

# Control of PMWS and PDNS



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Workers in France (Madec et al.<sup>1</sup>) have clearly demonstrated in large-scale field trials the value of the development of a high hygiene system of environmental control. This involves less intensive systems of production, small groups of pigs at weaning, reduced mixing, all-in all-out production with very high levels of cleanliness, hygiene and barrier techniques.

This work was summarised by Madec in a 20 point plan in the middle of 2001. However, on many farms it is difficult to satisfy and maintain all of these requirements. It is suggested that at least 16 of the 20 points must be carried out to show a significant response.

In October 2001 thePigSite published a development of Madec's plan which summarised the key points in three golden rules and tried to provide a structured approach to the implementation of the control points.

This work has been updated to include the latest research data and field experience, and is presented below. It is significant that the original three Golden Rules have now been increased to four.

## Disease Control: Four Golden rules

It is important to note that the **majority** of control points can be categorised into four golden rules. Keeping these four rules in mind and making efforts to follow their intent, will ensure you'll be on the right track.

***With these 4 key rules in mind***, below is a list of specific actions that can be taken at farm level to help mitigate the effects of the disease. To help with implementation these actions have been broken down into three categories:

1. **Management practices you must aim to achieve.**
2. **Management practices you should try to achieve.**
3. **Additional things that have been reported to help.**

Start from the top of the list, focusing on a few items at a time. Once these are in place move down the list, actioning a few items at a time. Always bear in mind the four golden rules and ensure everyone's actions meet their intent.

Finally, it is important to understand that the effectiveness of any action varies from farm to farm. What might work on one may not be effective on another, thus you need to approach the problem with a degree of flexibility and patience.

## Disease Control: Four Golden rules for PMWS and PDNS (and many other diseases)

<b>Rule 1</b>	<b><i>Limit pig-to-pig contact.</i></b>	The virus can spread around the farm by pig-to-pig contact. Limit pig-to-pig contact and you will help to limit the prevalence of the disease. <b>REMEMBER</b> pig-to-pig contact can also be <b>INDIRECT</b> by a needle, surgical instrument, manure or people. Spread can often be to many pigs in a pen or in large common groups etc.
<b>Rule 2</b>	<b><i>“Stress” is a killer.</i></b>	Stressed animals are far more likely to become diseased. Apart from obvious physical stress factors, exposure to micro organisms can cause major stress to the immune system. If the immune system is overactivated, the PCV2 virus may produce disease, unless there is a good level of colostral antibody. <b>THINK</b> – If a procedure causes the pigs to become stressed, ask “can this be done in a less stressful manner?”.
<b>Rule 3</b>	<b><i>Good hygiene.</i></b>	There is no substitute for good hygiene and biosecurity measures. Cleaning and disinfecting buildings and instruments coupled with good hygiene will make a difference. Don't spread disease by needle or other instruments.
<b>Rule 4</b>	<b><i>Good nutrition.</i></b>	Good nutrition is important not just for growth but also for development of the immune system. Colostrum provides protection against diseases present on the farm and it is important to ensure that pigs get as much colostrum as possible in the first 12 hours of life. After weaning pigs should be encouraged to eat high quality diets e.g. provide gruels, extra feeding points. High levels of antioxidants in weaner diets may help strengthen the immune system improving the pigs ability to fight off infection.

