Emergency Management and Response System

World Health Organization

November 2019

Context

World Health Organization

Event Detection

EIOS
Epidemic Intelligence from Open Sources

EWARS: Early Warning, Alert and Response System

HeRAMS: Health Resources and Services Availability Monitoring System

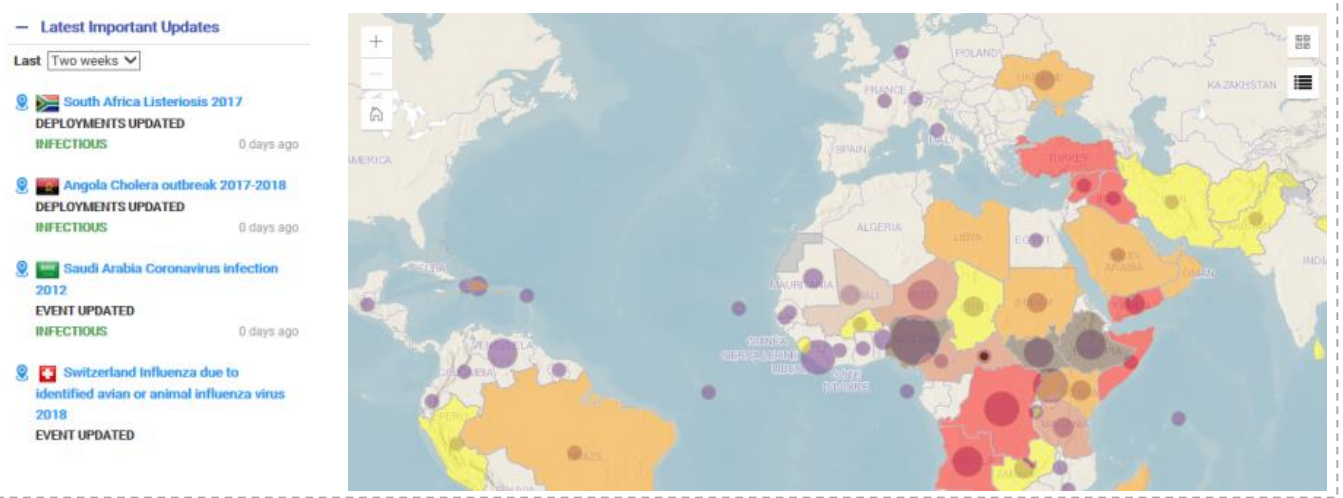
Go.Data: Contact tracing and visualizing chains of transmission

Field Data Collection

Emergency Management & Response System

EMS	EIS	vShoc
Event management	Reporting	Response management

Emergency Dashboard
Event monitoring, visualizing data sourced from different information systems



Partner Access - **GOARN Knowledge Platform**

Public Access

ICT Support & Services for Health Emergencies in the Field

The right connectivity, power and equipment at the right time

Project Vision & Key Principles

1. **Data and tools accessibility in country and regional offices**
   Solution design supporting low-bandwidth and offline services

2. **Information and tools sharing with Member States**
   Modular component-oriented architecture for sharing of relevant information and services

3. **Modular architecture approach**
   Loosely-coupled modules for rapid deployment, scalability, easier maintenance and change

4. **Flexibility and agility**
   User-driven configuration mechanism for power users in regional and country offices

5. **Focus on high usability**
   Front-end should be intuitive, making the system easy to use

6. **Multilingual support**
   Official UN languages as well as introduction of translation services

7. **Basics first, then advanced**
   Phased feature development – basic functionality first before moving to advanced features

Seamless, rapid, active and actionable **information flow** across **all actors** throughout the **full emergency management cycle** to respond appropriately, minimize impact and prevent morbidity and mortality.

EMRS at a glance

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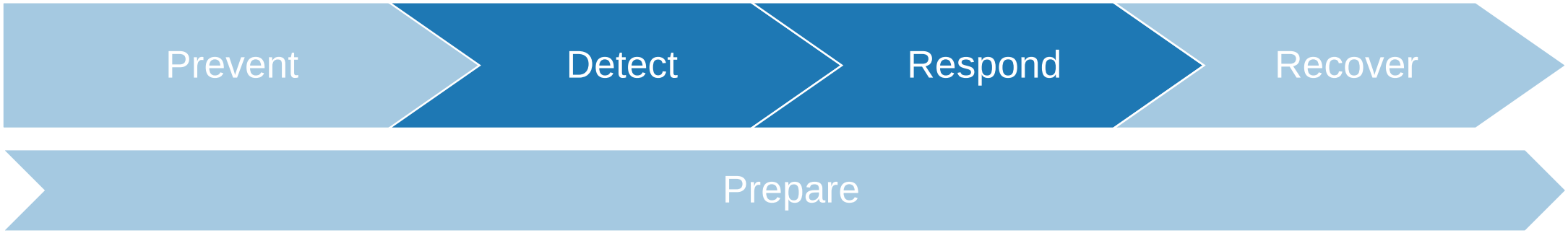
Users

HQ | RO | CO | Partners | Member States*

For distribution

Process



Data

Event Specific Data	Event Management Data	Contextual Data
• what, how many, where, who, how quickly and current status (e.g. clinical and epidemiological data)	• organized for the functional domains in the PHEOC: human and material resources on hand, status of interventions, partner activities, resource deployments, expenditure, progress on achievement of objectives	• geographic information mapping, population distribution, transportation links, locations of fixed and temporary facilities, availability of clean water, climate, weather and any other significant contextual information.

