

# CEZD-IIR

## Project Update

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**National Farmed Animal Health & Welfare Council Forum**  
**Ottawa, Ontario**  
**November 24<sup>th</sup>, 2015**

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## OVERVIEW

### PROJECT PROBLEM DEFINITION

- Zoonotic and emerging diseases such as influenza and SARS can pose grave threats to public and animal health, the economy and food production systems, and their impact is compounded by the ease by which they can circumvent national borders.
- In Canada there is no single organization or agency that has responsibility for detection, control and response with respect to these diseases – a collaborative structure.
- There is a critical gap in Canada and internationally with respect to the generation and distribution of “intelligence” to support effective anticipation, detection and coordinated response to emerging and zoonotic diseases.

## OVERVIEW

### PROJECT OBJECTIVES / OUTCOMES

*The objective of the project is to enhance intelligence generation in the area of zoonotic and emerging diseases through:*

- Integration of information and intelligence sources.
- Collaborative analysis of the data through community participation via a shared informatics platform (the Canadian Network for Public Health Intelligence [CNPHI]).
- Timely distribution of outputs for the use of the community via a range of communications channels.

The CEZD project is using a "One-Health" collaborative approach to address vulnerabilities relating to risk identification through generation and distribution of intelligence focusing on zoonotic and emerging diseases.

## OVERVIEW

### PROJECT FOUNDATIONAL PRINCIPLES

*The project has been designed around three foundational principles:*

- The project will employ existing sources of information and build off of existing investments in IT platform infrastructure in order to avoid “reinventing the wheel” and to leverage the value of existing systems,
- The project will initially make use only of non-classified information sources to maximize collaborative access among project partners and future stakeholders, and
- Sustainability of the network over the long-term through relevance to the community and effective use of resources.

# Centre for Emerging and Zoonotic Disease Integrated Intelligence and Response [CEZD-IIR]

## OVERVIEW PROJECT PARTNERS

- The three-year project is funded via:
  - the Canadian Safety and Security Program, a federal initiative managed by Defence Research and Development Canada's Centre for Security Science, as well as the in-kind contributions of fourteen multi-jurisdictional partner organizations.
  - Lead Agencies: CFIA and PHAC
  - Timeframe:  
April 1, 2013 – March 31, 2016

### ADVISERS

- Dr. Tim Ogilvie
- DAFF Australia
- Defra, UK

**Canada**  
■ Canadian Food Inspection Agency [Lead]  
■ Public Health Agency of Canada  
■ Agriculture and Agri-Food Canada

**Alberta**  
GOVERNMENT OF ALBERTA  
Agriculture and Rural Development

**BRITISH COLUMBIA**  
GOVERNMENT OF BRITISH COLUMBIA  
Agriculture

**Manitoba**  
Government of Manitoba | MAFRI

**Ministère de l'Agriculture, des Pêcheries et de l'Alimentation Québec**

**TDV** TDV Global Inc

**SAGARPA**  
SECRETARÍA DE AGRICULTURA, GANADERÍA, DESARROLLO RURAL, PESCA Y ALIMENTACIÓN

**USDA**  
Animal and Plant Health Inspection Services  
United States Department of Agriculture

**Canadian Animal Health Coalition**  
Promoting a collaborative approach to animal health

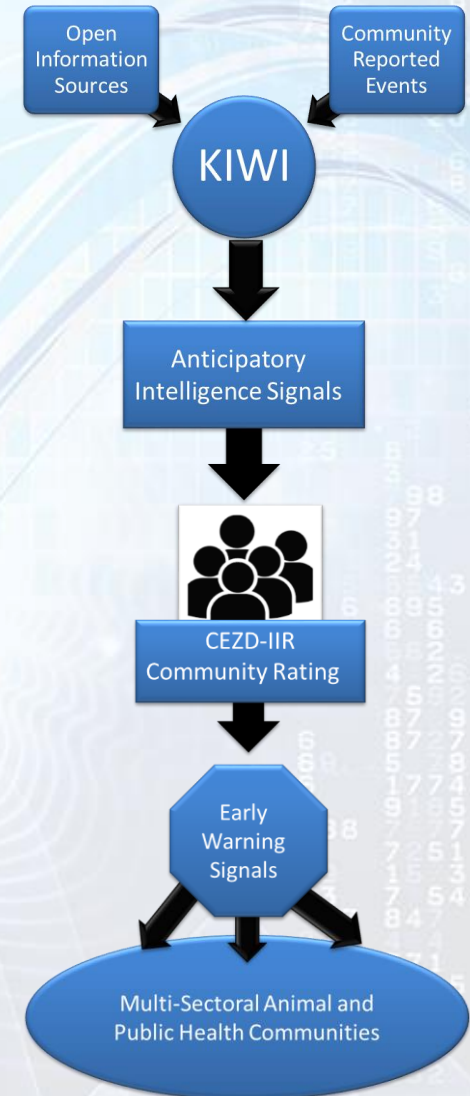
**Canadian Wildlife Health Cooperative**  
Réseau canadien de la santé de la faune

