

**Workshop**  
**INTRODUZIONE ALLA**  
**SORVEGLIANZA BASATA SU EVENTI PER ANALISTI**

Introduzione *all'Epidemic Intelligence* e alla  
metodologia della sorveglianza basata su eventi

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# Outline

- Cos'è l'*Epidemic Intelligence*?
- Principi della sorveglianza basata su eventi
- Come si fa EBS nel mondo?



- Cos'è un evento insolito?



# Esempio

Malattie causate  
da agenti  
biologici



# Esempio

Malattie causate  
da agenti  
biologici



Patologia conosciuta che si manifesta  
solo con frequenza/localizzazione insolita

Patologia insolita (sintomi, stagionalità,  
resistenza a farmaci, ...)

# Esempio

Malattie causate da agenti biologici



All'inizio le informazioni spesso sono troppo poche per distinguere chiaramente di cosa si tratti

Patologia conosciuta che si manifesta solo con frequenza/localizzazione insolita

Patologia insolita (sintomi, stagionalità, resistenza a farmaci, ...)

Epidemia in aree dove era stato riscontrato il patogeno  
(es Febbre gialla in Africa Occidentale)

Introduzione non documentata in precedenza  
(es Ebola in Africa Occidentale)

Malattia emergente  
- Mutazioni (TB, H1N1 2009)  
- Nuovo salto di specie (SARS)

Rilascio intenzionale  
(Antrace 2001)

Patologie non dovute ad agenti biologici

# Razionale per identificare presto possibili eventi insoliti in ambito biologico:

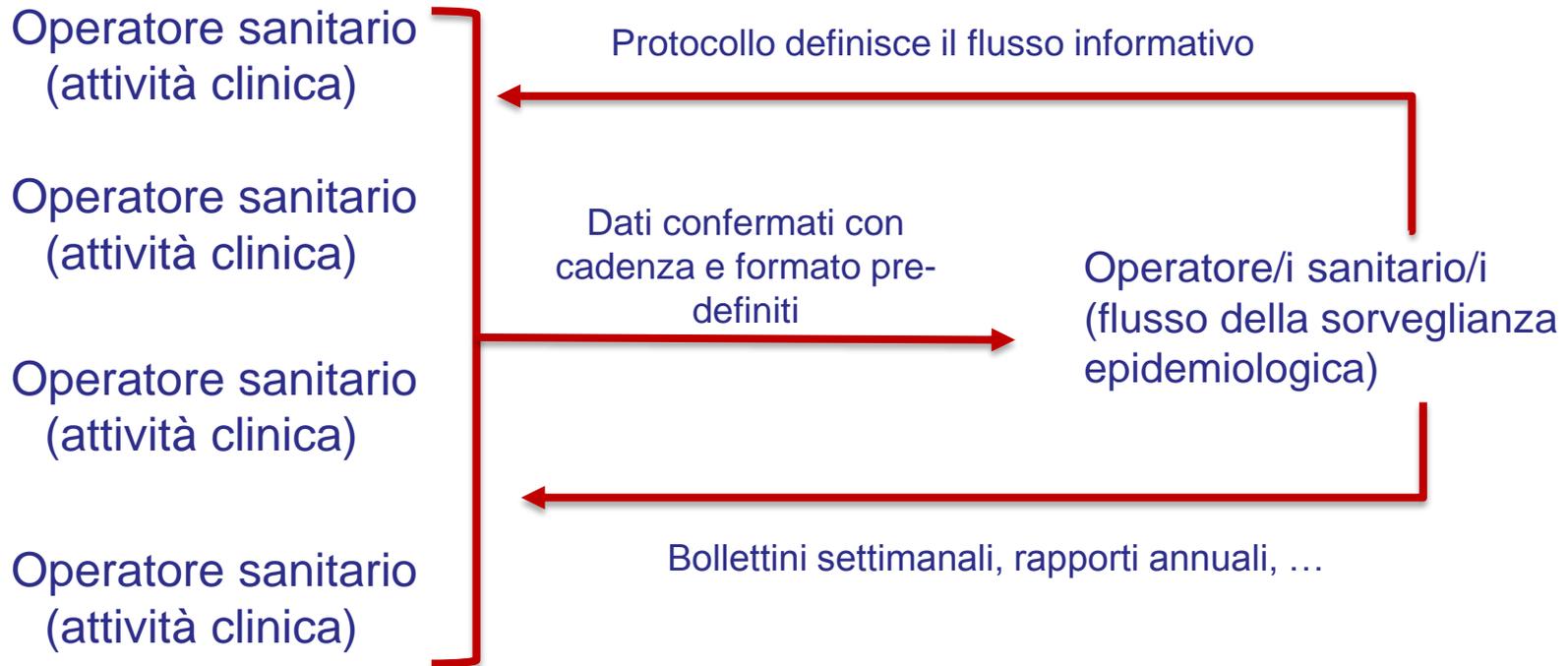
- **Finestra di opportunità** per controllare la diffusione di una nota/nuova malattia infettiva
- **Circoscrivere** un rilascio intenzionale (salute/giustizia...)
- **Allertare** paesi/regioni confinanti in modo da attivare piani di preparazione/risposta



