



**Australian Government**  
**Department of Agriculture**

# **Project Title: Collection, utilisation and sharing of post-mortem animal health data in the red meat supply chain**

**Milestone 3**  
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## **Acknowledgements**

APL with collaboration from Meat& Livestock Australia (MLA), South Australian Research and Development Institute (SARDI) and Department of Economic Development, Jobs, Transport and Resources, Victoria (DEDJTR) applied for grant funding under the Australian Government Department of Agriculture and Water Resource's Rural Research and Development (R&D) for Profit Programme ("the Programme") for grant funding to fund a collaborative research and development (R&D) project titled "Enhancing supply chain profitability through reporting and utilization of perimortem information by livestock producers ("the Project"). Subsequent to the successful grant application, the Australian Meat Processor Corporation (AMPC) have agreed to contribute funds to the Project and become a Partner Organisation.

## **Executive Summary**

### **The survey methodology**

In this, the final stage of the project, the team distributed the approved electronic survey to assess the base line of current activity in the processing sector relating to the collection, utilisation and sharing of post-mortem animal health data in the red meat supply chain.

The survey also gathered information on processor attitudes toward opportunities for improving communication with producers and opportunities for industry, processing companies and supply chains to increase the use of animal health information.

The electronic survey was distributed to 40 medium to large processors (see Attachment 1) and was backed up by telephone calls to increase the rate of response. There were 30 respondents to the electronic survey (SurveyMonkey) and the generated electronic report forms Attachment 3 to this report. By deduction it is possible to establish that 4 pork plants, 6 sheep/goats plants and 20 mixed species plants (sheep/goats and beef ) responded

In addition to the electronic survey, representatives from seven multi-plant groups (see Attachment 2) were interviewed to gain a more detailed insight into what their attitudes were to

- animal health data capture
- nature of current producer feedback
- future developments in this space

Six of these seven larger meat processing groups were surveyed face to face and one by telephone. A summary of these interviews is detailed in Attachment 4 to this report.

Taking into account both the electronic responses and those of the seven larger processor groups it would appear the survey successfully polled companies that in total process more than seventy five percent of the national beef, sheep and goat kill. In addition, although not required by the terms of reference MINTRAC also polled major pork processors to ensure that any initiatives in that sector were captured for the benefit of the overall Health4Wealth project.

### **The survey results**

Virtually all the companies (ninety five percent) surveyed were collecting some animal health information with the majority collecting more than just condemn data. The diseases and conditions on which data is currently being gathered is quite varied but there were some that were common to most data collection.

For cattle the main diseases/conditions for which information was being collected included;

- abscess
- hydatids
- pleurisy/pneumonia
- bruising
- liver fluke.

For sheep the main disease/conditions for which information was being collected included;

- arthritis

- CLA
- grass seeds
- sheep measles
- dog bites
- hydatids
- pleurisy/pneumonia
- bruising
- 
- liver fluke.

However, there are 10 more conditions and diseases being recorded in plants where data is gathered for the National Sheep Health Monitoring Program.

The pork processors all recorded approximately the same 10 conditions with minor variation between companies.

When it came to the accuracy of the inspection process two interesting points were raised.

The first related to the inaccuracy of organoleptic inspection. Many conditions need to be confirmed by laboratory testing and this should be considered when nominating conditions to be recorded. The second related to the need to calibrate inspection between establishments by utilising strategies such as periodic auditing of inspectors on plant or a regular on-line assessment of their ability to recognise the diseases being recorded.

In most plants surveyed the bulk of the data currently collected was done so by meat inspection staff employed by the company, third party providers or Department inspectors. In half of the plants QA staff were also collecting/recording some animal health data eg bruising. Where government inspectors were performing the primary inspection all carcass condemn data was gathered by these inspectors. In a few cases the government employed inspectors identified diseases and conditions, but company QA staff recorded the data.

Paper records or chalk boards are used in some plants instead of or in conjunction with touch screens. The paper records are also transferred to electronic data bases in a third of the plants.

Barriers to recording animal health data included the unwillingness of government inspectors to collect data in some plants, the speed of mutton and lamb chains and other difficulties associated with the capture of data such as no touch screen computer terminals at inspection points.

Just over 50% of the plants electronically surveyed currently provide animal health data to producers and they prefer to use email to distribute this information. Interestingly one hundred percent of those who do not provide data believe they would do so if there was a simplified system.

