



final report

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Prepared by: Dr Ben Madin & Dr Edwina Leslie
Ausvet Pty Ltd

Contributions by: Dr Nigel Perkins, University of Queensland
Dr Jessica Privett, Sydney

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Update of the Veterinary Handbook for Cattle, Sheep & Goats

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Abstract

In 2012, Meat and Livestock Australia / LiveCorp as part of LIV.0278 published the Veterinary Handbook for the Live Export Industry in bound paper format, and in 2014 as a website and a smartphone app, rebranded as the Veterinary Handbook for Cattle, Sheep and Goats. To remain relevant, it is important that the information contained in the handbook is kept up to date with contemporary knowledge. In addition, feedback from the original product included a request for more images of disease and of procedures.

This project addressed this by undertaking a comprehensive review of the current materials, through a literature review of the diseases and some updating of materials (such as reporting forms). It is noted that the focus has remained on diseases relevant to the live export trade. In addition, a secure site for uploading, moderating and sharing images for use in this or future publications was developed and is available to be used by industry.

Executive summary

The Veterinary handbook for the live export industry was produced in mid-2012 as the final product of LIV.0278. It was a ring-bound, 295 A5 page printed book, using paper and printing technology that was water resistant so that veterinarians could carry the handbook with them when undertaking field activities. In May 2014, a web-mounted version of the material was released (www.veterinaryhandbook.com.au), in conjunction with downloadable apps on both iOS and android platforms. The title of the handbook was changed in these products to Veterinary Handbook for Cattle, Sheep and Goats, with an accompanying subtitle of Animal health information for veterinarians and stock people in the livestock industries, to reflect the nature of the content being focused on conditions known to occur in livestock being exported from Australia.

This project was an opportunity to review and update the list of diseases for cattle, sheep & goats being exported, review and revise the general content with respect to disease investigation during the livestock export process, and generally improve the utility of the handbook.

To assist this, it was intended to compile an image library for the livestock export industry. Due to the sensitive nature of the industry, particularly with regard to livestock morbidity and mortality, the intention was to canvas those involved in the industry to supply images, which would be moderated by a person experienced in the livestock export industry (eg an accredited veterinarian, pathologist or researcher). To do this a facility was built allowing the upload and submission of images, along with a description of the image and the authorisation of the photographer to use the image. A moderator can then approve suitable images for use in Live export projects or for the handbook. Although a number of potential contributors were approached to submit images, at this stage none have uploaded any images. It is possible that most potential contributors are concerned about the requirement to assign the image rights to a third party.

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1 Background

The Veterinary handbook for the live export industry was produced in mid-2012 as the final product of LIV.0278, based on the handbook produced for LIV.0252 for cattle. It was a ring-bound, 295 A5 page printed book, using paper and printing technology that was water resistant so that veterinarians could carry the handbook with them when undertaking field activities. In May 2014, a web-mounted version of the material was released (www.veterinaryhandbook.com.au), in conjunction with downloadable apps on both iOS and android platforms. The title of the handbook was changed in these products to Veterinary Handbook for Cattle, Sheep and Goats, with an accompanying subtitle of Animal health information for veterinarians and stock people in the livestock industries, to reflect the nature of the content being focused on conditions known to occur in livestock being exported from Australia.

The original handbook was focussed on the conditions being researched in the LIV.0252 project “Identifying causes of mortality in cattle exported to the Middle East”. As such, much of the original material was specific to cattle (in particular respiratory disease). Although much of this was subsequently changed as part of the LIV.0278 project, there were still some quite specific areas (such as the disease reporting form) and diseases. In addition, as the resource is now a public one, it was necessary to ensure that the information available online was current. While the online resource has been marketed as a resource for the broader industry, it is currently funded by the live export industry. While the title of the app and web material provides an impression that the content may be relevant to all livestock, the introduction makes it clear that the content is focused on conditions known to occur in livestock being exported from Australia to other countries.

With the online and app presence, and the relatively straightforward capacity to extract copy for printing, the current format provides a robust base for supplying information targeted at onboard vets and stockmen. This update keeps it relevant.