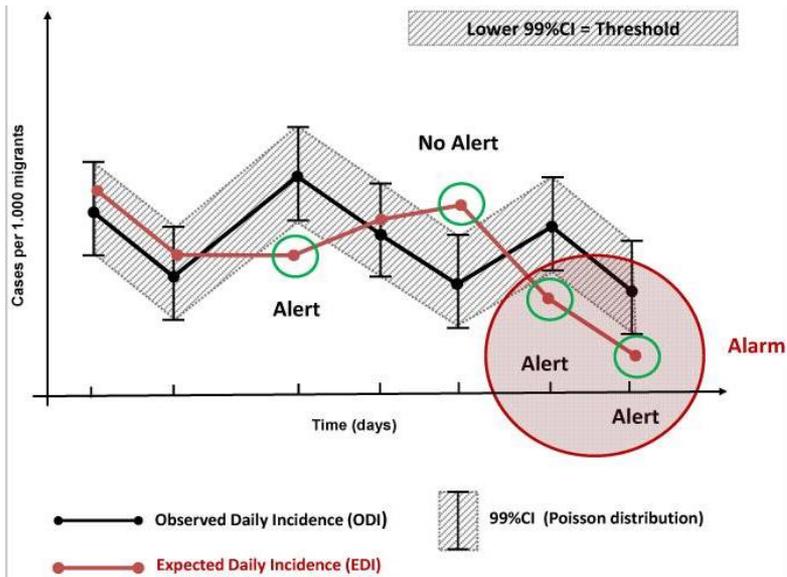
## **Strumenti classici per identificare eventi insoliti in ambito biologico:** Sorveglianza epidemiologica (malattie infettive, mortalità...)

- Raccolta sistematica di informazioni (definizione di caso, modalità di raccolta definite da un flusso informativo)
- Analisi ed interpretazione (trend, soglie di allerta)
- Diffusione dei risultati per guidare azioni di salute pubblica

# Modello semplificato: sorveglianza basata su indicatori



# Esempio: sorveglianza sindromica nei centri di immigrazione in Italia



*Int. J. Environ. Res. Public Health* **2014**, *11*, 8529–8541; doi:10.3390/ijerph110808529

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International Journal of  
Environmental Research and  
Public Health  
ISSN 1660-4601  
www.mdpi.com/journal/ijerph

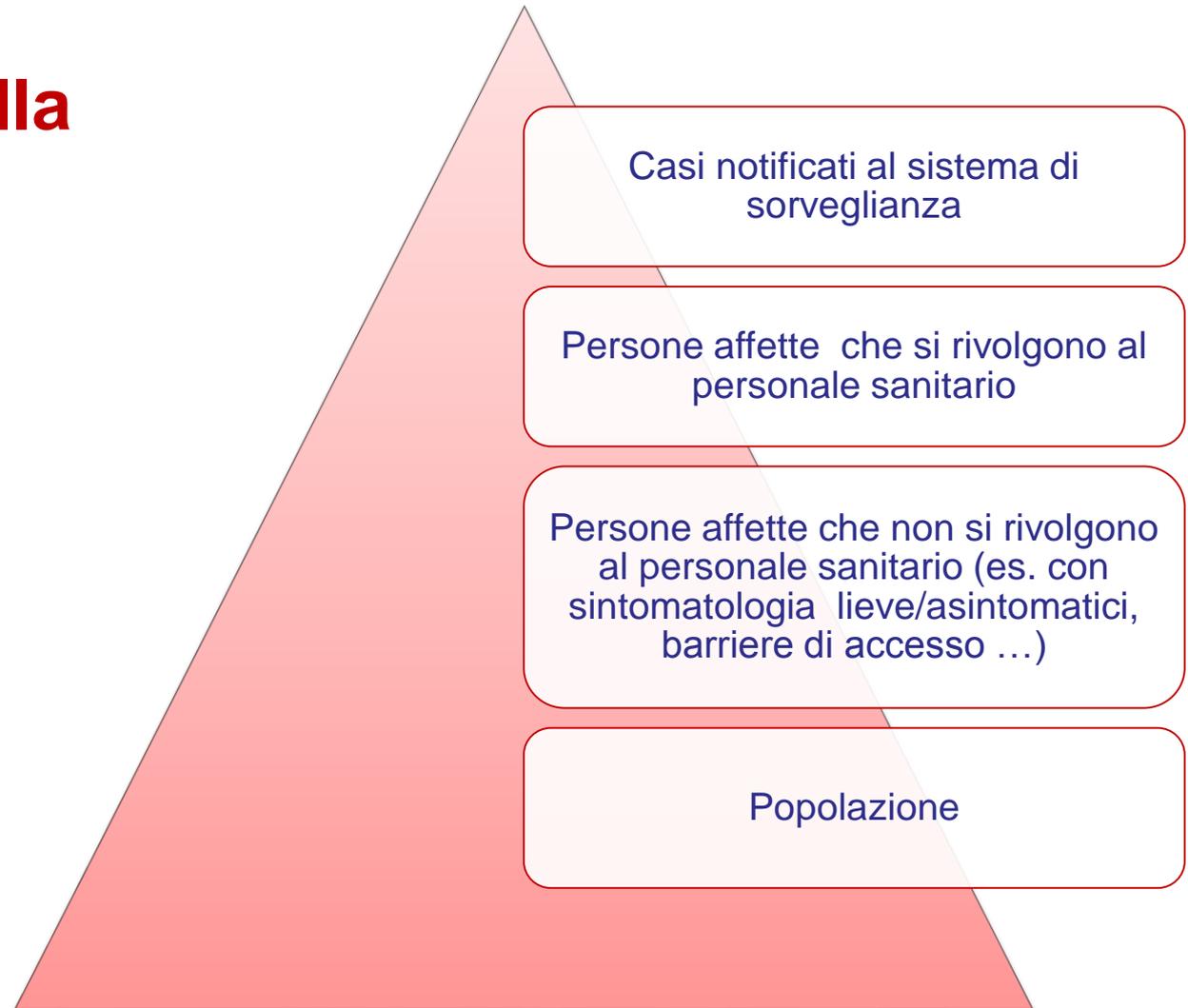
Article

## An Early Warning System Based on Syndromic Surveillance to Detect Potential Health Emergencies among Migrants: Results of a Two-Year Experience in Italy

