

Zoo Based Wildlife Disease Surveillance Pilot Project

Project Report

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EXECUTIVE SUMMARY

A one year pilot project was conducted to trial the integration of wildlife disease information from zoos into the national wildlife health information system. An independent review found that the pilot project was successful in capturing information that increased the coverage of the wildlife population. The 210 wildlife cases reported by the zoos for the 12 month period represented almost a third of all cases submitted during that period. The data collected was from additional 'catchment' areas, with an increased species distribution and a wider range of presenting syndromes and reporting reasons.

The review also found that the project increased the capacity of the national system to detect emerging diseases, and the capacity and capability of participating zoos to play an effective role in a disease emergency. The review recommended that the program be continued and expanded, with additional focus on epidemiological analysis of data and an increased budget for project coordination.

PURPOSE

This is the final report for the Zoo Based Wildlife Disease Surveillance Pilot Project, or ACERA Project No. 1004, *Post-Border Surveillance Techniques: Review, Synthesis and Deployment; Subproject 2c: 'Zoo-Based Surveillance'*.

This report provides an update to the progress report of February 2011, and outlines the activities and outcomes for the pilot project. A separate report has been prepared by AusVet Animal Health Services (AusVet), consultants conducting an independent review of the project.

PROJECT SUMMARY

The project is a 12 month pilot program to trial the input of wildlife disease information by zoos into the national wildlife health information system. It is a collaborative project between the Australian Wildlife Health Network (AWHN) and the Zoo and Aquarium Association (the Zoo Association) and is sponsored by the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) and the Australian Centre of Excellence for Risk Analysis (ACERA). The project commenced in October 2010. The project team included Lyndel Post from the Wildlife Health and Environment Program, DAFF, Rupert Woods, Keren Cox-Witton and Tiggy Grillo from AWHN, and Andrea Reiss and Martin Phillips from the Zoo Association.

Six major zoos in Australia were selected to participate in the pilot project:

- Adelaide Zoo, SA
- Australia Zoo, QLD
- Healesville Sanctuary, VIC
- Melbourne Zoo, VIC
- Perth Zoo, WA
- Taronga Zoo, NSW

The project collected an agreed data set of disease-related information from free-ranging or rehabilitation wildlife cases seen at the wildlife clinics at the participating zoos. The scope of the project did not include data from zoo collection animals. This project focused on reporting of existing work, rather than expansion of investigation or diagnosis. The participating zoos received initial and ongoing training and support in case selection and data entry. The zoos input data directly into AWHN's web-enabled database (eWHIS) on an approximately monthly basis for the 12 month period of the pilot project.

The data set and the functionality of the project were evaluated by an independent reviewer, AusVet.

The 12 month period of the pilot project ended on 31 October 2011. A decision was made to extend the project to June 2012 while the results of the independent review were considered and while funding opportunities were explored. As there was interest in the project from other zoos and wildlife parks, three new zoos/wildlife parks were added to the project:

- Currumbin Wildlife Sanctuary, QLD
- Sea World, QLD
- Territory Wildlife Park, NT

The continuation and expansion of the project are in line with the recommendations of the AusVet review (see 'Project Review' below).

