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Calf scours in southern beef enterprises (Phase 3)

Abstract

Neonatal calf diarrhoea (NCD) in beef calves has been an ongoing issue for producers for many years. A previous study determined that producers and veterinarians poorly understand the predisposing factors, causes and management of calf scours in suckler beef enterprises and there was minimal extension material on this subject. Consequently affected producers were frustrated by the lack of reliable and practical advice. This report details the successful production of current scientific and practical information on the prevention, control, diagnosis and treatment of NCD for veterinarians, farm advisers and producers. Two Tips & Tools for producers and a veterinary technical information package were finalised during September 2005. The Tips & Tools were featured on the MLA web site, and the veterinary technical information was promoted at the Australian Cattle Veterinarians (ACV) conference and has been distributed to all full members of the ACV. The technical document is supported by an information CD containing the presentations from the conference and a series of technical tools. By producing interrelated information at both the producer and the technical level, it is hoped that this will provide a consistent approach to NCD in the Australian suckler beef industry and maximise the uptake by producers.

List of Acronyms and abbreviations

ACV	Australian Cattle Veterinarians
MBfP	More Beef from Pastures
NCD	Neonatal calf diarrhoea
PCR	Polymerase chain reaction

Executive Summary

Neonatal calf diarrhoea (NCD) in beef calves has been an ongoing issue for producers for many years.[1, 2] Studies from overseas have shown that NCD is a major cause of economic loss to beef producers and have detailed preventive strategies. Despite this there is little Australian research that documents the impacts of this disease on beef enterprises, or demonstrates preventive and treatment strategies to minimise the impact.

The current project was a direct result of the recommendations from the previous two “Calf Scours in southern Australian beef enterprises” projects AHW.026 and AHW.057. The initial study demonstrated that neonatal calf scours is a significant and time-consuming disease problem on many of the suckler beef enterprises surveyed and that on those properties the mean cost of calf scours to the enterprise was \$18.70 per breeding cow. It determined that producers and veterinarians poorly understand the predisposing factors, causes and management of calf scours in suckler beef enterprises and there was little or no extension material on this subject. Consequently affected producers have been frustrated by the lack of reliable and practical advice. A whole of industry approach was recommended to ensure clear and consistent advice, together with structured systems to minimise the impact of this problem. The second phase of the project included a comprehensive literature review that outlined the latest research and opinions on all aspects of scours in neonatal beef calves and used this information to compile best practice information modules targeted at veterinarians and farmers.

The objectives for the current phase of the project were to ensure the information modules produced in phase 2 were consistent with current farm management practices and MLA extension programs, and to integrate the producer documents into these extension programs. We also needed to ensure that sufficient technical information was provided to veterinarians, and that the format used and information presented was aligned with the producer documents provide a consistent approach and maximise the uptake by producers. Finally we had to promote the material to veterinarians and producers to ensure maximum uptake at an industry level.

The major products for producers are 2 Tips & Tools. “Preventing calf scours in a suckler beef enterprise” explains how to better manage calving herds to avoid losses due to calf scours, improve calf health and immunity to infection and how to limit the spread of scours during an outbreak. “Treating calf scours” provides information on determining if calves require treatment for scours, how to select and use oral electrolyte solutions for best results and when to consult your veterinarian. Information on NCD was also produced for insertion in future editions of the MBfP manual.

The main product for veterinarians and advisers working in the suckler beef industry is the “Neonatal calf diarrhoea in suckler beef herds” technical reference. This comprehensive and current resource has a brief introduction that covers the aetiology of NCD and then four major sections on prevention, investigation, control and treatment. The technical information has been aligned with and referenced to the MBfP recommendations where applicable. Each chapter contains a list of key references for further reading, and the confidence in the research behind the recommendations is detailed for each major section.

Calf scours in southern Australian beef enterprises: Phase 3

The second product for veterinarians and advisers is the "Information pack CD". This contains the Tips & Tools and the technical reference; virtual PowerPoint presentations* and written papers from the MLA sponsored "Calf scour day" at the ACV Barossa conference; a video of best practice calf post mortem technique and a series of technical tools developed to support the technical reference.