Christian Napoli <sup>1,\*</sup>, Flavia Riccardo <sup>1</sup>, Silvia Declich <sup>1</sup>, Maria Grazia Dente <sup>1</sup>,  
Maria Grazia Pompa <sup>2</sup>, Caterina Rizzo <sup>1</sup>, Maria Cristina Rota <sup>1</sup>, Antonino Bella <sup>1</sup> and  
The National Working Group <sup>3</sup>

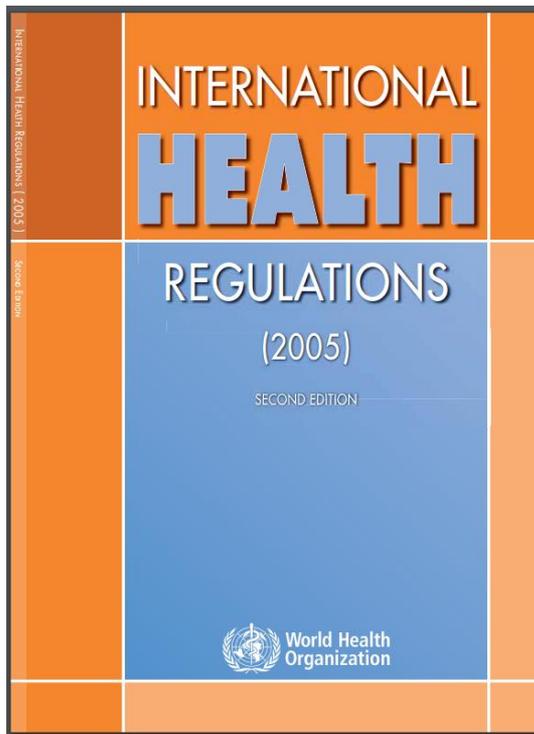
# La piramide della sorveglianza

- Vediamo solo la punta dell'iceberg?
- Possiamo captare prima un evento insolito in ambito biologico?



# *Il passaggio dalla malattia infettiva all'evento*

- Regolamento Sanitario Internazionale



«...strumento giuridico internazionale che si prefigge di “garantire la massima sicurezza contro la diffusione internazionale delle malattie, con la minima interferenza possibile sul commercio e sui movimenti internazionali, attraverso il **rafforzamento della sorveglianza delle malattie infettive** mirante ad identificare, ridurre o eliminare le loro fonti di infezione o fonti di contaminazione, il miglioramento dell’igiene aeroportuale e la prevenzione della disseminazione di vettori”.»

[http://www.salute.gov.it/portale/temi/p2\\_6.jsp?lingua=italiano&id=3066&area=usmaf&menu=vuoto](http://www.salute.gov.it/portale/temi/p2_6.jsp?lingua=italiano&id=3066&area=usmaf&menu=vuoto)

# Il passaggio dalla malattia infettiva all'evento

- Valutazione di **eventi** che possano costituire una emergenza sanitaria internazionale
- Attraverso un algoritmo decisionale (Annesso 2)
- Sviluppo di strumenti per identificare e riconoscere eventi insoliti



Detection of events of public health importance under the international health regulations: a toolkit to improve reporting of unusual events by frontline healthcare workers

Emily MacDonald , Preben Aavitsland, Dounia Bitar and Katrine Borgen

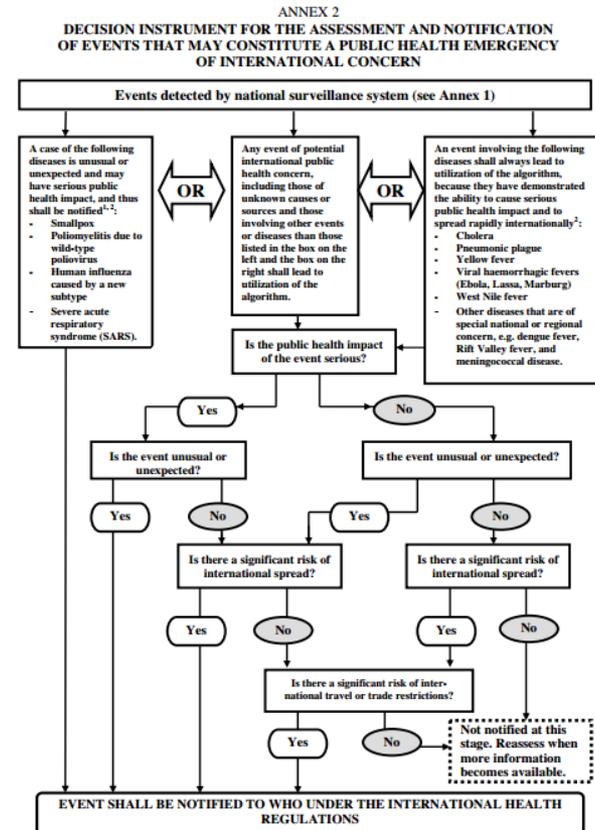
BMC Public Health BMC series – open, inclusive and trusted 2011 11:713 | DOI: 10.1186/1471-2458-11-713 |

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 Open Peer Review reports

<http://www.ncbi.nlm.nih.gov/pubmed/21936937>



<sup>1</sup> As per WHO case definitions.

<sup>2</sup> The disease list shall be used only for the purposes of these Regulations.