BACKGROUND AND STRATEGIC DIRECTION

- A nationalised, broad-ranging biosurveillance system is important for economic, health and biodiversity reasons. A strong biosurveillance program helps defend the nation's disease-free status, which must be supported by the capacity for early detection and appropriate response to disease. This project recognises the changing global and national biosecurity environment and addresses these concerns by evaluating a mechanism for incorporation of zoos into a national biosurveillance system.
- The project arose from recognition within the zoo industry of its unique capabilities, potential for a greater contribution to this area, and willingness to work closely with the government to contribute to improved national, regional and global biosecurity outcomes.
- Australian zoos are well positioned to provide valuable wildlife disease surveillance information. More than 10,000 wildlife cases are seen every year by wildlife clinics at six major zoos in Australia. The major zoos employ veterinarians with expertise in wildlife diseases and diagnostics, and a high level of awareness of emerging infectious diseases. In addition, zoos provide valuable connections to networks of wildlife carers, researchers and wildlife/ecological managers.
- The project was initially proposed by AWHN and the Zoo Animal Health Reference Group (ZAHRG). ZAHRG was established under AWHN to provide advice to the Australian Chief Veterinary Officer (ACVO) on zoo industry issues, and has representatives from each of Australia's major zoos and the Zoo Association. A representative of the ACVO and AWHN also participate, and AWHN provides administrative support to the group.
- The project was funded by DAFF and ACERA; participating zoos provided significant in kind contributions.
- The Zoo Association received funding support from the participating zoos for a Regional Veterinary Officer. The Zoo Association Board endorsed the development of this project and deployment of the Regional Veterinary Officer to work with AWHN and with zoos on the project. As well, the Zoo Association developed a multi-model project proposal including planning, risk analysis with costings to support further development of animal health surveillance within zoos.
- AWHN advised the Australian Animal Health Committee (AHC) of the project in October 2010 and AHC has been kept informed of the progress since then.
- The project is consistent with the core business of AWHN of wildlife and feral animal health surveillance and provision of information and intelligence to support national animal and human health programs, and is within the charter of the Zoo Association to promote the work of zoos and aquariums and share knowledge for effective conservation, research and education outcomes.
- Prior to the commencement of this project, Australian zoos were reporting wildlife disease events into the national system, but on an ad hoc basis only.

PROJECT OBJECTIVES

1. To perform a one year trial to integrate wildlife disease information from zoos into the national wildlife health information system.
2. To improve the information flow between zoo veterinarians and the relevant State/Territory agencies within their jurisdiction.
3. To collect 12 months of data on wildlife disease events presented at zoo based wildlife clinics into the central web-enabled database of national wildlife health information administered by AWHN (eWHIS).
4. To determine, through assessment of the pilot project, the potential for expansion of the program to other zoos and wildlife parks around Australia.
5. To perform an analysis of the data obtained from the pilot project to assess its usefulness for informing resourcing decisions about risks of emerging diseases from wildlife and for adding value to Australia's surveillance capacity.

PROJECT ACTIVITIES

1. PROJECT INITIATION

1.1. Project development

- AWHN worked with the Zoo Association, ZAHRG and senior veterinarians from participating zoos to develop the scope and methodology for the project. This included risk planning and briefing of AHC, DAFF and the Zoo Association Board on the objectives and processes of the proposed project. A formal survey was also conducted to collect data on numbers and taxonomic groups of wildlife seen by veterinary clinics at the major Australian zoos over a 12 month period (2009-10).

1.2. Project participant recruitment

- The six major Australian zoos selected to participate in the pilot project all confirmed their participation with a commitment to commence the project at the start of November 2010.
- Veterinarians at each of the six zoos were identified for two project roles: a senior veterinarian as the Coordinator, and a veterinarian for Data Entry. In some cases, one veterinarian performed both roles.

1.3. Participant training

- Training was provided to project participants by AWHN and the Zoo Association, covering the scope and intent of the project, selection of suitable events for reporting and eWHIS data entry. Training was provided in individual training sessions with each zoo, either in person or by phone. Each zoo entered at least one event into the eWHIS database during the training session. AWHN also discussed communication between the participants and their wildlife coordinator¹.
- Each participant received a project induction folder, which included the key project documents, a user guide for eWHIS, and general information about AWHN.
- Ongoing feedback and assistance with data entry and selection of events for reporting was provided to each zoo by the AWHN Project Officer.

¹ There are CVO-appointed wildlife coordinators in each state and territory. This group provides a framework for reporting wildlife disease information into the national wildlife health information system.

- As staff changes occurred at the participating zoos, training and support were provided to new members of the project group. A total of 11 training sessions were delivered by the AWHN Project Officer, at 1.5 to 2 hours for each session.

1.4. Project group meetings

- A total of seven project group meetings were held approximately every 2 months by teleconference, and continue on a quarterly basis.