One element of feedback from the original project was the lack of images. Images of diseases may be helpful in allowing veterinarians and stock people to diagnose conditions in animals under their care. Images may include pictures of disease in live animals (ringworm lesions for example) or pictures of post mortem changes in animals that have died of particular diseases (pneumonia).

2 Project objectives

1. Review and update the list of diseases and syndromes known to occur in livestock (sheep, goats, beef cattle and dairy cattle) being exported from Australia to other countries.
2. For each disease identified through the first Objective, complete or review content related to syndrome, signs, description, diagnosis, treatment and prevention.
3. Complete a framework that can be used for sourcing images from interested parties. The framework is intended to define what images are of value, and additional information on how images may be provided (file types and sizes) and ancillary information (metadata).
4. Compile a library of images with defined metadata for adding to the website and apps.

3 Methodology

3.1 Content review

3.1.1 Review of current content

A review of the list of diseases included in the current Veterinary Handbook was undertaken to determine whether any additional diseases should be added to the list, or whether any are superfluous. Where a new disease was identified, content was provided covering disease description, diagnosis, treatment and prevention. Existing content was reviewed with a focus on recent developments or changes eg in treatments that may be being used in export livestock.

In addition, the disease investigation section was reviewed, and a revised disease reporting form developed.

3.1.2 Review of content by experts in ruminant medicine

An expert in ruminant medicine was asked to oversee a review of the final draft content to ensure that all content is consistent with current international knowledge and standards for veterinarians.

3.2 Image upload facility

Images are intended to add to the ability of veterinarians and stock people to use the Veterinary Handbook to help to diagnose and control conditions in livestock. Images are intended to focus mainly on diagnosis and will be of typical lesions for each condition, either in live animals or at gross post mortem.

The intention of the system is that received images may be reviewed, the associated metadata edited where required and compiled into a library file sorted by disease name (using diseases listed in the Veterinary Handbook). This step is intended to ensure that only appropriate images are shared through this site, and that any metadata associated with the images is appropriate and accurate.

3.2.1 Process

1. A web-portal was developed to allow interested parties to upload images of animals and animal pathology to complement the Veterinary Handbook material. The image portal is hosted in the same cloud site as the shipboard mortality database, and is available at images.livexdb.com. Access is password protected, and users have the ability to see images that they have uploaded, and any images uploaded by other users that have been approved by moderators.
2. Communication and the web-portal link was sent by email to a number of parties associated with the industry asking for submission of images. Accompanying communication material will document image types (file types, resolution), associated metadata and how to upload images.
3. In addition, a number of experts were approached to take on the role of moderating images.

3.3 Report

The revised veterinary handbook was made live in June 2017. As most editing was undertaken on the custom CMS on which the system is hosted, no word copy was completed, however it can be extracted from the system on request from Newton-Green Technologies.

4 Results

4.1 Content review

A comprehensive content review was undertaken of the Disease section and the management and disease investigation sections of the handbook.

4.1.1 Disease Section

In the disease section, edits and updates were made on 113 pages, ranging from updates and additional information to minor grammatical corrections.

Two new disease entries were included (Grass Tetany and Caprine Arthritis and Encephalitis Virus), and the Woody Tongue and Actinobacillosis pages were merged.

A number of changes were also made to the disease links section and syndrome links updated.

4.1.2 Disease Management Section

In the disease management content, edits and updates were made on 41 pages, ranging from updates and additional information to minor grammatical corrections.

A number of new pages were added, including a new section on necropsy findings for specific conditions:

- Bovine Respiratory Disease (BRD)
- Heat stress
- Musculoskeletal Injury
- Ketosis
- Septicaemia

Much of this information was provided by Dr Jo Moore and is reproduced with acknowledgement.

Further detail was also added on:

- How to Choose, Sharpen and Maintain Autopsy Knives
- New Mortality Report Form

The knife sharpening information was generously provided by Dr Tristan Jubb and is reproduced with acknowledgement.