The technical tools include a comprehensive investigation protocol developed to ensure an industry standard in best practice approach to a NCD outbreak and a spreadsheet designed to calculate the cost of an NCD outbreak and determine the cost benefit of diagnostic and vaccination strategies. A management planner was also developed to help veterinarians and producers plan preventive management events according to the proposed start of calving.

There has been extensive promotion of the material. The technical document and Tips & Tools were launched at the MLA sponsored "Calf scour day" at the successful Australian Cattle Veterinarians (ACV) conference in the Barossa in October 2005. This conference was attended by over 130 delegates and featured international experts on NCD. It was used as a forum to present the information in the technical document. The Tips & Tools were featured on the MLA web site from September – December 2005 and are currently available from that site. Electronic copies have been put on the 2nd edition of the MBfP CD and they have been distributed at the MBfP 2006 regional expos. They were also featured in the summer 05/06 edition of Prograzier.

In December 05 the veterinary technical information booklet was distributed to all full members of the ACV that did not attend the conference. The Information pack CD and two audio CDs with presentations from the conference were distributed to all current members of the ACV in March 2006. The technical manual and tools are available from the ACV website; www.acv.com.au.

Whilst it is recognised that for many enterprises some preventive measures may not be cost-effective, this project has provided the tools for producers and their advisers to assess the impact of NCD on their property and make effective decisions on possible management strategies. Therefore at an individual farm level this project has the potential to have significant impact within the next 12 months.

The impact of this project in five years this time will depend on the level of further R&D in this area. Whilst there may be some changes in current scientific thinking, it is unlikely there will be significant changes in either the fundamental management strategies proposed or the advice on control and treatment. If the material is well promoted in the next few years to ensure industry uptake and respect, it will continue to have an impact at an individual producer level for many years. It is possible that diagnostic techniques will change as more laboratories offer technologies such as PCR. However modern electronic technology and the increasing producer use of the Internet and electronic media means that it is possible to revise and update the information and this should take place at least every five years.

This project has provided basic management principles for minimising NCD in suckler beef enterprises. These have not been evaluated in Australian conditions and consequently to maximise the impact of this project it would be useful to assess these in a well-defined prospective epidemiological study. This would provide robust advice on how to minimise the impact of this disease and have significant impact into the future.

* The PowerPoint presentation accompanied by the sound recorded on the day

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1 Background

Neonatal calf diarrhoea (NCD) in beef calves has been an ongoing issue for producers for many years. A 1966 study of beef cattle diseases in Victoria noted that over 80% of properties experienced some form of white scour, and this was regarded as a problem on just under 50% of properties. [1] In the mid 1990s there were two Meat and Livestock Australia (MLA) funded Producer Initiated Research and Development projects that studied aetiology of NCD and the efficacy of an enterotoxigenic *E. coli* vaccine, but yielded few answers to the producers involved.

Studies from overseas have shown that NCD is a major cause of economic loss to beef producers and have detailed preventive strategies. Despite this there is little Australian research that documents the impacts of this disease on beef enterprises, or demonstrates preventive and treatment strategies to minimise the impact.

The current project was a direct result of the recommendations from the previous two “Calf Scours in southern Australian beef enterprises” projects AHW.026 and AHW.057. The initial study demonstrated that neonatal calf scours is a significant and time-consuming disease problem on many of the properties surveyed and that on those properties the mean cost of calf scours to the enterprise was \$18.70 per breeding cow. Significantly the majority of producers that responded to the surveys were from suckler beef enterprises as opposed to calf rearing/vealer enterprises. It determined that producers and veterinarians poorly understand the predisposing factors, causes and management of calf scours in cow calf enterprises. A whole of industry approach was recommended to ensure clear and consistent advice, together with structured systems to minimise the impact of this problem.

Specific recommendations from phase 1 included establishment of:

- key management strategies at the herd level to minimise calf scours,
- appropriate, affordable and reliable standard diagnostic procedures and pathways on farm and at the laboratory
- appropriate treatment protocols

and subsequent extension of these strategies.

The aim of AHW.057 and the current project was to address these recommendations. The emphasis of the project was on calves aged 0 to 6 weeks in pasture based suckler beef enterprises. In AHW.057 the scientific literature was comprehensively reviewed and the latest research and opinions on all aspects of scours in neonatal beef calves were documented. A series of best practice information modules targeted at both veterinarians and farmers were drafted, based on the information gathered in the literature review. The objectives of the current project were to further develop and extend these information modules.

