Salmonella bacteria are commonly isolated from animal, the environment and especially pigs or their carcasses and for a number of years starting in 2003 a monitoring programme (Zoonosis action plan -ZAP) had been put in place.

This monitoring programme was not, however, about disease in pigs - it was about looking for evidence at slaughter of previous infection with Salmonellae that may be a potential source of infection for consumers of pork products. The test looked for antibodies to Salmonellae in meat juice extracted from samples collected on the slaughter line using an ELISA test. As a serological test it would not detect very recent infection (within the last 10 days or so) and equally may have faded by the time of slaughter if initial infection occurred early in life. Whilst nationally about 25% of samples (i.e. pigs) were positive on this test, the incidence of disease in pigs remained low. However, if you look hard enough at normal pigs, Salmonellae can often be isolated. There are over 2000 species of Salmonellae recognised and these are divided up into groups designated by a letter of the alphabet. The serological test used in slaughter pigs only detected Group B and C Salmonellae antibodies. These are thought to contain the most common species found in pigs which can cause food poisoning, especially in Group B e.g. Salmonella derby, Salmonella typhimurium and Salmonella kedoungo. The ZAP programme was discontinued several years ago and is now replaced by random carcass sampling for actual bacteria, a far more useful approach to food safety.

Salmonella typhimurium is the most common species found in pigs with more recently monophasic strains predominating from surveillance and clinical disease cases - mostly associated with post weaning scour, septicaemia and as a complication of other major systemic infections such as PRRS, PCVAD etc. It is also a significant food borne zoonotic infection and increasingly there are concerns not only regarding its transfer as a disease causing organism in man but also the ability for it and other Salmonella to transfer antibiotic resistance to human pathogens via the food chain. There is little evidence to date to show that this has actually occurred but complacency is unwise.

Group C Salmonellae contains, amongst others, Salmonella cholerae-suis, which is a rarely found strain but one which causes serious disease in pigs. A single isolate was found on UK carcass swabs in 2015 but actual disease associated with the organism has not been recorded under APHA's VIDA system since 2009. Ironically it is not implicated in human food poisoning but still may be implicated in transferable antibiotic resistance.

Its name indicates its significance - cholera of pigs; it is no coincidence that disease caused by Salmonella cholerae-suis is closely linked to Classical Swine Fever - also known as Hog Cholera - and was common in the 1960's before Classical Swine Fever was eradicated.

Salmonella cholerae-suis does, however, occasionally appear as a problem in pigs and can present in 2 forms.

**Clinical Presentation**

1) Septicaemic form. The most severe form of the disease and causing "cholera". This is an acute septicaemic disease in which young growing pigs, if seen alive, will be extremely ill - vomiting, depressed, laboured breathing and with a very high rectal temperature (41°C +). One of the chronic features of the disease is that the extremities will turn purple/blue, particularly the ears, scrotum and feet. Mortality rates are high.

2) Enteric form. A much milder disease, Salmonella cholerae-suis can be involved in causing scour in young growing pigs, in which case it appears to be restricted to the gut. In this sense, it behaves more like the other strains mentioned above, especially Salmonella typhimurium. Mortality is low, although the disease can be debilitating and may be part of the complex of disease that has its foundation in Post Weaning Multisystemic Wasting Syndrome (PMWS) on farms where that disease is not properly controlled by vaccination.

**Diagnosis**

Diagnosis of septicaemic/cholera forms of the disease is based on clinical presentation, post mortem findings (a typical septicaemic carcass is produced) and culture of causative organism. In the enteric form, the
organism may appear almost as a surprise in an investigation of weaner scours.

All Salmonellae are covered by the Zoonoses Order and, even though Salmonella cholerae-suis has no zoonotic implications, the isolation of this bacterium would lead to reporting and potential investigation by state authorities.

Treatment

Antibiotics, if carefully chosen, are highly effective at killing Salmonella cholerae-suis and the veterinary surgeon will make appropriate recommendations based on information available. Usually treatment will need to commence immediately before the cause is confirmed, but sensitivity testing will be of value to guide future treatment choices particularly where treatment failure occurs. If caught early, pigs affected with septicaemia can recover, although many die despite treatment. Survivors may experience skin or extremity sloughing as is commonly seen with other septicaemic conditions (eg Erysipelas, Glassers Disease) from which these must be distinguished.

Prevention of disease in an infected environment can be achieved by metaphylactic use of oral (via feed or water) antibiotics. Vaccination is not available from commercial sources in the UK, although in problem herds autogenous vaccines can prove very effective.

Outbreaks of the enteric form of the disease normally respond well to appropriate water soluble medication.

Prevention

Salmonella cholerae-suis is primarily a pig-based organism and, thus, the most likely source of infection in carrier pigs. Careful selection of sources of stock is vital to keep disease out. However, the organism is excreted in the faeces and can potentially spread into a farm by any mechanical vector carrying faeces (lorries, people and equipment) or biological vectors such as birds, rodents etc. Thus, herd biosecurity is critical.

Once present on a farm, hygiene levels will determine the ease and speed with which disease can be controlled. As with all enteric-based diseases, scrape through systems, continual occupation and lack of washing and disinfection will all tend to favour persistence of the organisms. Poor hygiene management is not a valid excuse for the long term use of antibiotics (in feed or via the water supply) to achieve control of the disease. Rigorous cleansing and disinfection programmes, resting of pens and avoidance of spreading faeces from group to group by operating all in all out husbandry systems are basic requirements.