**Canadian Regulatory Veterinary Epidemiology Network (CRVE-Net)**

## OVERVIEW PROJECT CONCEPT

The concept of the project relies on four distinct and dependent activities to develop intelligence outputs from the available information sources:

1. **Collection;**
2. **Assessment;**
3. **Identification; and**
4. **Reporting.**



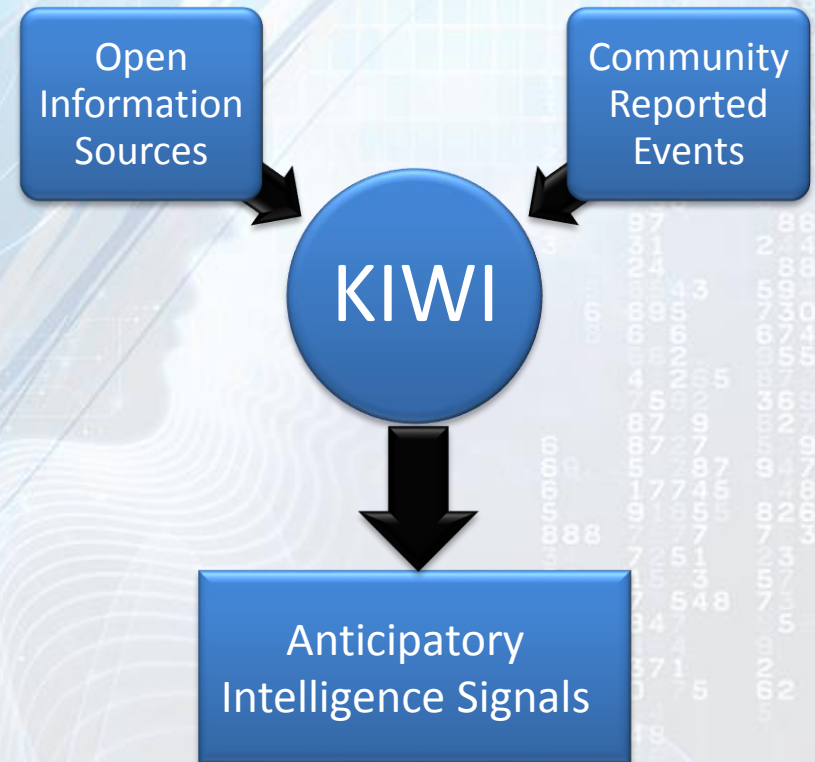
## OVERVIEW

### 1. COLLECTION

1. CNPHI's **Knowledge Integration using Web-based Intelligence (KIWI)** system collects disease information in order to produce anticipatory intelligence signals (**AISs**).

KIWI collects disease information via two different methods:

1. Automatically from (currently) nine open information sources; and
2. Through community reported events as submitted by users.





## OVERVIEW

### 2. ASSESSMENT

2. Once produced, the CEZD-IIR community collectively assesses and rates the relevance of each anticipatory intelligence signal using a common assessment framework.



## OVERVIEW

### 3. IDENTIFICATION

3. Those anticipatory intelligence signals that are rated sufficiently high are then filtered to produce early warning signals (EWSs)



## OVERVIEW

### 4. REPORTING

4. Early warning signals are ranked and introduced into various reporting mechanisms for distribution as intelligence outputs to the multi-sectoral animal and public health communities.



