

## Survival time of pathogens in water



Figure 1. Pathogens in the water system represent a major infection route to pigs

The environment within and around the water system in pig buildings provides ideal conditions in terms of temperature and humidity to promote the survival and multiplication of many common pathogens harmful to pig health. If appropriate cleaning and disinfection are not carried out, pathogens can survive in the waterline and in faeces for long periods of time, including across successive fills and batches. Pathogens in the water system represent a major infection route to pigs that are introduced to seemingly clean environments.

Correct microbiological and mineral testing, along with regular treatment to the whole water system, will prevent the growth and carry-over of pathogens. Water should be tested at both the point of entry onto the unit and at the end of the line from which pigs drink.

Refer to the *Standard Operating Procedures: Water sampling for microbiology, minerals, flow rate and water temperature* and *Water sampling for microbiology (Farm assurance requirement)* factsheet. Also, *Acceptable drinking water parameters for pigs* factsheet and *Mineral content guide*.

### Environmental contamination

Environmental factors also contribute to pathogen growth through unobserved faecal contamination, for example, through direct contact with drinkers or contamination at source. When infected and pathogen-carrying pigs use drinkers, they contaminate the drinkers and pipelines; the pathogen can then remain viable for variable periods of time, depending on the type of pathogen (Figure 2).

Once a drinker has been contaminated, the bacteria will form part of the biofilm (slime), coating the inside of the pipes. Bacteria can enter water systems through leaks, joints and any air gaps, such as those deliberately present in header tanks.

Once developed, biofilms can subsequently become mineralised within the water delivery system. The process

of mineralisation of biofilm will happen more if the water has high levels of calcium, magnesium salts, dissolved iron or manganese.

The nature of pigs is such that their mouths are frequently in contact with faecal matter, and drinking can then inoculate any form of drinker mechanism, with bacteria able to join the biofilm layer.

Appropriate storage of slurry and cleaning on farms remove the likelihood of faecal contamination of water and drinking troughs.

Farms that obtain their water by mains supply have an obligation under the Water Supply (water fittings) Regulations 1999, to ensure the water is not contaminated.

Pig units pose a high risk of contamination to the public water supply, because of the exposure to pathogenic substances and faecal material.

Private water supplies, typically boreholes, as well as on-farm storage, are often located on or near to a pig production unit. Boreholes need to be protected from contamination; manures or slurries should not be stored or applied within 50 m of a borehole, nor should they be located within 50 m of a soakaway attached to a septic tank or sprayer wash down pad.

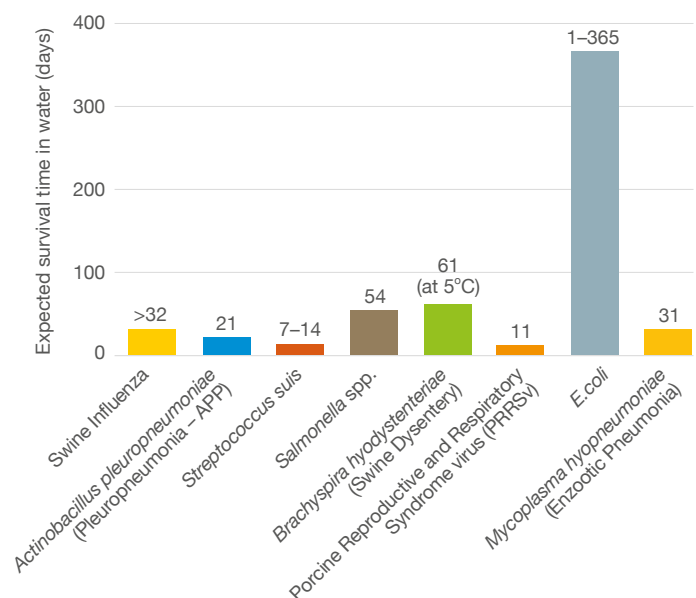


Figure 2. Survival times of commonly implicated pathogens and associated disease

Source: Adapted from: Optimising the Use of Antimicrobials – Preparing the industry for in-water delivery in the short term and improving hygiene and more effectively targeting medication in the longer term ([pork.ahdb.org.uk/media/274247/51510014\\_ft014\\_raft-solutions-ltd-water-report\\_approved\\_september-2017.pdf](http://pork.ahdb.org.uk/media/274247/51510014_ft014_raft-solutions-ltd-water-report_approved_september-2017.pdf))



Table 1. Examples of the types of potential contaminants and their sources, and suggested counter-measures to address the source of contamination

Contaminant/hazard		Source of contamination	Counter measures
Chemicals	Including heavy metals such as cadmium, copper, molybdenum, arsenic and lead, pesticides, nitrates and sulphates	Chemicals used in farming, forestry, industry, commercial premises or workshops	A risk assessment of the supply should be carried out to assess the potential for contamination; this will inform the level of testing required.  If a hazard is identified or if a test contains microorganisms or chemicals above the prescribed standards, there must be an investigation into the cause and appropriate remedial actions taken to reduce/ remove the risk
Microorganisms	Animal faeces, sewage from spreading or accidental leakage	Private water supplies drawn from land where animals graze or where manure is spread. Heavy rainfall or warm weather increases this risk	
Microorganisms	Cess pits or septic tanks	Discharge from cess pits or septic tanks	
Microorganisms	Ground water, vermin	The spring from which the ground water emerges or where it collects in the borehole or well. Vermin success to water storage facilities	Wells and boreholes need to be protected, i.e. cased to prevent contamination leaking through the sidewalls.  Spring water reaching ground level needs to be cased from its point of exit from the ground all the way to its point of use (or onto a storage tank)  Collection chambers/tank should be: <ul style="list-style-type: none"> <li>• Watertight with vermin-proof walls and lids</li> <li>• Above ground level (tops only for chambers) to stop water from surrounding land flowing into them</li> <li>• Designed to stop animals and debris from entering them</li> <li>• Designed to stop animals and debris from entering them (e.g. overflow pipes or vents in chambers) or have mesh cover installed</li> <li>• Positioned a good distance away from any soakaway or drain</li> </ul>

Source: Optimising the Use of Antimicrobials – Preparing the industry for in-water delivery in the short term and improving hygiene and more effectively targeting medication in the longer term ([pork.ahdb.org.uk/media/274247/51510014\\_ft014RAFT-solutions-ltd-water-report-approved-september-2017.pdf](http://pork.ahdb.org.uk/media/274247/51510014_ft014RAFT-solutions-ltd-water-report-approved-september-2017.pdf))

Further information can be found in *Private Water Supplies: Technical Manual*. [pork.ahdb.org.uk/media/272117/private-water-supplies-tech-manual.pdf](http://pork.ahdb.org.uk/media/272117/private-water-supplies-tech-manual.pdf)

It is always advisable to test your water to determine whether it contains any contaminants. Dependent on the type of contaminants identified, it may be valuable to implement a cleaning regime. See the *Shock water treatment guide* as a starting point.

A practical example of where a contaminated water supply has been treated can be found in the *Water sampling and cleaning case study* factsheet.

### Health and safety statement

Before carrying out any water sampling, conduct a health and safety risk assessment; this will cover, for example, working with water under pressure, chemicals and proximity to electrical equipment and supplies. A Control of Substances Hazardous to Health (COSHH) assessment will be needed where any chemicals are involved.

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