Very importantly, the clear majority of companies in both the electronic survey and the face to face interviews supported the use of a national data base to secure this information in addition to company data bases. There was universal agreement that the data should be made available to producers and processors. Overall the processors believed access to animal health data would be advantageous to the supply chain in terms of increasing returns for both producers and processors.

It should be noted that MLA/AMPC have funded the development of a draft Standard for the reporting of animal health data through the supply chain allowing a coding which identifies the disease/condition, where the data was gathered and by whom, what part of the carcase was affected and in some cases to what extent. The draft Standard represents a comprehensive approach to capturing and coding data. Its applicability to processor data gathering will need trialling to ensure it can be utilised easily and meets the needs of the supply chain.

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## **1. Background to Research**

Australian Pork Limited is currently leading a Rural Research and Development for Profit (RR&D4P) project “Enhancing supply chain profitability through reporting and utilization of perimortem information by livestock producers”.

This project aims to develop standards for the consistent reporting, recording and analysis of peri-mortem disease information for use by beef, pork and sheep producers, processors, regulators and other key stakeholders. A national approach to reporting peri-mortem animal disease information will contribute to streamlining investments in systems that are commonly used in livestock sectors such as processing automation, accreditation and certification and slaughter floor design.

Whilst many meat processing recording systems are already in place, data collection on carcase and offal condemnations and feedback varies considerably. This project aims to introduce a standardised and comprehensive approach, providing consistent data to producers for the monitoring of disease prevalence and enable informed production decisions to be made to maximise yield outcomes. A standardised approach will also provide the necessary data to inform industry initiatives such as carcase inspection, verification and certification procedures to improve animal health status and alternative risk management procedures.

MINTRAC has been contracted to work within this overall project to assess the extent of current animal health data collection and reporting in the meat processing sector.

## **2. Objectives of the Research Project**

The scope of the project MINTRAC has been contracted to undertake is to communicate with Australian red meat processing plants to determine the current state of play:

- what systems are being used for recording of information i.e. slaughter floor system, touch screens etc;
- the types of animal health data being collected, i.e. which diseases and conditions
- who is collecting this information i.e. government inspectors, third party providers, additional resources etc
- what are the challenges associated with collecting this information and/or barriers preventing additional data being collected?
- how is this data being communicated to producers and if so how i.e. phone call if problem, regular feedback emailed etc
- how is the processor looking to communicate differently with producers
- what opportunities do the processors see in this space and where is an industry response required to support them
- what principles need to be embedded into the business rules for data sharing
- identify the key opportunities for processing companies, supply chains and the industry in terms of implementing effective use of animal health information

### **3. Introductory Technical Information**

Livestock are inspected in slaughter establishments for a range of animal health diseases and conditions as set out in AS4696-2007 at ante mortem and post mortem inspection. The recording of these diseases/conditions will depend on the regulatory requirements, the company procedures and supply chain arrangements.

Inspection in abattoirs, depending on the jurisdiction, is carried out by a range of personnel including stock handlers, company inspectors, inspectors employed by third party providers, government inspectors and on plant government veterinarians.

### **4. Research Methodology**

MINTRAC adopted the following methodology for this project.

#### ***Stage 1***

A baseline for processor size to be surveyed was agreed with RR&D4P steering committee. It was agreed that

- processors with a throughput of more than 500 per week should be included in this study
- 40 companies should be electronically surveyed and a list was agreed to (see Attachment 1)
- seven multi-plant companies were to be surveyed by face to face interviews or telephone calls and a list was agreed to (see Attachment 2)

During this stage MINTRAC designed a questionnaire addressing the scope of current processor animal health data collection which was distributed using Survey Monkey. The survey was validated by the RR&D4P steering committee.

MINTRAC established a telephone and face-to-face interview schedule for September.

#### ***Stage 2***

In this phase MINTRAC staff;

- distributed the electronic survey to 40 processing plants.
- telephoned individual processors to follow-up data collection.
- visited up to 7 multi-plant processors for face-to-face interviews as required.

The SurveyMonkey survey exceeded the target participation rate of 70% of those surveyed. The survey had to be backed up with telephone calls to increase initial rate of response and achieve the final participation rate.

In addition, interviews with the group QA managers of seven of the larger multi-plant companies were undertaken. This ensured that information about animal data collection in a further 25 of the larger plants was captured.

After the survey was completed the results were recorded and the data analysed data and a survey report developed.



