

# Event Based Surveillance

## Technology Deep Dive: EIOS





## The EIOS Initiative

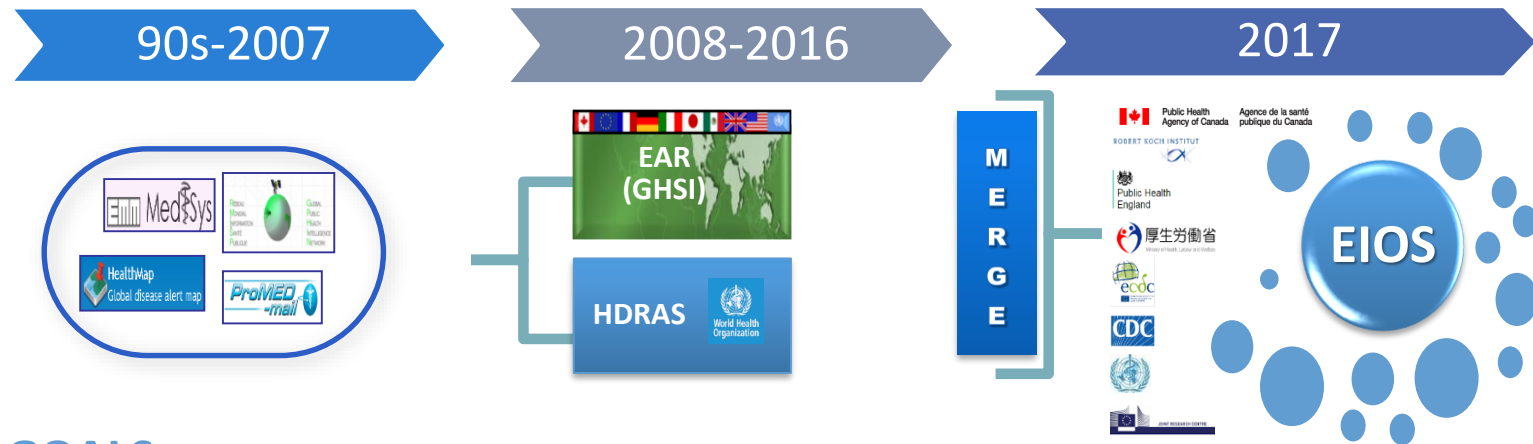
- The Epidemic Intelligence from Open Sources (EIOS) initiative is a unique collaboration between various public health stakeholders around the globe.
- It brings together new and existing initiatives, networks and systems to create a unified all-hazards, One Health approach to early detection, verification and assessment of public health risks and threats using open source information.

Find out more about the EIOS Initiative here: <https://youtu.be/NkIf3lOCTx0>

- Creating a community for public health intelligence (PHI) that includes Member States, international organizations, and other partners, is at the heart of the initiative



