# Healthy Animals | Healthy Future 2025

## From foresight to insight to action > applying foresight to Animal Health Emergency Management in Canada

*Fore-CAN: Foresight for Canadian Animal Health*

*September 2011*

Fore-CAN • Pré-CAN

*Foresight for Canadian Animal Health*
*Prospective en santé des animaux au Canada*





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# Message from the Champion

As Champion of Foresight for Canadian Animal Health (Fore-CAN), I am proud to present the summary report of this unique initiative, which applied foresight methods to shape a more effective animal health emergency management system for Canada.

Over the past decade and more, it has become increasingly apparent that animal health threats represent a collective challenge to the well-being of Canadians. Our economy, the health and welfare of our animal populations, the environment, and the health and livelihoods of thousands of Canadians are increasingly vulnerable, directly or indirectly, due to an array of infectious diseases, toxic contaminants and environmental disasters that have implications for animal health. The Fore-CAN initiative has provided an opportunity for partners in Canadian animal health management to engage in long-term, collaborative thinking about how to collectively improve our ability to manage animal health emergencies in the face of accelerating change, complexity and uncertainty.

During Fore-CAN's three years (2008-2011), more than 300 participants from the federal and provincial governments, farming and food production, and academia used a variety of foresight activities to spark rich discussions about the future and the requirements of an effective and robust animal health emergency management system. A Shared Vision was developed, along with an animal health risk management framework that emphasizes the significance of the convergence of health systems: animal health, public health, ecosystem health and economic health. A corresponding capability-based roadmap provides direction for ongoing improvements to the animal health emergency management system. Two unique tools for use by members of the animal health community as well as others were also developed: The Fore-CAN Foresight Guide and The Fore-CAN Capability Tool. The outcomes of Fore-CAN are shared in this Summary Report, along with descriptions of the foresight methods that were employed.

There were also some less tangible though equally powerful outcomes of Fore-CAN. The multi-jurisdictional and multi-disciplinary nature of foresight helped break down any barriers and siloed thinking among participants. A spirit of collaboration and openness enabled a holistic approach that was crucial to achieving the Shared Vision. I am confident that the strong relationships that have been developed will provide a lasting foundation of understanding, cooperation and trust as animal health risk managment is informed by Fore-CAN.

I want to take this opportunity to thank all the participants who provided their perspectives, experience and wisdom on this initiative, and our international and Canadian advisors who helped guide us through the foresight activities. I especially want to thank the project partners, whose enthusiasm and commitment to excellence provided the momentum to deliver the important results that have been achieved. I also want to thank our major funder, the Canadian Research and Technology Initiative (CRTI), for their belief in the power of foresight as a catalyst for change.

As the Fore-CAN initiative comes to a close, I don't see this as an end but rather as a new beginning for animal health emergency management. I encourage all members of the animal health and welfare community to maintain the Fore-CAN legacy by continuing to engage in forward-looking thinking and collective and coordinated activities to ensure "Healthy Animals, Healthy Future 2025".

*Martine Dubuc*

Dr. Martine Dubuc, Fore-CAN Champion,
Vice-president Science, Canadian Food Inspection Agency (CFIA)
September 2011

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# Healthy Animals | Healthy Future 2025

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## *Fore-CAN: Foresight for Canadian Animal Health*

# Executive Summary >

Foresight for Canadian Animal Health (Fore-CAN) is an innovative, multi-partner initiative that applies foresight methods to support new ways of thinking about the animal health emergency management (AHEM) system in Canada. Led by the Canadian Food Inspection Agency (CFIA), Fore-CAN (2008-2011) is funded by the Centre for Security Science (CSS) of Defence Research and Development Canada (DRDC) through the Chemical, Biological, Radiological-Nuclear and Explosives (CBRNE) Research and Technology Initiative (CRTI) and in-kind contributions of partner organizations.

Fore-CAN was launched in response to concerns from the animal health and welfare community that failure to anticipate and prepare for future challenges from new, existing or as yet unknown threats to healthy animal populations could lead to catastrophic consequences for the health of Canadians and Canada's economic health. In a series of foresight activities, a diversity of animal health and welfare experts, practitioners and stakeholders from across Canada and around the world are exploring the following question: How can Canada build a more effective and robust animal health emergency system for 2025 and beyond?

Foresight represents an evolving set of systematic methods that, when applied together, help participants move their thinking beyond traditional short- to medium-term planning to a horizon ten or more years in the future. Foresight activities help people with diverse points of view share, explore and test assumptions about change, uncertainty and complex interactions. Foresight leads to common understanding as participants imagine a range of plausible "futures" and the strategic options that might be necessary to meet the challenges of those futures.

The methods used in a foresight initiative depend on the question to be answered and the time available, resources, funding and other factors. Fore-CAN participants, who included representatives from federal and provincial governments, industry, academia, the veterinary community and non-governmental organizations in Canada and abroad, followed a stepwise process that included five foresight activities:

1. *Scanning* to identify driving forces and their implications for animal health.
2. *Scenario development* to consider possible and plausible future operating environments.
3. *Systems mapping* to capture the current activities and authorities in order to identify gaps and duplications.
4. *Integration* to develop strategic options.
5. *Validation* to confirm assumptions and direction.

The convergence of perspectives that emerged led to the development by participants of a Shared Vision for "Healthy Animals, Healthy Future 2025." It reflects participants' acceptance of and appreciation for shared responsibility for the animal health emergency management system by all members of the animal health and welfare community, and recognizes the inextricable interconnections among the economy, the environment, public health and animal health. The goal of the vision is to manage animal health and welfare risks and preserve economic prosperity, public health and the environment. The challenge is to build an AHEM system that addresses current needs while ensuring the ability to adapt to threats and opportunities of the future.

***Shared Vision:*** *Healthy Animals, Healthy Future 2025. Animal health will be recognized as a key pillar in the preservation and promotion of Canada's health and economic prosperity. In keeping with that perspective, Canada's animal health emergency management system will be anticipatory, adaptable, agile and seamlessly integrated with human, economic and environmental health systems.*

Other outcomes of the foresight activities support this shared vision.

- ***The Fore-CAN Integrated Risk Management Framework*** comprises five risk management action areas (anticipate; prevent; prepare; respond; and recover and renew) and five capability areas (Organization and Decision-making; Science and Technology; Expertise and Personnel; Policy, Law and Regulation; and Information and Data-sharing) that will need to be developed further to create a more integrated, agile and adaptive animal health emergency management system.
- ***The Fore-CAN Integrated Animal Health Emergency Management Roadmap*** identifies key outcomes in the short, medium and long terms, as well as candidate initiatives for building the requirements of each capability area.

The Fore-CAN initiative also led to the creation of unique tools for use by members of the animal health community and others. The Foresight Guide is a virtual resource that introduces users to the various foresight activities and the principles of collaborative future-thinking.

The Fore-CAN Capability Assessment Tool (FCAT) provides a systematic process to help organizations identify gaps and priorities and plan their animal health emergency management requirements so that they are aligned with the principles of integrated animal health risk management.

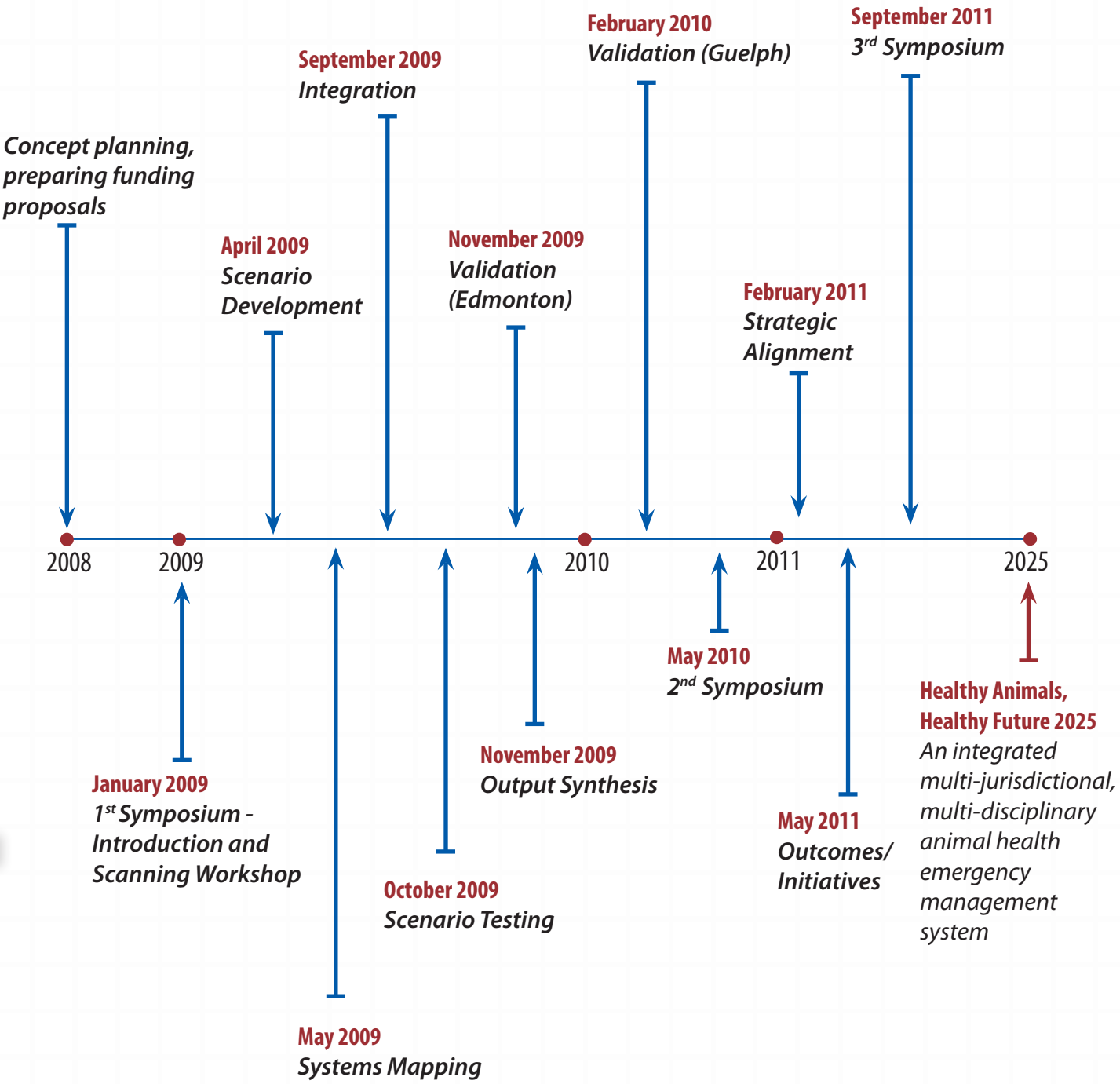
Throughout the Fore-CAN initiative, participants gained insights about foresight, including the ability of foresight activities to build relationships and trust among diverse stakeholders, to develop shared understanding of complex issues, and to illustrate connections among processes, functions and organizations within a multifaceted system. Insights were also gained about future threats and challenges, including their interconnectedness, uncertainty and volatile nature and how they may impact animal health, and about the complexity of the animal health emergency management system, which has interdependencies across jurisdictions, sectors and disciplines and intrinsic linkages among human health, ecosystem health, animal health and economic health. The importance of ongoing partnerships and a holistic approach to animal health risk management were other learnings coming out of the initiative.

The systematic and collaborative foresight activities of the Fore-CAN initiative harvested the wisdom and experience of more than 300 participants and 40 organizations. The key achievements of the Fore-CAN initiative include:

- *Foresight as an effective and powerful catalyst for change, action and innovation.* Participants have an understanding of foresight methods and how they can be used to anticipate future requirements.
- *An AHEM community*. New relationships and partnerships have been formed and a network of stakeholders with a common vision, commitment to collaboration and mutual trust has been developed.
- *A system-level, capability-based framework and roadmap for AHEM in 2025.* A shared vision has been established along with a framework for action and tools to assist decision-makers in planning and investing in capabilities to achieve desired outcomes within the complex AHEM environment.

The Fore-CAN initiative closes with its final Symposium and Working Session in September 2011. But Fore-CAN's vision for Canada's animal health emergency management system does not end there. Fore-CAN's principles are founded on the understanding that the foresight process must be continually applied to anticipate future threats. The animal health community must remain engaged and committed to this innovative and important work.