## Things you must aim to achieve:

	Action	Explanation	Reason/Benefits
1	<b>Farm-wide:</b> All-in, all-out is King. Apply across the farm. If not by building, by enclosed pen.	Strictly apply these procedures. For it to be successful all-in, all-out means just that. There are no half measures. It is vital it is done properly.	<b>Rule 1:</b> The virus appears to pass from pig to pig. The application of all-in, all-out helps limit this risk. However, it only works if it is practised fully and used in conjunction with the point below.
2	<b>Farm-wide:</b> Apply strict cleaning and disinfection procedures.	Hygiene standards are absolutely critical. Read the section on Hygiene Control to ensure you are doing this correctly. Use a disinfectant with a proven efficacy against PCV2. Disinfectants do not work properly unless all organic matter (dirt) has been removed by thorough cleaning.	<b>Rule 3:</b> The virus survives in waste organic matter. If pens are not fully cleaned and disinfected disease can be passed down the line. Use Virkon S as it is reported to be the most effective for killing the PCV2 virus. Micro-organisms need water to live; wherever possible allow pens to dry out before re-stocking.
3	<b>Farm-wide:</b> Limit the mixing of pigs to an absolute minimum.	Where practicable, try to maintain pig groups from weaning through to finishing.	<b>Rule 1,2:</b> Mixing pigs breaks two rules. It increases pig-to-pig contact and places the pigs under stress, both of which appear to increase significantly the prevalence of the disease.
4	<b>Farrowing:</b> Good colostrum management .	When a sow's colostrum contains antibodies to PCV2 piglets appear less likely to develop disease therefore it is vital that piglets get a good colostrum intake ideally within the first 6 hours of birth, but certainly within 24 hours. However, it is thought that 10–20% of sows have no antibodies and such litters may produce diseased piglets. The ' <i>Litter Swapping</i> ' technique might help overcome this.	<b>Rule 4:</b> Any procedures to enhance colostrum intake need to be taken within 24 hours of birth. Consider ' <i>Litter Swapping</i> ' to boost colostrum intake. Swapping litters within 3–12 hours of farrowing (allow newly born piglets to have a least one feed on their natural mother) and leaving them there to be reared doubles the chance piglets will receive antibodies to PCV2. For this procedure to work you obviously need sows farrowing at approximately the same time. The larger the herd, the easier this procedure is to adopt.
5	<b>Farrowing:</b> Stop cross-fostering after 24 hours.	In the first 24 hours piglets are receiving colostrum and any immunity is high. Once colostrum intake stops the immunity status of the piglets is fixed.	<b>Rule 1:</b> Cross fostering of piglets after 24 hours may help spread the virus. This should be avoided where possible. If this procedure needs to be used, set up a cull sow in a separate house/area specifically for this purpose.
6	<b>W-G-F:</b> Solid partitions between pens.	Where pens of pigs are separated by open barriers, these should ideally be changed to solid barriers.	<b>Rule 1:</b> Open partitions allow pig-to-pig contact. This allows the spread of the virus increasing the likelihood of disease. Solid partitions should also reduce the spread of other organisms which would increase the challenge to the immune system and trigger PMWS. Barriers should be designed to prevent nose-to-nose contact between pigs.
7	<b>W-G-F:</b> Lower stocking densities vital at weaning.	The following stocking densities are recommended by Madec: <b>Weaners:</b> 3 pigs/sq.m. <b>Grow/Finish:</b> > 0.75 sq.m/pig	<b>Rule 2:</b> Rule 2: The lower the stocking density the less the pigs are stressed. Less stress equals healthier pigs.

