

# DIARRHOEA IN PIGLETS, PART 2: WEANING

Weaning is extremely stressful for piglets and post-weaning diarrhoea (PWD) is a significant problem on many pig units. Post-weaning diarrhoea is a term used broadly for any diarrhoea episodes that occur in the first 10 days post-weaning. Post-weaning diarrhoea is important from an animal welfare point of view and also economically, due to the financial losses associated with it. With the imminent removal of zinc oxide from piglet diets, PWD is going to be more frequent on farms.

Changes experienced at weaning include:

- Piglets are removed from their mothers & mixed with other piglets.
- Establishment of a social hierarchy / pecking order.
- New environment.
- Change of diet type, form and presentation.

Despite many farmers' best efforts to make the transition at weaning as smooth as possible, it is normal that piglets experience some form of feed intake reduction and growth 'check'. It is important to try and ensure this 'check' has a minimal impact on piglets so that they get the best possible start at weaning. This promotes thrive and efficient growth to slaughter.

The signs of PWD are generally easy to recognise for producers.

They include

- Profuse diarrhoea
- Dehydration & loss of bodyweight
- Growth retardation
- Sunken eyes
- Increased mortality (often sudden death)

## Causes of post-weaning diarrhoea

Post-weaning diarrhoea is a multi-factorial disease. In most cases, it is likely caused by a combination of the issues presented in the figure below. With the changes on the use of zinc oxide in young pigs being implemented next year, different management strategies will have to be implemented on farms to prevent PWD. Generally, causes of PWD can be divided into 3 broad categories; predisposing factors, contributing factors and determining factors. They include but are not limited to the factors shown in Figure 1.

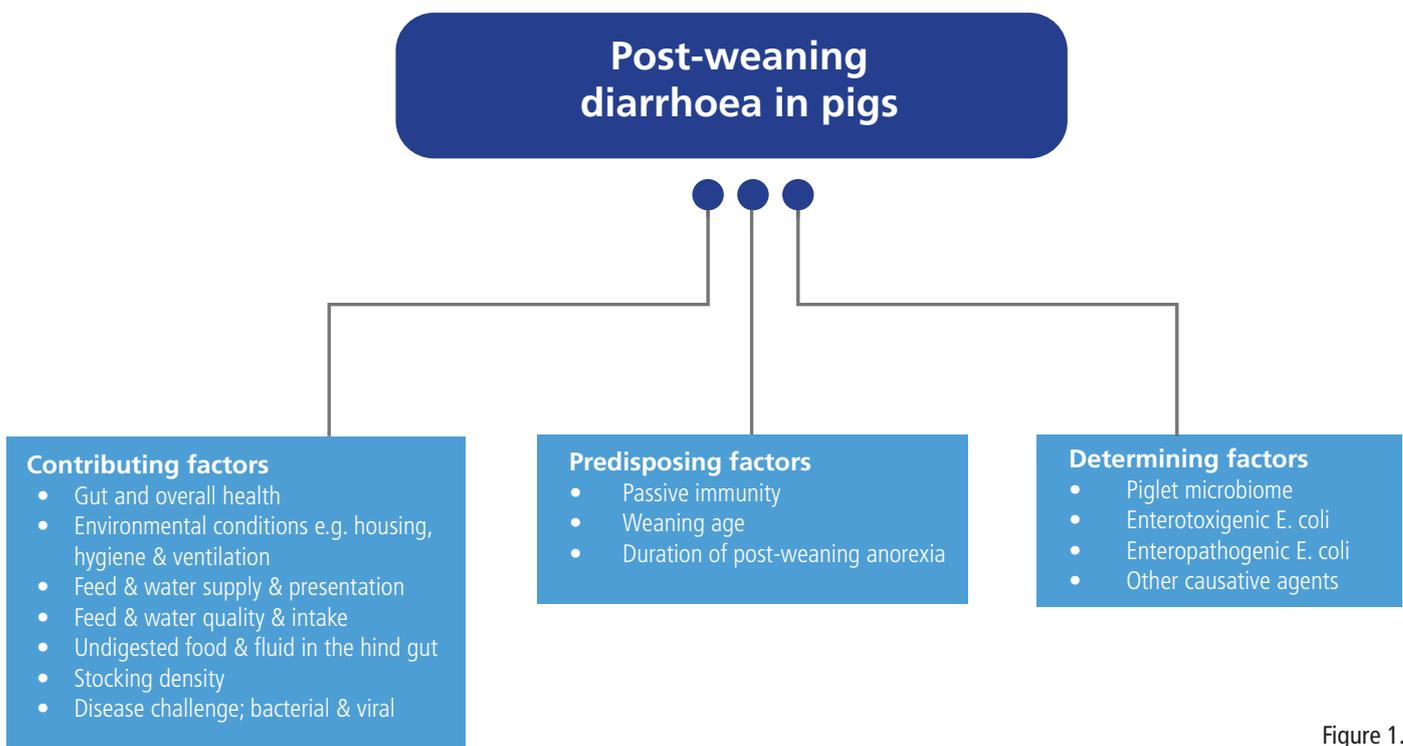


Figure 1.