## **CEZD-IIR IN ACTION**

### **FOLLOWING AN EARLY WARNING SIGNAL**

#### **Examples of Early Warning Signals:**

*New SARS-like virus can jump directly from bats to humans, no treatment available*

*New Asian mosquito found in B.C. a potential disease carrier*



*Tularemia case reported in Sudbury, 1<sup>st</sup> case in 12 years*

*Thousands More Poultry Dead in Nigerian Bird Flu Outbreak*

*Undiagnosed viral illness, swine*

## CEZD-IIR IN ACTION FOLLOWING AN EARLY WARNING SIGNAL

### 1. Collection by KIWI

*"A team of veterinary researchers at Iowa State University [ISU] has pinpointed a virus that has caused mysterious tremors in piglets dating back decades. The virus, which comes from a family known as "pestiviruses", infects young pigs and can cause them to shake involuntarily.*

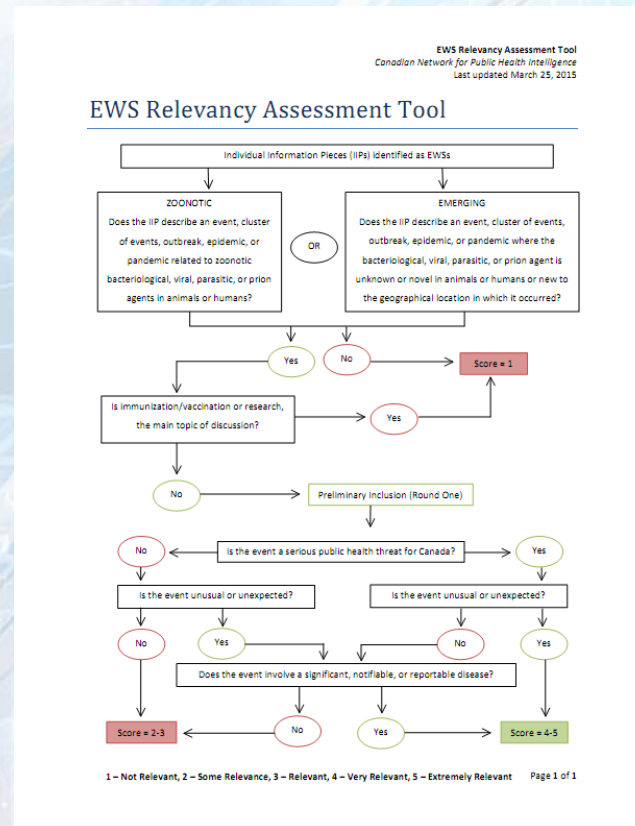
*Afflicted piglets are sometimes referred to as "shaker pigs" or "dancing pigs" and, in severe cases, the tremors prevent pigs from nursing and can lead to starvation."*

# CEZD-IIR IN ACTION

## FOLLOWING AN EARLY WARNING SIGNAL

### 2. Assessment by Community

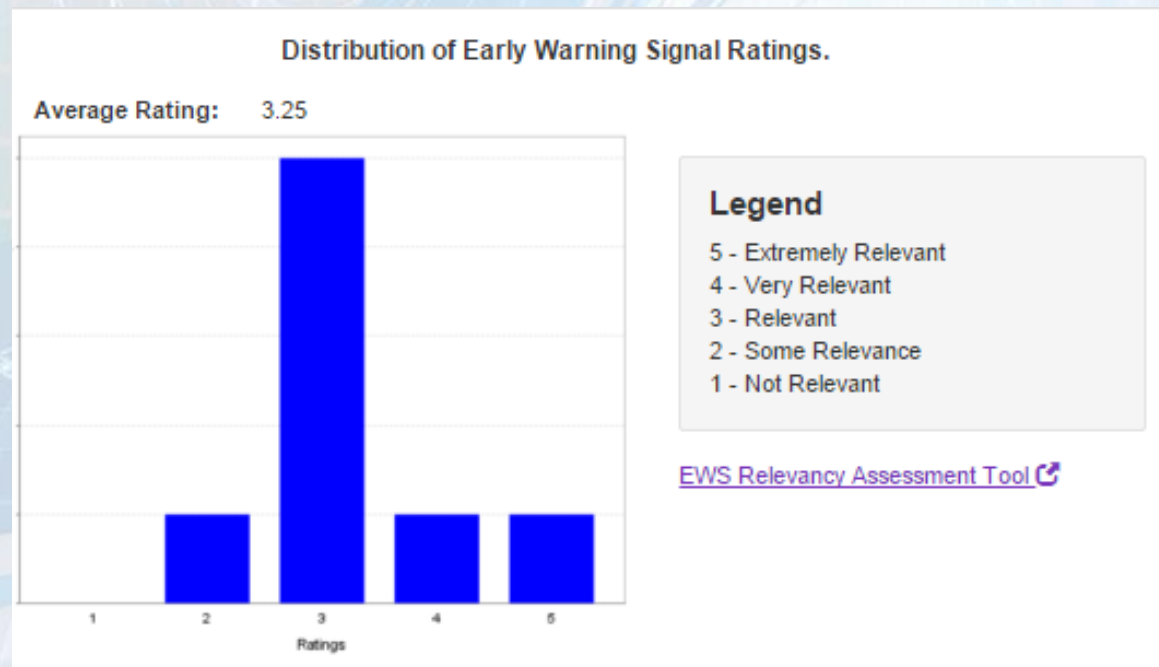
EWS Relevancy Assessment Tool provides guidance in assessing the relevance of a given Early Warning Signal