W-G-F = Weaner, Grower and Finisher accommodation

## Things you should try to achieve:

	Action	Explanation	Reason/Benefits
8	<b>Weaners:</b> Increase access to feeders.	The pigs should have plenty of room to access feeders and water. Madec recommends at least 7cms per piglet.	<b>Rule 2:</b> If piglets have to fight for food, this will increase the stress levels. Greater access lowers the need to fight for food, lowering stress.
9	<b>W-G-F</b> Improved temperature and ventilation control.	Limit the temperature variation the pigs are exposed to. Ideally the temperature should allow the pigs to be comfortable at all times.	<b>Rule 2:</b> Chilling causes stress, lowers immunity and increases the risk of infection. Draughts are particularly chilling and stressful. Make sure houses are warm enough for newly weaned pigs. Houses may have to be heated for 24 - 48 hours to warm up the building and floors.
10	<b>W-G-F</b> Reduce pen sizes.	Madec recommends a pen size of around 13 pigs, or that of one litter.	<b>Rule 1,2:</b> This may or may not be practical depending upon your building layout, but the fewer pigs in a pen (fewer pigs can be infected in any given group), the smaller the opportunity for pig-to-pig disease spread.
11	<b>Farrowing:</b> Stop teeth clipping.	Stop clipping teeth and free up some time to action some of the other points.	<b>Rule 1:</b> Is it really necessary to clip teeth these days? This may only help spread the disease. Many producers are reported to have stopped. Why not give it a try! Alternatively, action as point 12.
12	<b>Farm-wide:</b> Implement strict hygiene measures.	Ensure good hygiene standards when injecting and tail docking. Use new needles, disinfect instruments etc. between litters. Keep each farrowing house isolated with the use of foot dips and separate equipment.	<b>Rule 1,3:</b> What better way to spread disease than by injecting numerous pigs with the same needle! It has been suggested that needles and instruments be dipped in a 2% solution of Virkon S for 60 seconds between pigs to kill the virus. Have a number of instruments on the go, all stored in Virkon S, and rotate the instruments as you treat each pig.
13	<b>Sows:</b> * Immune stimulation.	This principle is based on exposing sows to the pathogen, to increase colostral immunity which is then passed on to the piglets.	One option is to expose weaner faeces from infected pigs to pregnant sows between 80 - 90 days gestation to raise colostral antibodies. This may or may not be successful, and <b>could</b> make things worse. Discuss this with your veterinarian.
14	<b>Farm-wide:</b> Hospital pens & prompt removal of sick pigs.	Move sick pigs promptly to a suitable hospital pen.	<b>Rule 1:</b> The longer sick pigs are left in the pen the greater the likelihood that other pigs in the pen will become sick.
15	<b>Farm-wide:</b> Formalise a "sick pig" policy.	Formalise your policy on what you will do with sick pigs in the hospital pen. Write it down and follow it to the letter. You should be clear on when a pig should be euthanased or how long it will be given to "recover".	There is nothing more demoralising than poorly pigs not getting any better. Be clear and decide what to do with them. It will help staff morale. Your veterinarian can provide advice on all these issues.
16	<b>Farm-wide:</b> Good "disposal" of dead pigs.	Do not leave dead pigs uncovered. Remove to a remote area of the farm and cover over with straw pending disposal.	The sight of dead pigs is very disturbing to staff and will not help morale. They act as a constant reminder of the problems.

W-G-F = Weaner, Grower and Finisher accommodation \* = Discuss with your veterinarian