# Fore-CAN Timeline



# PART 1 – What is Fore-CAN?

Foresight for Canadian Animal Health (Fore-CAN) is an innovative, multi-partner initiative that is applying foresight methods to support new ways of thinking about how to build a better animal health emergency management (AHEM) system in Canada. It was launched in response to concerns from the animal health and welfare community that animal health challenges are increasingly more complex, uncertain and difficult to manage.

### Fore-CAN Partners

- *Canadian Food Inspection Agency*
- *Agriculture and Agri-Food Canada*
- *Public Health Agency of Canada*
- *Health Canada*
- *Alberta Agriculture and Rural Development*
- *Ontario Ministry of Agriculture, Food and Rural Affairs*
- *Canada's Veterinary Colleges*
- *Dairy Farmers of Canada*
- *TDV Global Inc.*

The AHEM system is considered to be the network of organizations, infrastructure and people that share a responsibility for mitigating risks to Canada that are associated with threats to the health and welfare of animal populations. These risks are most often exemplified by infectious diseases that can have wide ranging consequences to humans, the economy and the environment and well as animals.

Led by the Canadian Food Inspection Agency (CFIA), Fore-CAN (2008-2011) is funded by the Centre for Security Science (CSS) of Defence Research and Development Canada (DRDC) through the Chemical, Biological, Radiological-Nuclear and Explosives (CBRNE) Research and Technology Initiative (CRTI) and
in-kind contributions of partner organizations.

Fore-CAN's three foundational objectives are:

- to learn about and use foresight methods to gain insight into future threats and opportunities;
- to apply the resulting insight to guide planning and investments in capabilities, capacities and competencies within the AHEM environment; and
- to share and transfer the knowledge gained with respect to the application of foresight methods and their potential benefits in order to enhance the AHEM system in Canada.

### Purpose of this Summary Report

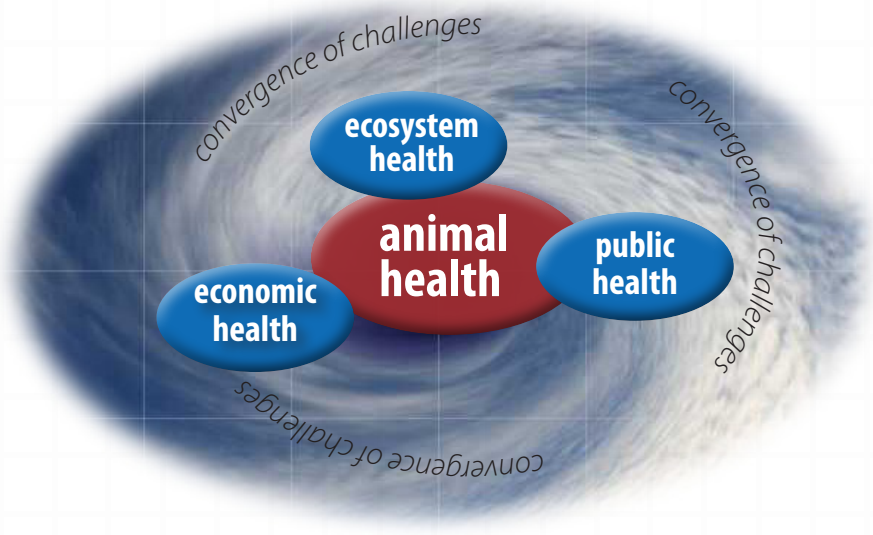
The purpose of this report is to provide a summary of the Fore-CAN initiative, including the foresight activities used and the insights gained, and to present the vision and future direction for Canada's AHEM system that were developed through the use of foresight. The report also includes the Fore-CAN Symposium and Working Session (September 2011) Report, which identifies the next steps for Fore-CAN Symposium (see Annex A) Readers will also find information about and links to the Fore-CAN virtual Foresight Guide (see Annex B) and the Fore-CAN Capability Assessment Tool (see Annex C).

# PART 2 – Convergence of Challenges

## *Defining the problem*

Around the world, animal health-related events, including outbreaks of infectious disease, are appearing with greater frequency and intensity. In Canada, the recent occurrence of highly pathogenic avian influenza (AI) and bovine spongiform encephalopathy (BSE) demonstrated the importance of an effective animal health emergency management system. These events had direct impact on the health of Canadians, the environment and the economy.

The convergence of a number of factors is influencing the emergence and re-emergence of infectious diseases that threaten healthy animal populations – and human, environmental and economic health. Some factors are genetic and biological, such as microbial adaptation and antimicrobial resistance, while others are demographic and societal, such as the world's growing population and increasing demand for animal protein. There are human behaviour influences, such as increasing urbanization and the loss of agricultural lands. There are also factors related to climate change and ecosystem pressures, such as fresh water access and food sustainability. These and other factors and influences add up to a "perfect storm" of vulnerable humans and animals and fragile and changing environments and economies. As infectious diseases traverse regional, national and international boundaries, local problems in one part of the world rapidly become global problems.



Failure to anticipate and prepare for future challenges from new, existing or as yet unknown threats to healthy animal populations could lead to catastrophic consequences for Canada and Canadians. But how does the animal health and welfare community get ahead of the wave of change?

The Fore-CAN initiative seeks to engage Canada's animal health and welfare leaders and stakeholders in a process that facilitates future-focused thinking in a multi-jurisdictional, multi-disciplinary environment. In a series of foresight activities, a diversity of animal health and welfare experts, practitioners and stakeholders from across Canada and around the world are exploring the following focal question:

***How can Canada build a more effective and robust animal health emergency system for 2025 and beyond?***

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***Some examples of recent animal health events and their wide-ranging consequences:***

- **Avian Influenza:** Repeated outbreaks of Avian Influenza (AI) in several provinces due to interactions with wildlife created a potential zoonotic threat to human health and resulted in significant culls of animals on local farms and severe economic losses.
- **Foot-and-Mouth Disease:** Foot-and-mouth disease erupted among livestock in the United Kingdom, contributing to significant losses in trade, social outrage and environmental issues associated with mass disposal of animal carcasses, and psycho-social and other direct and indirect impacts on human health (including stress and loss of livelihood).
- **Water Contamination:** Manure from apparently healthy livestock spread on farmland near the town of Walkerton, Ontario, contaminated the local water supply, leading to deaths and significant illness among the population as well as lost income and economic hardship.
- **BSE:** The discovery of bovine spongiform encephalopathy (BSE) in Canada in May 2003 caused the United States and other countries to close their borders to shipments of Canadian live cattle and beef products. By the end of 2004, financial losses for Canadian beef producers as a result of BSE had reached $5.3 billion.

> *While zoonotic diseases have always been a part of our lives, the convergence of animal and human health over the last two decades and the creation of new emerging and re-emerging pathogens has been unprecedented. The mingling of animals, both domestic and wildlife, animal products, and people has created a microbial milieu that not only favors the emergence of zoonoses, but suggests that this era of emerging and re-emerging zoonoses will likely continue unabated.*
>
> *Dr. Lonnie King, Dean, Ohio State University Veterinary College, and former Director of the Center for Disease Control and Prevention's National Center for Zoonotic, Vector-Borne and Enteric Diseases*

# PART 3 – Convergence of Thinking

## *Applying foresight*

### What is Foresight?

Foresight represents an evolving set of systematic methods that, when applied together, help participants move their thinking beyond the traditional one- to four-year strategic planning horizon to one that is ten years or more in the future. Foresight activities also encourage people to think at a system level rather than as individual stakeholders or organizations. The methods used in a foresight initiative depend on the question to be answered and the time available, resources, funding and other factors.

The participatory nature of foresight activities encourages understanding of the perspectives of others. Foresight helps people with diverse points of view – such as members of the animal health and welfare community – share, explore and test their assumptions about issues or problems and how they might evolve in an uncertain world. Ongoing discussions about a wide range of possibilities, uncertainties and potential impacts lead to a convergence of thinking as participants work toward a shared vision and common perspective.

### Foresight Success Factors

*The critical keys to success in government-led foresight programs include:*

- ✓ Focus on a clearly identified problem.
- ✓ Establish a clear link between foresight and today's policy agenda.
- ✓ Nurture direct links to senior policy-makers.
- ✓ Create strong public–private partnerships.
- ✓ Develop and employ methodologies and skills that are not always used in other departments.
- ✓ Ensure a clear communication strategy.
- ✓ Integrate stakeholders into foresight programs.
- ✓ Take advantage of the existence of, or create, a national–local academic receptor and training capacity.

*Adapted from "Critical success factors for government-led foresight", by Jonathan Calof and Jack E. Smith, Science and Public Policy, February 2010*

But foresight is not about predicting or forecasting the future. Rather, it is about thinking about change, uncertainty and complex interactions in order to anticipate a range of plausible "futures." The insights arising from conversations about these futures can then be used to develop policies and strategies to mitigate threats and take advantage of opportunities while moving toward a desired vision.

*Foresight is the ability to create and maintain viable forward views and to use the insights arising in organizationally useful ways"*

*Richard Slaughter, author of The Biggest Wake Up Call in History*

Foresight is especially useful for helping participants develop options for managing "wicked" problems – those that have the potential for significant costs and long-lasting effects and that are exceedingly difficult or impossible to resolve. Many animal health challenges present as dilemmas of this nature, requiring long-term management strategies involving all members of the stakeholder community.

In the face of such problems, traditional jurisdictional, disciplinary and sectoral boundaries lose their relevance. That's why successful foresight activities are based on the collaborative efforts of a broad range of participants.

## Foresight for Canadian Animal Health

The Fore-CAN initiative applies foresight to shape a future direction for Canada's animal health emergency management system. Fore-CAN partners and stakeholders include participants and advisors from federal and provincial governments, industry, academia, the veterinary community and non-governmental organizations in Canada and abroad.

Foresight methods help people and organizations share, explore, and test their assumptions about how the world is changing and what it means for the organization or the problem. For the Fore-CAN initiative, the following methods have been used to encourage the convergence of thinking toward a common vision for the future:

1. *Scanning* to identify driving forces and their implications for animal health.
2. *Scenario development* to consider possible and plausible future operating environments.
3. *Systems mapping* to capture the current activities and authorities in order to identify gaps and duplications.
4. *Integration* to develop strategic options.
5. *Validation* to confirm assumptions and direction.

**The Fore-CAN initiative enaged a community of stakeholders from widely diverse backgrounds, including:**

- *Academics*
- *Consumers*
- *Cultural Groups*
- *Farmers*
- *Futurists*
- *Government representatives*
- *Industry representatives*
- *Legal experts*
- *Policy experts*
- *Scientists*
- *Students*
- *Wildlife experts*

The Fore-CAN initiative followed a stepwise process that moved participants along a continuum of foresight activities. Each step led to both learnings about the process of foresight and insights about the nature of Canada's animal health emergency management system of the future.

## 1. Foresight Activity: Scanning

In January 2009, 80 participants from across Canada's animal health community as well as international experts participated in a foresight workshop that comprised a scan of past, present and future trends and drivers. The first exercise asked participants to consider, "*What are the past and present driving forces that have shaped the current situation of managing animal health emergencies?*"

While it may seem somewhat paradoxical, thinking about past and current events and changes helps ground thinking about the future in reality, as it provides a sense of the extent of past change and thereby a sense of the potential magnitude of future change. This thinking also provides insight on the drivers of change.

The second exercise focused on future changes and driving forces: "*What are the driving forces that will create the future? What changes could occur that could impact your ability to anticipate, prepare for and respond to future risks to animal health?*"

Themes or clusters of drivers emerged, as presented in the following diagram.


All these driving forces exert pressure on the animal health emergency management system. Each represents an important dimension of change and has potential for impact on human or animal health, the economy, or the environment. Some have potential for significant impact on one or more or all domains. Some forces have outcomes that are predictable, while others are highly uncertain.

Forces that are *both* high impact and highly uncertain are defined as "critical uncertainties." Participants at the workshop considered Societal Values and Nature of Infectious Diseases to be critical uncertainties.

**Societal Values** focuses on society's views and expectations about animals and their role in society. Will society view animals from a predominantly human-centric, economic perspective? Or will society view animals from a predominantly holistic perspective that represents the convergence of human health, animal welfare, environmental and economic concerns?