## CEZD-IIR IN ACTION FOLLOWING AN EARLY WARNING SIGNAL

### 3. Identification by Community

Distribution of  
community ratings  
for this signal



# CEZD-IIR IN ACTION

## FOLLOWING AN EARLY WARNING SIGNAL

### 4. Reporting

#### CEZD-IIR Weekly Intelligence Report

Centre for Emerging and Zoonotic Disease Integrated Intelligence and Response	
<b>CEZD-IIR WEEKLY INTELLIGENCE REPORT</b>	
This intelligence report is based on the collective rating of information signals by the CEZD-IIR community, as acquired and selected from nine distinct disease surveillance sources via the Knowledge Integration using Web-Based Intelligence (KIWI) tool hosted on the Canadian Network for Public Health Intelligence (CNPHI) informatics platform.	
<b>CHANGE ASSESSMENT LEGEND:</b>	
<ul style="list-style-type: none"> <li>■ Improving</li> <li>■ No change</li> <li>■ Deteriorating</li> <li>■ Undetermined</li> </ul>	
<b>Most Relevant Signals 04.11.2015 – 08.11.2015</b>	
<b>1</b>	<p><b>Disease:</b> Undiagnosed Viral Illness  <b>Species affected:</b> Swine  <b>Location:</b> Iowa, United States  <b>Highest average user rating:</b> 3.4  <b>Frequency of signals over four-week period:</b> 0  <b>Number of weeks in intelligence report:</b> 1  <b>Change assessment:</b> Undetermined</p> <p>A team of veterinary researchers at Iowa State University, using next-generation DNA sequencing techniques, have identified a "pestivirus" that infects young pigs and causes them to shake involuntarily. The virus can prevent the pigs from nursing and possibly lead to starvation. It is not known to infect humans and doesn't make pork unsafe to eat. If suspecting a case, veterinarians can now send in samples for laboratory confirmation.</p>
<b>2</b>	<p><b>Disease:</b> Dengue, West Nile Virus, Chikungunya, Encephalitis...</p> <p><b>Species affected:</b> Mosquito (<i>Aedes japonicus</i>)  <b>Location:</b> Vancouver, British Columbia, Canada  <b>Highest Average User Rating:</b> 3.35  <b>Frequency of signals over four-week period:</b> 0  <b>Number of weeks in intelligence report:</b> 1  <b>Change assessment:</b> Undetermined</p> <p><i>Ae. japonicus</i>, an invasive disease-carrying mosquito species, is widely found in Asia, Europe, New Zealand, as well as eastern parts of the United States and Canada. Canadian entomologists have now reported the first appearance of <i>Ae. japonicus</i> in western Canada, in a suburb of Vancouver, British Columbia. <i>Ae. japonicus</i> capability of changing its geographic range comes from its high cold tolerance and ability to use a variety of larval habitats (i.e. tire, tree holes, storm drains, etc.). Surveillance efforts are currently underway as the species can carry: Dengue Hemorrhagic Fever, West Nile Virus, Chikungunya, Japanese Encephalitis, St. Louis Encephalitis, and La Crosse Encephalitis.</p>
<b>3</b>	<p><b>Disease:</b> Tularemia  <b>Species affected:</b> Human  <b>Location:</b> Sudbury, Ontario, Canada</p> <p>For the first time since 2003, laboratory results have confirmed a human case of tularemia in an adult resident in Sudbury, Ontario, Canada. Tularemia is caused by the bacteria <i>Francisella tularensis</i> and is naturally occurring in Ontario wildlife populations.</p>



# CEZD-IIR IN ACTION

## FOLLOWING AN EARLY WARNING SIGNAL

### 4. Reporting

KIWI's User-Generated  
PDF Report on  
Early Warning Signal

PRO/AH/EDR> Undiagnosed viral illness, swine - USA (03):  
(IA) research, comment

This Early Warning Signal has not yet been verified.