## Other ideas that have been reported to have a positive effect:

	Action	Explanation	Reason/Benefits
17	<b>W-G-F:</b> Good nutritional diet.	Higher quality diets should be used after weaning to help counteract the stress of weaning. To encourage pigs to eat more feeding points may be needed. Food should be changed frequently to ensure it is fresh.	<b>Rule 2, 4:</b> Food intakes usually drop dramatically increasing stress at weaning. The developing immune system requires a good supply of nutrients. There should be easy access to clean drinking water at all times.
18	<b>W-G-F:</b> * The use of serum.	Have your vet treat piglets with serum derived from older healthy immune pigs who have been through the system. (90kg).	There are several complications with this. However, it is reported this procedure can be successful. Discuss with your veterinarian.
19	<b>Farrow-W-G-F:</b> * Vaccination and vaccination timing.	Vaccination programs may be used in piglets against: <ul style="list-style-type: none"> <li>• Enzootic pneumonia/M.-hyo</li> <li>• Glässers Disease</li> <li>• PRRS</li> </ul> Any effects should be monitored. The timing of vaccination should also be reviewed. Avoid vaccinating piglets around the time of weaning, apply, say one week before or after.	<b>Rule 2,3:</b> Vaccination has been suggested as a trigger for the disease on some farms, but on other affected farms vaccination has not been used. The timing of the M-hyo vaccination might be important on some farms, but if respiratory problems exist it is better to continue. Glässers vaccine could be more beneficial than not. PRRS vaccination at weaning has little effect on the disease (PMWS). Both weaning and vaccination stress the piglets thus doing both together can cause excessive stress which should be avoided.
20	<b>Sows/Gilts:</b> * Vaccination.	Vaccinate sows and gilts against PRRS and PPV before farrowing as advised by your veterinary surgeon.	Vaccination boosts sow immunity to those diseases resulting in antibodies being passed on to the piglets via colostrum. PRRS and PPV negative sows could result in piglets being more susceptible to PMWS and PDNS.
21	<b>W-G-F:</b> Improve air quality.	Madec recommends the following limits: NH <sub>3</sub> < 10ppm, CO <sub>2</sub> < 0.15%	Improving the air quality is beneficial because it reduces the development of respiratory disease. Minimise dust levels.
22	<b>W-G-F:</b> Sensible flow within buildings (air, animals).	Improving air flow within a building will help to reduce toxic gases. Eliminate draughts.	<b>Rule 2:</b> This helps reduce the stress on the respiratory system.
23	<b>Farrowing:</b> * Treat sows/gilts for parasites before farrowing.	Give sows/gilts a good wash and treat for parasites before they enter the farrowing house.	<b>Rule 2:</b> Parasitic burdens on the sow result in the animal becoming disadvantaged or in poor condition. In this state its colostrum levels might be compromised having a detrimental effect on the piglets. In a well managed herd this should not be an issue.
24	<b>W-G-F:</b> Aerial disinfection.	Aerial disinfection using Virkon S (or other suitable disinfectant) may have an effect on reducing the spread of the virus and exposure to other organisms.	<b>Rule 3:</b> There is little information on the effectiveness of aerial disinfection, but a number of producers are trying it.
25	<b>W-G-F:</b> Water disinfection.	Disinfection of the water reduces the micro-organism challenge presented to the pigs and improves hygiene.	<b>Rule 2,3:</b> Less challenge, less stress.

W-G-F = Weaner, Grower and Finisher accommodation \* Discuss with your veterinarian

## Examples of good and bad practice



**Breaking Rule 1:**  
*Open sided pens allow pig-to-pig contact.*



**Meeting Rule 1:**  
*Example of an open pen wall made solid.*



**Breaking Rule 2:**  
*Chilled pigs are stressed pigs.*



**Breaking Rule 2:**  
*Provide adequate feeder space to prevent stress.*



**Breaking Rule 3:**  
*This feeder is covered in bird excrement, perfect for spreading disease.*



**Meeting Rule 3:**  
*The use of foot baths at the exit of buildings helps limit disease spread.*

## Treatment

### ***Conventional***

No specific conventional treatments have been identified as wholly effective. The following have been reported to have had varying degrees of success. However, up to 80% of diseased pigs usually die or are destroyed on welfare grounds.

- Inject pigs with long-acting antibiotics on the first signs of disease.
- Medicate drinking water with broad spectrum antibiotic to help control secondary infections.
- Inject pigs with corticosteroids plus antibiotic treatment to reduce lung infections and congestion.

As there is no wholly effective treatment, taking action to reduce the incidence of disease is more likely to reduce overall mortality rates on farm.

### ***Use of serum***

Serological examinations have shown that almost 100% of finishing pigs (80-100kg) have been exposed to PCV2 on infected farms and have good levels of antibody. Field experience has established the use of serum produced from these pigs can be of value in both preventing and treating clinical disease. Piglets can be treated at weaning time from 3 weeks onwards, or at the very first signs of onset of disease. In severe continuous herd problems where this procedure has been used, the results have been positive. The application of this procedure should be discussed in detail with your veterinary surgeon.