**Nature of Infectious Diseases** focuses on the emergence of new diseases and their spread. Will new diseases remain primarily within existing pathogen classes, stable in their rate and regional in their extent? Or will new diseases emerge in new classes of pathogens and spread globally in an accelerated manner?

***What was learned from this foresight activity?***

- The participative nature of the scanning activity helped to:
  - validate the focal question;
  - concentrate thinking around the key areas that need to be addressed; and
  - develop a shared understanding of the focal question among a diverse group of participants.
- The scanning activity engendered a sense of common understanding and purpose across a diverse group of participants.

***What insights were gained about future challenges?***

- Driving forces that are impacting AHEM are often interconnected and have direct and indirect consequences for areas outside of what has been traditionally considered to be "animal health."
- A future system will need to manage risk in the midst of constant and rapid change across many fronts, especially the highly uncertain and unpredictable shifts in societal values and the complex, unpredictable and volatile nature of infectious diseases.
- Animal health and welfare stakeholders must collaborate today to develop future-ready strategies to better anticipate, prevent, and manage animal health challenges of the future.

## 2. Foresight Activity: Scenario Development

A two-day workshop was held in Ottawa in April 2009 to develop "scenarios of the future."

Scenarios are descriptions of the future — stories, images or maps describing plausible futures focused on a specific area, topic or question. The objective of scenario development is to provide a "thinking space" for participants to gain insight into how forces and converging factors might create a range of potentially very different future situations. Participants must consider not what will happen, but what would they do if it did happen.

Scenarios provide a context for identifying and analyzing strategic issues, risks and opportunities. They chart the waters ahead so that the consequences of today's decisions can be played out, evaluated and tested against the uncertainty of the future. This encourages the development of robust strategic options that would be effective across a range of future outcomes.

In this way, scenarios become vehicles for strategic conversations, learning and planning. They provide a framework for identifying issues, generating strategic responses and understanding the consequences of different policy approaches and decisions.

As part of the Fore-CAN initiative, the development of scenarios was intended to challenge participants' assumptions, explore issues and broaden shared understanding of the range of future operating environments for animal health emergency management in Canada. The scenario development process considered all of the uncertainties and risks associated with the trends and drivers that had been identified in the scanning exercise, with particular emphasis on what participants considered to be the two critical uncertainties: societal values and nature of infectious diseases.

The scenarios developed describe four distinctly different and plausible operating environments for animal health emergency management in 2025. Based on the characteristics they displayed, the scenarios were dubbed "Asleep at the Wheel," "One World, One Health," "Safe Food Inc." and "In My Backyard."

Each scenario stimulates further thinking about the potential risks, threats, challenges and opportunities – and how the trends and drivers may impact the animal health emergency management system.

## The Scenarios at a Glance

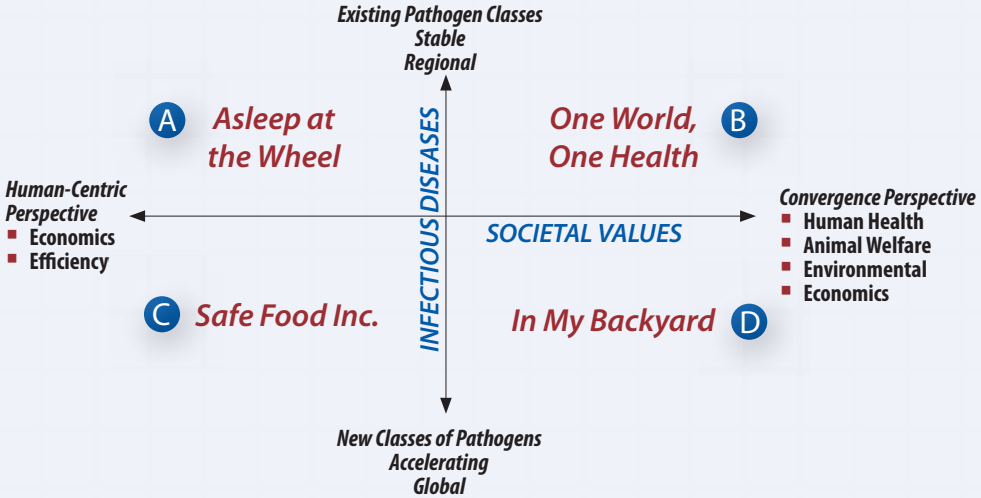
A In **"Asleep at the Wheel,"** there is a focus on food animal production efficiency. Relatively successful response and mitigation to a series of disease outbreaks leads to complacency and declining investment in the animal health emergency management system.

B In **"One World, One Health,"** the economic recovery does not lead to a return to old habits. Instead, people link their food consumption decisions to animal health and welfare and environmental consequences. A shift toward consuming less and travelling less reduce the risk of global disease spread. Periodic, regionally contained outbreaks demonstrate the value of the animal health emergency management system.

C In **"Safe Food Inc.,"** the economic recovery fuels a desire to get back to business. Global trade and travel resumes. Early on, there are new, rapidly mutating pathogens and escalating and accelerating global outbreaks of infectious diseases. The media amplifies events and public outrage spikes. The focus falls to assuring human health security and mitigating financial impacts as animal health, animal welfare and environmental concerns wane.

D In **"In My Backyard,"** a series of unconstrained global disease outbreaks undermines public confidence in the agriculture and food system, and leads to reactive policies, prescriptive regulations and rigorous enforcement that dramatically alter the industry.

### *ANIMAL HEALTH EMERGENCY MANAGEMENT* SCENARIO FRAMEWORK



***What was learned from this foresight activity?***

- Scenario development helps broaden thinking so participants understand the range of possible future conditions and risks.
- The scenario development process continues to build relationships and trust among diverse stakeholders.
- The resulting scenarios create a sense of "ownership" to the foresight process among participants.

***What insights were gained about future challenges?***

- The world will look very different in 2025 and beyond depending on how the driving forces emerge and how they converge with other factors.
- Our challenge is to build a robust AHEM system that can manage risk across a wide range of plausible conditions.

> *Good scenarios are plausible, realistic, recognizable from the signals of the present, creative in exploring new ground and ideas, relevant and significant to the organization, internally consistent, and challenging.*
>
> *$S^2S$ – Scenarios to Strategy Inc.*

## 3. Foresight Activity: Systems Mapping

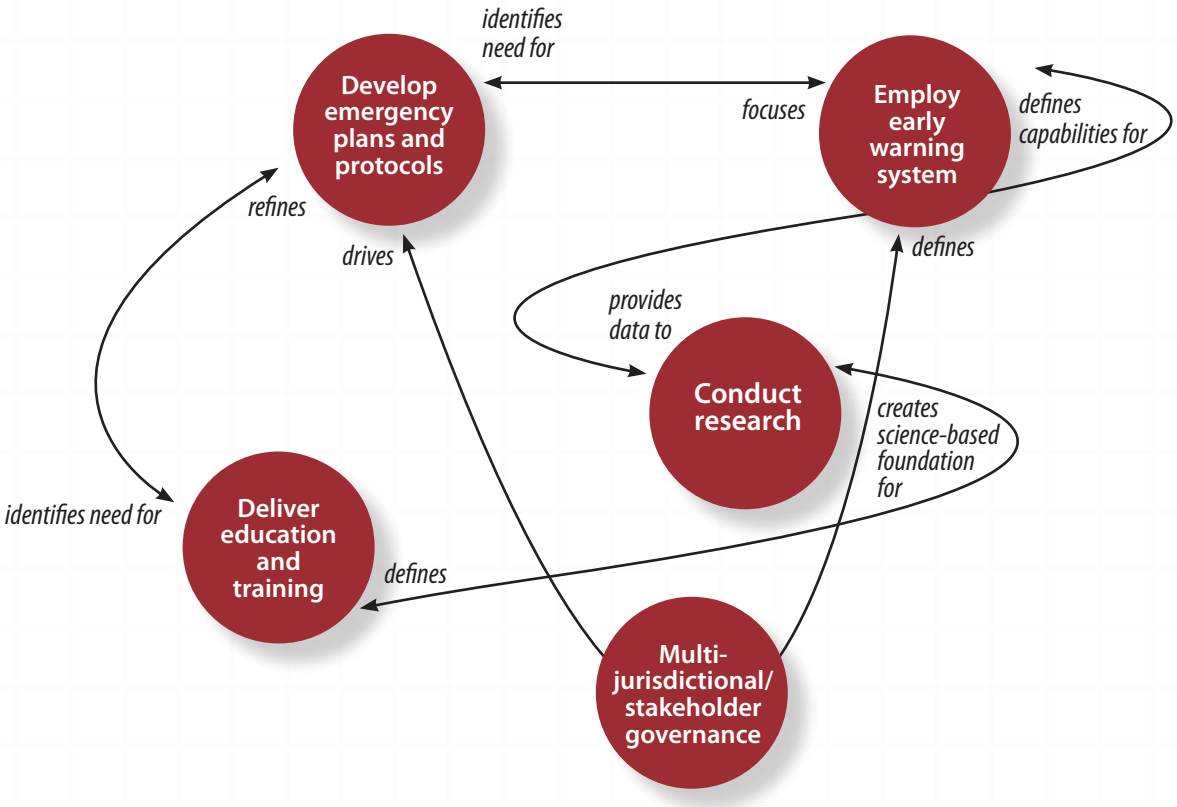
Whereas scenario development focuses on an exploration of possible futures, systems mapping focuses on current systems and operations.

Fore-CAN participants attended a two-day workshop in Ottawa in May 2009 to describe the various processes used today to manage animal health emergencies. Systems maps were drawn for each of the four traditional AHEM areas of prevention, preparedness, response, and recovery.

The maps set out the primary processes or elements for each area as well as the "impact relationships" that exist among those elements. The impact relationships were characterized as strong (formal linkages with strong infrastructure, established policies, funding priorities, etc.) or moderate ("influential" linkages that may be informal, individual driven, ad hoc, etc.).

The systems maps provided a foundation for further analysis to identify areas of duplication, gaps or other leverage points for intervention to improve AHEM processes and promote more cohesive and collective efforts.

### Segment of the Preparedness Subsystem Map



***What was learned from this foresight activity?***

- Systems maps illustrate the connections among processes, functions and organizations and help identify duplication, gaps and leverage points.
- Foresight is not just about averting threats – it can be a very useful tool for identifying and capturing opportunities, for example to reduce duplication or close gaps.

***What insights were gained about future challenges?***

- The AHEM system is complex, with interdependencies across jurisdictions and disciplines.This reinforces the importance of the ongoing collaboration of the animal health and welfare community.
- The current AHEM system works differently depending on the disease; this may not be a sustainable approach in the future.
- While there are complex interactions within each subsystem, it is important to remember that there are also relationships among elements across the four subsystems.
- The current AHEM is well structured and managed for emergencies related to known animal diseases, but not as well designed to meet the challenges of other animal diseases or other hazards, such as emerging diseases and bio-terrorist threats.
- Greater attention needs to be placed on anticipating animal health risks.

> *Systems thinking is holistic; it attempts to derive understanding of parts from the behavior and properties of wholes, rather than derive the behavior and properties of wholes from those of their parts."*
>
> *Russell L. Ackoff (1919-2009), American Organizational Theorist*

## 4. Foresight Activity: Integration

The outcomes of the trends and drivers, scenario development and systems mapping foresight activities came together with the integration activity. At a workshop in Ottawa in September 2009, participants considered, *"Given the current system, what options exist that will meet the challenges of the future identified in the scenarios?"*

The objective of this activity was to link the future challenges facing the AHEM system and the system requirements needed to meet those challenges. It led to the development of strategic options for ensuring adequate capabilities to effectively manage animal health emergencies in the future.

System requirements are qualities or characteristics that a system must have in order to successfully address an identified strategic challenge, such as the challenges raised in the scenarios. Examples of systems requirements include reduced complacency, active vigilance, flexibility, distributed communications, transparent command structures and effective surveillance.

Systems requirements also include those needed for the AHEM system as a whole to meet future challenges. Examples include capacity for public engagement, surge capacity, ability to muster significantly greater resources quickly, and the capacity to anticipate the emergence of new threats such as potential pathogens.