# Epidemic Intelligence



Eurosurveillance, Volume 11, Issue 12, 01 December 2006

Surveillance report

## EPIDEMIC INTELLIGENCE: A NEW FRAMEWORK FOR STRENGTHENING DISEASE SURVEILLANCE IN EUROPE

Citation style for this article: Paquet C, Coulobrier D, Kaiser R, Ciotti M. Epidemic intelligence: a new framework for strengthening disease surveillance in Europe. Euro Surveill. 2006;11(12):pii=665. Available online: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=665>

C. Paquet<sup>1</sup>, D. Coulobrier<sup>2</sup>, R. Kaiser<sup>2</sup>, M. Ciotti<sup>2</sup>

1. Institut de Veille Sanitaire, Saint-Maurice, France

2. European Centre for Disease Prevention and Control, Stockholm, Sweden

l'Epidemic intelligence (EI) comprende tutte le attività volte alla **identificazione precoce** di rischi in sanità pubblica, la loro validazione, valutazione ed indagine finalizzate alla raccomandazione di misure di controllo.

# Epidemic Intelligence

## Valutazione del rischio vs Gestione del rischio

*Monitoraggio del rischio*

**Epidemic Intelligence**

*Valutazione del rischio*

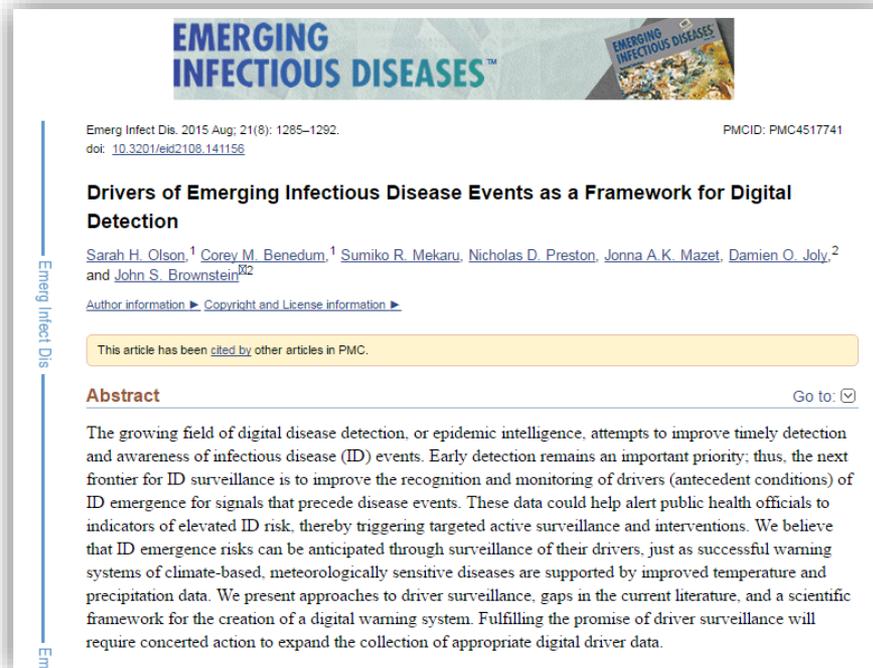
*Gestione del rischio*

*Comunicazione del rischio*



# Digital Disease Detection/Epidemic Intelligence

“The growing field of digital disease detection, or epidemic intelligence, attempts to improve timely detection and awareness of infectious disease (ID) events. ”



The image shows a screenshot of a PubMed article page. At the top, there is a banner for 'EMERGING INFECTIOUS DISEASES™' with a small image of a book cover. Below the banner, the article title is 'Drivers of Emerging Infectious Disease Events as a Framework for Digital Detection'. The authors listed are Sarah H. Olson, Corey M. Benedum, Sumiko R. Mekaru, Nicholas D. Preston, Jonna A.K. Mazet, Damien O. Joly, and John S. Brownstein. The article is from 'Emerg Infect Dis' 2015 Aug; 21(8): 1285-1292. The abstract text is visible, starting with 'The growing field of digital disease detection, or epidemic intelligence, attempts to improve timely detection and awareness of infectious disease (ID) events. Early detection remains an important priority; thus, the next frontier for ID surveillance is to improve the recognition and monitoring of drivers (antecedent conditions) of ID emergence for signals that precede disease events. These data could help alert public health officials to indicators of elevated ID risk, thereby triggering targeted active surveillance and interventions. We believe that ID emergence risks can be anticipated through surveillance of their drivers, just as successful warning systems of climate-based, meteorologically sensitive diseases are supported by improved temperature and precipitation data. We present approaches to driver surveillance, gaps in the current literature, and a scientific framework for the creation of a digital warning system. Fulfilling the promise of driver surveillance will require concerted action to expand the collection of appropriate digital driver data.'

EMERGING INFECTIOUS DISEASES™

Emerg Infect Dis. 2015 Aug; 21(8): 1285-1292. PMID: PMC4517741  
doi: [10.3201/eid2108.141156](https://doi.org/10.3201/eid2108.141156)

**Drivers of Emerging Infectious Disease Events as a Framework for Digital Detection**

Sarah H. Olson,<sup>1</sup> Corey M. Benedum,<sup>1</sup> Sumiko R. Mekaru, Nicholas D. Preston, Jonna A.K. Mazet, Damien O. Joly,<sup>2</sup> and John S. Brownstein<sup>1,2</sup>

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This article has been [cited by](#) other articles in PMC.