Remember the responses to farm changes vary from one farm to another – what gives a good response on one may appear to give a poor one on another. The way forward is to plan with your veterinarian the best controls to be adopted. Carry these out on 4 week batches of weaners followed by other changes in the next 4 week batch and so on. Monitor any changes against the disease norm. Treatment options should be discussed in detail with the farm vet.

## The role of nutrition

The role of nutrition, and in particular levels of available anti-oxidants, is thought to play an important part in maintaining and improving health.

In the field, a number of farms have reported noticeable benefits in feeding rations fortified with high levels of natural anti-oxidants. However, it should be noted the effects have not been reported universally, and there is no controlled trial work as yet to confirm any beneficial effect. Discuss further with your nutritional advisor.

Although not fully researched in the pig, there is evidence from studies in humans and developments in both chemical and biochemical analysis that increased levels of anti-oxidants may be beneficial.

Briefly, healthy cells have a mortal enemy called “free radicals” (or oxidants) which scientists know are responsible for attacking cell membranes and carrying out the actual destructive work in the development of disease and infection. The destructive effect of free radicals (which occur naturally and are associated with pollution, toxins, stress, aging, etc.) is generally dealt with by the body's immune system. This system comprises several defence layers, which identify, remember, attack and destroy invading pathogens, including free radicals.

Antioxidants work by neutralising free radicals and creating a win-win situation. The reduction in free radicals not only helps to prevent direct cell and tissue damage that could otherwise lead to disease, but in doing so, frees up the immune system to deal with other invading pathogens. It is this principle, applied to the pig, that could explain the beneficial effects of fortifying the diet with high levels of anti-oxidants.

For information, it is the result of this work that lead to the Government recommendation that you and I eat five daily portions of fruit and vegetables, which are high in natural anti-oxidants.



*Fresh fruit and vegetables contain high levels of natural anti-oxidants.*

## Welfare

Careful attention to all aspects of welfare when dealing with PMWS/PDNS is vitally important. A daily monitoring programme for sick pigs is essential to ensure high welfare standards are maintained. This should be coupled with a formal “sick pig” policy.

*The key welfare points are:*

- Remove PMWS/PDNS pigs to hospital pens as soon as possible. Ensure hospital pens provide a good warm environment with easy access to water and feed.
- Ideally, hospital pens should hold no more than eight pigs per pen.
- Many pigs will waste and die irrespective of treatment. Identify these and destroy early on welfare grounds.



*Good environment for pigs.*

## Biosecurity

PMWS has highlighted the need for continuous assessments of the methods by which pathogens may enter a pig farm. Whilst it is true to say that we do not fully understand how the disease spreads, a good secure farm is probably less likely to succumb to disease. Study the format below<sup>2</sup> to check out your farm with your veterinarian.

## Disease entry into a farm - Key things to consider:

***Before the farm is populated with new pigs:-***

### *Area*

Is your farm in a pig dense area? A VLA study has shown that farms were nine times more likely to be affected by PMWS if there was another diseased farm within 3km.

### *Location*

What is the position of your pig unit relative to other pig herds around it?

- How far away is the nearest infected large herd?
- Do you have an uninterrupted view of it?
- Is the land around you flat or hilly, bare or wooded, on the coast or inland?
- What precautions can be taken to prevent direct and/or indirect contact with other pig units?

### *Your foundation stock*

- Is it of appropriate health status for your location?
- Can you rely on a future continuous supply in adequate numbers of replacement stock of the same health status?
- What precautions can you take against contamination?

### **When the farm is being populated and afterwards:-**

#### *Isolation*

- Do you have good isolation facilities for incoming stock?
- How long are they to be kept in isolation? Is it long enough?
- Do you check that there has been no disease outbreak in the herd of origin before you move them in?

#### *Transport*

- Are the trucks that bring your pigs clean?
- Have they been to other farms?
- Have they been careful not to drive behind or park beside other pig lorries?
- Are the lorries that pick up your pigs for sale or slaughter empty when they arrive?
- Are they clean? Have they been disinfected?
- Does the driver wear clean boots and coveralls?
- Do you have a safe loading area?
- Does the water used to wash it run into or away from your pig buildings?
- Are the loading procedures safe? Can the driver contaminate your herd?



