



final report

Project code: B.NBP.0378
Prepared by: Nigel Perkins and Debby Cousins
Australian Biosecurity CRC
Date published: August 2007
ISBN: 9781740362610

PUBLISHED BY
Meat & Livestock Australia Limited
Locked Bag 991
NORTH SYDNEY NSW 2059

Bovine syndromic surveillance system review workshop

Meat & Livestock Australia acknowledges the matching funds provided by the Australian Government to support the research and development detailed in this publication.

This publication is published by Meat & Livestock Australia Limited ABN 39 081 678 364 (MLA). Care is taken to ensure the accuracy of the information contained in this publication. However MLA cannot accept responsibility for the accuracy or completeness of the information or opinions contained in the publication. You should make your own enquiries before making decisions concerning your interests. Reproduction in whole or in part of this publication is prohibited without prior written consent of MLA.

Executive summary

The Remote Area Surveillance Workshop held at the Bardon Centre in Queensland 5-6 June 2007 brought together a wide range of delegates with an interest in remote area surveillance, including people representing state and territory governments, federal government, the livestock industry, livestock producers, agriculture consultants, universities, SMEs in livestock health & epidemiology, and the AB-CRC. The delegates' cross-sector experience brought enhanced understanding of the extensive beef cattle industry to this workshop. The workshop was supported by MLA, AHA and the AB-CRC and provided a unique opportunity to consider stakeholder views on remote area surveillance and the potential role of the Bovine Syndromic Surveillance System (BOSSS) at both the producer and state government level.

Presentations were made on remote area and national surveillance systems, research achievements and the implementation challenges of BOSSS (which was developed as a PhD project funded by MLA, AHA and the AB-CRC), and these were further considered by group activity sessions.

The deliverables of the workshop were elaborated from group activities in response to a series of focus questions. The recommendations coming out of the workshop were as follows:

Recommendation 1

That the AB-CRC liaises with relevant state/territory departments and remote area producers, including large corporate producers with an interest, to develop options for state/territory department personnel to implement and test BOSSS as a tool for collecting and managing remote surveillance information including consideration of:

- i) modifications or enhancements to BOSSS to make it more functional or to integrate it better with existing systems;
- ii) planning for test implementation in multiple states/territories including resource requirements, training, implementation, data collection & analysis and reporting.

Recommendation 2

That the AB-CRC (and/or state/territory departments) continue to consult with producers and other potential industry users of the system including large corporate producers with an interest and university personnel, to encourage implementation and use of BOSSS by innovators in the industry and other groups interested in participating.

Recommendation 3

That the AB-CRC builds on identified strengths for BOSSS in the area of syndromic pattern recognition and as a training and awareness tool for a variety of users.

Recommendation 4

That the AB-CRC incorporate findings from the final report for the AB-CRC Application and Linkage project led by Professor Michael McGowan. This project has involved implementation of BOSSS in a university teaching program and in private practices servicing beef producers in QLD. Findings are expected to be relevant to Recommendations 1, 2 and 3 and to further discussions with potential BOSSS-users.

Recommendation 5

That the AB-CRC waits on the final report from the mobile platform project and for developments in remote internet before considering options for mobile and producer web installation. The exception to this is the committed remote innovator who is willing to invest in Internet access independently.

Recommendation 6

That the AB-CRC communicates with relevant state/territory departments and interested remote area producers, including those in the large corporate companies, in relation to syndromic surveillance methods, implementation outcomes and new information coming from AB-CRC funded research projects.

Overview

It was evident from the formal feedback and associated comments supplied at the workshop that this was a very productive meeting. We believe it contributed significantly to identifying the challenges to remote area surveillance in Australia, and found agreement on planning the way forward so that the future of our livestock industries and Australia's trade is enhanced.

Workshop Steering Committee:

Deb Cousins, Australian Biosecurity CRC

Wayne Hall, Meat and Livestock Australia

Nigel Perkins, Australian Biosecurity CRC

Stephen Prowse, Australian Biosecurity CRC

Ian Whan, Alliance Resource Economics

Acknowledgements

The Steering Committee is grateful for the financial support and in-kind contributions from:

Meat and Livestock Australia

Animal Health Australia

Australian Biosecurity CRC

and all Workshop speakers, chairpersons and participants.

Table of Contents

Executive summary	2
Workshop overview	6
Remote area surveillance needs	6
Research and implementation	9
Afternoon workshop activities	10
Recommendations	14
Evaluation	15
Proceedings	19
Welcome	19
Program	20
Background	21
Objectives and outcomes	22
Abstracts	23
List of PowerPoint presentations	28
Biographic details of presenter	29
Delegate list	31
Evaluation sheet	33

Workshop overview

Effective surveillance is essential for early detection of new and exotic diseases, management of disease outbreaks, and endemic disease control. A number of critical gaps have been identified in Australia's surveillance capacity including the provision of reliable surveillance data where none currently exists; the gathering of new & existing data into readily useable and broadly accessible information systems; and the provision of tools for the analysis of surveillance data.

In 2003, Meat and Livestock Australia (MLA), and the Northern Pastoral Companies Group through Animal Health Australia (AHA), together with the Australian Biosecurity CRC for Emerging Infectious Disease (AB-CRC) sponsored research into the development of a *Bovine Syndromic Surveillance System (BOSS)* specifically aimed at remote area surveillance.

A workshop was convened at the Bardon centre, Brisbane on 5-6 June 2007 to consider stakeholder views on remote area surveillance and assess the potential of BOSS as a remote area surveillance tool. This workshop was supported by MLA, AHA and the AB-CRC and was attended by a total of 32 delegates (see Delegates List) representing state and territory governments, federal government, the livestock industry, livestock producers (Kidman Holdings, North Australian Pastoral Company, Wolverson Pastoral Co, Australian Country Choice, McDonald Holdings, Georgina Pastoral Station, North Australia Beef Research Council, Katherine Primary Industries Advisory Council), agriculture consultants, universities, SMEs in livestock health & epidemiology, and the AB-CRC.

The objectives of the workshop were broadly to:

- discuss the needs and opportunities of remote area surveillance in Australia,
- update and inform delegates on the BOSS research, and as well as the progress to date on the implementation of BOSS;
- discuss the challenges associated with use of such systems with a view to finding a way forward.

It was recognised that a tool such as BOSS might have different applications for producers and state based organisations that collect surveillance data.

The workshop consisted of a series of presentations and general discussion sessions, followed by group activities that addressed a number of focus questions. The following is a summary of the major outputs of the workshop sessions as well as the final recommendations.

Remote area surveillance needs

The day started with two presentations on the broader topic of surveillance that were intended to provide background information and context for the workshop discussion.

- Remote area surveillance - why bother? (Dr Angus Cameron)
- National trends in surveillance - including remote area surveillance (Dr Kevin deWitte)

Some discussion occurred following these presentations focusing on:

- the meaning of the word *remote*
 - distance or access to services
 - far north vs any area that is distant to services

- far north has different risk of disease entry
 - unmanaged bush and associated stock
- the relative importance of surveillance for exotic vs endemic diseases
- the difference between clinical disease evidence vs serological evidence

Focus Question 1: Identification of valued outcomes of remote area surveillance – what should surveillance deliver?

A brainstorming session provided individual answers to this question, which was aimed at finding out what the stakeholders thought remote area should deliver to them. Responses to this focus question were sorted into a framework (see Figure 1), that served as a reference later in the day when the group considered what BOSSS might be capable of delivering.