[View Source](#)

**Description**  
Undiagnosed -- United States

**Detection Method** Manual      **Source** ProMED

**Type** AIS      **Date Posted** Nov 10, 2015 10:45:11 CST

**Perspectives**

**Ratings**

Distribution of Early Warning Signal Ratings.  
Average Rating: 3.25

Rating	Count
1	1
2	1
3	5
4	1
5	1

**Legend**

- 5 - Extremely Relevant
- 4 - Very Relevant
- 3 - Relevant
- 2 - Some Relevance
- 1 - Not Relevant

[EWS Relevancy Assessment Tool](#)

**Details**

Rating	Count
1	0

Report generated by the CNPHI KIWI system on Nov 16, 2015 11:48:09 CST      Page 1 / 2

## PROJECT STATUS UPDATE

### ALPHA AND BETA PILOTS

*The CEZD-IIR initiative has been active within this fiscal year, with much of the activity focused on the development and delivery of two Pilots:*

- The **Alpha Pilot** was focused on technical demonstration of the KIWI tools and CEZD-IIR Collaboration Centre.
- The **Beta Pilot** was focused on refinements to the informatics platform and tools based on community feedback, and involved a larger and more representative group of participants.

## PROJECT STATUS UPDATE FROM ALPHA TO BETA

Based on substantial feedback and analysis, refinements were implemented, including:

**1. Implementation of two-tiered intelligence signal framework:**

- Tier 1: Anticipatory Intelligence Signal (AIS); and
- Tier 2: Early Warning Signal (EWS).

**2. Addition of 4 additional information sources to KIWI:**

- the Poultry Site, Pig Progress, Outbreak News Today, International Biosecurity Intelligence System.

## PROJECT STATUS UPDATE FROM ALPHA TO BETA

### 3. Improved navigation and filtering of KIWI results:

- Rated / unrated;
- By date range; and
- By type of signal;

### 4. Enhanced interaction with intelligence signals:

- New commenting thread allows more organized discussion;
- Linkages to other EWSs related to the same health condition; and
- Graphical distribution of ratings by CEZD-IIR community.
- Push-button generation of PDF report on each individual EWS.

# PROJECT STATUS UPDATE

## PILOT SUMMARY COMPARISON

	Alpha Pilot	Beta Pilot
<b>Timeframe</b>	June – July	November – December
<b>Participation</b>	15 participants	35 participants
<b>Information Sources</b>	5 KIWI information feeds and Community Reported Events	9 KIWI information feeds and Community Reported Events
<b>KIWI Assessment Tools</b>	Google and Twitter Analytics	Google, Twitter Analytics and Linked Signals Identification
<b>Reporting</b>	Weekly reporting	Weekly reporting and User-generated PDF reporting