2 Project Objectives

The overall outcome for this project is to ensure consistent and scientifically sound advice is provided to beef farmers, by all levels of extension, on the prevention, investigation and management of calf scours. The emphasis of this project is on calves aged 0 to 6 weeks in pasture based cow-calf enterprises.

The principle objectives for phase 3 were as follows

1. Ensure that the information in the documents produced in phase 2 are consistent with current farm management practices and MLA extension programs
2. Ensure sufficient technical information is provided to veterinarians
3. Integrate the producer documents into the current MLA extension programs
4. Preparation of Tip & Tools for producers and technical information for veterinarians and farm advisers
5. Promote the material to veterinarians and producers to ensure maximum uptake at an industry level

3 Methodology

3.1 Ensuring that the information produced was consistent with current farm management practices and MLA extension programs

A 2 day workshop was held with key beef production veterinarians, together with agricultural advisers and producers involved in the “More Beef from Pastures” program to ensure internal and external consistency of the documents. The information was reviewed and key issues determined. It was then subjected to a hazard analysis and critical control point (HACCP) process to determine the most significant on-farm strategies for prevention, diagnosis, control and treatment. The content, style and products to be delivered to industry were discussed and options for delivery of project products were explored.

3.2 Preparation of information packets

The documents were rewritten with the content and in the format decided by the workshop. These were then submitted to a technical writer for production of Tips & Tools for producers and a technical information booklet for veterinarians and farm advisers.

3.3 Ensure sufficient technical information is provided to veterinarians

Comprehensive technical information for veterinarians is provided in a booklet entitled “Neonatal calf diarrhoea in suckler beef herds” which covers all major aspects of prevention, diagnosis, control and treatment. A list of key scientific references was included in each chapter and the level of confidence in research behind key recommendations was also outlined for each major topic.

A series of tools were developed for veterinarians working in the field. These were based around a comprehensive investigation package designed to ensure a thorough, consistent and best practice approach to a calf scour outbreak. The investigation package was supported by a cost of disease calculator that also estimated the cost benefit of a proposed diagnostic workup and of preventive vaccination strategies. To facilitate on-farm diagnosis and treatment the relevant tables from the “Neonatal calf diarrhoea in suckler beef herds” technical reference were condensed into a six-page document for veterinarians to have in their vehicles. A herd management plan was also developed for use in planning preventive strategies.

Finally the literature review from phase 2 was divided into a series of papers to be published in the Australian Veterinary Journal or the Australian Cattle Veterinarian so that the science behind the technical information will be accessible to all Australian veterinarians and researchers.

3.4 Integrate the producer documents into the current MLA extension programs

The main format for extension to producers was 2 Tips & Tools entitled "Preventing calf scours in suckler beef enterprises" and "Treating calf scours". Tips & Tools are practical and easy to follow information sheets on a range of topics and are one of the major extension formats used by MLA. The calf scours Tips & Tools were designed to stand alone, but also can be included in the toolkit of the "More Beef from Pastures" (MBfP) manual. Information for each relevant section of the MBfP manual was also put together for insertion when the manual is reprinted.

3.5 Promoting the material to ensure maximum uptake at an industry level

The "Neonatal calf scours in suckler beef enterprises" technical reference and the two Tips & Tools were launched at the Australian Cattle Veterinarians (ACV) conference in the Barossa Valley in October 2005.

The presentations from the conference were converted into "virtual PowerPoint presentations" and with the supporting papers became a major feature of the "NCD in suckler beef herds information pack CD". This CD also contained the technical reference, Tips & Tools and the Technical tool pack. Four major presentations from the conference were also recorded and produced into a double audio CD

The two CDs and a printed copy of the "NCD in suckler beef herds" technical reference were distributed to all members of the Australian Cattle Veterinarians to ensure that the majority of veterinarians involved in cattle practice had a copy. The package is also available from ACV for non-members.

The information has also been made available on the Internet. The Tips & Tools are available through the MLA web site, and the technical document and tools are available through the ACV web site. A feature article on a property that had overcome a calf scour problem was run in the summer 05 -- 06 edition of Prograzier to promote the calf scour Tips & Tools.