Responses recorded

- Certainty of trade (freedom from disease)
- Confidence in clean green product
- Profitability
- Impact on production and markets
- Market access and international credibility
- Certainty of markets
- Information must be valuable to supplier
- Early detection – best case scenario – ability to continue operations even if a disease is found (compartmentalization) continuing to operate in the face of disease
 - Exotic, new and emerging, and emergency disease (early detection)
 - Animal health and public health reasons
- Science based data set (information) to support many of the points
- Endemic disease patterns
- Heads up on emerging disease
- Improved communication between stakeholders
- Provide what the stakeholders want (accurate and valid information)
- Confirmation of disease (and implementation of disease programs if found – an appropriate response)
- Speed of detection/discovery, speed of response, speed of recovery
- Systems for surveillance (resources – machinery, sharing of cost burden) high quality that is continuously improved)
- Advanced warning system with confidence
- Screening system to improve efficiency
- Raising knowledge and awareness at the producer level (and others) but producers in particular
- Economic advantage
- Detection of abnormalities that affect markets and trade (including)
- Consistency in reporting (data quality, validity, coherence, consistency etc)

These responses were sorted to generate the following framework

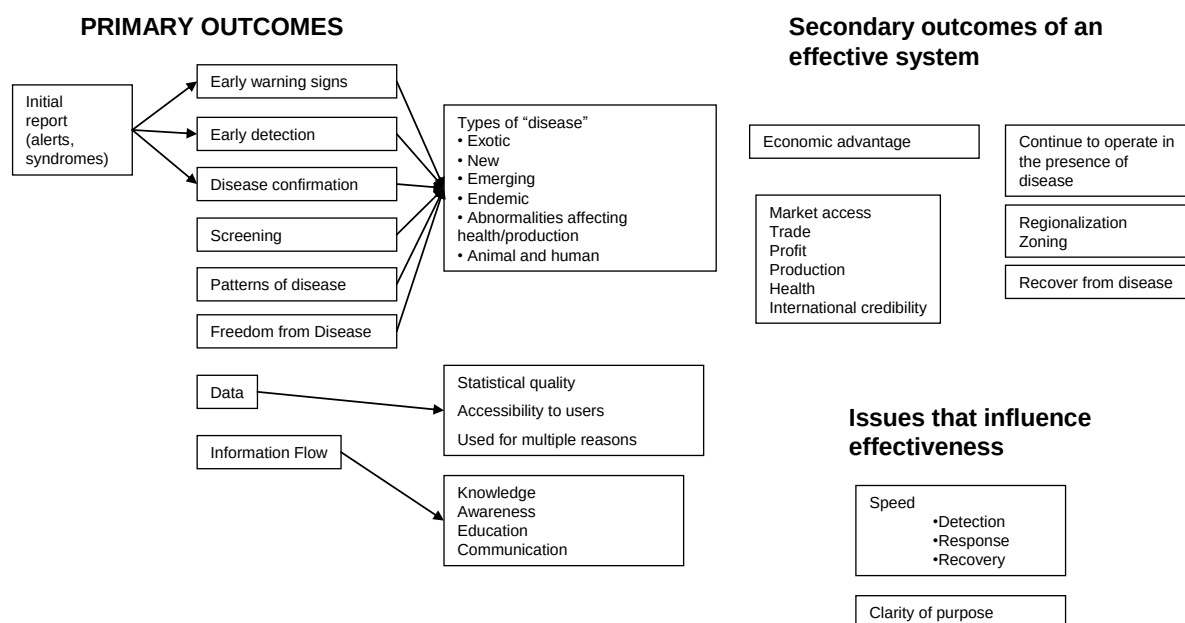


Figure 1: Diagrammatic summary of collective responses to Focus Question 1.

An attempt was made to sort the responses into primary outcomes, other outcomes and issues that were not really surveillance outcomes. One of the reasons for doing this was to separate out those primary or immediate outcomes of a surveillance system because these were considered likely to be most relevant to any assessment of capability of BOSSS to deliver surveillance outcomes.

Some of the responses to the focus question were determined not to be outcomes but were better described as related issues concerning functionality or effectiveness.

Many of the primary outcomes identified in this session were associated with detection or diagnosis of disease. The word disease was interpreted broadly and was considered to include for example suboptimal levels of health and productivity i.e. to not be limited to clinical disease caused by pathogens or toxins.

An effective surveillance system was also expected to serve as a source of statistically valid data for stakeholders to use for a variety of purposes and to contribute to information flows again for a variety of stakeholder uses.

If a remote surveillance system was functioning effectively and delivering the primary outcomes, then a number of secondary benefits or outcomes could be expected to occur as well and these included effects on trade, production, profitability and other measures. In addition the group identified the ability to rapidly recover from a disease outbreak or continue to operate in the face of a disease (including ability to declare zones or regions that may be free) as important outcomes of surveillance.

Research and implementation

Eight short presentations were delivered on different aspects of BOSSS. These included:

Presentations 1-3. BOSSS Research

- BOSSS: surveillance features, capabilities and limitations (Dr Richard Shephard)
- Porting BOSSS to a mobile phone - real prototype to be shown (Dr Rafael Calvo)
- Remote area surveillance, BOSSS and adoption challenges (Dr Stephen Prowse)

Presentations 4-8 BOSSS Implementation

- Producer Experiences with Remote Area Surveillance (Ian Whan, Jon Cobb, Emma Jackson)
- Remote Area Surveillance – The Queensland Perspective (Dr Karen Skelton)
- Preliminary observations of the use of BOSSS in private rural veterinary practice and integration into a clinical veterinary training programme (Prof Michael McGowan)

Discussion points following these presentations included the following:

- Relevance of the Frawley Report¹ which reviewed rural veterinary services and made a number of recommendations related to surveillance including increasing involvement of private rural veterinarians in surveillance activities.
- Qld DPI&F stock inspectors have been taken away from “surveillance” work and involved in compliance, ruminant field work, and general Biosecurity, rather than building relationship with clients for improved surveillance.
- Needs to be a consideration of cost of implementing and maintaining BOSSS on farm vs return?
- Recognition of the reluctance amongst segments of the industry to pay much attention to the types of syndromic or anecdotal data/information that may be derived from systems like BOSSS. Easy to criticise outputs as soft, of no value.
- Producers and other animal-side segments of the industry need to be involved in surveillance activities.
- Documentation of freedom from disease is important for trade purposes. Trade partners may ask: “What surveillance is being done?” Can BOSSS help in this area by providing evidence of surveillance activity?
- Need to consider potential cost associated with a disease outbreak and cost-benefit of surveillance (as opposed to no surveillance) with respect to issues like early detection, time to get back into the market etc.
- Much of the far north (and many other remote areas) has variable and often poor access to internet services and mobile phone coverage. This remains as a major problem for implementation and adoption of systems that are reliant on internet access or mobile phones.

¹ Frawley, PT. Review of Rural Veterinary Services. January 2003.
http://www.daff.gov.au/_data/assets/pdf_file/0008/156923/vetreport.pdf

Afternoon workshop activities

In the afternoon sessions delegates were randomly assigned to groups to address specific focus questions. Responses from each group were written on cards and stuck on the wall and then sorted in a facilitated discussion into clusters based on similarities ie items within the same cluster were considered to be related to the same underlying theme. Clusters were not named in this process.

Focus Question 2: What can BOSSS contribute to remote area surveillance? Can BOSSS collect data/information that will contribute to the surveillance outcomes identified in Question 1?

The following clusters were identified:

Cluster 1

- Syndromic data (but has to be interpreted)
- Generation of a data set of signs/syndromes
- Collection of support data for syndromes
- Alerts – leading to or facilitating targeted-investigations and early detection
- If used extensively may generate to early detection

Cluster 2

- Awareness of disease issues
- Increased awareness of potential threats
- One system with national applicability

Cluster 3

- Negative syndrome data to contribute to disease freedom
- Supports claims for disease freedom, data, activity
- Limited use for international credibility/market access

Cluster 4

- Management of resource allocation

BOSSS was clearly identified as having the ability to generate data on syndromes and that this could lead to alerts followed by targeted investigations and potentially early detection of particular diseases. A direct benefit of this sort of activity was considered to be increased awareness amongst users of disease issues.

Some concerns were expressed over the validity of the BOSSS process for generating alerts

- based on having sufficient data entered
- what is the marginal benefit over other systems (and what is the cost)?