## 1. Predisposing factors of PWD

**Passive Immunity:** It is well known that immunity plays a huge role in piglet health and well-being. At weaning, active immunity is immature, while passive immunity is low. Not only does the change of diet at weaning affect feed intake, it also has a significant impact on piglet immunity. Stressed piglets at weaning are more susceptible to viral or bacterial infection.

**Weaning age:** Research has shown that weaning age and pre-weaning health can pre-dispose piglets to PWD. Some Irish units are now weaning older pigs than before (e.g. 30-32 days) and have noted a significant decrease in labour requirements & improved thrive in piglets post-weaning. This is one strategy that is likely to be used on more units when the changes in zinc allowance are introduced.

**Post-weaning anorexia:** Prolonged post-weaning anorexia can result in growth retardation if not minimised. Therefore, encouraging feed intake in the newly weaned pig is critical.

## 2. Contributing factors of PWD

**Gut and overall health:** An imbalance of the microflora in the pig's gut is the result of stress.

**Environmental conditions:** Chilling young piglets reduces peristaltic activity in the intestine which results in increased bacterial colonisation. Inadequate temperatures & ventilation can encourage the spread of disease and impact the piglet's immune system.

**Feed & water supply, presentation, quality & intake:** If piglets can't recognise and easily access food and water, intakes can be negatively impacted. Inadequate feed intake causes local inflammation.

### Undigested food & fluid in the hindgut:

See section on gut function.

**Stocking density:** Over-stocked pigs (at any age, but particularly when vulnerable) are at greater risk of disease development. Under-stocked pigs, although not usually a problem on Irish units, can get cold, so heating should be adapted accordingly.

**Disease challenge:** This is farm-specific depending on health status. With the reduction in zinc oxide and antibiotic usage imminent, producers need to consider the best ways to reduce disease load on their units.

## 3. Determining factors of PWD

**E. coli:** Enterotoxigenic E. coli is often the causative agent of PWD (See section on Enterotoxigenic E. coli.)

**Other causative agents:** Other bacterial causes such as Salmonella, Clostridia, Brachyspira (causes dysentery), Lawsonia (causes ileitis), and Campylobacter should be considered. Rotavirus, Coronavirus, porcine epidemic diarrhoea (PED), transmissible gastroenteritis (TGE) and even PRRS can also be responsible for PWD. Parasitic issues such as worms and coccidia, although uncommon, should also be considered as a source of the problem if bacterial or viral concerns were ruled out. Nutritional causes of PWD must also be considered.

### Gut function & health at weaning

At weaning, piglets move from a liquid diet to a solid diet, or at least from warm liquid milk that contains high protein, fat and lactose to a diet that is lower in protein and high in carbohydrate. Despite farmers' best attempts to prepare the gut for weaning by feeding creep in the farrowing rooms, generally, there are some changes in intake habits at weaning. Feeding creep in the farrowing rooms is vital to condition the villi in the small intestine. If the same creep can be fed from similar feeders in the farrowing rooms and already be in the room when pigs enter the first stage, the impact on feed intake is generally lower.

Stress at weaning not only reduces feed intake, but results in a knock-on effect of dysfunction in the intestines that can cause diarrhoea. As in humans, the gastrointestinal barrier in pigs is extremely important for survival and overall health. Piglets have intercellular tight junctions along the lining of their small intestine. Under normal circumstances, these are 'tight' and provide a barrier to pathogens. However, when piglets are stressed, inflammation occurs and these junctions become loose. This allows more pathogens to get across the intestinal lining, a process known as leaky gut.

Generally, at weaning, piglets do not eat immediately, often resulting in an empty gut. When the piglet hasn't been eating, they start to get cold and their digestive system becomes confused. Piglets are then inclined to gorge when they do eat, leading to an over-full stomach and an over-spill of food into the intestine. The lining of the small intestine is extremely sensitive at this time. To coincide with this, the harmful bacteria in the feed do not spend long enough in the stomach to be inactivated by a low pH. Therefore, these pathogenic bacteria make their way to the small intestine and the over-flow of feed from the stomach continues, providing ideal conditions for pathogenic bacteria to multiply.