4 Results and Discussion

4.1 Ensuring the information was consistent with current farm management practices and MLA extension programs

The workshop reviewed the draft information documents, explored options, and reached agreement on the content, style and products to be delivered to industry and discussed delivery options for these products. It was recognised that many of the key messages for the prevention of NCD fitted extremely well with MBfP recommendations, and to prevent duplication and reinforce these messages the NCD material should refer to the MBfP manual for further information where appropriate.

It was agreed that the producer documents were too long as drafted and needed to fit the MBfP document format and be presented as Tips & Tools. The main document should focus on prevention

and be based on a HACCP approach to the key risk areas. This would be supported by a series of other tools including a property risk assessment protocol; a herd management calendar; a spreadsheet to explore costs & losses; a treatment of calf scours Tip & Tool and a cost benefit of vaccination calculator. As the main avenue for extension for this material is planned through the MBfP project it was agreed by the working group to write small sections on calf scours for insertion at each relevant point in the MBfP manual at the next revision.(7.1, 7.3, 7.4, 7.5)

There was general agreement that the technical documents as drafted also needed to be condensed into a single document covering prevention and management of an outbreak, and the key messages simplified and highlighted. It was decided that more of the MBfP management principles needed incorporation into the technical manual and the finer details of specific therapies should be signposted by references to appropriate veterinary texts or literature citations.

The view of the working group was that the information for producers should be delivered via MBfP but also by other MLA programs such as Beef Cheque, Edge Network, Field days & Demo farms. It was also recognised that animal health advisers, veterinarians, and rural merchants may be interested in delivery to producers. The Tips & Tools would be available from the MLA website. Producers wishing to obtain the technical documents or the literature review would be able to do so through published MLA reports and from the ACV office and website.

A full report of the workshop may be found in Appendix 1

4.2 The extension products (objectives 2 - 4)

The major products for producers are 2 Tips & Tools. "Preventing calf scours in a suckler beef enterprise" explains how to better manage calving herds to avoid losses due to calf scours, improve calf health and immunity to infection and how to limit the spread of scours during an outbreak. "Treating calf scours" provides information on determining which calves require treatment for scours, how to select and use oral electrolyte solutions for best results and when to consult your veterinarian during a calf scours outbreak. A third document entitled "What is calf scours" was submitted as a potential Tips & Tools, but it was decided that the 2 Tips & Tools produced contained sufficient information. These may be found in Appendix 4.

Information on NCD was also produced for insertion in future editions of the MBfP manual. This reflects the information in the Tips & Tools, but was specifically designed to complement the existing sections of the MBfP manual. This information may be found in Appendix 3.

The technical information booklet "Neonatal calf diarrhoea in suckler beef herds" is a comprehensive and current resource for veterinarians and advisers working in the suckler beef industry. It has a brief introduction that covers the aetiology of NCD and then four major sections on prevention, investigation, control and treatment. The technical information has been aligned with and referenced to the MBfP recommendations where applicable. Each chapter contains a list of key references for further reading, and the confidence in the research behind the recommendations is detailed for each major section. Please see Appendix 5 for the full document.

The second product for veterinarians and advisers is the "Information pack CD". This contains

- PDFs of the Tips & Tools
- the "Neonatal calf diarrhoea in suckler beef herds" technical reference

- virtual PowerPoint presentations[†] of all the talks at the MLA sponsored “Calf scour day” at the ACV Barossa conference
- the written papers from the MLA sponsored “Calf scour day”
- a video of a best practice calf post mortem technique that was demonstrated at the ACV field day
- the technical tools that were developed to support the technical reference

The technical tools may be found in Appendix 6 and are available to veterinarians and other interested persons on the information pack CD or on the ACV website. A comprehensive investigation protocol was developed to ensure an industry standard in best practice approach to a NCD outbreak. It contains 8 sections covering farm details; an enterprise overview; the history of the problem on the farm; the history of the current outbreak; an assessment of risk factors; recommendations for control; management of affected calves and diagnostic tests. Major findings are highlighted in a one page summary sheet at the front of the document. The CD also contains a.