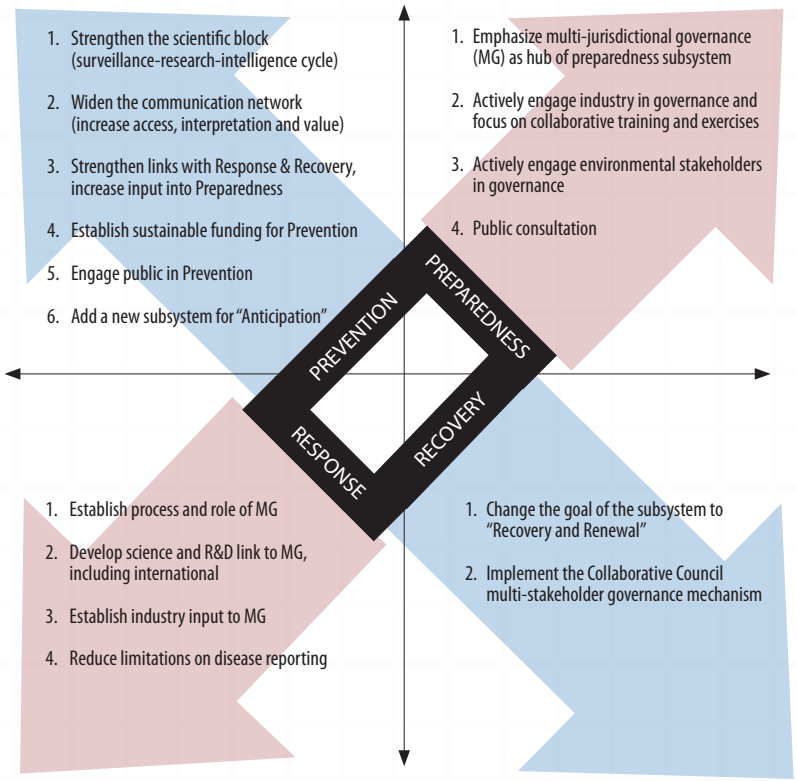
The integration activity also considered the design criteria that would be required for an effective future AHEM system. Participants explored the existing relationships that could be strengthened, weakened or changed, processes that could be changed or improved, decision-making points, and overall goals of each subsystem. A key outcome of these discussions was the addition of "anticipation" as a separate subsystem and the expansion of the "recovery" subsystem to also include "renewal."

> *The only relevant discussions about the future are shifting the question from whether something will happen to what we would do if it did happen.*
>
> *Arie de Geus, former Head of Shell Oil Company's Strategic Planning Group from 1951 to 1989*

The following table provides an example of work done during this foresight activity.

***Strategic Options for AHEM System, by Subsystem***

***CRITICAL STRATEGIC OPTIONS MATRIX***




***What was learned from this foresight activity?***

- Foresight is a systematic, step-by-step process: the insights arising from one activity inform assumptions and thinking in subsequent activities.
- The foresight activities of scanning, scenario planning and systems mapping built the sense of community required to tackle the integration activity.
- Potentially transformative strategic options have been identified from the integration activity.

***What insights were gained about future challenges?***

- "Anticipation" should be considered as a key, stand-alone subsystem.
- Recovery without renewal perpetuates the same state of vulnerability; "recovery and renewal" should be considered as a key, stand-alone subsystem.
- All subsystems of the AHEM system are equally important.
- An integrated, systems-wide approach is needed: complexity and convergence must be managed holistically.

## 5. Foresight Activity: Validation

This activity sought to validate the insights and findings of the Fore-CAN initiative to date with additional groups of stakeholders in Alberta (October 2009) and Ontario (February 2010). Participants included people from a variety of sectors both inside and outside the core Fore-CAN animal health stakeholder community.

The project validation workshops provided the opportunity for Fore-CAN partners to share the foresight process learnings and the insights gained about the animal health emergency management system of the future. Participants then provided their perspectives on the implications for their provincial animal health emergency management systems.

***What was learned from this foresight activity?***

- Foresight methods effectively shaped an appreciation for future challenges and an understanding of AHEM system requirements to meet those challenges.
- Foresight is a "learning journey" – participants both contribute to and benefit from the process.
- Provincial perspectives indicated that the Fore-CAN initiative is on the right track: the learnings and insights from the initiative are relevant and compatible with provincial perspectives.

***What insights were gained about future challenges?***

- As AHEM is a shared responsibility between federal and provincial governments, an effective AHEM system requires alignment across jurisdictions.
- Collaboration and partnerships will be crucial for success.

# PART 4 – Convergence of Perspectives

## *Creating a Shared Vision*

In a future world dominated by complexity and accelerating change, solutions are required that build on the many linkages and interactions that span jurisdictional boundaries and cross science, health and public policy communities. Throughout the foresight activities applied in the Fore-CAN initiative, discussions consistently pointed to the need for a collaborative, multi-disciplinary approach to Canada's future AHEM system. In keeping with One Health concepts, Fore-CAN participants highlighted the connectedness of healthy animals, healthy ecosystems and healthy citizens. However, Fore-CAN participants further emphasized the importance of healthy animals to a healthy economy.

The convergence of perspectives that emerged from the foresight activities point to a new, more broadly defined paradigm: one that links public health, animal health, environmental health and economic health. When planning the capabilities and resource requirements of an animal health emergency management system, a healthy animal resource base must be recognized as an integral element in Canada's future prosperity and social well-being.

### *One Health*

The international One Health Initiative defines the concept of "One Health" as "a strategy for expanding interdisciplinary collaborations and communications in all aspects of health care for humans, animals and the environment. It proposes an international, interdisciplinary, cross-sectoral approach to surveillance, monitoring, prevention, control and mitigation of emerging diseases, as well as to environmental conservation."
Fore-CAN's animal health perspective has also brought a significant new policy focus to the dialogue: the importance of animal health to Canada's economic health and prosperity.

## *Shared Vision for 2025 ... and Beyond*

Drawing on the insights arising from the foresight activities that encouraged collective thinking about the future, a shared vision emerged for the AHEM system of 2025 and beyond. It reflects the acceptance of and appreciation for the shared responsibility for the AHEM system by all members of the animal health and welfare community.

This shared vision recognizes the inextricable interconnections among the economy, the environment, public health and animal health. The goal of the vision is to manage animal health and welfare risks and preserve economic prosperity, public health and the environment. The challenge is to build an AHEM system that addresses current needs while ensuring the ability to adapt to threats and opportunities of the future.

**SHARED VISION – *Healthy Animals, Healthy Future 2025***

*Animal health will be recognized as a key pillar in the preservation and promotion of Canada's health and economic prosperity. In keeping with that perspective, Canada's animal health emergency management system will be anticipatory, adaptable, agile and seamlessly integrated with human, economic and environmental health systems.*

## Achieving the Shared Vision

### 1. Risk Management Action Areas

The Fore-CAN partners and participants envision an AHEM system that comprises five risk management action areas: Anticipate; Prevent; Prepare; Respond; and Recover & Renew.


All of these risk managment areas are interdependent and equally important to an effective AHEM system.

### 2. Capability Areas and Desired Outcomes

Canada's current animal health emergency management system is oriented around specific roles, responsibilities and mandates for individual organizations and jurisdictions, with a focus on rapid response to animal disease outbreaks. The insights gained through the Fore-CAN initiative underscored that effectively addressing animal health threats requires a holistic system that crosses disciplines and jurisdictional boundaries and that also focuses on anticipation, prevention, preparation, and recovery and renewal.

The convergence of challenges impacting animal health in the future will continue to intersect with those impacting public health, the environment and the economy. Animal health stakeholders must take action today to build the capabilities needed to effectively manage these challenges.

Fore-CAN participants identified five key capability areas that will need to be developed further to create a more integrated, agile and adaptive AHEM system:

- Organization and Decision-making
- Science and Technology
- Expertise and Personnel
- Policy, Law and Regulation
- Information and Data-sharing

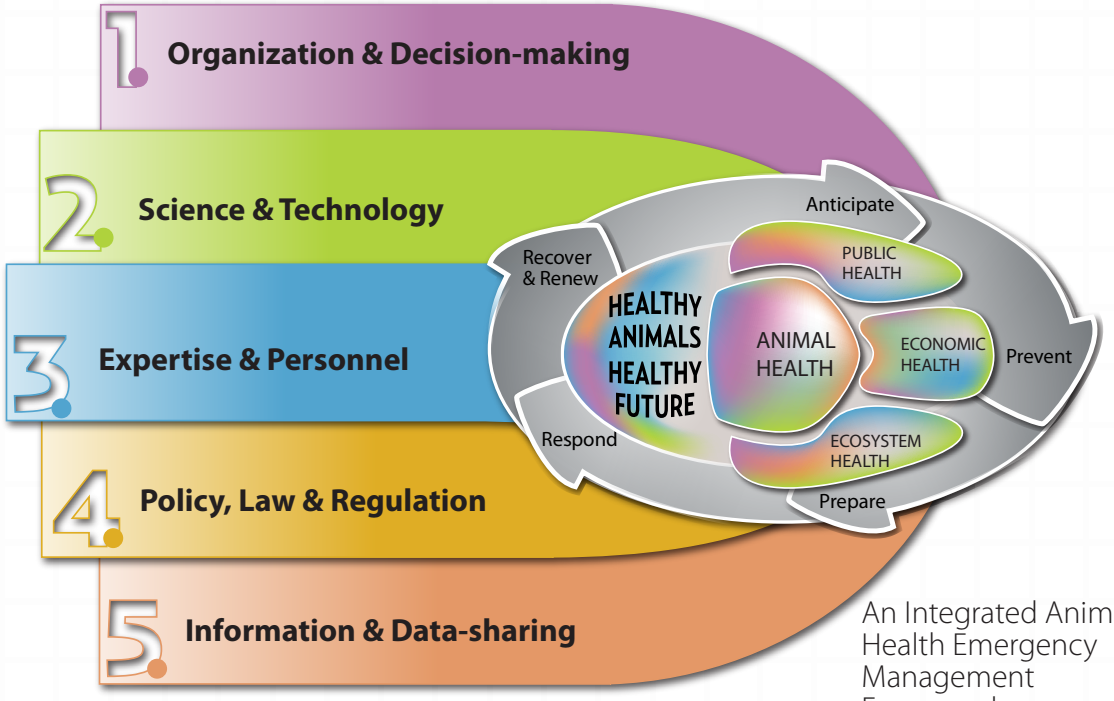
The following table outlines the desired outcomes and characteristics of each capability area.

## AHEM System Capability Areas:

| DESIRED OUTCOME | CHARACTERISTICS OF THE FUTURE AHEM SYSTEM |
|---|---|
| 1. ***Organization and Decision-making*** Within Canada, practices accommodate multiple layers of jurisdiction and legislation, acknowledge multiple interests that will guide priority setting and accountability protocols, and welcome and ensure transparency and inclusivity of relevant stakeholders. | Collaborative<br>Multi-jurisdictional<br>Multi-disciplinary<br>Rapid<br>Rehearsed<br>Scalable |
| 2. ***Science and Technology*** Investments are guided by identified needs and gaps; awareness of available and emerging technology is broadly shared; and resources and staffing are commensurate with needs. | Applied<br>Coordinated<br>Current<br>Expanded<br>Staffed |
| 3. ***Expertise and Personnel*** Training systems encourage recognized certification, ensuring adequately trained and available individuals with the skills and interoperability to ensure a surge capability consistent with identified needs. | Certified<br>Educated<br>Exercised<br>Interoperable<br>Skilled<br>Surge-capable |
| 4. ***Policy, Law and Regulation*** Guided by relevant international standards that evolve in a transparent, consultative manner, Canadian stakeholders identify and adopt best practices and embrace consistency across disciplines and jurisdictions. | Best Practices<br>Consistent<br>Consultative<br>Engaged<br>Internationally relevant |
| 5. ***Information and Data-sharing*** Information systems are accessible and trusted by all relevant stakeholders, modern, integrated across functions and sectors and internally consistent. | Accessible<br>Consistent<br>Integrated<br>Modern<br>Trusted |

### 3. Integrated Animal Health Risk Management Framework

The following graphic model represents the integration of the Fore-CAN shared vision, risk management areas and capability areas.