There was discussion of the potential for BOSSS to contribute to documentation of disease freedom. There was recognition of the potential for BOSSS to generate data attesting to the lack of particular syndromes and that these types of data may be considered to provide some evidence of freedom from particular diseases. However, it was also recognised that negative syndrome data may not have sufficient international credibility to be useful for market access purposes.

Participants felt that additional data needed to be entered into BOSSS before it could be fully evaluated (see Recommendations 1 and 2).

Focus Question 3: Can BOSSS provide outputs that are useful and not necessarily directly related to surveillance outcomes? Is there a value that is not directly related to surveillance but of interest as a motivator for involvement?

The following clusters were identified:

Cluster 1

- Better understanding of herd health issues
- Education
- Awareness/education
- Education & training

Cluster 2

- Diagnosis
- Could highlight trends

Cluster 3

- Improved herd health management

Cluster 4

- Increased interaction with government and industry contacts
- Networking
- Providers/producers a heads up to seek professional advice

Cluster 5

- Electronic herd health recording

A number of issues were highlighted in the discussions, in particular related to the use of BOSSS as an education tool with a number of flow-on benefits identified in the clusters above. These discussions built on the presentation by Prof. Michael McGowan who highlighted the use of BOSSS by veterinary students working with private practitioners on farm. A project funded by the AB-CRC to evaluate the usefulness of this mechanism is due to be reported by the end of July 2007. The use of BOSSS as an ongoing education tool needs to be reviewed after this final report is delivered (see Recommendations 3 and 4).

Focus Question 4: What are the constraints for BOSSS? What is interfering with interest in, or sustainable use of, BOSSS for remote area surveillance?

The following clusters were identified:

Cluster 1

- Network access
- Telecommunications
- Complexity of system
- Internet (technology) access and system usability
- Skills, recruitment (linkages) time and access to IT

Cluster 2

- Validation of data (bias)
- Concerns about data quality

- Competency = quality for information
- Quality and quantity of data
- Participation uptake & coverage
- Demonstrated utility assumption

Cluster 3

- Privacy of data for individual property
- Confidentiality and security
- Fears of consequences of reporting

Cluster 4

- Very few syndromes seen
- Low prevalence of disease leading to decrease commitment to recording
- Apathy, critical coverage 100% minimum

Cluster 5

- Lack of value to producers
- Stakeholders' perception of value
- No feedback or post action
- Voluntary / cost
- Incentives for co-operators
- Human apathy – lack of time motivation

Cluster 6

- Not a national system. Raised the notion of building a national system based on unstructured surveillance – why restrict it to remote areas?

Cluster 7

- Lack of cow-side use in current form
- Disease probabilities not currently expressed

Cluster 8

- Integration with other systems including software for farm/animal management

A number of underlying issues are presently barriers to the uptake of BOSSS. These include the issues of validation, perceived need and value, and inconsistent availability of technologies, and network coverage (see Recommendations 2 and 4).

Focus Question 5: What impact does the hand held BOSSS platform offer in relation to topics identified in items 2, 3 & 4?

The following clusters were identified:

Cluster 1

- Easier data collection: government, not producers
- Improves quality of data, transfer of data, saves time
- Addition of GPS + camera

Cluster 2

- Network access problems removed
- Removes need to copy hand written notes – and duplication errors

- Help with automated reports

Cluster 3

- Hand held helps with producer
- Should appeal to younger people
- May be a driver of uptake (more so with younger or tech-savvy people)
- Essential to successful implementation of initiatives like BOSSS

Cluster 4

- Cost (increased) of system use
- Doesn't address user constraints and inability to use technology
- Needs to be robust – dust moisture proof

In the feedback session there was discussion around the opportunities of linking a hand-held system to the NLIS system – and whether this would add value.

There was some agreement that state government agencies saw advantages in using mobile system, however this was seen to be of limited use to producers because of the technology issues. It was agreed that there was a spectrum of managers with different abilities and levels of interest.

It appeared relatively clear that the ability to use the mobile platform and web-enabled data entry are not yet widely available at a level that actually allowed effective implementation and adoption of the technology. The technical challenges of slow internet, lack of mobile coverage etc are genuine barriers to potential users (see recommendations 2 and 4).

Focus Question 6: What can be done to make BOSSS more useful, valuable or attractive to stakeholders? Answers may be directed to ease of use, functionality, reports, portability and may be related to surveillance or non-surveillance functions.

It was agreed that:

- there would need to be a staged approach to any further development, and that it would be necessary to determine who would be the lead users and what value the system would add for them;
- the BOSSS system (at this stage) would provide most value to state government agencies and that it would be necessary to work with each of the states with remote area surveillance responsibilities to determine how the system might integrate with systems already in use;
- remote producers have the potential to use initiatives like BOSSS to contribute to surveillance activities;
- it was important to generate sufficient data into the system to allow appropriate assessment and validation;
- the BOSSS system may be too high-tech for some producers;
- the technology was probably too advanced for many producer users at this stage.

It was also stated that syndromic surveillance has the potential to be a good source of information in areas that have sparse data and that syndromic surveillance has the potential to detect broader disease patterns (new and emerging diseases).

Focus Question 7 (drawing to a conclusion): What consensus on the value of BOSSS to key stakeholders and where further work is warranted? Where to from here?

A summary of the outcomes of the workshop was provided by Dr Stephen Prowse at the conclusion of the day.

- It was agreed that there were no real confidentiality concerns.
- The value of the system has been proved to some extent with existing work in Queensland.
- It was agreed there was still a need to prove the technical aspects of BOSSS.
- There was general consensus that further discussion with the states and territories may facilitate integration with existing systems.
- It was still ambiguous at the end of the workshop as to whether BOSSS could substantially contribute to claims for disease freedom or be useful in detecting significant disease events. This was partly due to the fact that insufficient data had been put into the system to test the algorithms that would flag a significant event.
- There were questions raised as to whether there would be a benefit in parts of the system, whether unpacking some parts would have value or whether the system could be used for species other than cattle (e.g. pigs, horses, poultry).
- AB-CRC to facilitate discussion about surveillance (including use of BOSSS) to determine next steps forward for use of BOSSS in state departments to test the system' and to identify significant constraints and issues.
- It was agreed to include interested and motivated corporate producers in further discussions and updates.

General

Every effort was made to get people from all major user groups to attend. In the end there were fewer producers than we would have liked but given the difficulty of long-distance travel for producers it was considered that the representative attendance was excellent. Participation in and throughout the workshop was very good and participants remained interested and contributed to the discussion throughout the day.

Consideration of scope

The opening presentations provide a good backdrop to surveillance and there was general discussion on the needs and opportunities and challenges for surveillance in remote areas. Despite this there was some confusion or perhaps disappointment from a few individuals that the organisers didn't allow more discussion on the broader issues of remote surveillance. It was difficult to deal effectively with these issues and BOSSS in the time allowed (and it would have been even more difficult to get people to attend for longer than the one day).

The organisers are confident that valuable feedback on BOSSS and identified a way forward for now (and the evaluation supported this).

Recommendations

The recommendations coming out of the workshop were as follows:

Recommendation 1: That the AB-CRC liaises with relevant state/territory departments and remote area producers, including large corporate producers with an interest, to develop options for state/territory department personnel to implement and

test BOSSS as a tool for collecting and managing remote surveillance information including consideration of:

- iii) modifications or enhancements to BOSSS to make it more functional or to integrate it better with existing systems;
- iv) planning for test implementation in multiple states/territories including resource requirements, training, implementation, data collection & analysis and reporting.

Recommendation 2: That the AB-CRC (and/or state/territory departments) continue to consult with producers and other potential industry users of the system including large corporate producers with an interest and university personnel, to encourage implementation and use of BOSSS by innovators in the industry and other groups interested in participating.

Recommendation 3: That the AB-CRC builds on identified strengths for BOSSS in the area of syndromic pattern recognition and as a training and awareness tool for a variety of users.

Recommendation 4: That the AB-CRC incorporate findings from the final report for the AB-CRC Application and Linkage project led by Professor Michael McGowan. This project has involved implementation of BOSSS in a university teaching program and in private practices servicing beef producers in QLD. Findings are expected to be relevant to Recommendations 1, 2 and 3 and to further discussions with potential BOSSS-users.