# PROJECT OBJECTIVES UPDATE

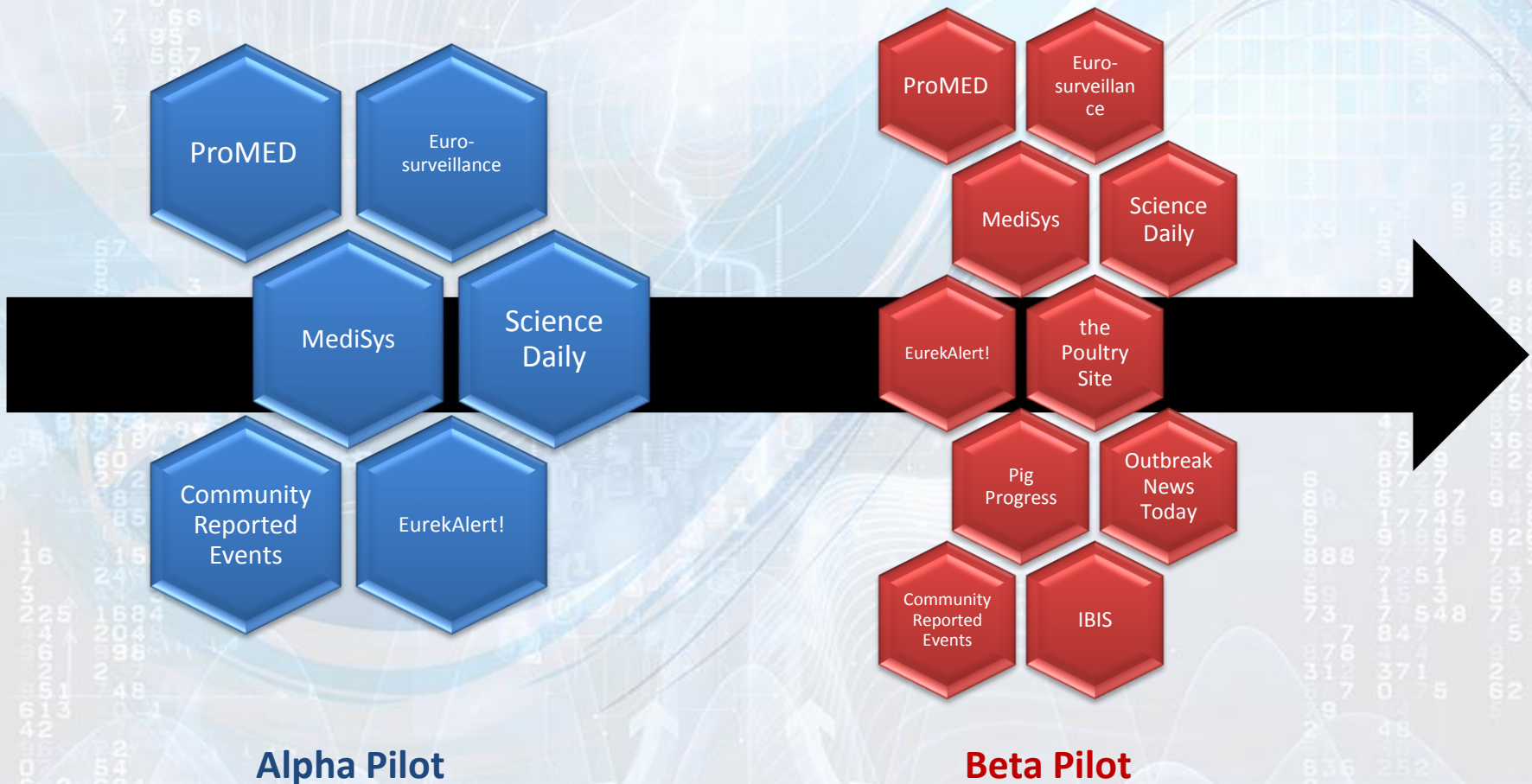
## 1. INTEGRATION OF INFORMATION SOURCES

*The Knowledge Integration using Web-based Intelligence (KIWI) tool applies a text-mining algorithm to identify early warning signals of relevance from numerous open information sources.*

- KIWI allows for the filtering, review, assessment and discussion of information derived from multiple sources in a single secure location.
- The modular nature of the tool allows for the inclusion of additional sources as they are identified or developed.
- KIWI applies a common look-and-feel to early warning signals emerging from all sources, allowing for a direct apples-to-apples comparison of information.

# PROJECT OBJECTIVES UPDATE

## 1. INTEGRATION OF INFORMATION SOURCES



## PROJECT OBJECTIVES UPDATE

### 2. COLLABORATIVE COMMUNITY-BASED ANALYSIS

*The CEZD-IIR community is exclusively comprised of individuals with the knowledge, interest and enthusiasm for emerging and zoonotic disease issues.*

- The CEZD-IIR community is comprised of representation from the federal, provincial, industry, academia, practitioner and not-for-profit sectors.
- Assessment of early warning signals is conducted from a uniquely Canadian perspective, ensuring that issues of the most significant relevance to domestic communities are identified.
- CEZD-IIR can engage the entire community quickly and efficiently using PING polling tools.
- The CEZD-IIR Collaboration Centre allows for trusted discussion of public and animal health issues of interest.