An Integrated Animal Health Emergency Management Framework

> *Foresight is intended to lead to action....*
>
> - *Foresight is neither prophecy nor predictions, but invites us to consider the future as something that we can create or build rather than as something already decided.*
> - *Foresight assumes that there are numerous possible futures, any of which can be created through the actions we choose to take today.*
> - *Foresight is not only understanding the system and looking into the future, it is also a collective learning process with a view to long-term strategic decision making.*
>
> *Marie de Lattre-Gasquet, CIRAD, Paris, France*

# PART 5 – Convergence of Actions

## *Moving from insight to action*

The systematic and collaborative foresight activities of the Fore-CAN initiative harvested the wisdom and experience of more than 300 participants and 40 organizations and led to a collective understanding of existing and emerging trends and drivers and their potential impact on animal health risk management. A number of insights about the AHEM system of the future were gained, including recognition of the intrinsic and complex linkages among human health, ecosystem health, economic health and the health of animals, shared responsibility across disciplines, sectors and jurisdictions, and the importance of collaboration and partnerships. These insights led participants to develop the shared vision and identify the capabilities required for its achievement.

The next phase of the Fore-CAN initiative aimed to turn insight into action through the development of an AHEM system roadmap to guide the development of capabilities in the short, intermediate and long terms as well as planning, risk management and foresight process tools for adaption and use by others.

## Designing the Animal Health Emergency Management System Roadmap

### 1. Identifying Relevant Initiatives

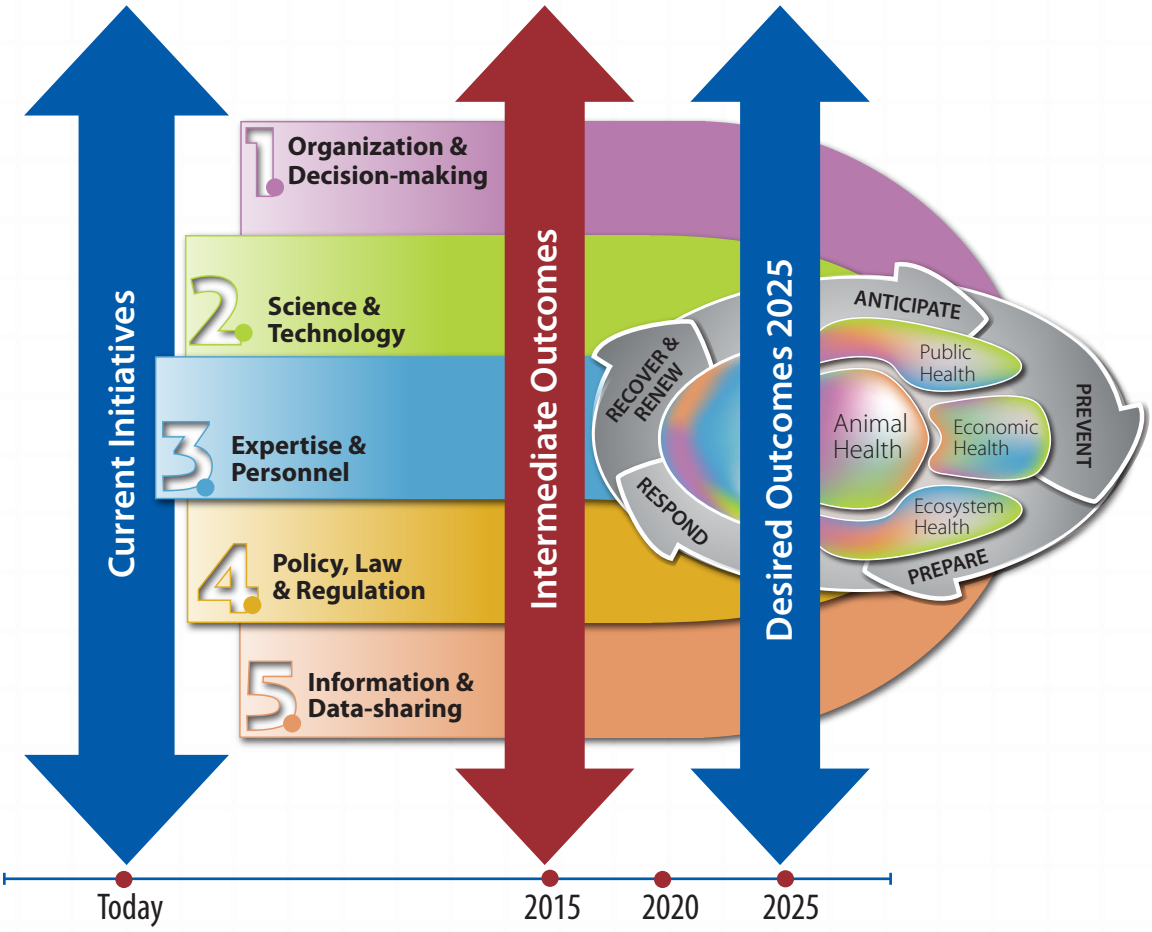
Fore-CAN partners and participants identified existing animal health initiatives and considered their potential for supporting the shared vision and required capabilities of the AHEM Risk Management Framework. Participants recognized that, while there are many initiatives underway in various jurisdictions and disciplines, they are often not well aligned or integrated with one other and there is unnecessary duplication of efforts. In terms of development of the five capability areas, participants felt that there are some areas where little or no work is being done and where action is required.


## 2. Aligning Initiatives

Using the desired outcomes of the AHEM Risk Management Framework as starting points, participants reviewed the existing initiatives and identified synergies and opportunities for alignment, innovation and collaboration across jurisdictions and disciplines.

The result is a strategic Animal Health Emergency Management Roadmap that identifies key outcomes in the short, intermediate and long terms, as well as candidate initiatives for building the requirements of each capability area. The draft roadmap was initially presented to stakeholders at the Fore-CAN Collective Planning Meeting in Ottawa in May 2011.

An Integrated Animal Health Emergency Management Roadmap



## Healthy Animals, Healthy Future 2025 Toolkit

In addition to the AHEM Roadmap, the Fore-CAN initiative has led to the creation of unique tools for use by members of the animal health community and others.

### 1. Foresight Guide

In order to share the knowledge gained about applying foresight methods for strategic problem solving, Fore-Can has developed an adaptable "how-to" guide for the use of foresight from concept to action that can be used by other organizations. This virtual guide introduces users to the various foresight activities and the principles of collaborative future-focused thinking. www.forecan-precan/foresightguide

### 2. Assessment Tool

The Fore-CAN initiative has also led to the development of the Fore-CAN Capability Assessment Tool (FCAT), which provides a systematic process to help organizations identify gaps and priorities and plan their AHEM requirements so that they are aligned with the principles of integrated animal health risk management. The first part of the process identifies the current state of the function or issue. Part 2 identifies the involvement of each health dimension (animal, public, economic and ecosystem) and the associated drivers and their level of impact and uncertainty. Part 3 looks at the vulnerabilities within each subsystem of the AHEM system (anticipate, prevent, prepare, respond and recover and renew). In Part 4, users assess the strengths and weaknesses of a set of attributes for each capability area. Analysis of these results leads to options and recommendations that can help direct policy development and investment decisions.

---

**Fore-CAN:** *Addressing tomorrow's challenges by informing today's decisions*

---

# PART 6 – What's Next?

The Fore-CAN initiative has demonstrated that foresight can be a catalyst for change.

Fore-CAN used foresight methods to develop a risk management framework and system-level roadmap for an effective animal health emergency management system. The result is an outcomes- and capability-based approach for managing animal health emergencies that has potential for application by all members of the animal health and welfare community, both internationally and in Canada.

The partners and participants of Fore-CAN are proud of the work they have accomplished, the shared vision they have developed, and the potential for Canada's AHEM system to meet the challenges of the future. Through the Fore-CAN initiative, Canada is recognized as a global leader in animal health emergency management and in applying foresight to complex issues that require strategic thinking.

The Fore-CAN initiative closes with its final Symposium and Working Session in September 2011. But Fore-CAN's vision for Canada's animal health emergency management system does not end there. Fore-CAN's principles are founded on the understanding that the foresight process must be continually applied to anticipate future threats. The animal health community must remain engaged and committed to this innovative and important work.

At the Working Session following the Symposium, Fore-CAN participants focused on how to move the outcomes of the Fore-CAN project forward. Participants agreed that it will be important to promote the Fore-CAN shared vision for integrated animal health risk management beyond the core partners by engaging a broader range of stakeholders, including producer groups, processors and retailers, as well as the next generation of animal health and human health practitioners through the veterinary colleges and medical schools. The general public is another audience that should be made aware of Healthy Animals, Healthy Future 2025 and One Health concepts.

*It's tough to make predictions, especially about the future.*
***Yogi Berra***

## Conclusion

The Fore-CAN initiative has demonstrated that applying foresight methods can build understanding, trust and shared, long-term vision among stakeholders responsible for managing animal health emergencies in Canada. Complex and uncertain issues, accelerating change and constrained resources mean that stakeholders from government, academia and industry must find new and innovative ways of working together to mitigate risks to Canadians. The Fore-CAN approach is right for addressing today's – and tomorrow's – challenges.

Fore-CAN highlights an important role for the federal government as convenor and facilitator of diverse groups of stakeholders that are tasked with developing joint solutions and strategies to manage risk. Indeed, Fore-CAN's processes and tools are being adopted by federal departments and agencies and by Fore-CAN partner organizations, and benefits of multi-dimensional and integrated management approaches to risk are already being realized.

The Fore-CAN initiative further validates the urgent need for governments, organizations and citizens to take a holistic One Health approach to animal health challenges to improve the well-being of Canadians, the environment and the economy.

Over the coming months, the CFIA will develop a communications plan to share the Health Animals, Healthy Future 2025 Report and disseminate the knowledge and products that have been derived from the Fore-CAN initiative.

As Fore-CAN closes, it has exceeded its objectives.
*Key achievements of the initiative include:*

- *Foresight as an effective and powerful catalyst for change, action and innovation.* Participants have an understanding of foresight methods and how they can be used to anticipate future requirements.
- *An AHEM community.* New relationships and partnerships have been formed and a network of stakeholders with a common vision, commitment to collaboration and mutual trust has been developed.
- *A system-level, capability-based framework for AHEM in 2025.* A shared vision has been established along with a framework for action and tools to assist decision-makers in planning and investing in capabilities to achieve desired outcomes within the complex AHEM environment.

# KEY LEARNINGS AND INSIGHTS

Fore-CAN • Pré-CAN

### Lessons Learned from Fore-CAN foresight activities

- The participative nature of foresight:
  - Helps to validate the focal question and concentrate thinking around the key areas that need to be addressed.
  - Builds relationships and trust among a group of diverse stakeholders, which leads to shared understanding and common purpose and a sense of "ownership" of the outcomes and recommendations.

- Foresight is a systematic, step-by-step process: the insights arising from one activity inform assumptions and thinking in subsequent activities.

- Foresight is a "learning journey" – participants both contribute to and benefit from the process.

- Foresight not only helps identify threats but also highlight opportunities.

### Insights gained about future animal health challenges

- Driving forces that are impacting AHEM are often interconnected and have direct and indirect consequences for areas outside of what has been traditionally considered to be "animal health."

- The world will look very different in 2025 and beyond depending on how the driving forces emerge and how they converge with other factors.

- A future AHEM system will need to manage risk in the midst of constant and rapid change across many fronts, especially the highly uncertain and unpredictable shifts in societal values and the complex, unpredictable and volatile nature of infectious diseases.

- Animal health and welfare stakeholders must collaborate today to develop future-ready strategies to better anticipate, prevent and manage animal health challenges of the future.

- An integrated, systems-wide approach with alignment across jurisdictions is needed: complexity and convergence must be managed holistically.