Recommendation 5: That the AB-CRC waits on the final report from the mobile platform project and for developments in remote internet before considering options for mobile and producer web installation. The exception to this is the committed remote innovator who is willing to invest in Internet access independently.

Recommendation 6: That the AB-CRC communicates with relevant state/territory departments and interested remote area producers, including those in the large corporate companies, in relation to syndromic surveillance methods, implementation outcomes and new information coming from AB-CRC funded research projects.

Evaluation

The delegates were provided with an evaluation sheet at the completion of the workshop (see page 21) which asked them to complete three open-ended questions (asking them about their expectations of the meeting, how well these expectations were met, and how they feel the workshop could have been improved) and 12 scaled questions (asking them to rate the success of each of the sessions, and their views on how successfully the workshop achieved its desired outcomes). Of the 32 delegates attending, evaluation sheets were obtained from 27 (84%). The questions and a summary of the responses are provided below.

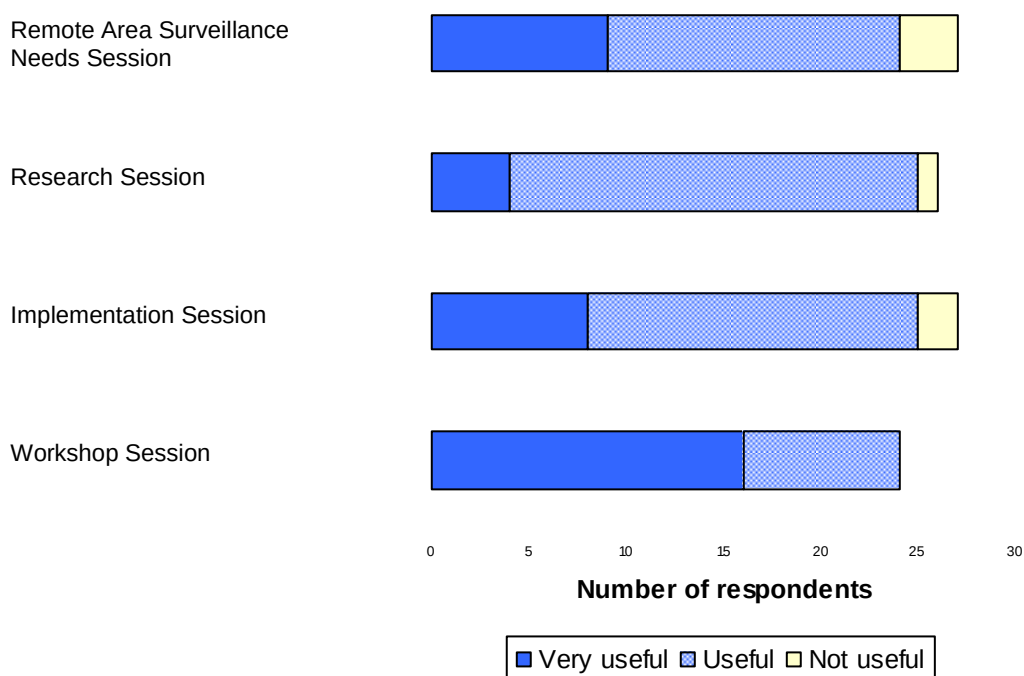
What was your main reason(s) for attending the workshop? Did the workshop fulfill your main reason(s) for attending?

The three main reasons the delegates included in their responses to this question included (i) an awareness of the future outlook for BOSSS, (ii) an understanding of producer needs and benefits, and (iii) general interest in remote area surveillance. Twenty six of the delegates (81%) felt the workshop met their expectations (18 fully,

4 partially). Three delegates felt the workshop was too BOSSS specific. Two did not respond to this question.

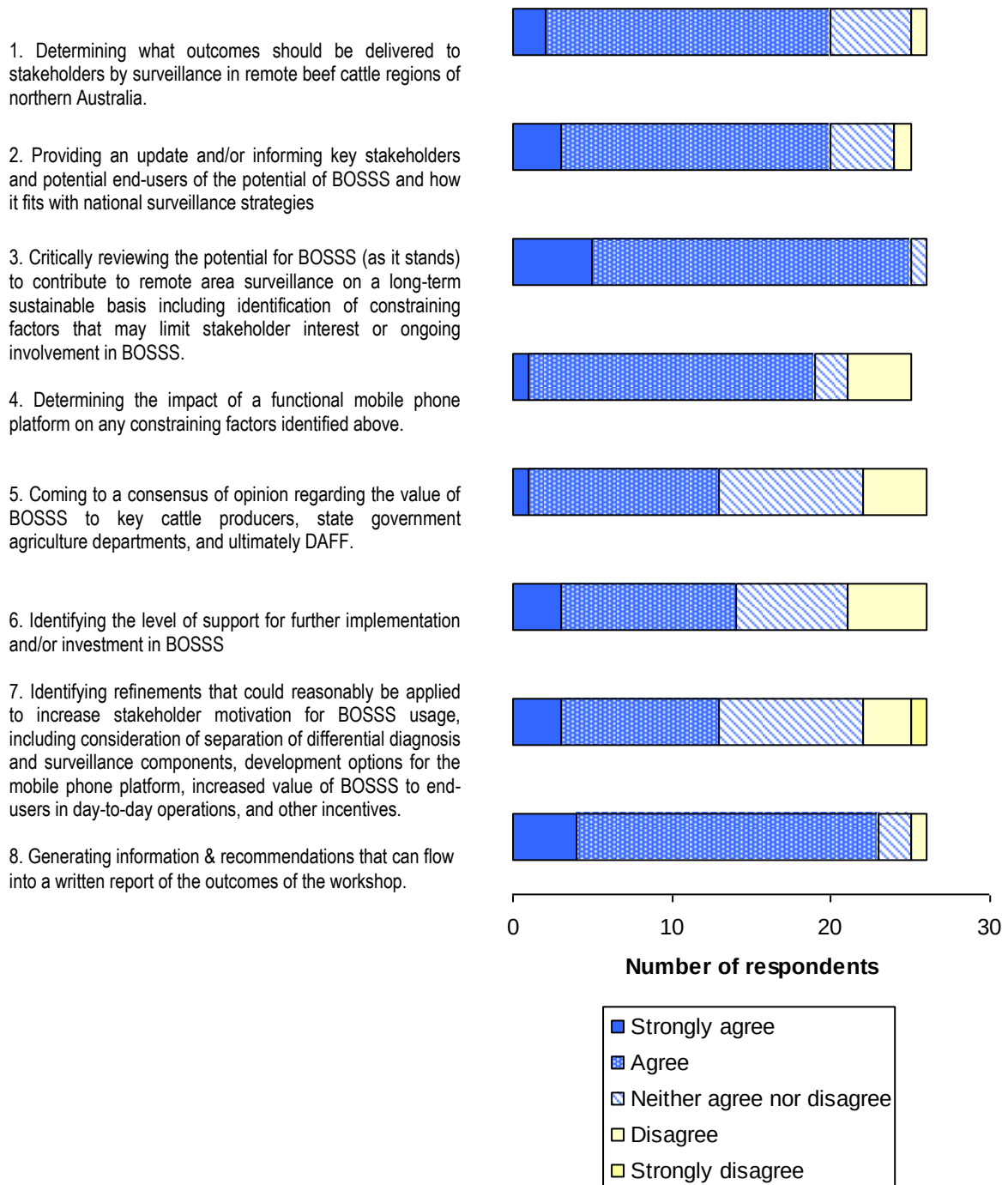
How useful do you feel the following session were in fulfilling your reason(s) for attendance?

Responses to this question indicate the majority of delegates felt all sessions were useful or very useful, and all session met their requirements. Of all session, the workshop was rated most useful by the delegates, with two thirds of the respondents indicating they felt this session was very successful in fulfilling their reasons for attendance.