The Mortality Report (see appendix 1) was reworked to provide a stepped approach, and a level of detail which should aid both veterinarians and stockpersons. In the new design the first page is

intended to be suitable for an investigation where in-depth sampling was impractical, and focuses on information of a clinical and management nature. It might be presumed that such a form would be applicable to all deaths during the live export process, rather than risk not collecting any data. The second page provides a pro-forma for recording gross necropsy findings. The third page is only likely to be of value in feedlots pre- and post-export, however on vessels where specific arrangements have been made for sample collection and subsequent analysis it would be applicable.

The form is provided in a paper format, however the design has been informed by an understanding of digital user experience with the intention that this would be suitable for adoption to portable devices.

4.1.3 Expert review

During the project proposal stage an expert in ruminant medicine was approached about reviewing the revised material. This person was unable to be contacted during the project, and the limited resources made it difficult to engage an alternative person.

4.2 Image upload facility

The image upload facility is a web-based front end with a database driven backend to store details of images, and manage user access. Images in their raw form are stored in AWS S3 object storage and replicated across three data centres, providing a very high level of security and reliability. At the time of submission images are ‘thumb-nailed’ for efficiency into a range of standard sizes. The image metadata storage is backed up daily. All data is stored within Australia. A separate part of the interface allows for suitably authorised persons to create and update user details, and bestow moderator privileges.

The system allows users to view their prior submissions and add new ones. Users can also view the existing ‘approved’ images from all users.

Initially contact with some potential submitters indicated some reluctance to ‘give’ to MLA photos for two reasons. One was concerns about security and who would see some images, and how they might be misrepresented. It is possible that the mechanisms for this were not properly addressed in the resources available for the project. The other concern related to a sense that images form part of their professional library and may have personal and professional value which they were assigning to Meat and Livestock Australia without due recognition or compensation. In an attempt to address this, the terms of the submission system were amended to licence contributions under a ‘Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License’¹. This licence provides a framework to ensure that at the least the images will always be attributed to the contributor, and that no-one else can profit from the image or alter it.

The completed image library system remains available, along with a draft framework providing advice on how new images may be submitted in the future and received, assessed and added to the website or app if appropriate.

¹ <http://creativecommons.org/licenses/by-nc-sa/4.0/>

5 Discussion

5.1 Role of the Veterinary Handbook

The Veterinary Handbook represents a substantial body of knowledge, and as such is a highly valuable resource, likely to be able to be updated and remain useful to the live export industry for a long time. However, it could be argued that it is slightly under-delivering, due to a lack of clarity around its role. To date it has been wholly funded through Live Export Programme funding, but it has been to some extent marketed as a general veterinary resource for Cattle, Sheep and Goats. The content is clearly inadequate for this broader role, as there are a number of diseases which have little relevance to live export and have not been included, some which would have relevance if the handbook was being used more in-market (see 6.1 below) and a number of issues (such as notifiable disease reporting) which would be important for a national comprehensive manual. It will be important to make some decisions about how to proceed in this respect, but the current base would provide a solid start for general levy funding to improve on.

5.2 Building an image library

A dedicated resource has been created and tested for capture and managed sharing of images related to the live export trade, however to date there has been little enthusiasm to adopt it. A number of issues related to ownership and potential exploitation presumably need to be further addressed. The current resource would however be suitable for use in any further projects, although since completion a number of ideas for improvement have been suggested by some users, including categorisation of images and a collection style of system, where images related to a topic could be grouped and discussed.

6 Conclusions/recommendations

6.1 Continuous review and improvement required

While the handbook is a valuable contemporary resource, it requires an ongoing commitment to review and updating. We would recommend that a mechanism is put into place to support this on a regular (if not continuous) basis. A simple implementation might be to provide a feedback mechanism to the hosting company, such that any user with suggestions could submit them. A further process would then fund allocating these suggestions to an expert panel (or at least a convenor) to assess, and if important implement. This might also require funding for a regular (or semi-regular) update cycle for the app, and notification system within the app. It would also raise questions about the role of a printed bound copy and how often it should be updated. We would still see a role for the printed, water-resistant, batteries not required copies, for example ensuring one was available in each registered premise, on each vessel and in-market facilities (which might also require addition of some diseases with market specific impact, such as Peste des petits ruminants).