# Definitions

The following definitions were derived from sources including:

- World Health Organization (WHO) – www.who.int
- Organisation for Animal Health (OIE) – www.oie.int
- Canadian Food Inspection Agency (CFIA) – www.inspection.gc.ca
- Public Health Agency of Canada (PHAC) – www.phac-aspc.gc.ca
- Michigan State University College of Veterinary Medicine – http://cvm.msu.edu

**Animal Health Emergency Management System (AHEM):** *The network of organizations, infrastructure and people that share a responsibility for mitigating risks (e.g., infectious diseases) associated with threats to the health and welfare of animal populations, public health, food safety and food supply.*

**Antimicrobial resistance:** *Antimicrobial resistance (AMR) is resistance of a microorganism to an antimicrobial medicine to which it was previously sensitive. Resistant organisms (including bacteria, viruses and some parasites) are able to withstand attack by antimicrobial medicines, such as antibiotics, antivirals, and antimalarials, so that standard treatments become ineffective and infections persist and may spread to others. AMR is a consequence of the use, particularly the misuse, of antimicrobial medicines and develops when a microorganism mutates or acquires a resistance gene.*

**Avian influenza:** *Avian influenza ("bird flu") is an infectious disease of birds (food producing birds such as chickens, turkey, quail, guinea fowl, etc., as well as pet birds and wild birds) caused by type A strains of the influenza virus. The infection can cause a wide spectrum of symptoms, ranging from mild illness, which may pass unnoticed, to a rapidly fatal disease that can cause severe epidemics.*

**Bovine spongiform encephalopathy (BSE):** *Spongiform encephalopathies are a group of diseases that affect humans and animals. They are characterized by spongy degeneration of the brain, with severe neurological signs and symptoms. They include Creutzfeldt-Jakob disease in humans, scrapie in sheep, and bovine spongiform encephalopathy (BSE) in cattle.*

**Emerging Infectious Disease (EID):** *Infectious diseases are the world's leading cause of death. During the past two decades alone, at least 30 new infectious diseases have appeared. Ebola haemorrhagic fever and Bovine spongiform encephalopathy are prominent examples of newcomers. At the same time, older diseases like diphtheria, cholera and tuberculosis are returning vigorously. The basic definition of an emerging or re-emerging infectious disease is a disease whose incidence has increased in a defined time period and location. If the disease was unknown in the location before, the disease is considered to be emerging. However, if the disease had been present at the location in the past and was considered eradicated or controlled, the disease is considered to be re-emerging.*

# Definitions

**Foot-and-mouth disease:** *Foot-and-Mouth Disease is a severe, highly communicable viral disease of cattle and swine. It also affects sheep, goats, deer and other cloven-hoofed ruminants. Elephants, hedgehogs and some rodents are also susceptible to the virus but do not develop clinical signs of the disease. Horses are not affected. The disease is characterized by fever and blister-like sores on the tongue and lips, in the mouth, on the teats and between the hooves. Many affected animals recover, but the disease leaves them weakened and debilitated.*

**Foresight:** *A discipline or practice of systematic methods for moving users from traditional short- to medium-term approaches to planning to longer-term, systems thinking to solve complex problems.*

**One Health:** *A strategy for expanding interdisciplinary collaborations and communications in all aspects of health care for humans, animals and the environment. www.onehealthinitiative.com*

**Scanning:** *A foresight activity to identify the driving forces that exert pressure on the system(s) in question.*

**Scenarios:** *A foresight activity in which plausible, realistic descriptions of the future are developed to challenge assumptions and broaden understanding of possible future operating environments.*

**Systems mapping:** *Identification of the primary processes, functions and elements that exist within an organizational or operational system.*

**Zoonosis/Zoonotic disease:** *A zoonosis is any disease or infection that is naturally transmissible from vertebrate animals to humans. Animals thus play an essential role in maintaining zoonotic infections in nature. Zoonoses may be bacterial, viral, or parasitic, or may involve unconventional agents. As well as being a public health problem, many of the major zoonotic diseases prevent the efficient production of food of animal origin and create obstacles to international trade in animal products.*

# Acronymns

| | |
|---|---|
| **AHEM** | Animal Health Emergency Management |
| **AI** | Avian influenza |
| **AMR** | Antimicrobial resistance |
| **BSE** | Bovine spongiform encephalopathy |
| **CBRNE** | Chemical, Biological, Radiological-Nuclear and Explosives |
| **CFIA** | Canadian Food Inspection Agency |
| **CRTI** | Canadian Research Technology Initiative |
| **CSS** | Centre for Security Science |
| **DRDC** | Defence Research and Development Canada |
| **EID** | Emerging Infectious Disease(s) |
| **FCAT** | Fore-CAN Capability Assessment Tool |
| **Fore-CAN** | Foresight for Canadian Animal Health |
| **NFAHWC** | National Farmed Animal Health and Welfare Council |
| **OH** | One Health |

## Acknowledgements

As project manager for Fore-CAN, it has been my privilege to work closely over the past four years with a dedicated project team, a diverse group of enthusiastic partners and participants, and a supportive project Champion.

We have together experienced the positive impact that the application of foresight methods can have on helping the animal health community build a shared vision for a future in which animal health emergencies in Canada are managed proactively using integrated strategies that address, in a balanced manner, the animal, human, ecosystem and economic dimensions of health.

Although the time and energy of many individuals have made this project a success, I would like to thank in particular members of the project team, including Martine Dubuc (Champion), Primal Silva, Ingrid Van der Linden, James Dunlop, Harry Gardiner, Patricia-Abena Nsonwah, Sandra Gabler, Carla Baker and Jhenae Hosue, and expert advisers Peter Black, Ed Empringham, Jack Smith, Shane Roberts and Leah Soroka. I want to especially thank Norm Willis for his contribution to the development of the Fore-CAN Capability Assessment Tool (FCAT).

The project team is grateful for the guidance and financial support provided by the Centre for Security Science (CSS) through the Research and Technology Initiative (CRTI) and the in-kind contributions of partners.

*Shane Renwick*

Dr. Shane Renwick, Manager, Fore-CAN and
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Canadian Food Inspection Agency
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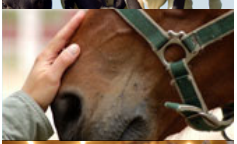
# ANNEXES

A Fore-CAN Symposium September 8 - 9, 2011 Report

B Fore-CAN Guide to Foresight

C Fore-CAN Capability Assessment Tool (FCAT)

# Annex A

## Fore-CAN 3rd Annual Symposium and Working Session

### SUMMARY REPORT

### Introduction and Context

Foresight for Canadian Animal Health (Fore-CAN) is an innovative, multi-partner[1] initiative that is applying foresight methods to support new ways of thinking about how to build a better animal health emergency management (AHEM) system in Canada. Fore-CAN hosted its 3rd Annual Symposium on September 8, 2011 in Ottawa. The event brought together Canadian and international experts in animal and public health, risk assessment, disease surveillance and foresight, and included representatives of the federal and provincial governments, academia, and industry. The objectives of the Symposium were to share the learnings, insights and outcomes of the Fore-CAN initiative, which concludes at the end of September 2011, and to identify ways to promote and transfer knowledge from the Fore-CAN roadmap and framework. The Symposium included presentations, panel discussions and informal networking opportunities.

***Dr. Martine Dubuc, Fore-CAN Champion and Vice-president Science, Canadian Food Inspection Agency (CFIA)***, opened the Symposium. She noted that over the past decade, it has become increasingly apparent that animal health threats represent a critical threat to the well-being of Canadians. The Fore-CAN initiative provided an opportunity for partners in Canadian animal health and welfare management to explore the use of foresight as a means to improve the collective ability of the animal health community to manage animal health emergencies in the face of accelerating change, complexity and uncertainty. The initiative was possible due to the financial support of Defence Research and Development Canada (DRDC) through the Chemical, Biological, Radiological-Nuclear and Explosives (CBRNE) Research and Technology Initiative (CRTI), as well as contributions from Fore-CAN partners. Dr. Dubuc emphasized that the Symposium marks not the end of Fore-CAN but a beginning of continued collaboration and an opportunity to chart a new course for animal health emergency management.

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[1] Fore-CAN Partners:

- Canadian Food Inspection Agency
- Agriculture and Agri-Food Canada
- Public Health Agency of Canada
- Health Canada
- Alberta Agriculture and Rural Development
- Ontario Ministry of Agriculture, Food and Rural Affairs
- Canada's Veterinary Colleges
- Dairy Farmers of Canada
- TDV Global Inc.

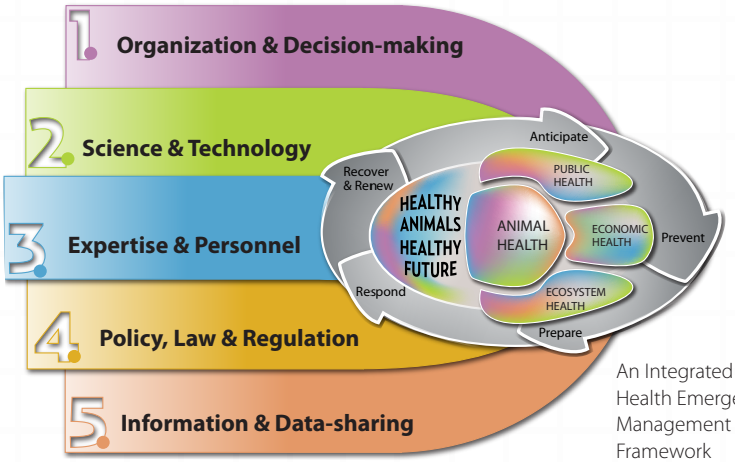
***Dr. Shane Renwick, Director, Animal Health Science Foresight, CFIA, and Fore-CAN Project Manager,*** presented "The Fore-CAN Journey," which provided participants with an overview of the initiative's activities and outcomes over its three-year period. He noted that by engaging the participation, buy-in and commitment of a diverse group of animal health and welfare experts, practitioners and stakeholders in a series of foresight activities[2] , a shared vision – Healthy Animals, Healthy Future 2025 –and an integrated animal health risk management framework were developed. The framework includes three critical layers of focus:

1. *Health Dimensions:* Animal health, public health, environmental health and economic health are intrinsically connected.
2. *Risk Management Action Areas:* Five interdependent yet equally important risk management action areas (anticipate, prevent, prepare, respond, and recover and renew).
3. *Key Capability Areas:* Effectively addressing animal health threats requires an integrated, agile and adaptive holistic system with capabilities in five key areas: Organization and Decision-making; Science and Technology; Expertise and Personnel; Policy, Law and Regulation; and Information and Data-sharing.

The shared vision and framework led to the development of an Animal Health Emergency Management System Roadmap that includes desired outcomes in the short, intermediate and long terms. The goal of the roadmap is to guide the development of capabilities in each area, while reducing duplication and closing gaps in order to maximize resources.

Fore-CAN also spurred the creation of other tools for use by the animal health and welfare community, including:

- The ***Foresight Guide,*** which introduces users to the various foresight activities that Fore-CAN applied and the principles of collaborative future-focussed thinking.
- The ***Fore-CAN Capability Assessment Tool (FCAT)***, which provides a systematic process to help organizations manage risk, change and uncertainty by applying systems thinking to assess issues.




An Integrated Animal Health Emergency Management Framework

[2] Foresight activities included:
- *Scanning* to identify driving forces and their implications for animal health.
- *Scenario development* to consider possible and plausible future operating environments.
- *Systems mapping* to capture the current activities and authorities in order to identify gaps and duplications.
- *Integration* to develop strategic options.
- *Validation* to confirm assumptions and direction.

Dr. Renwick invited participants to consider how to best implement the Fore-CAN outcomes to ensure the benefits of the collective efforts of the initiative are achieved across the animal health and welfare community.

## Guest Speakers and Their Key Messages

The Symposium keynote speaker was ***Dr. Michael Jackson,*** founder and Chairman of ***Shaping Tomorrow,*** a U.K.-based consultant group that is the leading, open global portal for strategic foresight and innovative change management solutions. Dr. Jackson noted that complex systems, such as the animal health emergency management system, require a much larger range of skills than any one organization can develop. Open, cross-disciplinary and interjurisdictional partnerships are needed to facilitate "genuine systems thinking." Questions to be considered include: What may be changing? What might it mean to us? What should we do about it? Strategic foresight helps create the agility and resilience to manage instability and uncertainty, and to anticipate and better prepare for whatever happens. By applying foresight methods, organizations can avoid tunnel vision and silos, test the robustness of policies, optimize resource use over time, and achieve better decision-making.

Dr. Jackson provided "forecasts for 2025" for each capability area of the Fore-CAN animal health risk management framework, including:

- Organization and Decision-making: Partnerships are key; business models are "lean and mean"; science and data are freely shared/open; and robust prediction models emerge in many fields.
- Science and Technology: Scanning and foresight are encouraged at all staff levels; new "onomics"; new "intelligent" technologies for use in livestock production and health assessment and treatment; and alternative proteins.
- Expertise and Personnel: New education models enhanced by technology; talent wars for "systems thinkers" and managers of complex systems.
- Policy, Law and Regulation: Cross-government policy making based on proactive strategic foresight; technology enables improved user-pay tracking; bottom-up approach.
- Information and Data-sharing: Real time and cumulative data technologies; availability of precision applications ("apps") for personal/animal specific information; increased security requirements.