The results of the SurveyMonkey of the 40 plants (see Attachment 3) and the face to face interviews (see Attachment 4) established the baseline of current activity in the processing sector relating to the collection, utilisation and sharing of post mortem animal health data. The nature of the health data is captured in Attachment 5.

The reports detail:

- the number and % of processors currently collecting animal health data
- the % of processors providing feedback to producers for each of the species and what % of the total national kill this represents
- the nature and frequency of feedback and how the data is being communicated to producers
- the scope of data being collected in terms of the diseases and conditions reported
- the data collection system used
- who is collecting the data i.e. inspectors, QA staff etc
- details on storage and ownership of data
- processes for communicating data to producers i.e. phone call if problem, regular feedback emailed etc
- current barriers to gathering and / or reporting animal health data.

The survey and interviews also identified processor attitudes toward the opportunities for;

- improving communication with producers
- processing companies to increase the use of animal health information
- supply chains to benefit from the collection and sharing of animal health data.

### **Stage 3**

In this stage MINTRAC has developed and submitted the draft final report to the RR&D4P steering committee for comment and amendment before the final report is to be submitted on the 15<sup>th</sup> of October 2017.

## **5. Results**

The initial electronic survey of 40 plants had 30 respondents and the summary of the generated electronic report forms Attachment 3 to this report.

The results of the face to face interviews with the multi-plant groups are summarised in Attachment 4 to this report. The face to face interviews allowed for developing a more comprehensive understanding of the processor's present practices and where they see data capture and producer feedback programs are likely to be developed into the future.

The survey also enabled the development of lists of diseases and conditions that processors consider worth capturing for the target species and these could be used as the basis of any data bases that are developed.

## **6. Discussion**

### ***Industry attitudes and current practices***

This study demonstrates that the meat processing industry is quite clearly cognisant of the advantages of gathering animal health data. One hundred percent of those surveyed believe it will bring returns for producers and ninety percent think processors can benefit from feedback to livestock suppliers. Seventy percent of processors provide feedback either as a routine service or on an exception basis when diseases and conditions are at a level in a lot that warrant a discussion with the producer eg grass seed contamination in lambs.

Currently, those larger processors with well-established supply chain relationships are developing sophisticated feedback mechanisms in order to achieve those advantages which will flow from improved livestock health data feedback. All the larger multi plant companies gather animal health data over and above condemnations and seventy percent of the other processors surveyed gather this data also. Seventy percent distribute animal health data of some form to producers and the remaining thirty percent indicated that they would be willing to if the system was simplified.

Additionally, there appears to be some appetite for a national data base that will enable producers to access their animal health data at will via their NLIS account. Despite this, many processors may need to be convinced of the advantages of a standardised reporting system because they regard customised reporting as an opportunity to develop a point of difference with their suppliers.

### ***Potential issues***

There are in the view of processors, some steps required for the development of a system for collecting animal health data in processing establishments.

The first is the development of a specific list of diseases and conditions for each species. The general view is that the “list” needs to be limited to those diseases/conditions that producers can act upon and achieve some reduction in the incidence of the disease. It was also recommended that only diseases/conditions that do not require routine laboratory testing for confirmation be included.

In addition, some plants believe the list should be limited to a few of the most significant diseases (5-8) to make it easier to have on a touch screen or record on paper. Having said that there are 20 conditions in the NSHMP recording sheets and companies and inspectors seem to have coped.

MLA/AMPC has already funded the development of a Standard for Animal Health Data which has been submitted to the AUSMEAT Language Committee as a draft. This Standard with its definitive nomenclature for diseases and conditions and its coding protocol may provide a way round any difficulties stemming from plants using a unique nomenclature of diseases to record and report.

The practicalities of animal health data collection in plants may necessitate the use of different technologies and protocols depending on the species, chain speed and inspection arrangements.

Government inspectors are in place in approximately fifty percent of all medium to large plants surveyed while company inspectors are in thirty percent of these plants and third-party inspectors are in the remaining twenty percent. Animal health data has been collected successfully in plants utilising company or third-party inspectors for some time now without issue. The collection of health data by

government inspectors over and above carcase condemnations however still appears problematic, but it is occurring in some plants and it is a matter of ongoing discussion in others.

Touch screen entry of beef animal health data is an established practice and approximately 60% of plants have it in place. Paper records are still also utilised to collect some or all of the animal health data in roughly half the plants. Regardless, recording data utilising either technique represents an additional component to an inspector's work load and this is seen as an issue in some plants.