The “Cost of NCD calculation tool” was designed to use in conjunction with the NCD investigation protocol, and the information required by the calculator is collected in this document. The tool is a spreadsheet designed to calculate the cost of an NCD outbreak in a suckler beef herd. This can either be retrospective or prospective. To calculate the potential costs once an outbreak has commenced, it should be assumed that the current mortality rate and % of calves treated are likely to remain the same. The cost of the outbreak can be compared with the cost of diagnostic strategies and used to calculate the cost-benefit of a vaccination strategy where indicated.

A management planner was also included to help veterinarians and producers set dates for major preventive management strategies in line with the proposed start of calving.

For the busy practitioner the Information CD also contains the “Veterinary car kit”: links to a series of documents that would be useful to print out and have in the car. It includes a document with just the tables from the “Neonatal calf diarrhoea in suckler beef herds” technical reference that pertain to field diagnosis and treatment. These are condensed onto 6 sheets as a handy reference on farm.

Major sections of the literature review produced in phase 2 were rewritten into 5 papers for submission to the Australian Veterinary Journal for publication. The papers are entitled “Aetiological agents associated with neonatal calf diarrhoea – epidemiology, pathology and diagnosis”, “Risk factors associated with neonatal calf diarrhoea in suckler beef herds”, “Prevention and control of neonatal calf diarrhoea in pasture-based suckler beef calves”, “Treatment of neonatal calf diarrhoea” and “Evaluation of failure of passive transfer (FPT) in calves”.

4.3 Promoting the material to veterinarians and producers to ensure maximum uptake at an industry level

The technical document and Tips & Tools were launched at the MLA sponsored “Calf scour day” at the successful Australian Cattle Veterinarians (ACV) conference in the Barossa in October 2005. Meat and Livestock Australia sponsored a day at the conference that focused on NCD and promoted the technical manual and tools. The keynote speaker was Professor Peter Constable from University of Illinois at Urbana-Champaign, an internationally recognised authority on the subject. He was supported by Australian veterinarians with considerable experience of NCD, notably Professor John

[†] The PowerPoint presentation accompanied by the sound recorded on the day

House from University of Sydney and Dr Rod Manning, a veterinarian and beef producer and a member of the technical reference group. Over 130 delegates attended the conference. At the field day on the second day of the conference there were two sessions relevant to calf scours, the first on post mortem techniques in the calf and the second on “in-house” laboratory diagnostics. The program from the conference is in Appendix 2

The Tips & Tools were featured on the MLA web site prior to this conference, and promoted to veterinarians attending the conference. They were also featured in the summer 05/06 edition of *Prograzier* with a supporting article about a property where a calf scour problem had been solved by changing the management of calving cows.

In December 05 the veterinary technical information booklet was distributed to all full members of the ACV that did not attend the conference. The Information pack CD and two audio CDs were distributed to all current members of the ACV in March 2006. The Tips & Tools were featured on the MLA website from September – December 05 and are currently available from that site. Electronic copies have been put on the 2nd edition of the MBfP CD and they have been distributed at the MBfP 2006 regional expos. The technical manual and tools are available from the ACV website; www.acv.com.au.

5 Success in Achieving Objectives

This project has successfully achieved all its objectives. The workshop held with key beef production veterinarians, agricultural advisers and producers involved in the “More Beef from Pastures” program was extremely productive and aligned the project outcomes with current industry thinking and practices. Clear direction was given for the content and presentation of the extension material. The material was then rewritten into 2 Tips & Tools and a comprehensive technical manual, submitted to a technical writer and printed in time for its launch at the ACV conference in early October. The technical information booklet “Neonatal calf diarrhoea in suckler beef herds” together with the accompanying tools provides both scientific and practical information for veterinarians, and the scientific papers will provide a review of current scientific thinking when they are published. The feedback from both veterinarians and producers on the material has been extremely positive, although no formal evaluation has been undertaken.

Although the information produced for the MBfP manual will not be utilised until the manual is reprinted, several MBfP presenters have incorporated some of the material into their producer presentations. The Tips & Tools are written in a modified HACCP style similar to the MBfP manual and refer to the relevant sections of the MBfP manual. The availability of producer information has also resulted in several farmer information days on the topic in Victoria.

The “Calf scour day” at the ACV conference was extremely successful with over 130 delegates attending. The program was based around the technical manual, with background presentations on pathology and aetiology of NCD and on the history the project. There was also a series of case histories presented by local veterinarians.