*Is the transport clean?*

#### *Visitors' book*

- Do you make visitors sign a visitors' book to affirm that they have not been near other pigs?

#### *Mechanical transmission*

- Are clean boots and coveralls provided at the entrance to your unit for all visitors and your staff?
- Are there clean showers for visitors? Is there a proper changing area?
- Do you make anyone who may have been near other pigs recently shower?
- Do you make anyone who may have been near other pigs recently have a gap of say, 24 hours before they visit your unit.



*Are clean boots and coveralls available?*

### *Mechanical transmission (continued)*

- Are toilets available for your staff and are they clean and hygienic?
- Do you ever need to use equipment on your pig farm that has been in contact with other pigs?
- If so, how do you disinfect it?

### *Bedding materials*

- Are they from a known clean source?
- Are they contaminated by rats, mice or birds?

### *Feed source*

- Are you satisfied with its quality?

### *Feed lorries*

- Do they have to enter your pig compound?
- Do you have your own bulk feed pipe?



*Do you control flies or are they a problem?*

### *Water supply if not from the mains*

- Have you had it tested for bacteria?
- Are your water storage tanks clean and rat proof?
- Should you chlorinate it?

### *Vectors*

- Flies - do you control them or are they a problem?
- Rats and mice - do you have a regular efficient rodent control programme?
- Birds - can they get to feed supplies and bedding stores? Should these be netted off?
- Do you have a perimeter fence (including building walls) that would deter stray animals, including wild boar and human curiosity seekers?

### *Human food*

- Do you allow it to be brought into your pig buildings?
- Do you allow pig meat products to be eaten on your farm?
- Do you have a special area (canteen) where food must be eaten?

### *Dead animal disposal*

- Do you have safe procedures?
- Are they collected from your farm?
- What do you do with casualty animals?

### *Artificial insemination*

- Have you assessed the risk of disease introduction?

### *You*

- If you are the unit owner or manager, do you visit friends' pig herds?

## Hygiene Control on the Farm

The use of all-in, all-out procedures coupled with good hygiene standards is essential if adequate levels of disease control are to be achieved. To ensure your hygiene standards are up to scratch, follow the simple format below and pay attention to detail.

### ***House cleaning procedures***

- Remove all detachable equipment lamps, troughs etc.
- Remove all muck and empty slurry channels and gullies and brush down ceilings and floor areas.
- Isolate the electricity supply.
- Thoroughly soak, pre-clean, wash, rinse, disinfect and dry out the building following the procedure below.
- Drain out the water system and fill with a detergent steriliser or disinfectant. Leave for 2 hours then drain out and refill once washing has been completed.
- Remember to clean and disinfect lamps, equipment, brushes etc.
- Carry out a careful inspection of the building for evidence of contamination. Repeat cleaning where necessary.
- Finally place a disinfectant foot bath outside the house. Top it up and replace disinfectant regularly.

### ***Notes***

- Explain to staff the importance of cleanliness and the discipline to maintain isolation between one batch of pigs and another during the critical period.
- Where practicable change boots and overalls when working between batches of pigs. It is easier and a more efficient way than just a foot dip.
- Such environmental standards will also reduce the effects of other diseases and improve efficiency of growth and economic performance.



*A good quality pressure washer is vital.*



*Cleaned weaner pen and heat mats. Ensure all traces of dung are removed.*



*Foot baths are important, so use them properly.*

## ***Procedure for Pen Cleaning and Disinfection***

Immediately after the pigs are moved the following steps should be carried out:

### **1. SOAK**

- As soon as possible after removal of the pigs. Do not allow the pen to dry out, as this will make removal of the organic material that much more difficult.