Recording data on high speed sheep chains is still difficult and to date it involves either paper records or a supernumerary inspector to use a touch screen to enter data. A voice recognition system for recording the incidence of disease in a lot is currently in the pilot stages of trialling in sheep plants. While results are promising it is a long way from a proven technology.

### ***Data availability***

Where animal health data is collected it is seen as useful to management and distributed widely among the plant management team. It is used widely to explain and understand yield losses and to give livestock buyers information on stock quality. In vertically integrated companies it is shared with the relevant feedlots and farms. The NSHMP data is made available to producers through its automatic up-load to LDL ( via EDIS).

Where data is shared with producers by processors' the preferred method of distribution is email although northern plants report that connectivity is still an issue with some regions.

All the plants surveyed were of the opinion that animal health data should be made available to producers (their livestock data) and processors (stock they processed). The majority of plants are in favour of this data being stored in both a national and company data bases with eighty percent in favour of there being a national data base. Industry is less enthusiastic about other parties sharing this data but more relaxed if the data is aggregated and individual producers cannot be identified.

## 7. Attachment I

The following processors were surveyed using SurveyMonkey

	Company
1	BE Campbell
2	Bindaree Beef
3	Cowra Meat Processors
4	E C Throsby
5	Eversons Food Processors
6	Gundagai Meat Processors
7	Monbeef
8	Northern Co-operative Meat Co Ltd
9	Southern Meats
10	Wodonga Rendering
11	Australian Country Choice
12	John Dee Warwick
13	Kilcoy Pastoral Co
14	Nolan Meats
15	Stanbroke Beef
16	Western Meat Exporters
17	Wide River Pork
18	Prime Valley Pastoral
19	Strath Pastoral
20	Ararat Abattoirs
21	Australian Lamb Colac
22	Cedar Meats
23	Forestall
24	G&K O'Connor
25	M C Herd
26	Midfield Meat International
27	R Radford & Son
28	Riverside Meats
29	Taro Meat
30	Wagstaff Cranbourne
31	Tasmanian Quality Meats
32	Dardanup Butchering Company
33	Goodchild Abattoirs
34	Harvey Industries Group
35	Hillside Meat Processors
36	V&V Walsh
37	WAMMCO International
38	Wellard Animal production
39	Western Meat Processors
40	Northern Australia Beef

## **8. Attachment 2**

The following multi-plant companies were included in the survey. The QA Manager or Supply Chain Managers were interviewed either face to face or in one instance by telephone.

### **Company**

- 1 JBS Australia
- 2 Teys Australia
- 3 Nippon
- 4 Fletcher  
International
- 5 Thomas Foods  
International
- 6 Rivalea
- 7 Greenhams

## **9. Attachment 3**

See Data-All-171005(1) pdf document attached to this report

## 10. Attachment 4

### Results of face to face interviews with multi plant groups.

#### Face to face survey Participants

The face to face interviews were conducted with the QA manager or the Supply Chain Manager at seven multi-plant processing groups which collectively have 28 plants between them. The companies surveyed were

- JBS
- Fletcher International
- Teys Australia
- Nippon
- Thomas Food International
- Riverlea
- Greenhams.

The interviews were based on the questions from the electronic survey but the interaction enabled the company representatives to expand on their answers and views.

#### Results

No.	Question	Answers
1.	Is animal health data (including carcase condemnations) collected at your establishment?	All seven of the processing groups currently gather animal health data. The nature of the data varied between plants. Those plants which are part of the National Sheep Health Monitoring Program and those plant with integrated supply chains collected more health data.
2.	Do you only collect data on condemned carcasses?	Only one of the twenty eight plants collected nothing more than condemn details report to DAWR
3.	What species do you collect animal health data for?	Three groups ran seventeen beef plants between them. There were three multi species plants, three pork plants, five sheep plants
4.	What bovine diseases/conditions do you collect data for?	<p>There was a wide range of diseases and conditions that are currently collected. Those identified included</p> <ul style="list-style-type: none"> <li>• Abscess</li> <li>• Bruising</li> <li>• Hydatids</li> <li>• Jaundice</li> <li>• Liver fluke</li> <li>• Pleurisy/Pneumonia</li> <li>• Scarring</li> <li>• Nephritis</li> <li>• BJD.</li> </ul> <p>However, the overwhelming <i>preference was to collect data on fewer rather than more diseases and conditions</i>. These should be diseases and conditions that producers can impact on by changes to husbandry practices. A practical limitation on high through put beef chains was that there was limited time to scroll pages on touch screens to find a particular disease. The preference was for a maximum of five to eight diseases with</p>