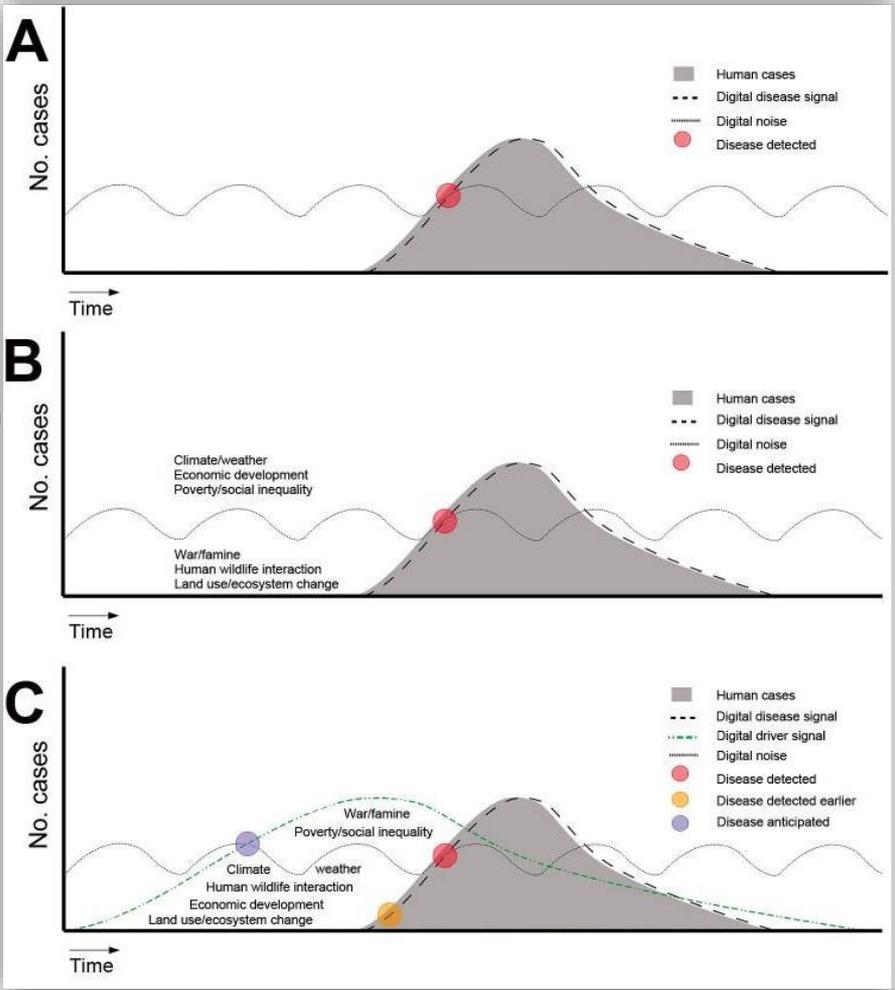
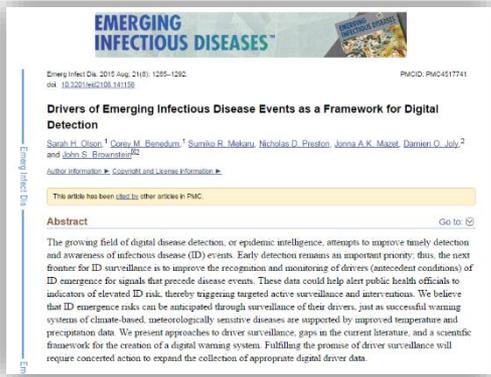
**Abstract** [Go to:](#)

The growing field of digital disease detection, or epidemic intelligence, attempts to improve timely detection and awareness of infectious disease (ID) events. Early detection remains an important priority; thus, the next frontier for ID surveillance is to improve the recognition and monitoring of drivers (antecedent conditions) of ID emergence for signals that precede disease events. These data could help alert public health officials to indicators of elevated ID risk, thereby triggering targeted active surveillance and interventions. We believe that ID emergence risks can be anticipated through surveillance of their drivers, just as successful warning systems of climate-based, meteorologically sensitive diseases are supported by improved temperature and precipitation data. We present approaches to driver surveillance, gaps in the current literature, and a scientific framework for the creation of a digital warning system. Fulfilling the promise of driver surveillance will require concerted action to expand the collection of appropriate digital driver data.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4517741/>