Rate the extent to which the workshop achieved the desired outcomes of the meeting.

Overall the responses to these items were positive, with the majority of respondents agreeing that the workshop was successful in achieving the planned outcomes. As the outcomes increased in complexity (see particularly items 4-7), the proportion of respondents who agreed that the outcomes were met in the workshop decreased.



Suggestions for how the organisers of this workshop could improve the workshop:

Twelve delegates provided responses to this question. Five of these responses were positive.

*Worked well- good mix of people for range of views
Well run workshop
Nice length and good transitions, well supervised.
Very well facilitated and organized
I think it went well*

Three respondents (two of which were producers) suggested the involvement of more producers was required. Significant efforts were made to include as many producers as possible in this workshop and we were able to facilitate the involvement of six cattle producers in the workshop (~20% of workshop delegates). It is likely that attaining high levels of participation from cattle producers from remote and rural regions is always going to be problematic.

Involve more producers without them all efforts will be wasted
More producers / managers
Greater focus on the producer/recorder acceptance and use

Three respondents also suggested the focus of the workshop should have been broader. It was clearly stated in the invitation and program that the workshop would focus on the BOSSS platform for remote surveillance.

More information in aggregation, utilization of data. Outcomes mostly dependent on what data can do
The process of the workshop was well done but to make a decision on an issue when other alternatives are available is not a good use of time and resources
Make it broader discussion

One final respondent suggested speakers should be kept to their time limit.

Proceedings

Welcome

Dear Colleagues,

It is our pleasure to welcome you to the Bardon Centre in Queensland for the Remote Area Surveillance Workshop. Effective surveillance is essential for early detection of new and exotic diseases, management of disease outbreaks and endemic disease control. Coming together at this workshop provides us with a unique opportunity to consider stakeholder views on remote area surveillance and the potential role of BOSSS and other surveillance tools.

We are delighted that such a wide range of delegates with an interest in remote area surveillance are attending this workshop. Our list of delegates includes 34 people representing state and territory governments, federal government, the livestock industry, livestock producers (Kidman Holdings, North Australian Pastoral Company, Wolverton Pastoral Co, Australian Country Choice, McDonald Holdings, Georgina Pastoral Station, North Australia Beef Research Council, Katherine Primary Industries Advisory Council), agriculture consultants, universities, SMEs in livestock health & epidemiology, and the AB-CRC. Many of our delegates have experience across these sectors and bring enhanced understanding of the extensive beef cattle industry to this workshop. As you are aware, MLA, AHA and the AB-CRC have partnered to bring this workshop together.

A number of outcomes were identified for this workshop in the information sent to you. Our intention is to complete all but the final outcome by the time the workshop concludes. The final outcome is the generation of a written report describing the proceedings of the workshop and including the presentations and a summary of other outcomes. This report will be provided to all workshop participants as soon as it is completed.

Thank you for taking the time from your busy schedules to attend this workshop. We hope it will be a productive meeting that will contribute significantly to identifying the challenges in remote area surveillance in Australia, agreeing on solutions, and planning a way forward so that the future of our livestock industries and Australia's trade is enhanced.

Kind Regards

Debby Cousins
Director, Application and Linkage
Australian Biosecurity CRC

Wayne Hall
Manager, Northern Production
Research
Meat and Livestock Association



Program

5 June 2007

Dinner 7.00pm – for 7.30pm – Dinner, The Bardon Centre

6 June 2007

8.30 am Registration - tea and coffee

Session	Topic	Speaker	Time (mins)
8.45-8.50	Welcome and housekeeping	Stephen Prowse	5
Remote area surveillance needs – Chair – Ian Johnsson			
8.50-9.10	Remote area surveillance - why bother?	Angus Cameron	20
9.10-9.20	National trends in surveillance - including remote area surveillance	Kevin de Witte	10
9.20-9.45	Discussion: what outcomes should remote surveillance deliver	Facilitated by Nigel Perkins and Stephen Prowse	25
Research – Chair – Graeme Garner			
9.45-10.05	BOSSS: surveillance features, capabilities and limitations	Richard Shephard	20
10.05-10.40	<i>Morning tea</i>		
10.40-10.50	Porting BOSSS to a mobile phone - real prototype to be shown	Rafael Calvo	10
10.50-11.00	Remote area surveillance, BOSSS and adoption challenges	Stephen Prowse	10
Implementation – Chair – Stephen Prowse			
11.00-11.15	Producer Experiences with Remote Area Surveillance	Ian Whan, Emma Jackson and Jon Cobb	15
11.15-11.25	Remote Area Surveillance – The Queensland Perspective	Karen Skelton	10
11.25-11.35	Preliminary observations of the use of BOSSS in private rural veterinary practice and integration into a clinical veterinary training programme	Michael McGowan	10
Workshop – Facilitator – Nigel Perkins			
11.35-12.15	Introduction of workshop aims and structure Group work and/or facilitated discussion	Nigel Perkins	40
12.15-1.20	<i>Lunch</i>		
1.20 – 2.10	Workshop Part I	Participants led by Nigel Perkins	50
2.10-2.50	Workshop Part II	Participants	40
2.50-3.20	<i>Afternoon tea</i>		
3.20-4.00	Workshop Part III	Participants	40
4.00-4.30	Summary outcomes and actions	Nigel Perkins	30

Background

Effective surveillance is essential for early detection of new and exotic diseases, management of disease outbreaks, and endemic disease control. A number of critical gaps have been identified in Australia's surveillance capacity including the provision of reliable surveillance data where none currently exists; the gathering of new & existing data into readily useable and broadly accessible information systems; and the provision of tools for the analysis of surveillance data.

In 2003, MLA and the Northern Pastoral Companies Group through Animal Health Australia, together with the Australian Biosecurity CRC sponsored research into the development of a *Bovine Syndromic Surveillance System (BOSS)* specifically aimed at remote area surveillance.

The forward thinking of these groups promoted further research aimed at delivering BOSS via a mobile phone platform, with the view of linking with new mobile phone coverage networks, such as G networks.

The cattle industry, and states & territories with responsibility for surveillance in the northern pastoral regions (Qld, WA, SA and the NT) recognised the potential value of BOSS and sponsored training, testing & implementation of the system in 2005-2006.

BOSS is currently in the initial stages of an implementation trial aimed at registering cattle property owners and managers. It was hoped that once producers had registered with BOSS they would utilise the diagnostic capacity of the system and voluntarily submit reports that could flow into State and/or national surveillance mechanisms. The first phase of the BOSS trial incorporated the web-based input of data from registrants' own computers.

While a reasonable number of properties have been registered with BOSS throughout 2006, actual use of the system to date has been low. The application of BOSS (and the broader issue of improving disease surveillance on remote-area cattle properties) is more difficult than originally imagined and presents many challenges. Despite the difficulties inherent in BOSS implementation, the concept is still seen to have significant merit.

The Remote Area Surveillance workshop aims to review the needs and opportunities for remote area surveillance, examine the role of BOSS as a surveillance tool, and obtain an industry and state government perspective on the value of BOSS, the challenges facing adoption, and the best way forward.

Objectives and outcomes

Specific objectives of workshop

- Determine the options & opportunities for improved remote area surveillance from industry, state/territories & Commonwealth perspectives.
- Provide an update and/or inform key stakeholders and potential end-users of the potential of BOSSS and how it fits with national surveillance strategies.
- Critically review the potential for BOSSS (as it stands) to contribute to remote area surveillance on a long-term sustainable basis including identification of constraining factors that may limit stakeholder interest or ongoing involvement in BOSSS.
- Determine the impact of a functional mobile phone platform on any constraining factors identified above.
- Come to a consensus of opinion regarding the value of BOSSS to key cattle producers, state government agriculture departments, and ultimately DAFF.
- Identify the level of support for further implementation and/or investment in BOSSS.
- Identify refinements that could reasonably be applied to increase stakeholder motivation for BOSSS usage, including consideration of separation of differential diagnosis and surveillance components, development options for the mobile phone platform, increased value of BOSSS to end-users in day-to-day operations, and other incentives.
- Generate information & recommendations that can flow into a written report of the outcomes of the workshop.
- Give consideration to the formation of a working group to identify options for further development of BOSSS with required levels of participation and measurable implementation & performance indicators.