### **2. WATER PRECLEAN**

- Remove the organic material softened by soaking.

### **3. DETERGENT CLEAN**

- Use a detergent with cleaning and degreasing properties. This step is essential to remove the protective biofilm around bacteria.

### **4. WATER WASH AND RINSE**

- Thorough cleaning and rinsing is necessary to remove all remaining traces of organic matter (e.g. dung) and any residual detergent.

### **5. PRIMARY DISINFECTION**

- Use a broad spectrum disinfectant that is effective against bacteria, viruses and fungi.
- Make sure that the disinfectant is used at the correct concentration and temperature.

### **6. FINAL DISINFECTION (optional)**

- Consider using fumigation to increase the effectiveness of disinfection.

### **7. DRY OUT THE HOUSE**

- Drying all surfaces helps prevent recontamination by residual bacteria.
- Floors and walls can get very cold in empty houses. For newly weaned pigs houses may need to be heated for 24–48 hours to ensure they are comfortable for pigs. Use a space heater for these purposes.

## **Economics**

The cost of any disease obviously depends upon its severity. PMWS and PDNS both significantly increase morbidity and mortality with huge economic effect. A continuous 20% increase in post-weaning mortality would increase costs by around £11.00 per 95kg pig sold. This equates to approximately £24,000 per annum per 100 sows based on 22 pigs sold per sow per year.

The figure can also be expressed as being equivalent to 12 pence per kg liveweight, an approximate cost increase of 15%.

*These costs are made up from:*

- Increased post-weaning mortality (20%).
- The costs of production to point of death.
- Loss of margin over feed.
- Treatment costs.
- Effects on production on the herd including a 0.2 worsening of the feed conversion rate (FCR) and up to 21 days extra to slaughter.

## Public Health

Fifty veterinarians who had been in close contact with PCV2, and 33 healthy blood donors, were tested for antibodies to PCV1 and PCV2 using three different methods. The results showed all samples were negative for both strains, suggesting that PCV2 infection does not readily occur in healthy human beings<sup>3</sup>.

Recent serological examinations have shown no evidence of antibodies to PCV2 in cattle or horses<sup>4</sup>.

## Current Research and Literature

Research is currently being carried out at Queen's University Belfast, University of Barcelona, The Institute for Animal Health, Compton, The Veterinary Laboratory Agency and DEFRA. This includes vaccine studies and epidemiological investigations, disease reproduction and an understanding of immunological changes in diseased pigs. The role of colostrum and virus transmission is under active investigation. Research is supported by funding from the EU, DEFRA and MLC.

An experimental vaccine appears to protect against disease, and a commercial product is under development but this is unlikely to be available for many months especially given clinical trials could take a year to complete.

A recent literature review has been produced in booklet form by Merial which highlights the latest scientific information. The recent proceedings of the conference in St Malo summarise the latest reported research work.

## Summary

PMWS and PDNS can have a crippling impact on the economic viability of affected farms. However there are many actions that can be taken to control and reduce the effects of these diseases, and work is ongoing on the development of effective treatment protocols.

In order to have an impact, it is vitally important to understand fully the control points highlighted in this booklet, and address as many of these as possible, especially those in the "must do" category. Additionally, there is evidence emerging that adopting two specific procedures may improve the situation in badly affected herds.

As research continues and a greater understanding of PCV2 is developed, our knowledge base expands and our ability to combat these diseases increases. It is therefore important to keep up to date with the latest research and developments in the field.

## Further information

Additional information can be found on the internet. MLC supports a PMWS Technical Zone on thePigSite.com where updates to this information will be posted and where supporting research can be found. Additional Information is also available on the National Pig Association's website and the MLC website:

**ThePigSite.com:** [www.thepigsite.com](http://www.thepigsite.com)  
**National Pig Association:** [www.npa-uk.org](http://www.npa-uk.org)  
**Meat and Livestock Commission:** [www.mlc.org.uk](http://www.mlc.org.uk)

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