



MESSAGE FROM THE DIRECTOR

The past months have highlighted the dangers presented by an invasive organism that has a mindless disregard for our daily activities, economy and, most critically, human lives. COVID-19 has shaken the human world profoundly and continues to do so. Among its significant impacts are a sharpened appreciation for biosecurity and risk management, and the implications of different actions.

The current crisis has also emphasised the high value of trustworthy and illuminating statistics. Epidemiologists and public health experts have been thrust into the spotlight. Daily, decision-makers worldwide are relying on (or ignoring!) statistics and modelling to make decisions with life and death consequences. The public's appetite for enlightening information is no less voracious as the world struggles to gain a reliable and interpretable picture of this evolving situation. Now, more than ever, statistics and science are key to understanding our world and deciding what to do next.

While CEBRA's focus is on pests of agricultural concern, many of these species—for example, Hendra virus—also have implications for human health. Furthermore, there are similarities in the spread mechanics of all invasives, whether they are primarily of agricultural, human health or ecological concern. CEBRA researchers regularly collaborate with our colleagues in human and animal health; recent examples include Dr Richard Bradhurst's Australian Animal Disease (AADIS) model and Dr Susie Hester's work on the damage caused by European wasps and the potential benefits of biocontrol. Further proof of the very valuable work that our researchers are doing was emphasised by Professor Jane Elith's election to the US National Academy of Sciences in April. Hearty congratulations to Jane!

While the pandemic has hindered in-person conferences and meetings, our valuable conversations and engagement have transitioned online. Recently, I presented a talk titled 'Biosecurity by the numbers' as part of New Zealand's Biodiversity

and Biosecurity 2020 webinar series. We have also recently published several papers, as well as a chapter on innovative approaches to evidence-based policy making (more in this newsletter). CEBRA's important research continues, and we are fortunate that our ability to produce high quality research throughout this time has not been impacted.

Andrew Robinson

Managing Director,

Centre of Excellence for Biosecurity Risk Analysis

IN THIS EDITION

- 1 MESSAGE FROM THE DIRECTOR
- 2 THE 18TH AUSTRALASIAN DATA MINING CONFERENCE 2020
- 2 WORKING WITH GOVERNMENT – INNOVATIVE APPROACHES TO EVIDENCE-BASED POLICY MAKING
- 3 HEALTH OF AUSTRALIA'S BIOSECURITY SYSTEM

The 18th Australasian Data Mining Conference 2020

When: 1–4 December

Where: Virtual event

AusDM'20 welcomes data mining researchers and practitioners to share the latest research and developments in data mining algorithms and applications. This year's conference, in conjunction with the IEEE Symposium Series on Computational Intelligence seeks to showcase research prototypes, industry case studies, practical analytics technology and research student projects. AusDM invites contributions addressing current research in data mining and knowledge discovery as well as experiences, novel applications and future challenges.

Call for papers ends: 7 August

ausdm20.ausdm.org

Working with government – innovative approaches to evidence-based policy making

The CEBRA model of how government and science work together to answer biosecurity research questions features in a recently published book chapter. The chapter 'Working with government – innovative approaches to evidence-based policy making', authored by Edith Arndt, Mark Burgman, Karen Schneider and Andrew Robinson is included in *Conservation Research, Policy and Practice*, recently published by Cambridge University Press.

The chapter first discusses the factors that influence the relationship between government policy-makers and scientists. Then, it presents a spectrum of working strategies that can be implemented to improve the effective use of science in policy. One working strategy that has the potential to overcome some of the issues and barriers discussed in the chapter is shared governance, or co-production. The Australian Department of Agriculture, Water and the Environment and CEBRA have adopted this working strategy, developing and managing research priorities collaboratively. The chapter explores the primary features of this successful shared governance model, outlines its advantages and disadvantages and concludes with lessons learnt.

www.cambridge.org/core/books/conservation-research-policy-and-practice/working-with-government-innovative-approaches-to-evidencebased-policymaking/E40F2E11BFE6A89AA72D7E060EA19233

Health of Australia's biosecurity system

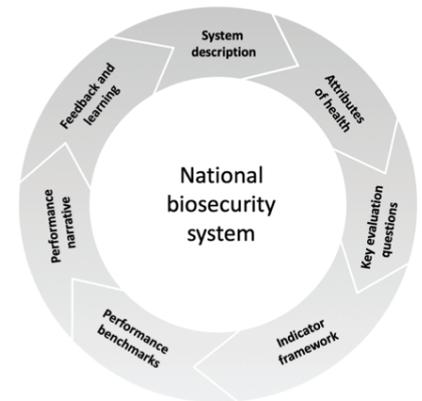
Australia's biosecurity system is complex. Many participants undertake a multitude of activities at different points along the biosecurity continuum to protect the environment, economy, amenity and human health from the negative impacts associated with entry, establishment and spread of exotic pests and diseases. Biosecurity is also a challenging task because the growing volumes of trade and traveller movements increase the risk of invasive pests and diseases. Given the objectives of the biosecurity system and ongoing resource constraints, decision-makers need to allocate limited resources wisely.

CEBRA recently completed a ground-breaking three-year project that can support such decision-making (Schneider and Arndt, 2020). This project focused on evaluating the health, or the performance, of the national biosecurity system. Measuring system performance is essential for making investment decisions, identifying key risk areas in the system and improving the management and effectiveness of existing operations (Craik et al. 2017). It also underpins the accountability of government at all levels. In the past,

performance evaluation was limited to jurisdictional boundaries, but the outcomes of the CEBRA 'Health Project' overcame that barrier and lifted performance evaluation to the national level.