		these diseases having the maximum impact on carcase and/or offal condemnations.
5.	What other bovine diseases/conditions should be collected?	A wide range of additional conditions recommended included arthritis, actino, cancer, cirrhosis, emphysema, melanosis, pericarditis, pregnancy. (See Attachment 5) It was suggested that the diseases needed to be corelated with the age of the livestock
6.	What ovine diseases/conditions do you collect data on?	Most sheep plants surveyed were part of the National Sheep Health Monitoring Program. Consequently, they gathered data on the following conditions. <ul style="list-style-type: none"> <li>• Arthritis</li> <li>• Bruising</li> <li>• CLA</li> <li>• Cancer</li> <li>• Cirrhosis</li> <li>• Tenuti</li> <li>• Dog bites</li> <li>• Fever/Septicaemia</li> <li>• Knotty Gut/ Pimply Gut/ Nodule Worm</li> <li>• Grass seeds (L,M,H)</li> <li>• Hydatids</li> <li>• Liver fluke</li> <li>• Lungworm</li> <li>• Melanosis</li> <li>• Nephritis</li> <li>• Pleurisy</li> <li>• Pneumonia</li> <li>• Rib Fracture</li> <li>• Sarco</li> <li>• Sheep Measles</li> <li>• Vac Lesions</li> </ul>
7.	What other ovine diseases/conditions should be collected?	Melanosis
8.	What porcine diseases/conditions do you collect data on	Here again there were a range of diseases and conditions recorded at ante and post mortem inspection. These included; <ul style="list-style-type: none"> <li>• Abscess</li> <li>• Anaemia</li> <li>• Arthritis</li> <li>• Bruising</li> <li>• Erysipelas</li> <li>• Septicaemia</li> <li>• Melanoma</li> <li>• Peritonitis</li> <li>• Pleurisy</li> <li>• Vaccination Abscess</li> </ul>



9.	What other porcine diseases/conditions should be collected?	None suggested
10.	Who collects this data?	The bulk of data is collected by company employed inspectors or third party employed inspectors. Where government inspectors were employed all carcass condemn data was gathered by these inspectors. In a few cases the government employed inspectors identified diseases and conditions, but company QA staff recorded the data.
11.	How is this data initially recorded?	Touch screens were utilised by almost all the beef plants and some sheep plants. However, in sheep plants health data was more likely to be hand written and transferred onto an electronic data base at the end of the kill. The speed of the sheep chain was mentioned as a major obstacle to recording health data in sheep plants.
12.	What are the issues associated with collecting data this way?	<p>The issues raised were for sheep</p> <ul style="list-style-type: none"> <li>• The chain speed making touch screens difficult on sheep chains</li> <li>• The number of conditions and touch screen size</li> <li>• Hygiene of touch screens</li> <li>• Transcription errors</li> </ul> <p>There were two interesting points raised. The first related to the inaccuracy of organoleptic inspection. Many conditions need to be confirmed by laboratory testing and this should be considered when nominating conditions to be recorded. The second related to the need to calibrate inspection between establishments by utilising strategies such as periodic auditing of inspectors on plant or a regular on-line assessment of their ability to recognise the diseases being recorded.</p>
13.	Who is this distributed to in plant?	Where data was recorded it was distributed to the QA Manager, Plant Manager, Livestock buyers and the OPV (Department of Agriculture and Water Resources). Sheep processors in the NSHMP identified that Animal Health Australia got the data.
14.	Is animal health data fed back to producers	In the major beef processing plants, a very high % of the cattle are on direct consignment to the plant from properties or feedlots. This enables relatively easy feedback to producers. Likewise, where sheep are processed at plants in the NSHMP animal health data is now available via the LDL
15.	How is the feedback to producers provided?	Telephone, fax, letter and e-mail were all employed by processors who never the less had a distinct preference for emails.