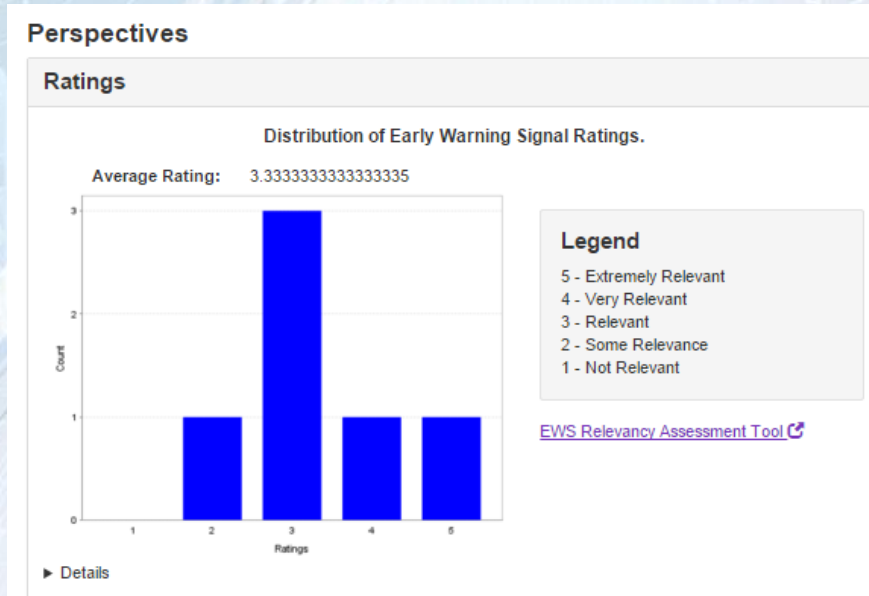
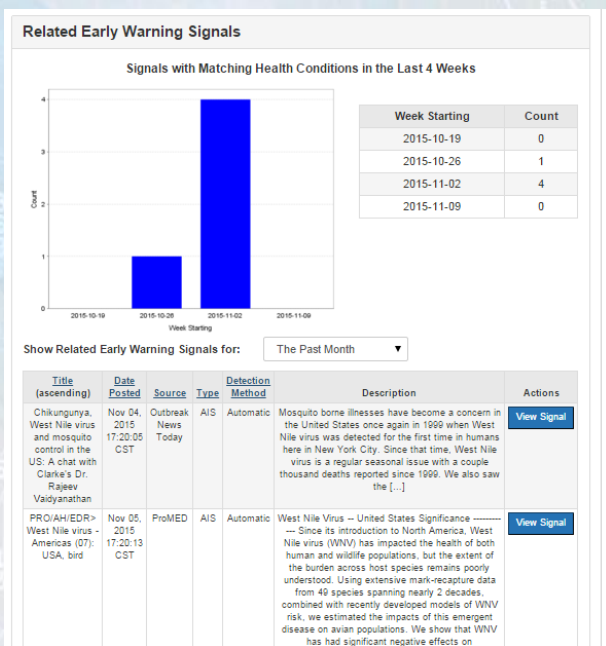
# PROJECT OBJECTIVES UPDATE

## 2. COLLABORATIVE COMMUNITY-BASED ANALYSIS

*The Knowledge Integration using Web-based Intelligence (KIWI) tool provides a range of distinct insights to assist with assessment of early warning signals.*

### 1. Related Early Warning Signals

### 2. Community Rating Distribution

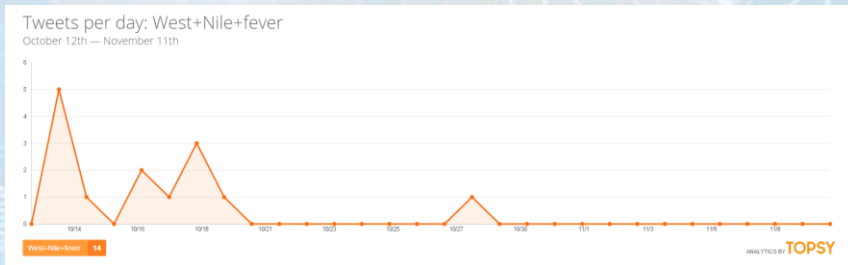


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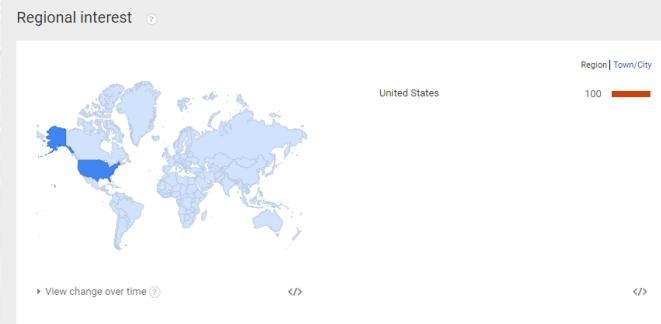
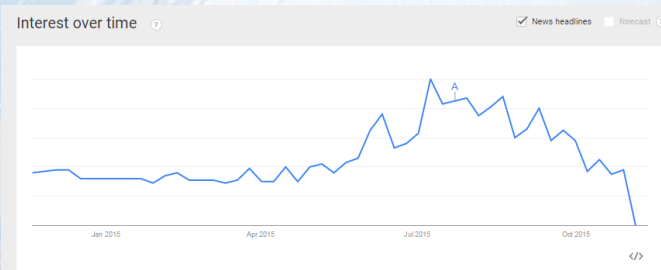
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## 3. Twitter Analytics