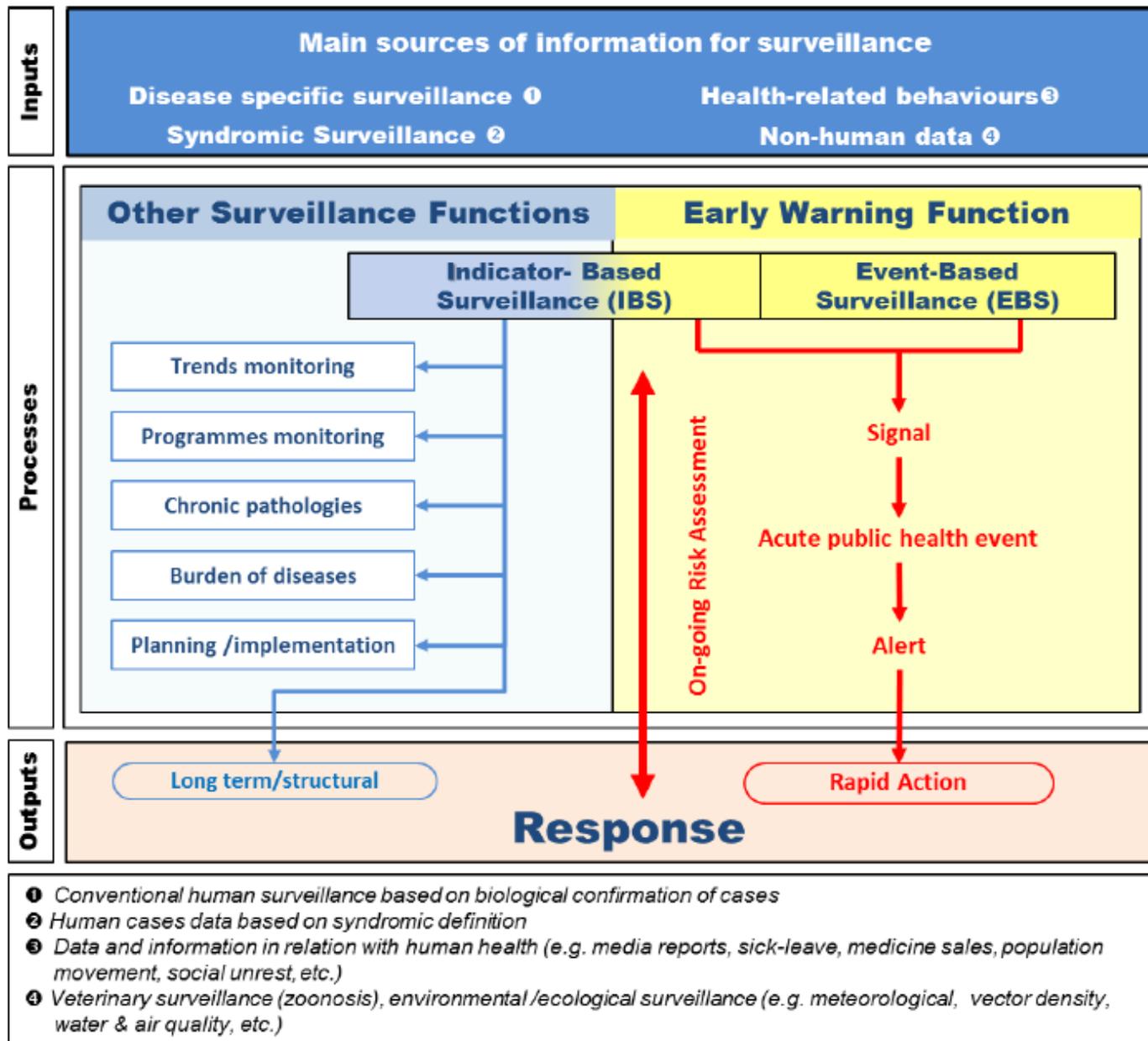
# Digital disease surveillance

# Digital driver surveillance



<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4517741/>





Sorveglianza basata su indicatori, sorveglianza basata su eventi, early warning ed epidemic intelligence.

Estratto da WHO **Implementation of Early Warning and Response with a focus on Event-Based Surveillance, 2014**

# Componente basata su eventi (EBS) di un sistema di *epidemic intelligence*

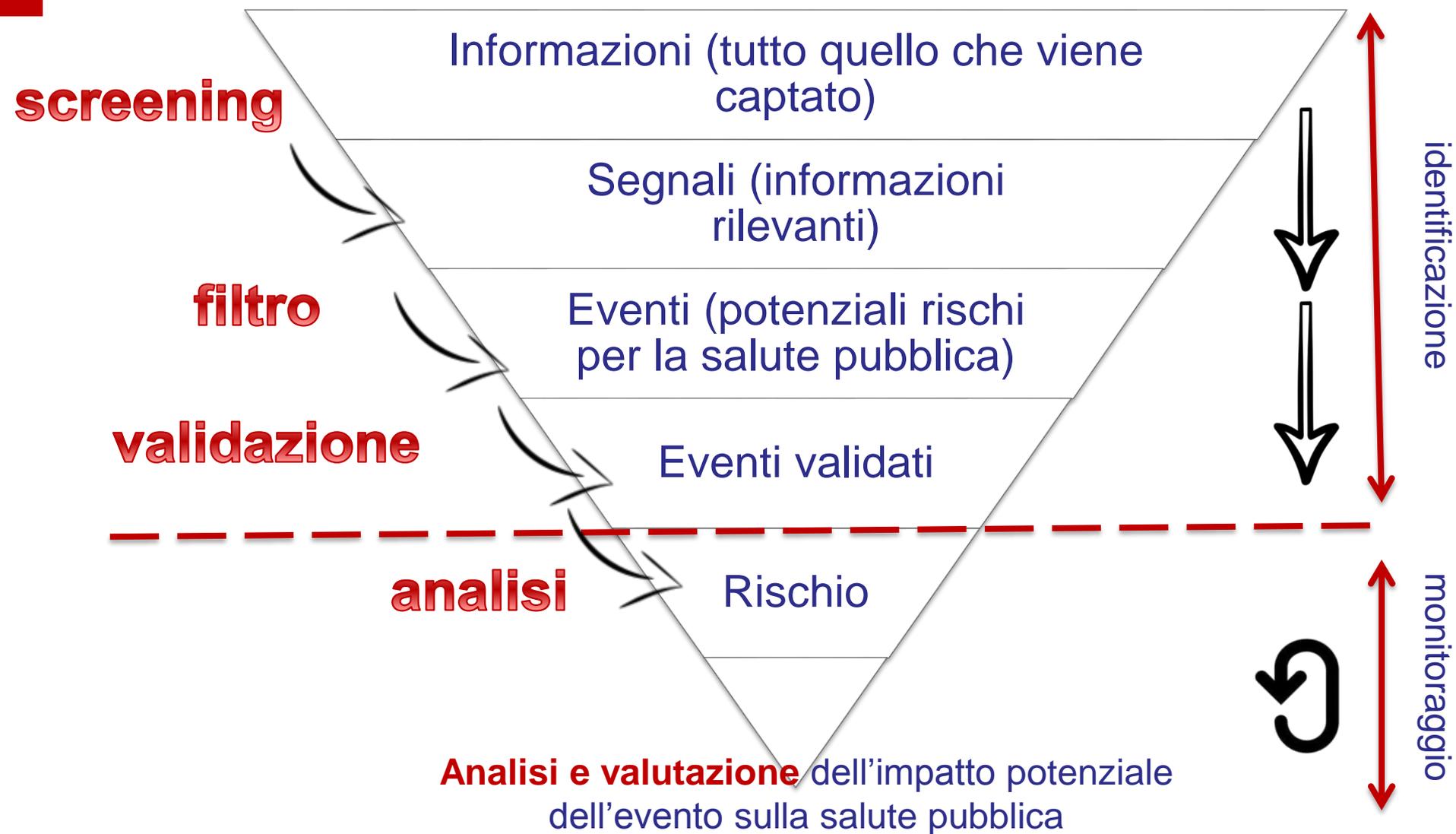
- Insieme di procedure volte ad identificare, **da fonti informative non-strutturate**, segnali di una possibile emergenza sanitaria.
- OSINT = Open Source Intelligence (informazione pubblica).
- Fonti : generalmente i media ed internet, piattaforme di bio-sorveglianza (aggregatori e filtri).