# Epidemic Intelligence from Open Sources (EIOS) conception



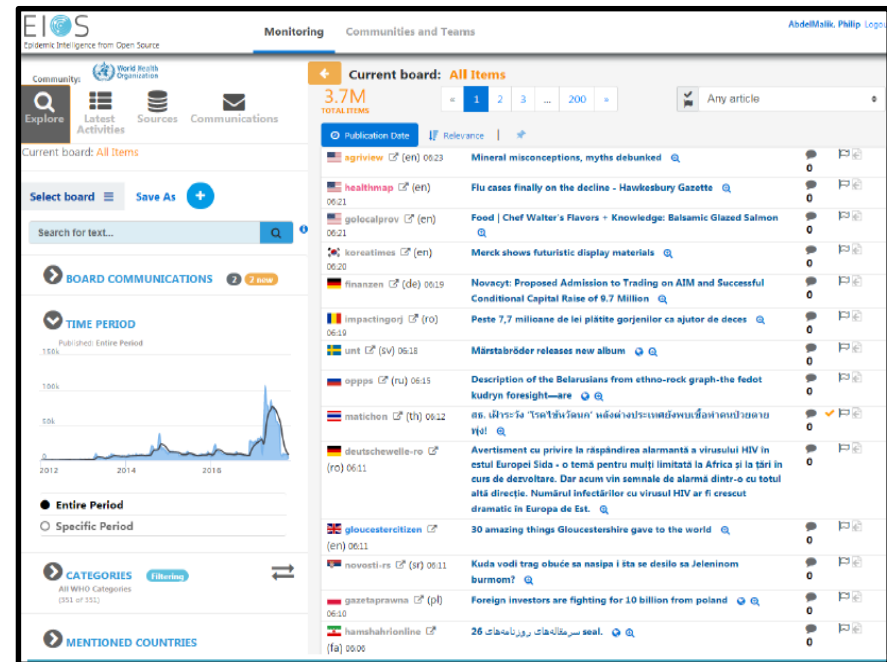
## GOALS

- Capitalize on existing media aggregators
- Foster synergies with other surveillance programs
- Pool expertise across surveillance communities
- Reduce duplication of efforts
- Increase adaptability of surveillance system

# The EIOS system

- Developed by the Joint Research Centre (JRC) with input from EBS analysts
- EIOS scans >300K articles per day from >11K selected media and other sources, in more than 50 languages
- Information contained on the platform can be translated into English
- Surveillance can effectively move away from the laborious manual collection of disease event information from several sources, and provide a “one-stop shop” for EBS, thus automating workflow

*EIOS is a “one-stop shop” for scanning public health related information captured by the various information gathering systems*

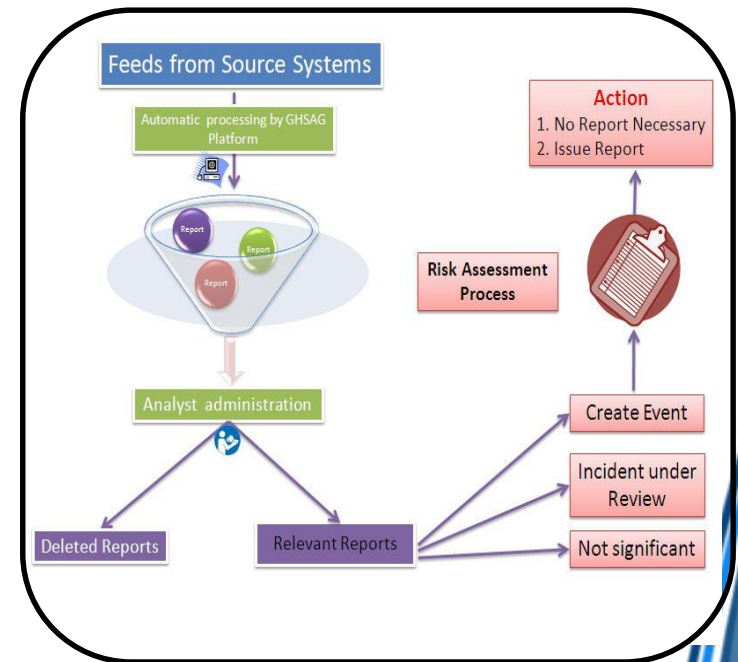
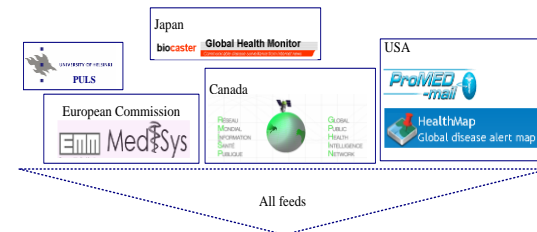


View of EIOS main monitoring page

# Internet scanning & data ingestion

## Inputs:

- Open source unclassified intelligence, including:
  - **Leading global health sources**, such as *WHO's Disease Outbreak News (DON)* reports
  - **Major news outlets**, such as *Reuters*, the *New York Times*, and *Relief Web*
  - **National press releases**, such as alerts from Ministries of Health
  - **Local news outlets**, such as *Star Kenya* or the *South China Morning Post*
  - **Blogs**, such as *Flu Diaries*
  - **Social media outlets**, such as *Twitter*