## 4. Google Analytics

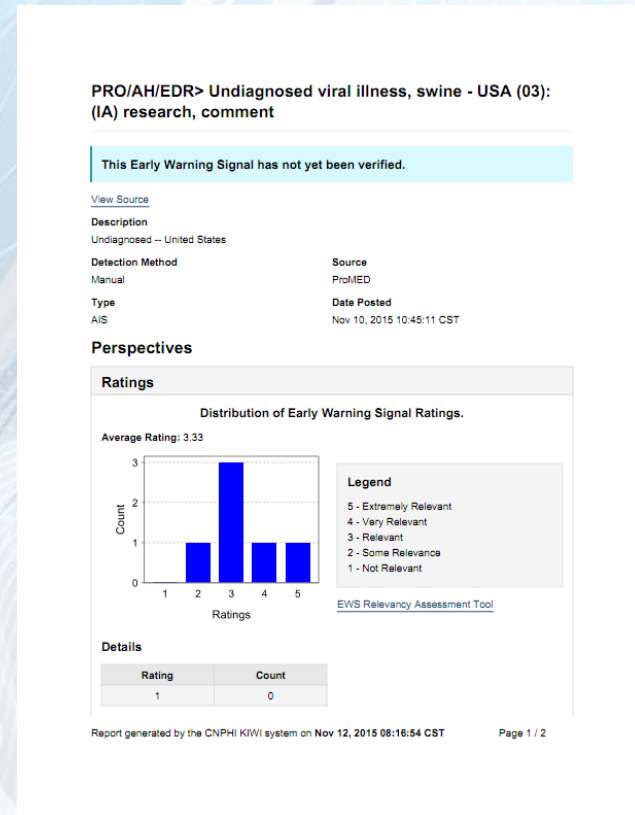


# PROJECT OBJECTIVES UPDATE

## 3. TIMELY DISTRIBUTION OF INTELLIGENCE OUTPUTS

*The CEZD-IIR initiative is looking to develop a variety of intelligence outputs that serve a range of user needs and requirements.*

### 1. KIWI's User-Generated PDF Reporting



# PROJECT OBJECTIVES UPDATE

## 3. TIMELY DISTRIBUTION OF INTELLIGENCE OUTPUTS

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## 2. CEZD-IIR Weekly Intelligence Report

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## PROJECT OBJECTIVES UPDATE

### 3. TIMELY DISTRIBUTION OF INTELLIGENCE OUTPUTS

*The CEZD-IIR initiative is looking to develop a variety of intelligence outputs that serve a range of user needs and requirements.*

Other intelligence outputs are also under consideration, including:

- **Monthly, Quarterly or Annual** summary reports; and
- Broader scope of user-defined reporting (allowing the user to set the timescale, sensitivity, key words, etc.).

## SUSTAINABILITY

### SUSTAINABILITY PLAN

*The CEZD-IIR initiative is committed to sustainability of this intelligence capability beyond the project lifecycle. To that end:*

- A Sustainability Plan was drafted by the Project Team with input from project advisors;
- The plan will be taken to CFIA senior management for input and approval; and
- Partner organizations will be engaged over the December-January timeframe for their feedback and input.

## **SUSTAINABILITY ALIGNMENT WITH CAHSS**

***The CEZD-IIR initiative is committed to alignment with the CAHSS network of networks initiative:***

- CEZD-IIR is an independent network that will operate within its own governance and reporting structures in accordance with the CAHSS Purpose and Principles.
- CEZD-IIR is committed to ensuring that the foundational characteristics of CAHSS member networks are clearly established, including:
  - Purpose, Principles, Participants, Organizational Concept, Constitution and Practices.
- Work is also underway on the development of an integrated business plan with CAHSS and CAHSN to maximize alignment and the efficient use of resources within the CFIA.

## KEY NEXT STEPS

*The CEZD-IIR initiative will be very active in the final 4 months of the project, including:*

- Analysis of feedback from Beta Pilot and development of further refinements for wide release in early 2016;
- Further demonstration of the value proposition to end-user communities and key stakeholders over final span of the project; and
- Finalization of sustainability plan and associated action plan by end of March, 2016.