In closing, Dr. Jackson noted that the foresight process needs to be ongoing to address the need to "stay ahead of the game."

***Dr. Ian Alexander, Executive Director, Animal Health Directorate, CFIA,*** provided an overview of animal health surveillance in Canada. Animal health surveillance involves the ongoing, systematic collection, collation, analysis and interpretation of data. What is most important is that the results are disseminated to the necessary parties for effective decision-making. Surveillance activities are undertaken at the federal and provincial levels and by industry. Surveillance is a key aspect of all risk management action areas, not just prevention. Strategic directions for surveillance under consideration within the CFIA include establishing more formal partnership agreements with industry, provincial/territorial governments and academia for surveillance programs for federally-controlled domestic diseases; moving from disease-based surveillance to species-based surveillance; integrating surveillance activities across the animal health and meat hygiene programs; and working closely with the National Farmed Animal Health and Welfare Council (NFAHWC).

Dr. Alexander noted that the Fore-CAN work has been instrumental in demonstrating the importance of collaborative approaches and in shaping thinking toward an integrated, national approach to Canadian animal health surveillance.

***Dr. Peter Black, Office of the Chief Veterinary Officer, Australian Government, Department of Agriculture, Fisheries and Forestry,*** provided an overview of the Australian model for animal health surveillance. The federal government is responsible for quarantine, international animal health matters, including disease reporting, export certification and trade negotiation, and coordination of national policy. State and territory governments are responsible for disease control, disease eradication and quarantine within their own boundaries. A cost-sharing agreement is in place between the Australian government, state and territory governments and livestock industries that provides "certainty of funding" for an emergency animal disease incident.

There are a number of organizations that support animal health surveillance, including:

- Animal Health Australia (AHA) is a partnership involving government, livestock industries and other stakeholders in animal health. It facilitates, manages and evaluates national programs and provides a forum for government consultation and engagement with industry.
- The Animal Health Committee (AHC) comprises the national, state and territorial chief veterinary officers and provides strategic scientific and policy advice to AHA.

- The Consultative Committee on Emergency Animal Diseases (CCEAD) is convened when an animal health emergency occurs and provides technical coordination and implementation of response plans.
- The Australian Wildlife Health Network (AWHN) collects, analyzes and disseminates information on wildlife disease surveillance.
- The National Animal Health Surveillance Strategy (NAHSS) Reference Group uses foresight techniques, including a STEEP process which considers context and drivers in terms of their potential social, technical, economic, environmental and political/policy impacts, to identify strategic requirements for animal health surveillance. The process has identified the need to enhance sensitivity of the surveillance system (time to detection), improve disease investigation, and develop expertise and capacity for analysis of surveillance data. In addition, an approach to surveillance that is based on livestock production zones rather than state/territory borders is being explored.

In closing, Dr. Black noted that to be effective, foresight needs to be "embedded" into how challenges and issues are approached. Other success factors include transparency and information sharing, the buy-in of senior government decision-makers, broad stakeholder engagement, and alignment of strategies and culture ("culture eats strategy for breakfast").

## Panel Presentations and Discussion

Participants heard from animal and human health leaders on "Perspectives on the Fore-CAN Journey: Toward Integrated Activity in Animal Health." The panel members were:

- Dr. Moira McKinnon, Chief Medical Health Officer, Saskatchewan Health
- Dr. Douglas Freeman, Dean, Western College of Veterinary Medicine
- Dr. Wayne Lees, Co-chair of the National Farmed Animal Health and Welfare Council and Chief Veterinary Officer, Manitoba Government, Department of Agriculture, Food, and Rural Initiatives
- Dr. Peter Black, Office of the Chief Veterinary Officer, Australian Government, Department of Agriculture, Fisheries and Forestry,
- Dr. Ian Alexander, Executive Director, Animal Health Directorate, CFIA,
- Dr. Christine Power, National Manager, Epidemiology and Surveillance, CFIA
- Mr. Tim Nelson, Executive Director, Poultry Industry Council of Ontario

Following the presentations, Dr. Ian Alexander and Dr. Peter Black joined the panel for an open forum discussion. Key messages that emerged from the presentations and discussion included:

- ***Emerging infectious diseases (EID) of domestic animals, wildlife and humans have complex connections*** with each other and share numerous pressures, including agricultural intensification, human encroachment, increased animal-wildlife-human interaction, and ecological manipulation.

- ***Surveillance is key:***
  - The ability to anticipate events hinges on an integrated approach to surveillance.
  - Need participation at national and provincial levels as well as industry partners.
  - Need training and education.
  - Need common protocols and platforms.
  - Information sharing is crucial; the right information to the right people at the right time.
  - Need incentives (e.g., compensation program) to encourage reporting.

- ***One Health:***
  - Using the "One Health" concept could facilitate improved integration across the animal health community as well as increased awareness and understanding with both decision-makers and the public as it provides a recognized "brand."
  - One Health is well aligned with the underpinnings of sustainable agriculture, which seek to achieve sound economic, social and environmental outcomes.
  - One Health has traditionally been defined as involving animal health, human health and ecosystem health. There is a need to add "food" into the equation as it is a key bond that ties the three domains. This would raise awareness of the need to respect food and food production and the social contract between agriculture and consumers.
  - New funding models are needed to support One Health approaches.
  - Training is needed to help people think "across disciplines."

- ***Improved communication with farmers and the general public*** is needed to promote understanding of the principles that support an integrated AHEM system (science-driven, evidence-based, sustainable) and the importance of primary agriculture to the Canadian economy.

- ***Academia's role includes knowledge creation, education and training in necessary skills,*** inclusion of One Health concepts in human and animal health curricula, promotion of cross-discipline relationships and inter-professional development, and creation of new funding models.

- ***The federal government responsibility.*** The federal government is responsible for 32 reportable animal diseases; responsibility (federal or provincial) for new diseases needs to be clarified. A clear "home" needs to be found for these and other challenges, and "bridges" or effective working relationships have to be built between a wide variety of key stakeholders in order to better deal with existing and emerging threats.

- ***Challenges to working at a systems level include:***
  - Organizational culture (traditional siloed approaches, inability to see the bigger picture).
  - Structural barriers (short-term funding, lack of performance measures).
  - Establishing clear leadership.
  - Establishing clear and common definitions.

- ***Success factors for an integrated animal health risk management system include:***
  - Multi-jurisdictional and multi-sector partnerships.
  - Fore-CAN's current partners need to remain engaged. It is important to include others, such as additional producer categories, producer associations, processors, and retailers.
  - Clear roles and responsibilities.
  - Champion/leadership.
  - Buy-in and engagement of decision-makers.
  - Engagement of the next generation of practitioners and leaders.
  - Focus on outcomes; set targets.
  - Formalized partnership and funding agreements.
  - Performance measures ("what gets measured gets done").
  - Patience and persistence.

- ***Continue to engage partners and others in foresight:*** embed foresight into all planning processes and every project.

- ***There is synergy and alignment*** between the Fore-CAN work and shared vision and the NFAHWC.

- ***The Fore-CAN initiative has developed a foundation and tools for an effective AHEM system of the future;*** they need to be applied today to create a system that is ready for tomorrow's challenges.

- ***The Fore-CAN initiative and its outcomes present an opportunity*** to "brand" Canada as a leader in animal health emergency management.

## Next Steps

In a working session following the Symposium, the project partners, Symposium presenters and other participants focused on how to move the outcomes of the Fore-CAN project forward.

Participants agreed that it will be important to promote the Fore-CAN shared vision for integrated animal health risk management beyond the core partners by engaging a broader range of stakeholders, including producer groups, processors and retailers. The general public is another audience that should be made aware of the principles of Fore-CAN and the One Health concept. The need for a visible and active champion (or champions) was emphasized.

Participants provided the following ideas and suggestions for next steps:

### *1. Communications and Engagement*

***A) Promote the Fore-CAN Framework, Roadmap and Capability Assessment Tool (FCAT):***

- Finalize the Fore-CAN Report and disseminate broadly.
- Develop tailored communications to the Fore-CAN community of relevant stakeholders.
- Develop academic-based journal articles.
- Distribute horizon scanning briefings developed by Shaping Tomorrow Inc. to keep the Fore-CAN community informed about key emerging trends.
- Look for opportunities to inform on strategic planning within relevant organizations.
- Demonstrate foresight and assessment tools with stakeholder organizations.

***B) Leverage existing activitities:***

- Connect Fore-CAN to the next Agricultural Policy Framework/Growing Forward II.
- Seek alignment with the National Farmed Animal Health and Welfare Council (NFAHWC) through the development of a value proposition to identify areas of common interest and the optimum approach to support the Council's priorities.

***C) Promote "Healthy Animals, Healthy Future 2025" and "One Health" concepts:***

- Target younger generation
  - Work with veterinary and medical community to introduce concepts into animal health and human health curricula.
- Target producers/farmers: make the concepts "real" for them.

***D) Promote the use of foresight to facilitate future thinking about a related issue (e.g., BSE).***

### 2. *Acting on the Vision of "Healthy Animals, Healthy Future 2025:*

- Develop proposals that aim to further develop these identified key capabilities in order to effect positive change on the system:
  - surveillance;
  - biosecurity;
  - academic training; and
  - multi-jurisdictional governance.

On an interim basis, it was suggested that the existing network of Fore-CAN partners would be best suited to consider and address these suggestions following formal completion of the Fore-CAN initiative on September 30, 2011.

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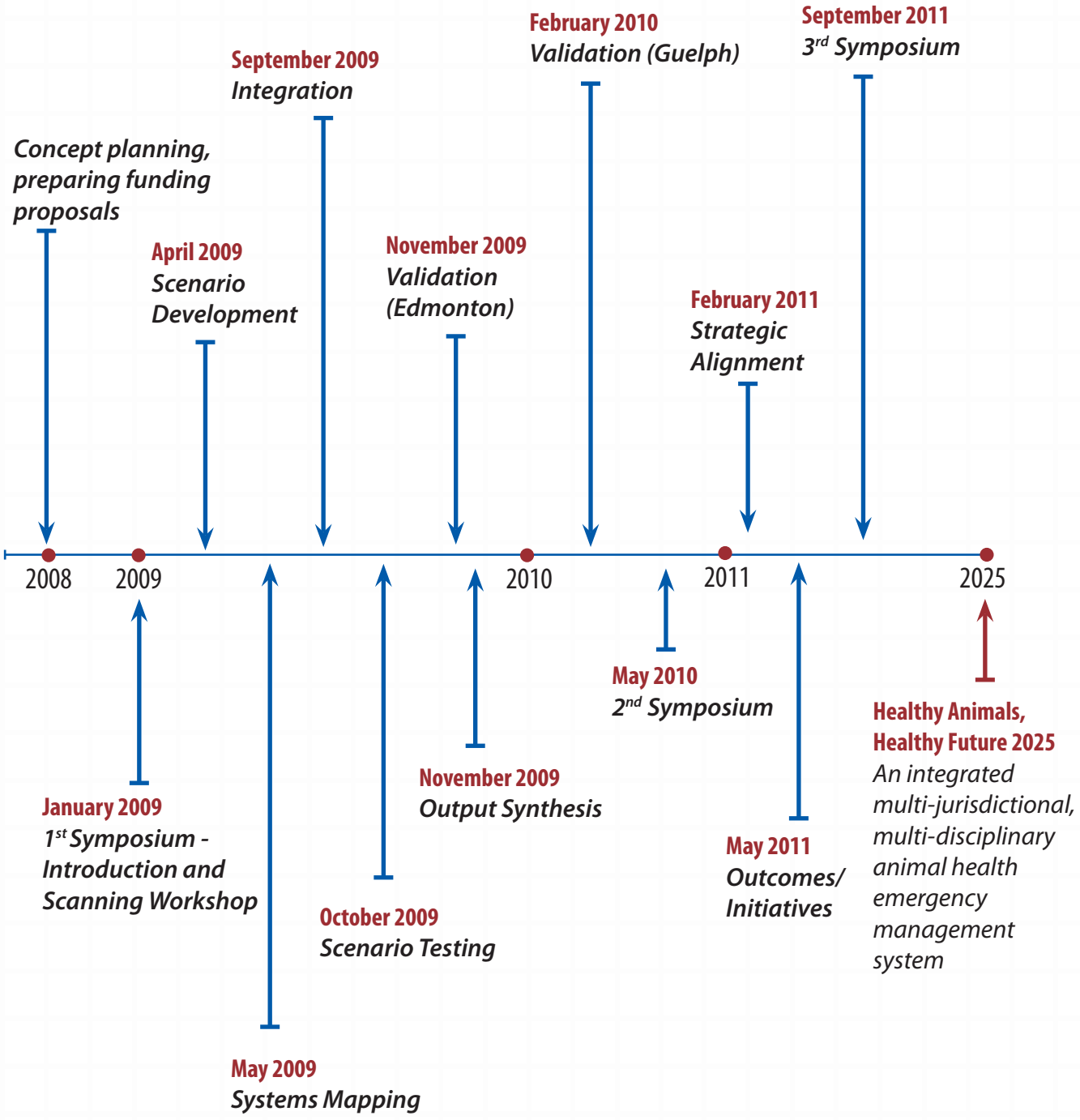
FORE-CAN FORESIGHT GUIDE