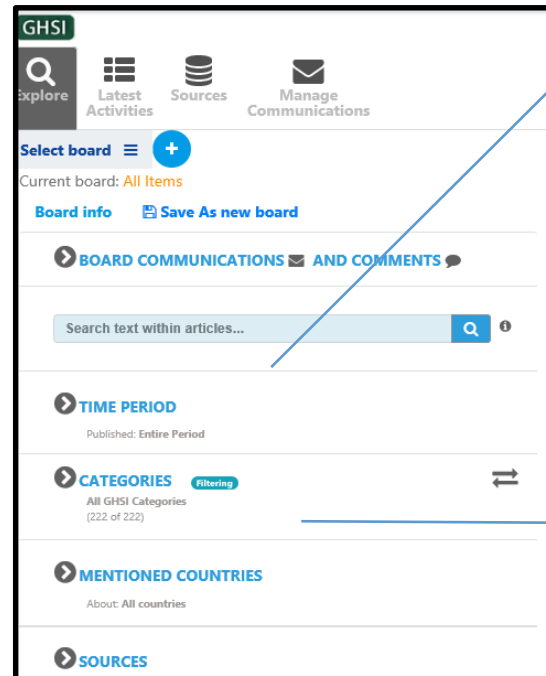


# Data processing & categorical filtering

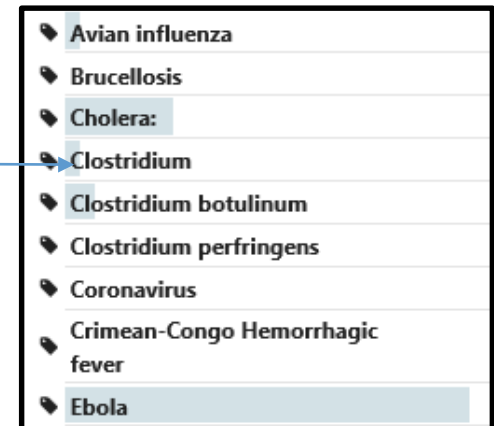
## EIOS processing chain:

- Standardization
- Deduplication
- Translation
- Entity tagging
- Aggregation
- Categorization

*By the end of the processing chain, the system will have produced a structured collection of information*



View of EIOS navigation panel



# Analyst assessment & outbreak alerting

## What we're watching....

- A user community can customize the types and sources of information for surveillance
- Events are prioritized based on interests of specific user communities
- Prospective tracking of disease events of importance by creating EIOS “boards”
- Analysts can sift through filtered media records, and further flag, pin, comment upon and/or share articles to alert colleagues of a potential new outbreak

The screenshot displays the EIOS interface. At the top, there's a 'Select board' dropdown and a '+ Exit current board' button. The current board is 'Ebola in DRC (Nord-Kivu) - 2018', which is categorized under 'biological' and 'iur'. Below this, there are buttons for 'Board info' and 'Edit info'. The board has 45 members. The 'Rationale' section provides a detailed report from the provincial health Division of North Kivu dated July 28, 2018, regarding 26 cases of fever with haemorrhagic signs, including 20 deaths in the Mangina health area. It mentions that six samples were analyzed by the National Institute for Biomedical Research (INRB), with four being positive for Ebola Virus disease. A link to a Mailchimp declaration is provided. Below the rationale, there's a section for 'GHSI Members' and a list of other boards. The list includes 'Ebola in DRC (Nord-Kivu)', 'Lassa fever - Africa - 2018', 'Rift Valley fever in East Africa - 2018', 'Listeriosis in Europe and Australia - 2015-2018', 'Drug-resistant typhoid - Pakistan - 2018', and 'Cholera - world wide - 2018'. Each board entry shows its category (biological, iur, or all hazards) and the creator/modifier information.