# Modello semplificato: sorveglianza basata su eventi



# Procedure EBS



# Procedura dell'EBS

- Servono a:
  - identificare, da **fonti informative esterne** ai sistemi di sorveglianza, notizie che possano suggerire precocemente una criticità.

## Flusso di lavoro “tipico”

- Monitoraggio e selezione (screening/filtro) → segnali ed eventi
- Validazione
- Analisi del rischio
- Comunicazione
  
- Consulenza su tematiche specifiche

# Chi fa EBS?

- Organizzazioni internazionali (WHO, ECDC)
- Network di paesi (GHSAG EAR)
- Federazioni (CDC-Atlanta) e singoli Stati

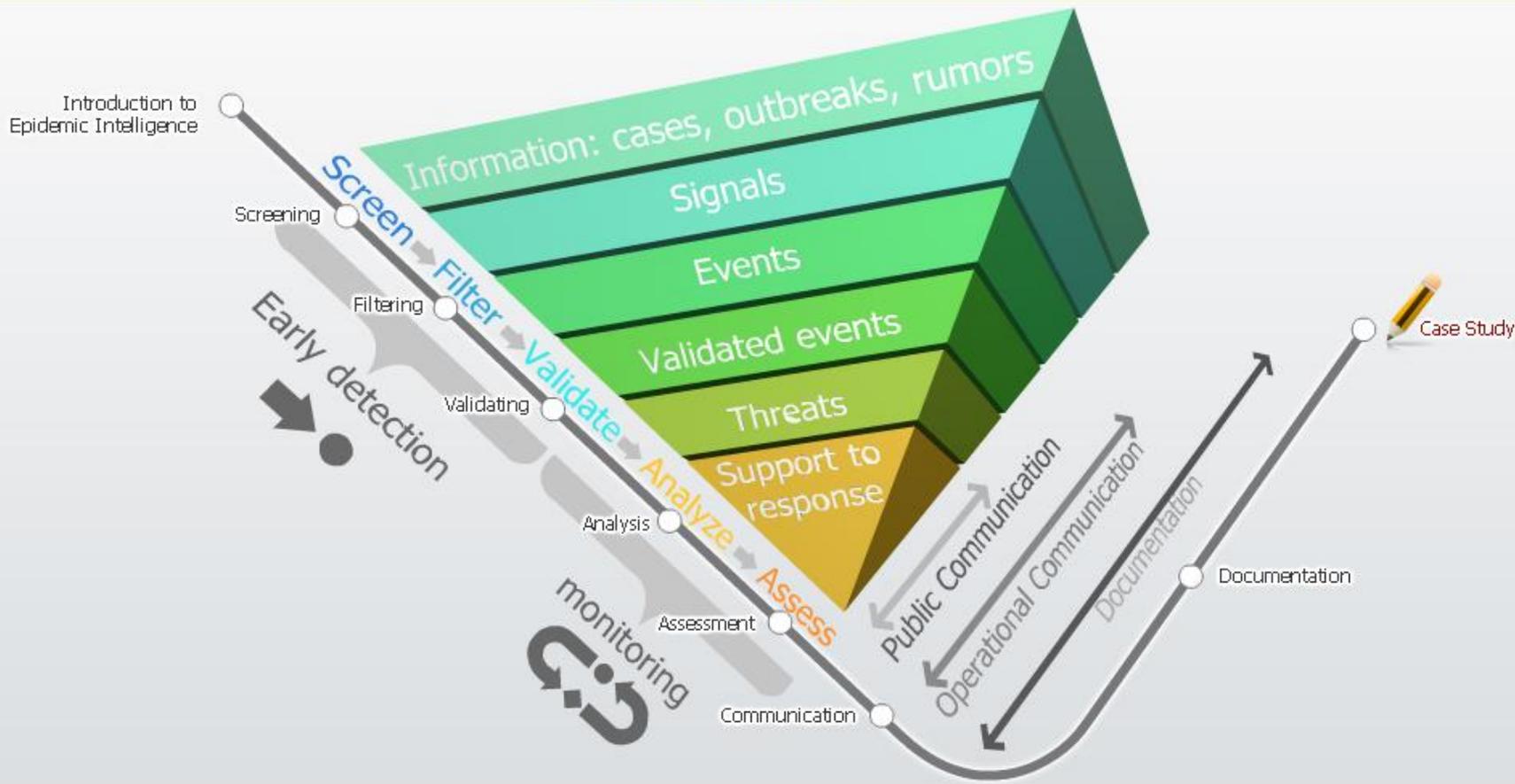
[http://ecdc.europa.eu/en/publications/surveillance\\_reports/Communicable-Disease-Threats-Report/Pages/cdtr.aspx](http://ecdc.europa.eu/en/publications/surveillance_reports/Communicable-Disease-Threats-Report/Pages/cdtr.aspx)