## Leaky gut

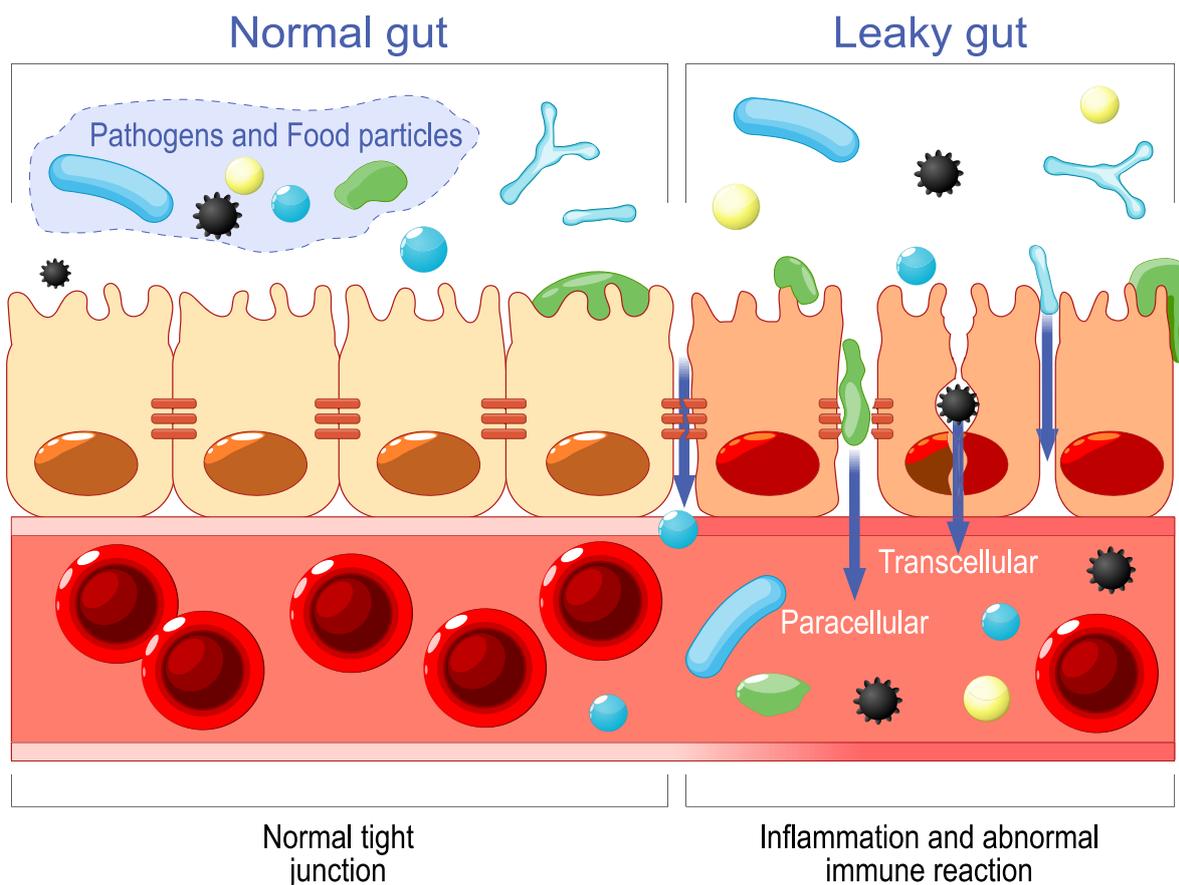


Figure 2.

When piglets are stressed, the villi in the gut shrink which results in a reduced digestive and absorptive surface area. Nutrients then pass further down through the digestive tract to the large intestine. Intestinal disorders post-weaning generally occur from villus atrophy, crypt hyperplasia and increased intestinal permeability (leaky gut Figure 2).

### Enterotoxigenic E. coli – the common cause

Many cases of PWD can be traced back to some form of E. coli if it occurs in the first 3 - 5 days (but up to 10 days) post weaning, or immediately following the first dietary change. At weaning, piglets are stressed, don't have protection from milk antibodies and have food in their system which is not well-digested. These all combine to provide favourable conditions for PWD.