Select board Exit current board

Current board: Ebola in DRC (Nord-Kivu) - 2018

Board info Edit info

GHSI Members: 45 user(s)

Rationale

On Saturday, July 28, 2018, the provincial health Division of North Kivu reported to the Ministry of Health 26 cases of fever with haemorrhagic signs, including twenty (20) deaths in the Mangina health area located in the Mabalako health zone., blessed territory, in the Province of North Kivu. Six (6) samples taken from hospitalized patients arrived in Kinshasa on Tuesday, 31 July 2018 and were analyzed by the National Institute for Biomedical Research (INRB). Of the Six (6) samples analyzed, four (4) were found to be positive for Ebola Virus disease. Sequencing is underway at INRB to identify the strain of the virus.  
[https://mailchi.mp/49b37201b847/declaration Ebola\\_kivu?e=356f82d082](https://mailchi.mp/49b37201b847/declaration Ebola_kivu?e=356f82d082)

Created by Hercik, Christie on 01/08/2018 15:42 | Last Modified by Hercik, Christie on 01/08/2018 16:36

**GHSI Members**

**Ebola in DRC (Nord-Kivu)**

Created by Hercik, Christie on 01/08/2018 15:42 | Last Modified by Hercik, Christie on 01/08/2018 16:36

**Lassa fever - Africa - 2018**

Created by Hercik, Christie on 16/02/2018 11:20 | Last Modified by Hercik, Christie on 01/08/2018 16:36

**Rift Valley fever in East Africa - 2018**

Created by Hercik, Christie on 01/08/2018 16:27

**Listeriosis in Europe and Australia - 2015-2018**

Created by Hercik, Christie on 01/08/2018 15:47 | Last Modified by Hercik, Christie on 01/08/2018 15:55

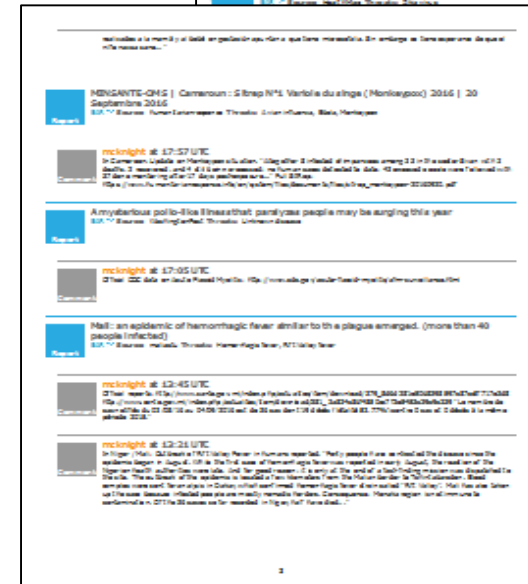
**Drug-resistant typhoid - Pakistan - 2018**

Created by Kaasik Aaslav, Kaja on 26/04/2018 14:25 | Last Modified by Kaasik Aaslav, Kaja on 28/04/2018 09:09

**Cholera - world wide - 2018**

Created by Kaasik Aaslav, Kaja on 28/04/2018 05:40 | Last Modified by Kaasik Aaslav, Kaja on 28/04/2018 08:25

*The EIOS communication architecture strengthens the growth of epidemic intelligence and public health networks, creating opportunities for information sharing and discussion*





# EIOS user communities & beneficiaries

- EIOS will be accessible to all WHO member states, and utilized by existing surveillance communities, such as GHSI, GOARN, and the animal health communities (OIE, FAO)
- The platform can be customizable to particular user communities
  - One standardized user manual will be developed for all users
  - Community-specific SOPs will be developed to optimize platform procedures to best serve the unique missions of each user community
- Governance
  - EIOS Core Team (WHO) – Executive oversight
  - Coordination Group (11 members) – Initiative oversight
  - User community leadership, project teams, working groups



## Future benefits of the EIOS initiative



- Expand the breadth and depth of open source information coverage thus improving early detection of public health threats
- Enable standardization of approaches to epidemic intelligence
- Facilitate collaborative event characterization and analysis of emerging health hazards
- Establish a surveillance network of public health experts that reach beyond individual surveillance communities
- Enhance near real-time communication across a wide range of networks
- Enhance coordination for international outbreak response



# Links

EIOS system:

<https://portal.who.int/eios/Login?returnurl=%2feios>

EIOS Initiative website:

<https://www.who.int/eios>

EIOS youtube video:

<https://youtu.be/NkIf3IOCTx0>



# Thank you!

**Global Disease Detection Operations Center (GDDOC)**  
**Email: GDDOC-Outbreak ([GDDOUTBREAK@CDC.GOV](mailto:GDDOUTBREAK@CDC.GOV))**