Desired outcomes of workshop:

- Consideration of the options and opportunities for remote area surveillance in Australia.
- Identification of any constraining factors that may limit stakeholder interest or ongoing involvement in BOSSS.
- Formation of a consensus of opinion regarding the impact of a functional mobile phone platform on any constraining factors identified.
- Formation of a consensus of opinion regarding the value of BOSSS to key cattle producers, state government agriculture departments, and ultimately DAFF.
- Identification of the level of support for further implementation and/or investment in BOSSS.
- Identification of strategies that could increase stakeholder motivation to use BOSSS (or similar tools) as an ongoing component of surveillance activities.
- Generation of a written report describing the proceedings of the workshop, including keynote & working group presentations, and outcomes.

Abstracts

National trends in surveillance

Kevin de Witte

Animal Health Australia (AHA) is a service provider to government and industry that coordinates programmes of national relevance. Programs are core funded or 'special' funded depending on applicability. Observations will be made on areas of involvement by AHA in the National Animal Health System.

The National Animal Health Information System (NAHIS) is a validated secondary data base that gathers, stores and reports animal disease information of importance for trade. There are 34 separate data tables representing a diverse range of diseases and issues. The database has recently been redeveloped.

Disease surveillance programs managed by the company include the National Arbovirus Monitoring Program (NAMP) which monitors for three key arboviruses, the TSE Freedom Assurance Program which includes TSE surveillance and a range of other measures, the Australian Bovine TB Surveillance Program, and the National Bovine and Ovine Johne's Disease programs. A new program is being planned for endemic, ovine disease monitoring and reporting from abattoirs.

In 2006 it was agreed that a National Animal Health Surveillance Strategy (NAHSS) Reference Group be created to provide strategic oversight for existing and new surveillance projects consistent with AusBIOSEC. There are two new PISC endorsed projects to be further developed under NAHSS - the National Significant Disease Investigations Project and the Wildlife Disease Investigations Team Project.

Development and deployment of the Bovine Syndromic Surveillance System (BOSSS) in an animal health surveillance network

Richard Shephard, Jenny-Ann Toribio, Angus Cameron, Peter Thomson, & Chris Baldock

Syndromic surveillance systems record signs of disease, such as coughing, lameness, and vomiting, within the population to detect disease. Consequently, syndromes generally provide a high sensitivity but low specificity detection test for individual diseases. Human health surveillance demand for early warning capacity has hastened the development of these systems. Detection algorithms monitor occurrences of specific syndromes or combinations of syndromes, or detect changes to the underlying syndrome distribution to detect disease events. New data sources can be quickly incorporated into syndromic surveillance systems because the algorithms use generic methods. Syndromic surveillance capability may enhance traditional animal health surveillance systems by utilising new data sources, and by implementing the generic detection algorithms. Syndromic surveillance systems require large amounts of data for the algorithms to function effectively, and the collection of adequate data is the greatest challenge to use of these systems within animal health. Typically, many more cases of animal disease are observed than provide data to the traditional general surveillance system, and most observers are not professionally trained. This is especially true of the remote extensive cattle producing regions of Australia. New methods to capture data and to encourage data reporting by non-professional observers are essential to maximise effectiveness.

We developed the Bovine Syndromic Surveillance System (BOSSS) to allow lay observers within the remote areas of Australia to report disease observations. BOSSS uses novel methods to capture and analyse syndromic data. BOSSS is an electronic system that can be used by a range of people, including lay observers (e.g. farmers), to capture syndrome data from diseased cattle. BOSSS uses the naïve Bayes classifier BOVID[®] to diagnose disease. The database contains approximately 1,000 diseases and 1,500 descriptors of disease such as clinical signs and signalment. The graphical user interface simplifies data entry by using an outline image of a cow with anatomical hyperlinks to the sign hierarchy. BOSSS analyses entered signs providing a list of potential diseases and key signs to further differentiate diseases. Further information on key signs is obtained via an interrogation module that asks the user to confirm, deny or indicate if unsure about the presence of each sign. This captures negative sign data. Real-time interpretation and feedback in the form of differential diagnostic lists, ongoing investigation approaches, links to experts and general information is provided. These qualities are essential to maximise use of the system by lay observers.

BOSSS system aids surveillance in a number of ways. Firstly, the artificial intelligence system provides capacity to obtain more complete (and therefore more specific) information on individual disease events. Secondly, the disease diagnostic component in BOSSS provides an estimate of the likelihood of an event being a specific disease. This information can be used to guide further investigation of specific cases as required. Thirdly, the data from all reported events can be generically analysed to detect changes to the frequency and/or distribution of individual or grouped signs over time. This generic detection capacity provides ability for the system to detect new and emerging (i.e. undescribed) diseases in the population.

The deployment and use of the BOSSS system has been slow. The drivers to use a disease reporting and investigation system such as BOSSS by both departments of agriculture and by cattle producers have not been described or studied. These drivers need to be explored to determine: if the BOSSS system can provide a cost-effective addition to surveillance, identify required modifications and determine further research and/or training for users of the system at all levels.

Porting BOSSS to a mobile phone

Rafael Calvo

The mobile platform for BOSSS (mBOSSS), a mobile diagnosis and surveillance platform will be introduced. We will briefly describe the aims of the project and show you a demonstration of a realistic use scenario.

Remote area surveillance, BOSSS and adoption challenges

Stephen Prowse

Surveillance in remote pastoral properties is considered important to support claims for freedom from disease and subsequent market access, and to monitor for disease incursions. The processes and tools to undertake this surveillance are yet to be developed. The imperatives that drive remote area surveillance vary considerably between jurisdictions, industry and associated sectors. The differences in expectations can result in some difficulties in designing and implementing systems that meet the needs of stakeholders. A careful analysis of the needs of industry,

state and federal jurisdictions is warranted prior to the development of systems aimed at improving remote area surveillance.

Producer experiences with remote area surveillance

Ian Whan, Emma Jackson & Jon Cobb

Economic considerations of surveillance and monitoring need to be considered and while there is potentially a large benefit to producers, it remains relatively ill defined. The barriers to effective surveillance will be reviewed by Ian Whan. Presentations from two cattle producers will provide a personal perspective of their experience of remote area surveillance. Emma Jackson from Cape York and Jon Cobb from Glengyle in the Channel Country will provide valuable insights into the issues related to surveillance in very remote locations in Australia.

Remote area surveillance – the Queensland perspective

Karen Skelton

General animal health surveillance information was not adequately reflecting the situation in the remote areas of Queensland and several options to improve this were investigated. These included digital diagnosis from photographs emailed by producers, training of producers in post mortem techniques and use of the Bovine Syndromic Surveillance System (BOSSS).

Workshops designed to encourage producers to submit animal health information highlighted some particular remote area issues. Cattle production is seasonal with little or no husbandry activities in the wet season or when it is very hot. This limits the opportunities to conduct training and for producers to put the training into practice. The lack of reliable mail services and mailing restrictions affects sample submissions to the laboratory and replenishment of sample collection equipment. Disease incidents are relatively rare in extensive situations so regular training of producers in post mortem techniques is required to maintain this skill. With any computer based system, there are challenges training producers with a wide range of computer skill levels.

The workshops effectively raised awareness of emergency and endemic diseases and did result in increased laboratory submissions. They also established good working relationships between producers and DPI&F. More work is required to maintain the lines of communication with producers, to engage more producers in surveillance activities and to improve our capacity to monitor and interpret collected data.

Remote area surveillance remains a high priority for Biosecurity Queensland. It is very difficult to highlight a single process that provides outcomes for both producers and DPI&F, so a multifaceted approach will continue. Good producer/biosecurity inspector or veterinary officer relationships remain the cornerstone of effective surveillance.