2. DATA COLLECTION & DOCUMENTATION

2.1. Collection of wildlife health information

- All six participating zoos commenced entering wildlife event information selected from the zoo's November 2010 caseload into eWHIS. All zoos continued to provide monthly reports of selected wildlife disease events for the 12 month period of the pilot project. Participants entered cases on a monthly basis, or at an interval to fit in with their internal reporting practices.
- Participating zoos provided a report of the entered wildlife disease events to the project group at each teleconference, which often prompted useful discussion on unusual, interesting and emerging disease events.
- A total of 241 records were reported into eWHIS by the participating zoos during the 12 month pilot project. Of the events reported, 210 occurred during the 12 month pilot period, and the remainder occurred prior to the commencement of the pilot project and the records were entered retrospectively.
- Useful information was captured through the pilot project that might otherwise not have been reported, or was reported earlier than would normally have occurred. Further detail is provided under 'Project Results' below.

2.2. Project logs & reports

- The AWHN Project Officer maintained the following project logs:
 - *Communications Log*: to record significant communications relating to project participation, project implementation and feedback from participating zoos regarding the project.
 - *Events Log*: to record valuable wildlife disease information collected as a result of the project that: a) might otherwise not have been reported, b) was reported earlier than might have normally occurred, and/or c) resulted in an opportunity for improving information flow and strengthening of the wildlife health network. This log was kept to provide information for the review of the project and any future analysis or project planning.
 - *Activities Log*: to record project activities such as project group meetings, participant training sessions, participant data entry and submission of monthly reports.
- Regular updates and reports have been provided to AHC, AWHN management, the Zoo Association Board and ZAHRG. A progress report was submitted to ACERA in February 2011.

PROJECT OUTPUTS

1. PRESENTATIONS & PUBLICATIONS

- The AWHN Project Officer presented a summary of the project entitled "An Integrated Wildlife Disease Surveillance Plan for Australian Zoos" at the annual Wildlife Disease Association (Australasian section) (WDA-A) conference in December 2010, and included data collected through the pilot project in a presentation on the eWHIS national wildlife health database at the WDA-A conference in September 2011. An update on the project will be presented by the Zoo Association Regional Veterinary Officer at the September 2012 WDA-A conference.

- The Zoo Association Regional Veterinary Officer presented a summary of the project at the annual Zoo and Aquarium Association (Australasia) conference in May 2011.
- A summary of the project was included in the annual *Animal Health in Australia* report in 2010 and 2011.
- Susie Hester from ACERA reported on the zoo pilot project as part of the larger ACERA project at a meeting of the IUCN-SSC CBSG Wildlife Disease Risk Analysis Tool Development working group.
- The Zoo Association Regional Veterinary Officer will present a poster summary of the pilot project at the international Wildlife Disease Association conference in Lyon, France in July 2012.
- AWHN and the Zoo Association intend to submit a summary of the project and its outcomes for publication in a peer-reviewed journal.

2. REPORTING OF WILDLIFE HEALTH INFORMATION

- Events entered into eWHIS by the zoo veterinarians during the pilot project included 61 cases with a diagnosis of a World Organisation for Animal Health (OIE) reportable disease (including diagnoses based only on clinical signs). These diseases included Psittacine Beak and Feather Disease (reportable as 'circovirus'), avian chlamydophilosis, toxoplasmosis and sarcoptic mange. These data contributed to Australia's OIE report. Suspected or confirmed poisoning cases were also reported, and were included in AWHN's regular report to the Australian Pesticides and Veterinary Medicines Authority (APVMA) as part of the Adverse Experience Reporting Program for Agricultural Chemicals.
- Wildlife health information entered into eWHIS by the participating zoos as part of the pilot project was included in AWHN's collated data reports for *Animal Health Surveillance Quarterly* <http://www.animalhealthaustralia.com.au/elibrary> (AHSQ 2010 Volume 15, Issue 4; 2011 Volume 16, Issues 1-4).

PROJECT RESULTS

1. SIGNIFICANCE OF DATA

1.1. Significant information collected

Detailed information regarding significant and valuable information collected through the pilot project was recorded in the *Events Log*. The following are examples of information captured through the pilot project that are unlikely to have been reported into the national system otherwise, or that were entered into eWHIS earlier than might otherwise have occurred.