The screenshot shows the ECDC website interface. At the top, there is the ECDC logo and the text 'European Centre for Disease Prevention and Control'. A search bar is located on the right. Below the logo, there is a navigation menu with tabs for 'Health Topics', 'Publications', 'Data & Tools', 'Activities', 'About Us', and 'News & Media'. The main content area is titled 'Communicable Disease Threats Report' and includes a description of the report as a weekly bulletin. Below the description, there is a 'LATEST ISSUE' section with a table listing recent reports and maps.

Type	Title	File Size	Name
Maps and graphs from ECDC Communicable Disease Threats Report		2763 KB	CDTR-maps-graphs-week17
Countries with confirmed autochthonous cases of Zika in past nine and two months		125 KB	Countries-with-confirmed-autochthonous-cases-of-Zika-in-past-nine-and-two-months
Map of countries with confirmed autochthonous cases of Zika in past nine months		712 KB	Map-Countries-with-confirmed-autochthonous-cases-of-Zika-in-past-nine-months

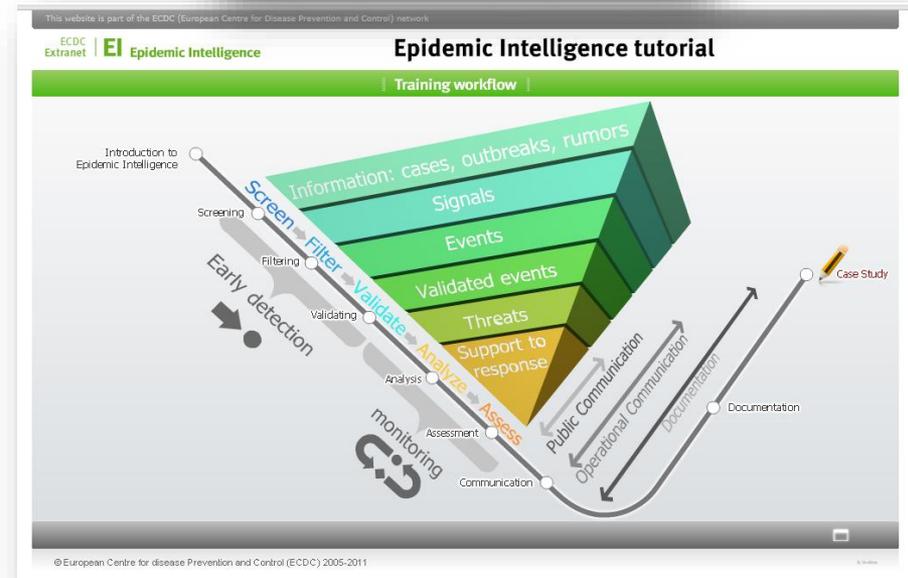
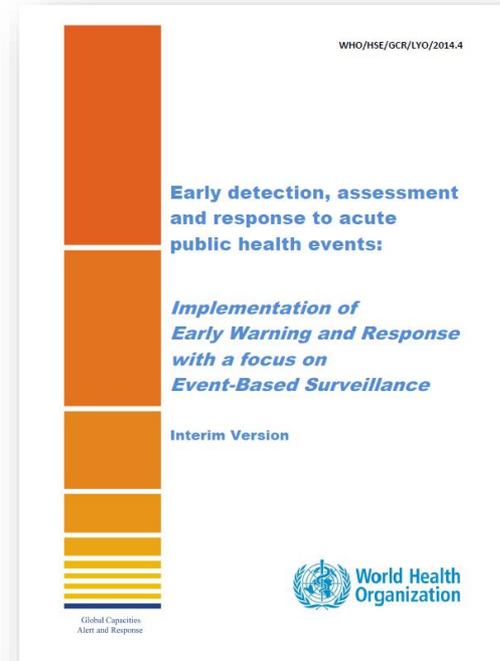
# Epidemic Intelligence tutorial

## Training workflow



# Materiali utili

- Manuale dell'Organizzazione Mondiale della Sanità **Implementation of Early Warning and Response with a focus on Event-Based Surveillance, 2014** ([http://apps.who.int/iris/bitstream/10665/112667/1/WHO\\_HSE\\_GCR\\_LYO\\_2014.4\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/112667/1/WHO_HSE_GCR_LYO_2014.4_eng.pdf))
- Tutorial del Centro Europeo per la Prevenzione ed il Controllo delle Malattie (ECDC) [http://external.ecdc.europa.eu/EI\\_Tutorial/course.htm](http://external.ecdc.europa.eu/EI_Tutorial/course.htm)



# Rapporto ISTISAN (in italiano)

- **Il contributo della sorveglianza digitale alla sorveglianza delle malattie infettive in Italia, 2007-2017.**

(<http://www.iss.it/publ/?lang=1&id=3078&tipo=5>)





**GRAZIE!**

**DISCUSSIONE**