Enterotoxigenic E. coli (ETEC) bacteria attach themselves to cells in the gut. Once attached in sufficient numbers, ETEC secrete toxins. The response from the pigs to the toxins is to increase the amount of water that flows into the lower gut. This results in a loss of water and important electrolytes from the piglet in the form of diarrhoea. These ETEC also cause inflammation and disrupt the function of tight junctions. At weaning, the piglets' immune system is still immature and their immune defence

is weak. Post-weaning diarrhoea can transmit from pigs carrying the E. coli strains to susceptible pigs. Faecal contact has a huge impact on the transmission of PWD caused by E. coli, hence the importance of correct sanitation and hygiene practices on affected farms. The warm, moist environment in first stage weaner accommodation provides ideal conditions for these E. coli to survive.

## Practical solutions and preventions of PWD



Producers should focus on sanitation practices, pathogen control and correct nutrition. Below are some practical control measures that can be implemented on-farm.

**Good quality feed:** Use high quality, contaminant free, digestible feed at weaning.

**Adequate but not excessive protein levels:** Undigested protein reaching the hindgut causes a proliferation of undesirable bacteria.

**Ease of access:** Provide easy and unrestricted access to feed & water and have feed in troughs when piglets are moved into first stage accommodation.

**Fresh & Clean water:** Particularly if using troughs or cube drinkers. The poultry industry are attributing some of the recent improvements in overall flock health and a reduction in antibiotic usage to significant changes they have made to the treatment and feeding of clean, hygienic water through a carefully sanitized system. Ensure the flow rate of water to your piglets is sufficient & clean lines appropriately.

**Familiar feed:** Provide same source and form (wet, dry or both) from same feeder type in the first stage room as the farrowing rooms.

**Familiar & appropriate water sources:** Provide numerous water sources for the first few days e.g. turkey drinkers & cube drinkers. Consider the height and type of fixed drinkers.

**Feed little and often:** To ensure feed stays fresh (particularly liquid creep). Research has shown higher incidences of PWD in litters fed twice daily post weaning compared with those fed more than twice per day.

**Water-to-feed ratio:** With liquid creep, ensure your water-to-feed ratio is high enough. Thick liquid feed discourages intake.

**Water temperature:** Don't use freezing cold water to mix liquid creep. This is a balancing act though, as warm water sitting in a room for hours provides conditions for microbial proliferation.

**Feed additives:** There are some beneficial feed additives available for piglets depending on the causative agents of PWD on your farm. It is likely in the future without zinc oxide that successful strategies will vary from farm to farm based on numerous factors.

**Electrolytes:** Use Start Aid Electrolytes at weaning to restore water and electrolyte balance and encourage water intake following dehydration caused by diarrhoea.



### Biosecurity:

Ensure strict biosecurity measures are in place particularly in relation to on-site visitors being 'clean' and lorry drivers not entering the unit. Attention also needs to be paid to internal biosecurity.

**Clean room:** All areas of the room should be washed, disinfected, fully dried & then heated prior to moving in piglets. Inspect around corners and lips of troughs to ensure biofilms aren't building up in those 'hard-to-reach' areas. Everything used to move piglets (e.g. trolleys) should be cleaned between batches if soiled.

**Temperatures:** Stressed piglets eat less and therefore produce less heat while eating. Ensure the room is warm enough.

**Micro-climate:** Use canopies for comfort. Provide rubber mats in the lying area.

**Room layout:** Keep liquid troughs or turkey drinkers away from the lying area so that wetting the lying area is avoided.

**Air flow & ventilation:** High air flow and draughts can pre-dispose piglets to diarrhoea.

**Minimise stress:** Move piglets in small groups & if they need to go outside, try to move them at a warmer time of the day, to avoid cold shock. The period from leaving the farrowing house to entering first stage accommodation should be as short as possible.

**Clean feeding equipment:** When other causes have been ruled out, consider cleaning wet feed lines that could potentially be covered in a biofilm. If your liquid feed is fed via a stub line, consider that the first feed dispensed to the piglets could be severely fermented. Dumping feed from the line prior to the first feed should be considered.

**Clean clothing & equipment:** Staff should be provided with clean clothes and footwear to work in these areas. Staff should be able to easily clean and disinfect their footwear. Consider disposable aprons if required.

**Stock people:** Ensure stock people are gentle with piglets. It is understandable that weaning is exhausting and takes a lot out of farm staff, but minimizing stress is critical.

**Vaccination:** It is possible to vaccinate against certain E. coli strains. Consult your vet for advice.

Speak to your Inform pig nutritionist for further nutritional information:

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