The main objective of this project was to develop a performance evaluation framework that can be used repeatedly to evaluate the health of the national biosecurity system against agreed performance criteria using appropriate performance indicators. The initial stages of the project delivered comprehensive reviews of the concept of system health and the performance evaluation literature in the public sector in Australia and New Zealand. This information formed the basis for the development of a seven-step evaluation framework. CEBRA developed the first four steps: a system description, the attributes of health, the key evaluation questions and the indicator framework. The remaining steps are the subject of implementation. Extensive stakeholder engagement throughout the project influenced and endorsed methodological choices

Adopting a theory-driven approach, CEBRA



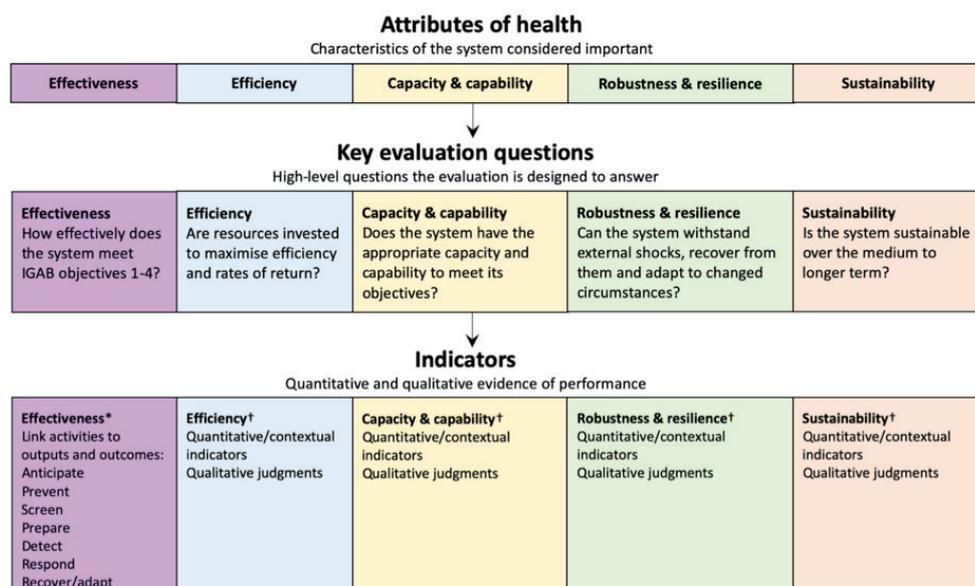
Framework for evaluating the performance of the national biosecurity system

comprehensively described Australia's biosecurity system and represented it in diagrammatic format, which had not been done before. The description of the system is the heart of the evaluation framework because it articulates the links between the inputs into the system, the activities undertaken and the outputs delivered, as well as the immediate and longer-term outcomes. In collaboration with stakeholders, CEBRA categorised the activities in the biosecurity system into activities that *anticipate, prevent, screen, prepare, detect, respond, and recover and/or adapt*. The system description also includes influencers and enablers. These activities underpin the biosecurity system and are fundamental to its performance and the value it creates.

The performance of the biosecurity system will be assessed against five attributes of health:

- effectiveness
- efficiency
- capacity
- capability
- robustness and resilience
- sustainability

The selection of attributes guided the subsequent development of key evaluation questions and indicators.



* Effectiveness indicators apply to each component of the biosecurity system. See effectiveness indicator framework
† Indicators for these attributes apply across the system as a whole. See indicator framework for other attributes of health

Sequence of indicator development

CEBRA developed two indicator frameworks because of the different nature of the attributes of health. One framework applied to effectiveness, which is linked to each component of the biosecurity system. The other framework proposed indicators for the remaining attributes of health that apply to the system as a whole. We proposed quantitative and qualitative indicators of performance because a mixed methods approach enhances evaluation outcomes. The method included the use of rubrics as a tool to capture qualitative information. A rubric is a form of constructed scale that provides a structured and transparent process for articulating the aspects of performance that are important. Rubrics are widely used in educational settings and are now increasingly being used in program evaluation. Applying them to evaluate system performance, however, may be novel.

The Department of Agriculture, Water and the Environment has endorsed the project outcomes. The next step is to implement the framework, which requires a number of considerations around governance and planning. The last three steps of the evaluation framework (performance benchmarks, performance narrative, and feedback and learning) will be informed by the implementation process.

For more information, including a link to the final report, please visit:

cebra.unimelb.edu.au/research/building-scientific-capability/health-of-australias-biosecurity-system

Craik, W, Palmer, D & Sheldrake, R 2017 Priorities for Australia's biosecurity system. An independent review of the capacity of the national biosecurity system and its underpinning Intergovernmental Agreement. Department of Agriculture and Water Resources, Canberra.

Schneider, K. and Arndt, E. 2020. CEBRA project 170714: Evaluating the health of Australia's biosecurity system. CEBRA technical report for the Department of Agriculture, Water and the Environment.



Follow CEBRA on Facebook

<https://www.facebook.com/cebrauom/>



Follow CEBRA on Twitter

https://twitter.com/CEBRA_UoM?lang=en

To subscribe to the CEBRA newsletter visit <http://cebra.unimelb.edu.au/engage/contact-us>