- Information contributing to a better understanding of syndromes with unknown aetiology:
 - Increased number of sick, injured and dead barn owls in the Sydney region. Data reported through the project enabled a better national picture of this disease event, and provided improved opportunities for collaboration between the zoos and a university.
 - Additional information on cases of recognised syndromes where the cause has not been fully identified e.g. non-suppurative encephalitis in ravens, paralysis in rainbow lorikeets. The project also improved the capability of the network to share samples for testing and research.
- Unusual events or findings that could indicate an emerging syndrome or trend. Of the 241 records entered in eWHIS as part of the pilot project, 177 were classified by the submitter as 'interesting or unusual'. New and emerging diseases or trends are most likely to be identified through reporting in this category. As an example, a potentially significant and emerging disease impacting on rehabilitation success of koalas was reported.
- Information relating to threatened species e.g. Carnaby's cockatoo mortalities.
- Capture of information with potential human health implications e.g. Salmonellosis, angiostrongylosis.
- Improved data capture e.g. reporting of history and clinical signs for bats submitted for testing for Australian Bat Lyssavirus, which is a significant disease with zoonotic risk.

2. STRENGTHENING OF WILDLIFE HEALTH NETWORK

2.1. Dissemination of disease alerts and information requests

- As part of its responsibilities, AWHN regularly distributes disease alerts, requests for information, notification of significant publications and release of guidelines and policy documents. This can assist in early detection of emerging diseases, and keeping veterinarians and others working with wildlife informed of current disease events and recommended biosecurity practices. AWHN administers a number of focus groups that are the target of these communications. The pilot project provided a framework for disseminating this information, and widened the national network of wildlife veterinarians in Australia.
- Examples of communications and notifications that AWHN circulated to the pilot project group included:
 - Pigeon Paramyxovirus: The pilot project provided a framework for AWHN to update zoo veterinarians about the outbreak in Victoria in 2011, to highlight potential implications for zoos and their biosecurity including potential risk to zoo collection birds, and to discuss submission of samples for testing. As it was not initially known whether the virus could spread from domestic pigeons into native species, testing of a variety of birds was important.
 - Hendra Virus: Notification and discussion occurred at a pilot project teleconference regarding the potential for increased risk of Hendra virus in zoo collection equids during the spate of Hendra cases in NSW and QLD in 2011, including discussion about appropriate biosecurity measures.
 - Requests for information: A request for information from the Queensland Centre for Emerging Infectious Diseases on mass abandonments or unusual mass deaths of flying foxes during 2011 was circulated to the group.
 - Neurological disease in horses: A state/territory communication about neurological disease in horses was circulated, with a request to be alert to any wildlife cases which may have been of relevance. This issue was also discussed at a project group teleconference in relation to risk to equids in zoo collections.
 - Policy documents: AWHN advised the group of relevant guidelines and policy documents such as the 'Policy for the Transfer of Biological Specimens to Overseas Laboratories for Infectious and Parasitic Disease Testing' and 'Management of Designated Zoo Animals Imported from Countries at Risk from Transmissible Spongiform Encephalopathies (TSEs)'.

2.2. Improved information flow and relationships between zoos and government agencies

- AWHN strongly encouraged project participants to communicate regularly with their wildlife coordinator, in particular to notify them of significant or potentially sensitive cases that they intended to report into eWHIS. This was discussed in detail at the initial training sessions and repeated at teleconferences and in individual emails. AWHN also kept the wildlife coordinators updated on the progress and activities of the project.
- During the project AWHN noted an increased level of communication between some zoo veterinarians and the government wildlife coordinator. Although in most cases relationships were already established, the project appeared to strengthen these and to improve communication and flow of information.
- Feedback from zoo participants and the Zoo Association Board indicated that they were pleased to be contributing to a project that was beneficial for biosecurity outcomes and for an understanding of wildlife diseases, and that they could see the value of incorporating their information into the national system. They also appreciated that the information they contributed was valued and that zoos' role in biosecurity and surveillance was recognised outside of the zoo industry, particularly by government.
- The project contributed to capacity building for national disease surveillance by establishing a system that could respond rapidly if the need for targeted surveillance arose e.g. in an emergency outbreak situation.
- The pilot project provided a framework to promote the National Significant Disease Investigation program (NSDI), which is managed by Animal Health Australia and provides funding for private veterinarians (including those working in zoos and wildlife parks) to conduct investigations into potentially significant disease events in

wildlife, as well as livestock. The program was promoted by email and discussed at each project teleconference, and several of the participants applied for NSDI funding during the pilot period.