16.	If the process for providing feedback to producers was simplified would your organisation participate?	Those still in the development phase of a producer feedback strategy would welcome an LDL type platform to make animal health data available to producers with a minimum input from themselves.
17.	What is your preferred method(s) of providing feedback to producers	There was a clear preference for communicating by e-mail with producers. However, a number said in the event of a disease or condition impacting highly on yield from a lot then a telephone call would be made to the producer.
18.	Is there a role for an industry wide system for producers to receive animal health data on livestock slaughtered?	There was a division here between those groups who have a well-developed plan/strategy for communication with suppliers and those who are developing their strategy. Those still in the development phase would welcome an LDL type platform to make animal health data available to producers with a minimum input from themselves. Those with a developed strategy are ambivalent to a national industry based program.
19.	How should this data be stored?	There was consensus that companies should maintain their own data bases. However, there was less enthusiasm for a national data base but all admitted it was probably a good idea.
20.	Who should have access to the national data base?	Universally interviewees said a processing company should have access to data for stock processed at their plant only while producers should be able to access data on their stock only. There was general agreement that DAWR and state DPIs should have access to aggregated data for market access and disease abatement strategies. Some groups believed MLA, APL and AMPC should have access to aggregated data only to enable research.)
21.	What advantages do you see in the collection of animal health data for your company?	For groups managing their supply chain through producer programs there were seen to be significant advantages in identifying disease and condition issues that producers could be encouraged to manage and therefore improve yields. Interestingly some processors believed this would help build the relationship between processor and producer because many producers are already seeking/requesting animal health data.
22.	What advantages do you see in the collection of animal health data for producers?	Almost all interviewees identified improved productivity and returns for producers. The confirmation or not of the efficacy of their existing husbandry practices was seen as key to the beneficial impact of animal health data on producers. Several groups believed that animal health data results should always be accompanied by information on how to reduce the incidence of the disease or condition.
23.	What advantages do you see in the collection of	The most interesting reply to this question is that currently the industry mainly socialises losses due to diseases/conditions like

	animal health data for the supply chain as a whole?	hydatids or liver fluke. However, with detailed analysis of health data effective producers could be rewarded for eradicating diseases and enabling processors to recover more offal. In this way strong market signals could be sent to encourage producers to prepare high yielding cattle.
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## Attachment 5 : Diseases and conditions recorded by companies surveyed electronically

### Ovine Conditions

No.	Disease / Conditions	% of plants
1.	Arthritis	35
2.	CLA (Cheesy gland)	23
3.	Cysticercus tenuicollis	15
4.	Hydatids	12
5.	Grass seeds	23
6.	Liver fluke	12
7.	Pleurisy/pneumonia	19
8.	Sarcocystis	15
9.	Sheep measles	23
10.	Vaccination lesions of any kind	15
11.	Ovine Johnes Disease (OJD)	12
12.	Lung worm	8
13.	Bladder worm (tenui)	8
14.	Dog bites	27
15.	Knotty gut	4
16.	Rib fractures	8
17.	Bruising	24
18.	Cirrhosis	8
19.	Nephritis	12
20.	Fever/septicaemia	31

### Other Ovine conditions:

No.	Disease / Conditions	No. of plants
	Cancers	1

	Melanosis	1
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### **Bovine Conditions**

<b>No.</b>	<b>Disease / Conditions</b>	<b>% of plants</b>
	Abscess	40
	Adhesions	29
	Bruising	43
	Hydatids	32
	Jaundice	21
	Liver fluke	32
	Pleurisy/Pneumonia	36
	Scarring	7
	Nephritis	25
	BJD.	17

### **Other bovine diseases/conditions mentioned included**

<b>No.</b>	<b>Disease / Conditions</b>	<b>No. of plants</b>
	Actino	2
	Cancer	3
	Cirrhosis	3
	Emphysema	2
	Melanosis	1
	Metritis	1
	Peritonitis	1
	Retention cysts	1
	Telangiectasias	2
	Pericarditis	1
	Fatty liver	1
	head abscesses	1

	injuries / wounds	<b>2</b>
	gross contamination	
	Anaemia	<b>2</b>
	Pyaemia	<b>1</b>
	fever	<b>1</b>
	emaciation	<b>1</b>
	Uraemia	<b>1</b>
	inoculation abscesses	<b>1</b>
	Jaundice	<b>1</b>
	Septicaemia	<b>1</b>
	ecchymosis	<b>1</b>

### **Porcine Conditions**

<b>No.</b>	<b>Disease / Conditions</b>	<b>% of plants</b>
	Abscess	50
	Abscess (Inoculation)	25
	Anaemia	25
	Arthritis	50
	Bile contamination	25
	Bruising	75
	Dermatitis	0
	Erysipelas	50
	Septicaemia	50
	Melanoma	50