# Annex B

# Fore-CAN Guide for Foresight

www.forecan-precan/foresightguide




# Annex C
# Profile: Fore-CAN Capability Assessment Tool (FCAT)

## Purpose

The Fore-CAN Capability Assessment Tool (FCAT) is designed to be a simple yet rigorous device to help organizations identify gaps and opportunities associated with the management of an animal health issue. Through the lens of integrated animal health risk management, it allows for a comprehensive assessment of strengths and weaknesses in key capability areas of the risk management system, thereby providing an explanation for possible areas of vulnerability. Its use therefore can help organizations establish a solid foundation for formulating recommendations, preparing communications and taking action within the context of an integrated animal health risk management framework.

The integrated animal health risk management system, as defined by the Fore-CAN initiative, comprises the interconnected web of mandates, resources and activities of numerous individuals and organizations in Canada, and exists to safeguard animal health and the environment, defend agriculture and the animal-based economy, and protect Canadian citizens from preventable threats to their health.

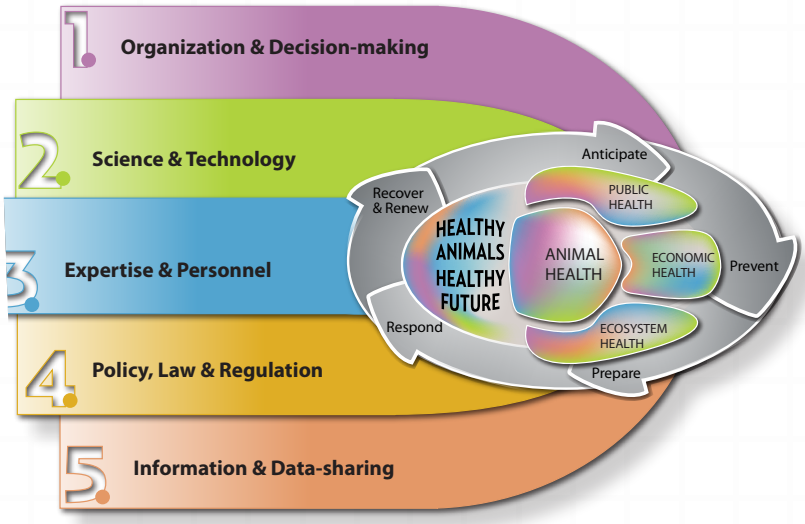



Figure 1

The Fore-CAN initiative has developed a Shared Vision for the animal health risk management system. It comprises five capability areas that support a risk management system that is integrated across five action areas (anticipate, prevent, prepare, respond, and recover & renew), and four health dimensions (animal health, public health, ecosystem health, and economic health). A model of the framework for the system is illustrated in Figure 1.

## Approach

FCAT is a questionnaire-based tool that is designed to be most effective when used by a multidisciplinary group of stakeholders from organizations across government, industry, academia and other relevant groups with perspectives representing the interests of animal, public, economic and ecosystem health.

FCAT can be employed in a group setting or individually, in which case the results are pooled with those of other respondents. The process requires respondents to provide scores to questions in three discrete levels of assessment (Health Dimensions, Risk Management Action Areas, and Capability Areas).

The scores provide rigor to the process and allow for direct comparison of identified gaps and vulnerabilities for two or more animal health issues.

## Structure: Three Levels of Assessment

Each level of assessment provides insight on one layer of the integrated animal health risk management system and is in keeping with principles of a future-ready system developed under Fore-CAN. Since the layers of the system are linked, the assessment of Level 1 provides focus for that of Level 2 and similarly the assessment of Level 2 provides focus for that of Level 3.

### LEVEL 1: Assessment of Four Health Dimensions

**Principle:** Complex animal health issues can no longer be addressed through one-dimensional approaches, and must be considered and understood in terms of their impacts on multiple health dimensions.

**Purpose:** The first level of assessment examines an issue from the perspective of the major drivers and impacts across four health dimensions (animal health, public health, economic health and ecosystem health), in order to gain understanding of how the issue is viewed by stakeholders in each dimension as well as how the impacts of the issue are seen to be distributed. The assessment can help participants gain insight into the interconnections between dimensions that might not otherwise be apparent. A result might be, for example, the involvement of non-traditional stakeholders in the co-development of management solutions.

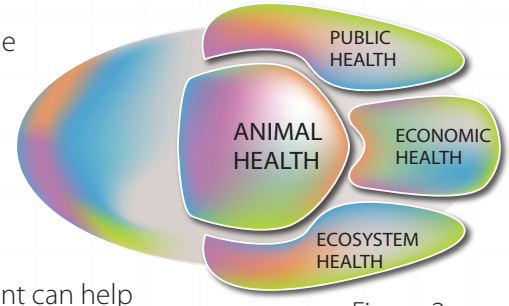



Figure 2

## LEVEL 2: Assessment of Five Risk Management Action Areas

**Principle:** All components of the risk management cycle are important since a weakness in any one may cause the whole system to function less effectively than it should, or fail. A risk management strategy intended to manage or mitigate an animal health issue must strive to ensure that all action areas are fully functional.

**Purpose:** The second level of assessment examines an issue from the perspective of the risk management cycle, in order to determine the vulnerability within each action area, and of the system as a whole. The vulnerabilities identified will be explained by strengths and weaknesses that emerge from the Level 3 assessment.


Figure 3

## LEVEL 3: Assessment of Five Capability Areas

**Principle:** Effective management of risks requires support from a wide range of interconnected capabilities, all of which are equally necessary to achieve desired outcomes in animal health risk management.

**Purpose:** The third level of assessment examines the issue from the perspective of five capability areas, each of which is a critical component of an effective integrated animal health risk management system.

Assessment at this level highlights the strengths and weaknesses of specific capabilities that the system has in place to manage risks associated with an animal health issue.

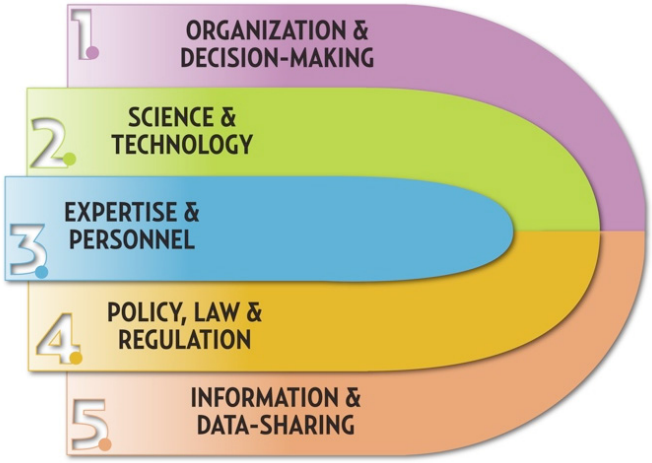



Figure 4

Each capability area is assessed against a set of key attributes that represent those required of a future-ready integrated system as determined through Fore-CAN. The scores given can indicate a potential system strength or weakness that explains vulnerability defined in the assessment of Risk Management Action Areas (Level 2). When completing the assessment of Capability Areas (Level 3), responses to the assessment of Health Dimensions (Level 1) and assessment of Risk Management Action Areas (Level 2) can help focus attention on specific capability areas.

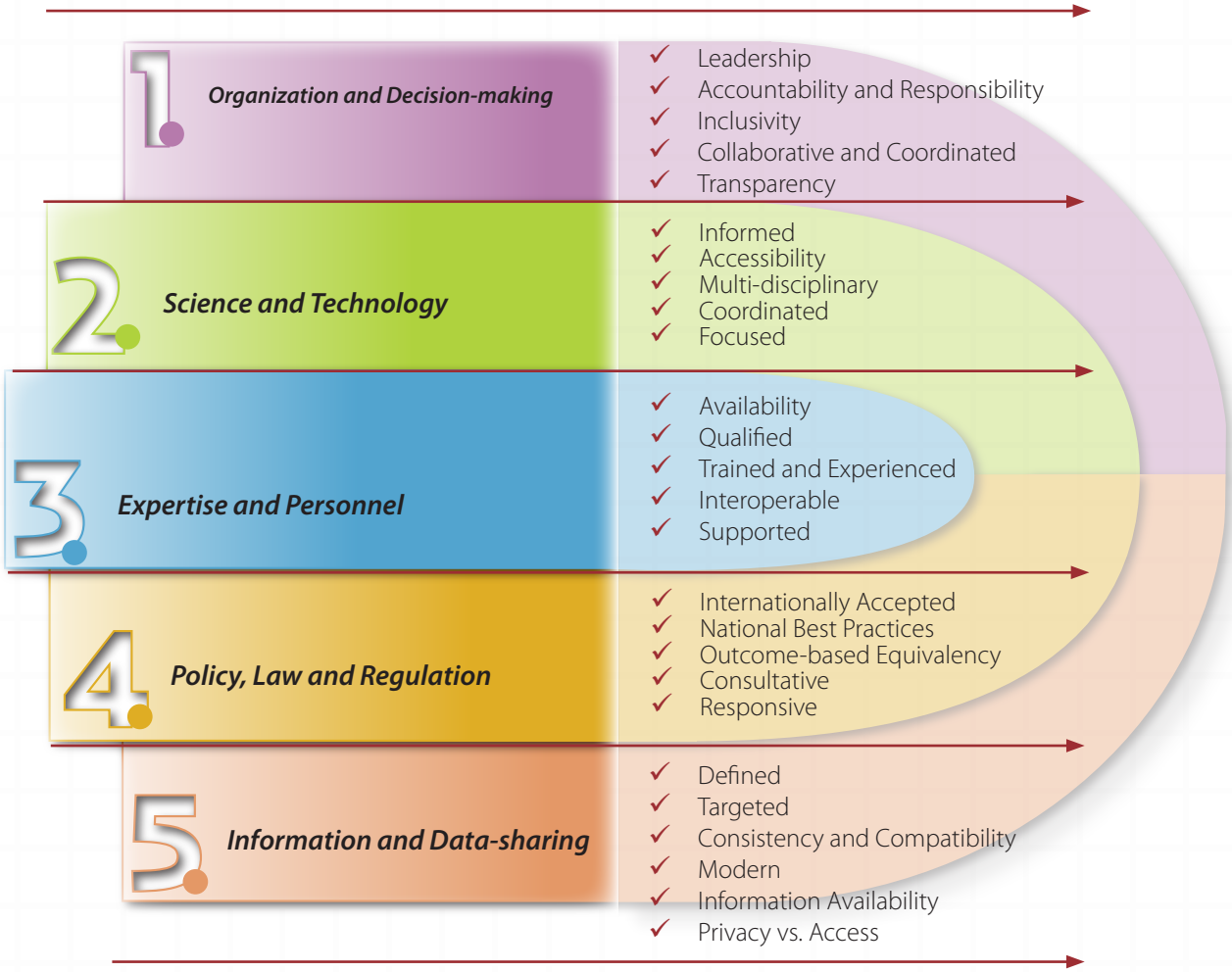



Figure 5

## Who Should Use FCAT?

The FCAT, which is currently being refined, is intended to be used by any organization with a vested interest in the effective management of animal health risks.

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