6 Impact on Meat and Livestock Industry – now & in five years time

Data from a recent survey has indicated that 16% of beef producers consider calf scours to be either a significant or very significant issue on their property.[3] For at least 20 years there has been little material produced on the prevention and control of NCD in suckler beef enterprises in Australia and consequently affected producers have been frustrated by the lack of consistent and practical advice. Although information available from overseas was relevant to Australia the concepts had not been adapted for Australian beef enterprises.

This project has produced current scientific and practical information on the prevention, control, diagnosis and treatment of NCD for veterinarians, farm advisers and producers. By producing interrelated information at both the producer and the technical level, it is hoped that this will provide a consistent approach to NCD in the Australian suckler beef industry and maximise the uptake by producers. Unfortunately this information was not available for the extensive outbreak of NCD that occurred in New South Wales in September 2005, but this outbreak did increase interest in the project material and is likely to result in rapid uptake by concerned producers.

Whilst it is recognised that for many enterprises some preventive measures may not be cost-effective, this project has provided the tools for producers and their advisers to assess the impact of NCD on their property and make effective decisions on possible management strategies. Therefore at an individual farm level this project has the potential to have significant impact within the next 12 months.

The impact of this project in five years time will depend on the level of further R&D in this area. Whilst there may be some changes in current scientific thinking, it is unlikely there will be significant changes in either the fundamental management strategies proposed or the advice on control and treatment. If the material is still available and is well promoted in the next few years to ensure industry uptake and respect, it will continue to have an impact at an individual producer level. It is possible that diagnostic techniques will change as more laboratories offer technologies such as PCR. However modern electronic technology and the current producer use of the Internet means that it is possible to revise and update the information every three to five years.

This project has provided basic management principles for minimising NCD in suckler beef enterprises. It is recognised that these have not been evaluated in Australian conditions and consequently to maximise the impact of this project it would be useful to assess these in a well-defined prospective epidemiological study. This would provide robust advice on how to minimise the impact of this disease and have significant impact into the future.

7 Conclusions and Recommendations

This project has produced current scientific and practical information on the prevention, control, diagnosis and treatment of NCD for veterinarians, farm advisers and producers. Prior to this project there was little or no Australian material available to suckler beef enterprises on this subject.

To ensure maximum ongoing impact it is important that this material continues to be available and promoted, specifically to producers through the MBfP project. The material should also be revised

and updated at least every 5 years. To ensure consistency of information and further promote uptake it would be useful to prepare standard extension material that can be utilised by MBfP trainers.

Whilst the information produced has been based on current scientific knowledge and a thorough understanding of the epidemiology of the disease, it has not been evaluated under Australian conditions. Increased knowledge of the epidemiology of NCD in southern beef suckler enterprises is essential and has been recommended in the previous 2 phases of this project. A thorough epidemiological investigation of an appropriately determined number of scours outbreaks should be supported. A case control study spanning multiple regions and different management systems and environmental conditions would be appropriate.

8 Bibliography

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2. Gunn, A.A., *Calf scours in southern Australia*; in Final report AHW.057 (phase 1). 2003, Meat & Livestock Australia.
3. Sloane, R., *Calf Scours: A survey of producers in southern Australia*, in Final report AHW. 129. 2006, Meat & Livestock Australia.

9 Appendices

9.1 Appendix 1: Report from the reference group workshop

See attached

9.2 Appendix 2: Program from the ACV Barossa Conference October 06

See attached

9.3 Appendix 3: Additional material for insertion into the MBfP manual

See attached

9.4 Appendix 4: Tips & Tools

9.4.1 Preventing Calf Scours in Suckler beef herds

9.4.2 Treating Calf Scours

9.4.3 What is calf scours

See attached

9.5 Appendix 5: “Neonatal calf diarrhoea in suckler beef enterprises” technical reference

See attached

9.6 Appendix 6: Additional tools for veterinarians

9.6.1 Neonatal Calf Diarrhoea Investigation Protocol

9.6.2 Cost of NCD calculation tool

9.6.3 Herd Management planner

9.6.4 Useful tables from the “Neonatal calf diarrhoea in suckler beef herds” technical reference

See attached