FEEDBACK – PARTICIPANTS & STAKEHOLDERS

Feedback about the pilot project from participants and stakeholders was recorded in the *Communications Log*. Additional comments were collected by AusVet through an online survey of project participants and wildlife coordinators as part of their review of the pilot project (see 'Project Review' below). Examples of feedback are outlined below, to provide an overall impression of the project.

1. ISSUES RAISED

A number of issues and concerns were raised by participants and wildlife coordinators, including:

- Limited funding for disease investigations, including field visits, post mortem examinations and laboratory testing.
- Duplication of data entry effort for zoo veterinarians e.g. additional to entry into zoo clinic databases, primary pathology databases.
- Potential for duplication of data in eWHIS by the wildlife coordinators and zoo veterinarians, such that discussion and coordination is required.
- Limited time and resources for participation in the project, although most zoos reported that the project was not onerous and, at least at current caseload levels, quite manageable.

2. POSITIVE FEEDBACK

Overall the feedback from the project was positive, notwithstanding the issues raised above. There has also been external interest in the pilot project, including a discussion at an international forum (see 'Project Outputs' above). Towards the end of the project, AWHN was approached by the senior veterinarian from a large wildlife park who was interested in his institution joining the project.

Some of the benefits of the project recognised by participants were:

- As mentioned in 'Improved Information Flow' above, participants were pleased to be contributing to the national biosecurity and surveillance effort, and also appreciated the recognition by government agencies of their role in the national system.
- Participants found it beneficial to hear about disease events in other areas and jurisdictions, particularly where similar syndromes were identified in other locations. This helped them to put their own local findings into a broader context and to better understand the disease processes involved. The regular teleconferences facilitated this process. Access to eWHIS gave them the opportunity to see what other events were being reported, although feedback seemed to indicate that only a small number made use of this.
- The teleconferences provided an additional mechanism for communication to those already in place, and an opportunity to hear updates from other institutions.

PROJECT REVIEW

An independent review was conducted by AusVet to assess the data set and the functionality and sustainability of the project. The outcomes of the review are presented in the report "*Review of the Zoo Based Wildlife Disease Surveillance Pilot Project*", December 2011. The key outlined recommendations of the report are provided in summary form below.

Project scope: Continue and expand the project.

Project management: Expand the role of the project coordinators.

Case selection: Consider a two-tier system for data submission, to capture better information on denominator data.

Data management: Conduct additional epidemiological analysis, interpretation and reporting of data; expand publication and distribution of information.

Data integration: Avoid duplication of data entry efforts by integrating systems.

Financial: Maintain or increase the funding to participating organisations, and increase the budget for project coordination. The project should be funded by the Commonwealth as it provides public good at the national level.

CONCLUSION

The Zoo Based Wildlife Disease Surveillance Pilot Project trialled the integration of wildlife disease information from zoos into the national wildlife health information system. It was found to be successful in increasing the scope of information reported into the national wildlife health information system, in expanding the network of veterinarians working with wildlife in Australia, and in improving communication between zoos and government. The plan for the program is further expansion in line with recommendations from the independent review.

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List of Abbreviations

AWHN: Australian Wildlife Health Network

ACERA: Australian Centre of Excellence for Risk Analysis

ACVO: Australian Chief Veterinary Officer

AHC: Animal Health Committee

APVMA: Australian Pesticides and Veterinary Medicines Authority

DAFF: Australian Government Department of Agriculture, Fisheries and Forestry

eWHIS: electronic Wildlife Health Information System

NSDI: National Significant Disease Investigation program

OIE: World Organisation for Animal Health

WDA-A: Wildlife Disease Association (Australasian Section)

Zoo Association: Zoo and Aquarium Association

ZAHRG: Zoo Animal Health Reference Group