6.2 Clarity over image ownership and purpose

The current image upload facility raised questions over the fate of uploaded images – who owned the rights to them, and how they might be used. This might be somewhere between a legal and a philosophical argument, but it is an industry resource, and the onus is on the industry to take advantage of the opportunity to build an image library to use as required. For example, it could be a requirement of projects to include any images in reports in the image library in a high quality format.

In addition, some modifications to the system to allow (for example) comments by multiple moderators or subject matter experts to be included would also potentially improve the quality of the 'shared' images.

7 Key messages

7.1 Resource updated and some known errors fixed

This project has ensured the ongoing value of the Veterinary Handbook and made some updates to improve its value for the live export industry and the broader animal production industry.

7.2 Facility available for secure uploading and review of images

There is now a secure, industry owned and controlled facility for uploaded images. This provides capacity for development of a better live export image library for use in training, research and promotion activities.

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Smith BP (2014) 'Large Animal Internal Medicine (5th edn)'. Mosby Elsevier, St Louis.

Smith MC and Sherman DM (2009) 'Goat Medicine', Wiley-Blackwell.

A number of additional online resources were also consulted for some material:

NSW Department of Primary Industries: <http://www.dpi.nsw.gov.au/content/agriculture/livestock>

Department of Agriculture and Food Western Australia <https://www.agric.wa.gov.au/>

Department of Agriculture and Fisheries, Queensland. <https://www.daf.qld.gov.au/animal-industries/animal-health-and-diseases>

VEIN Sheep Health & Production. <http://vein.vetsci.usyd.edu.au/sheephealth/>

9 Appendix

9.1 Revised Mortality report

9.1.1 Overview

The mortality report form was originally designed for the W.LIV.252 project, with a focus on use for follow up investigations into mortality where respiratory disease was the primary interest. The form was redesigned to increase its suitability for general investigation, and for use in pre-embarkation facilities, on-board vessels and in-market.

In addition, layout was fixed to improve space and make it easier to add data quickly. The form design is now a three page form, where the first page is all that would be required for a quick data submission with no necropsy or samples taken. The second page covers reporting of necropsy data, where in the most common case samples will not be taken due to limited capacity for further analysis (ie on-board or in-market). These two pages could be copied back to back where no sample collection was envisaged. The final page is a generic form for sample collection related to the most common conditions encountered during live export preparation and delivery. It is likely that if protocols have been established to allow samples to be returned to Australia for testing, or into local facilities in the destination that a more specific laboratory submission form is more likely to be used.

The new form is attached below.

Mortality Report**Case #** _____**Date:** ____/____/20____

(to be completed for all dead animals including those not necropsied)

Tentative Diagnosis: _____**Location**

Ship/Feedlot: _____

Deck: _____ Hold: _____ Lane: _____ Pen: _____ (Usual location)

Died in Hospital Pen: Y / N

Comments: _____

Animal Characteristics

ID – Eartag: _____ ID – other: _____

Age (Months): _____ Sex: M / F Breed: _____

Weight: _____ kg Condition Score (1 emaciated – 5 fat): _____

Other: _____

Clinical signs/Syndrome displayed before death _____

Other animals with same clinical signs/syndrome: Y / N How many? _____

Treatments given: _____

Predisposing risk factors or event (tick/cross-out)

Animal factors	Management factors	Environmental factors
Age	Stocking rate	Weather
Breed	Access to feed / water	Hold conditions
Weight	Quality of feed / water	Ventilation
Condition Score	Quantity of feed / water	Air quality (pellet dust, fumes)
Size (cf pen mates)	Deck washing	Floor surfaces
Coat or Wool length	Grazing system	Ground conditions
Pregnancy	Introductions of new animals	Shelter / Shade
Lactation	Handling system	Air temperature
Temperament	Transportation	Humidity
Vaccination	Treatments given	Ectoparasites eg. ticks
Origin	Other:	Other:
Other:		