Preliminary observations of the use of BOSSS in private rural veterinary practice and in the clinical training of veterinary undergraduates

Michael McGowan, Andres Ardilla, Anna Gates and Malcolm Heath

In mid-2006 a small AB-CRC funded project was initiated to evaluate the logistics and usefulness of implementing BOSSS on beef and dairy properties serviced by 2

rural veterinary practices operated by The University of Queensland. In addition, an evaluation was made of how implementation of BOSSS in these undergraduate veterinary training practices could enhance practical training in disease surveillance.

The Dayboro Veterinary practice is located approximately 45 minutes North West of Brisbane in a sub-tropical mixed farming district immediately adjacent to the outer suburbs of Brisbane and within 1 hour drive of the international airport. The primary farming activities are dairying, small scale beef production and commercial pineapple production. The practice is staffed with 2 large animal and one small animal practitioners, and an intern. Final year veterinary students spend 1 week in the practice. Three producers (1 dairy only, 1 beef only and 1 dairy and beef) were recruited to the study. Their properties ranged in size from 96 to 360 hectares and carried between 150 to 700 head of cattle, with cattle being checked either daily or monthly.

The Pastoral Veterinary Centre (PVC) is located in Goondiwindi approximately 4 hours drive southwest of Brisbane on the New South Wales-Queensland border. The primary agricultural activities in the district are broad acreage cropping and cotton production, and beef cattle and sheep production. The practice is currently staffed by 3 large animal practitioners. Final year veterinary students spend 2 weeks in the practice. Five primarily beef cattle producers were recruited to the study. Their properties ranged in size from 1,000 to 10,000 hectares and carried between 600 to 2000 head of cattle. Due to the drought conditions the cattle and watering points were checked every second day during the study.

At both sites due to a combination of lack of broad band access (most producers had only dial-up internet access), limited computer skills and lack of time, on property entry of data onto the BOSSS website was not possible. Only one of the eight properties had the capacity to enter the data. Therefore, a data collection template was designed and a folder of data sheets was given to producers who entered data each time they checked their stock. The completed data sheets were posted to the practice for collation. Originally it had been intended that a member of each practice would enter the data, however due to problems with being able to set up properties on the BOSSS website and lack of free time to do the data entry a technical officer based at the university's Gatton campus was sent all the data sheets for entry onto BOSSS. An example of the data recorded is presented in Table 1.

Data was submitted from four of the five Goondiwindi properties and from all three properties at Dayboro for observation periods ranging from 2 to 6 months. For the Goondiwindi properties the observed morbidity rates range from 3.2 to 13.6%, with the most prevalent disease being 'pink-eye'. The observed mortality rate ranged from 0.3 to 0.8%. A wide range of commonly diagnosed diseases were observed, with 2 cases of central nervous system disease and 6 cases of ulceration of the mouth detected (all of these cases were investigated by a veterinarian from the PVC). For the Dayboro properties the observed mortality rate ranged from 1 to 11.8% and the mortality rate ranged from 0 to 2%. Again a range of commonly encountered cases of disease were observed with one apparent outbreak of respiratory and alimentary tract disease with 6 out of 30 youngstock dying.

At the completion of the data collection period the practitioners and producers were surveyed to get feedback on the logistics of BOSSS data collection and its value to their businesses. Producers and practitioners generally did not find BOSSS to be user friendly with respect to entering property or disease data, and some data requirements, e.g latitude and longitude of property were difficult to obtain. Producers struggled with some of the scientific terminology used and both groups found it

difficult to justify the time commitment to enter data. Further, the diagnostic programme of the system was of limited value as in the case of several of the Dayboro properties it did not cover common dairy cattle diseases, and in the case of Goondiwindi a cattle tick free area, the two most common diseases the programme generated for cases observed was tick fever and ephemeral fever. Undergraduate veterinary students were very interested in the programme and understood its purpose. Overall the findings of this study indicate that producers are able to provide disease data which previously has not been captured, however there is a critical need to improve the logistics of data capture and entry for BOSSS.

Table 1. Disease surveillance data collected from one herd at Goondiwindi

Observation	1	2	3
Date	Sep 06 – Feb 07	Sep 06 – Feb 07	Sep 06 – Feb 07
Breed	Angus	Angus	Angus
Class Stock	Cows	Calves	Heifers
# Mob	800	800	800
# cattle with signs	20	300	6
# cattle dead	4	0	6
Signs	Lumps of purulent material in submandibular region	Blight in calves eyes	Ulcers in mouth
Diagnosis	Believed by owner to be from eating prickly pear	Pink eye	Negative to pestivirus antigen ELISA

PowerPoint presentations

1. Kevin de Witte
2. Richard Shephard
3. Rafael Calvo
4. Stephen Prowse
5. Ian Whan, Emma Jackson & Jon Cobb
6. Karen Skelton
7. Michael McGowan

Biographic details of presenters

Nigel Perkins is a veterinary epidemiologist and partner of AusVet with extensive experience in statistical analytical techniques, study design and epidemiological data analysis and many years of experience in teaching quantitative statistical techniques.



Angus Cameron is an internationally recognised veterinary epidemiologist and director of AusVet. Angus' main areas of interest are disease surveillance, information systems, epidemiological data analysis, GIS and data analysis.



Kevin de Witte graduated from the veterinary program at the University of Queensland in 1982 and moved to Darwin where he worked in companion animal practice, the Brucellosis & Eradication Campaign (BTEC) and Live exports. He was Regional Veterinary Officer in Katherine from 1985 to 2003. As Principal Veterinary Officer from 2003 to 2006 he was responsible for TFAP, Emergency Animal Disease preparedness and animal welfare. He relocated to Canberra to work for Animal Health Australia as Project Officer in early 2006. Responsibilities include the management of the National Animal Health Information System (NAHIS), the National Arbovirus Monitoring Program (NAMP) and involvement in the National Animal Health Surveillance Strategy (NAHSS) and AB-CRC projects



Richard Shephard is a veterinary consultant with expertise in syndromic surveillance systems and dairy production.



Rafael Calvo is a Senior Lecturer at the University of Sydney - School of Electrical and Information Engineering. He has a PhD in Artificial Intelligence applied to automatic document classification (e.g. web site classification). He has taught at several Universities, high schools and professional training institutions. He has worked at Carnegie Mellon University (USA) and Universidad Nacional de Rosario (Argentina), and as an Internet consultant for projects in Australia, Brasil, USA and Argentina.



Stephen Prowse is the CEO of the AB-CRC and an Adjunct Professor at the University of Queensland. He has a background in disease research in humans and livestock with a focus on pathogenesis, and the development of vaccines and diagnostics. Prior to his current appointment he was the Manager for Strategy and Evaluation in the CSIRO Division of Livestock Industries, where he had responsibility for leading the development and implementation of scientific strategy, and for the evaluation of the Programs and projects. In 2001, he was Acting Director of the CSIRO Australian Animal Health Laboratory.



Ian Whan is an Associate of RMP and contributes to the company's R&D and consultancy activities. His company, Alliance Resource Economics, specialises in agribusiness and natural resources. He has over 30 years experience gained with the Queensland Department of Primary Industries, Queensland Livestock and Meat Authority and Darling Downs Bacon. He is highly regarded for his expertise in economic and social impact studies applying to water resource development and conservation. Specific industries where Ian has experience include intensive crop production, the meat and livestock industries and forestry.



Karen Skelton graduated in Veterinary Science from the University of Queensland in 1978. After some years in private practice in Australia, the United Kingdom and Zimbabwe, she returned to Queensland University to complete a PhD in equine reproduction and physiology. Then she worked at the Queensland government Racing Science Centre in regulation and drug control in racing animals. In 2001, she joined the Department of Primary Industries working on numerous projects to enhance preparedness for emergency animal diseases such as foot and mouth disease and bovine spongiform encephalopathy (BSE). Her major interest is in animal disease surveillance and she leads the Biosecurity Surveillance Systems sub-program.



