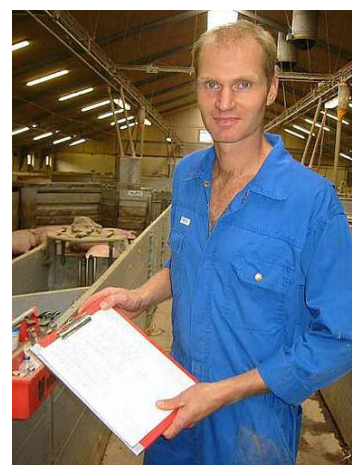
- if an animal that should have been retained was picked up for slaughter

DC: Day: 8919 1920 or 8919 2970 **Evening/morning:** 2466 1109

Tican: 9919 2310 or **Reception:** 9919 2351



Remember: 30 days' retention time for all treatments with tetracycline



All treatments must be recorded



Clearly mark all treated animals

All fact sheets for Good Antibiotic Practice are available for download at vsp.lf.dk in Danish, English and Russian.

VIDEN - TIL STALDGANGEN - SMÅGRISE

The image shows two screenshots of the VSP website. The top screenshot displays the 'TIL STALDGANGEN' page, where the 'VIDEN' menu item is circled in red. The bottom screenshot shows the 'MANUAL OM GOD ANTIBIOTIKAPRAKSIS' page, with the manual title circled in red. The website features a navigation menu with 'AKTUELT', 'VIDEN', 'SERVICES', and 'OM VSP'. The 'VIDEN' section includes a list of topics such as 'Dyrevelfærd', 'Foder', and 'Sundhed og forebyggelse'. The manual page includes a description of the manual's purpose and a list of authors.

<http://vsp.lf.dk/Viden/Til%20staldgangen/Manualer/antibiotikapraksis.aspx>