Comments: _____

Mortality Report

Case # _____

Date: ____/____/20____

Necropsy findings

Estimated time between death and necropsy: _____ hours

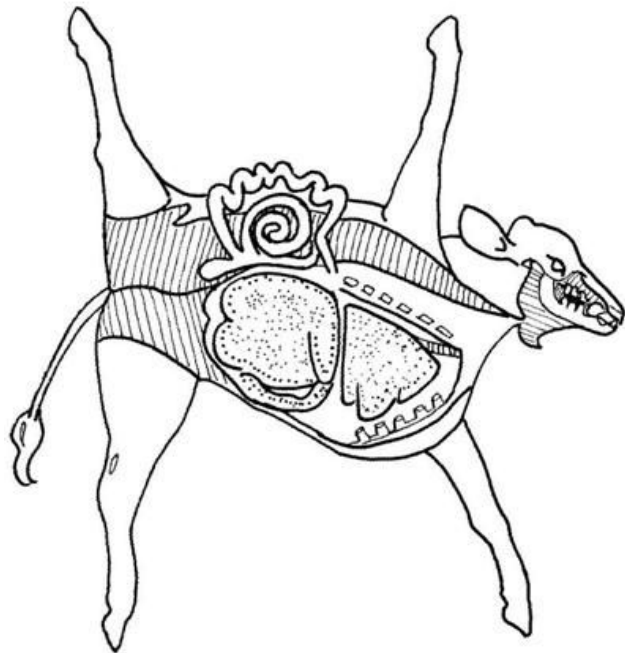
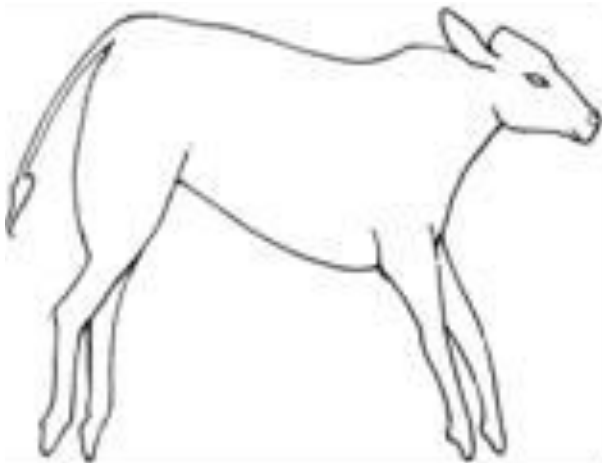
Core body temp: _____°C

Ambient temp: _____°C

Urine dipstick: ketones _____

Rumen fluid dipstick: pH _____

*Circle areas of pathology on the images



Description of gross necropsy findings _____

Mortality Report
Necropsy Samples Collected

Case # _____

Date: ____/____/20____

Formalin-fixed tissues

Targeted protocol

Additional samples for comprehensive protocol

- | | | | |
|--|--------------------------|---------------------------------|--------------------------|
| Lung (normal & affected) | <input type="checkbox"/> | Skeletal muscle | <input type="checkbox"/> |
| Trachea (just proximal to bifurcation) | <input type="checkbox"/> | Spleen | <input type="checkbox"/> |
| Heart | <input type="checkbox"/> | Adrenal gland | <input type="checkbox"/> |
| Liver | <input type="checkbox"/> | Mesenteric lymph node | <input type="checkbox"/> |
| Kidney | <input type="checkbox"/> | Brainstem and spinal cord at C1 | <input type="checkbox"/> |
| Ileo-caecal junction | <input type="checkbox"/> | Pancreas | <input type="checkbox"/> |
| Ventral rumen (wall & pillar) | <input type="checkbox"/> | Reticulum | <input type="checkbox"/> |
| Other- | <input type="checkbox"/> | Abomasum | <input type="checkbox"/> |
| Other- | <input type="checkbox"/> | Large Intestine | <input type="checkbox"/> |
| Other- | <input type="checkbox"/> | Gall bladder | <input type="checkbox"/> |

Microbiology/molecular biology

Swab in viral transport media: Nasal Faecal Lung-normal Lung affected

Other _____

Toxicology

Contents of reticulum Fresh kidney Fresh liver

Other _____

Clinical pathology and biochemistry

Pre-mortem blood Aqueous/Vitreous humour CSF

Other _____