Michael McGowan began his career as lecturer in Animal Reproduction at the School of Veterinary Science, University of Queensland. In 2000 he was Appointed Professor of Farm Animal Medicine and Surgery at the Royal Veterinary College, followed by becoming Head of the Population Medicine Group in the Department of Veterinary Clinical Sciences in 2002. In 2005 he returned to Australia and the University of Queensland as Professor of Livestock Medicine and Head of the Veterinary Population Health and Production section in the School of Veterinary Science.



Delegate list

Name	Affiliation	<u>email address</u>
Angus Cameron	AusVet Animal Health Services	angus@ausvet.com.au
Ash Mercy	Department of Agriculture and Food Western Australia (DAFWA)	amercy@agric.wa.gov.au
Binendra Pratap	Queensland Department of Primary Industries and Fisheries (QDPI&F)	binendra.pratap@dpi.qld.gov.au
Brian Heim	Katherine Primary Industries Advisory Council (KPIAC)	Brian.Heim@cdu.edu.au
Brian Radunz	The Department of Primary Industry, Fisheries and Mines (DPIFM)	brian.radunz@nt.gov.au
Colin Beavis	Queensland Department of Primary Industries and Fisheries (QDPI&F)	colin.beavis@dpi.qld.gov.au
Craig Hunter	Queensland Department of Primary Industries and Fisheries (QDPI&F)	craig.hunter@dpi.qld.gov.au
David Fox	Australian Centre of Excellence for Risk Analysis (ACERA)	david.fox@unimelb.edu.au
Deb Cousins	Australian Biosecurity CRC (AB-CRC)	debby.cousins@abcrc.org.au
Dinah Johnson	Australian Biosecurity CRC (AB-CRC)	dinah.johnson@abcrc.org.au
Emma Jackson	Wolverton Pastoral Company	emma.nevillejackson@bigpond.com
Geoff Kingston	North Australian Pastoral Company (NAPCO)	geoffk@napco.com.au
Geoff Niethe	Meat & Livestock Australia (MLA)	g.niethe@bigpond.com
Graeme Garner	Department of Agriculture, Fisheries and Forestry (DAFF)	graeme.garner@affa.gov.au
Ian Johnsson	Meat & Livestock Australia (MLA)	ijohnsson@mla.com.au
Ian Whan	Alliance Resource Economics	ian@cmpconsulting.com.au
Jim Titmarsh	Australian Country Choice Production Pty Ltd.	jtitmarsh@accbeef.net.au
John Cox	North Australia Beef Research Council (NABRC)	jonarcy@bigpond.com
John Dorian	Australian Meat Industry Council (AMIC)	jdorian@amic.org.au
John Stewart	AgForce Qld	johnstewart@agforceqld.org.au

B.NBP.0378 - Bovine syndromic surveillance system review workshop

Name	Affiliation	<u>email address</u>
Jon Cobb	Kidman Holdings	glengyle@kidman.com.au
Karen Skelton	Queensland Department of Primary Industries and Fisheries (QDPI&F)	karen.skelton@dpi.qld.gov.au
Kevin de Witte	Animal Health Australia (AHA)	kdewitte@animalhealthaustralia.com.au
Malcolm Anderson	Department of Primary Industries and Resources of South Australia (PIRSA)	anderson.malcolm@saugov.sa.gov.au
Matt Bullard	Department of Agriculture and Food Western Australia (DAFWA)	mbullard@agric.wa.gov.au
Michael McGowan	University of Queensland	m.mcgowan@uq.edu.au
Neil Buchanan	Department of Primary Industries and Resources of South Australia (PIRSA)	buchanan.neil@saugov.sa.gov.au
Nick Harris	Australian Quarantine & Inspection Service - Northern Australian Quarantine Strategy (AQIS-NAQS)	Nick.Harris@aqis.gov.au
Nigel Alexander	North Australian Pastoral Company (NAPCO)	admin@napco.com.au
Nigel Perkins	AusVet Animal Health Services	nigel@ausvet.com.au
Rafael A. Calvo	University of Sydney	rafa@ee.usyd.edu.au
Richard Shephard	University of Sydney	rshephard@gippslandhi.coop
Roger Halliwell	Georgina Pastoral Company	rhalliwell@georginapastoral.com.au
Sandi Jephcott	Australian Cattle Veterinary Association	dumpu@bigpond.com
Stephen Prowse	Australian Biosecurity CRC (AB-CRC)	stephen.prowse@abcrc.org.au
Sue Fitzpatrick	NT Department of Primary Industry, Fisheries and Mines (DPIFM)	susan.fitzpatrick@nt.gov.au
Wayne Hall	Meat & Livestock Australia (MLA)	whall@mla.com.au
Zanda McDonald	McDonald Holdings	Zanda.mcdonald@mdh.net.au



Remote area surveillance workshop

Evaluation

It would be greatly appreciated if you could take the time to complete this evaluation form and return it to Debby Cousins at the end of the workshop. Alternatively, you can post your completed form to Debby Cousins, Director of Application & Linkage, Australian Biosecurity CRC, Curtin University, GPO Box U1987, Perth WA 6845.

Which of the following do you represent at the workshop?

- ☐ State & Territory Government
- ☐ Federal Government
- ☐ Australian Biosecurity CRC
- ☐ University Sector

- ☐ Livestock Industry
 - Producers
 - Consultants
 - Transporters
 - Consultant
 - Other

What was your main reason(s) for attending the workshop?

Did the workshop fulfill your main reason(s) for attending?

How useful do you feel the following session were in fulfilling your reason(s) for attendance?

Remote Area Surveillance Needs Session

Very useful ☐ Useful ☐ Not useful ☐

Research Session

Very useful ☐ Useful ☐ Not useful ☐

Implementation Session

Very useful ☐ Useful ☐ Not useful ☐

Workshop Session

Very useful ☐ Useful ☐ Not useful ☐

Do you have any suggestions for how the organisers of this workshop could improve the workshop?

The desired outcomes of the workshop are listed below. Please tick the box that you feel best represents the extent to which this workshop achieved these outcomes.

Determining what outcomes should be delivered to stakeholders by surveillance in remote beef cattle regions of northern Australia.

Strongly ☐ Agree ☐ Neither agree ☐ Disagree ☐ Strongly ☐
agree nor disagree disagree

Providing an update and/or informing key stakeholders and potential end-users of the potential of BOSSS and how it fits with national surveillance strategies.

Strongly ☐ Agree ☐ Neither agree ☐ Disagree ☐ Strongly ☐
agree nor disagree disagree

Critically reviewing the potential for BOSSS (as it stands) to contribute to remote area surveillance on a long-term sustainable basis including identification of constraining factors that may limit stakeholder interest or ongoing involvement in BOSSS.

Strongly ☐ Agree ☐ Neither agree ☐ Disagree ☐ Strongly ☐
agree nor disagree disagree

Determining the impact of a functional mobile phone platform on any constraining factors identified above.

Strongly ☐ Agree ☐ Neither agree ☐ Disagree ☐ Strongly ☐
agree nor disagree disagree

Coming to a consensus of opinion regarding the value of BOSSS to key cattle producers, state government agriculture departments, and ultimately DAFF.

Strongly ☐ Agree ☐ Neither agree ☐ Disagree ☐ Strongly ☐
agree nor disagree disagree

Identifying the level of support for further implementation and/or investment in BOSSS

Strongly ☐ Agree ☐ Neither agree ☐ Disagree ☐ Strongly ☐
agree nor disagree disagree

Identifying refinements that could reasonably be applied to increase stakeholder motivation for BOSSS usage, including consideration of separation of differential diagnosis and surveillance components, development options for the mobile phone platform, increased value of BOSSS to end-users in day-to-day operations, and other incentives.

Strongly ☐ Agree ☐ Neither agree ☐ Disagree ☐ Strongly ☐
agree nor disagree disagree

Generating information & recommendations that can flow into a written report of the outcomes of the workshop.

Strongly ☐ Agree ☐ Neither agree ☐ Disagree ☐ Strongly ☐
agree nor disagree disagree