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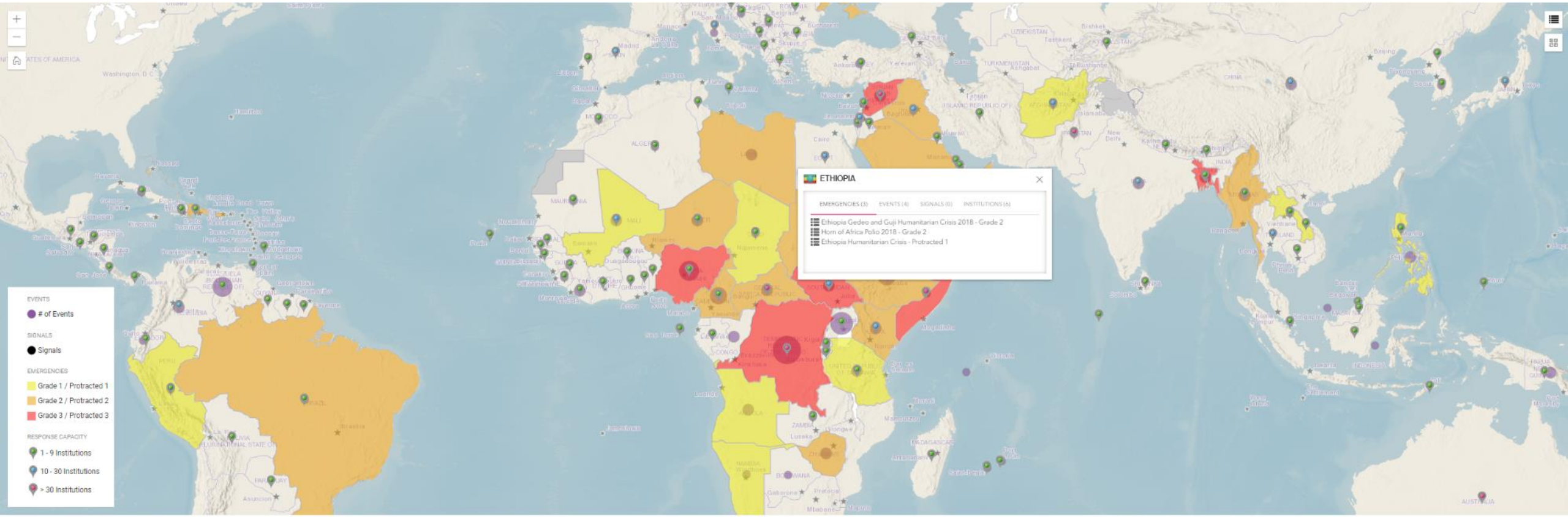


SIGNALS | EVENTS | EMERGENCIES | RESPONSE CAPACITY

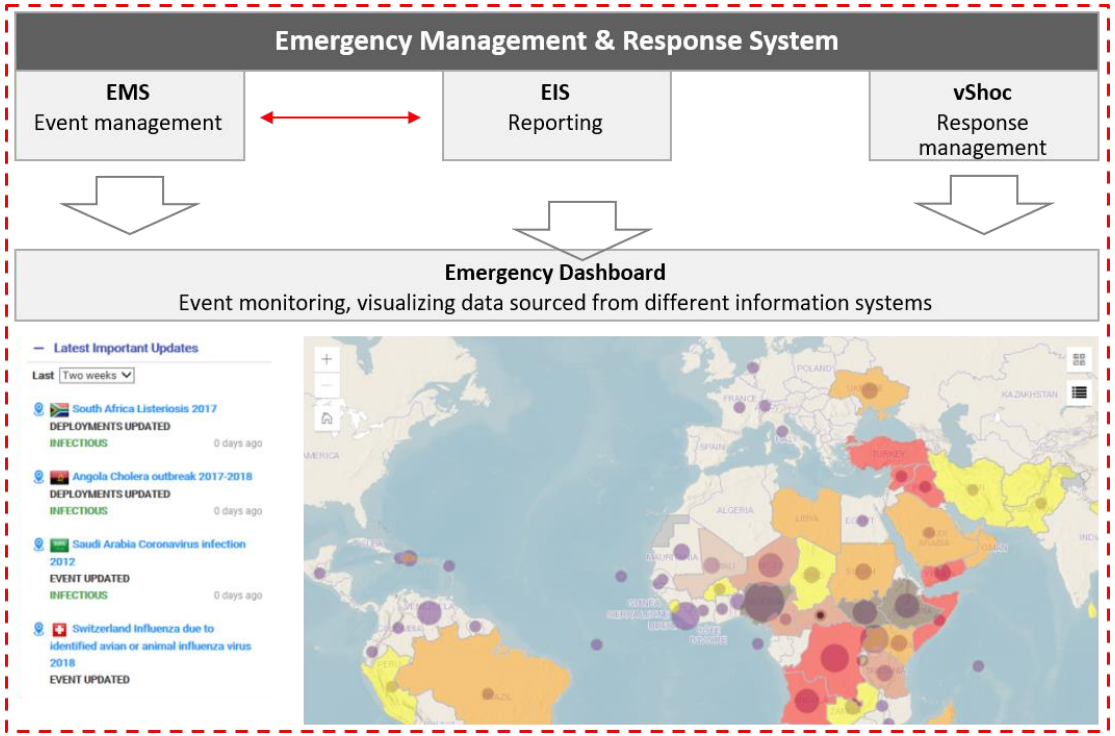
Emergency statistics

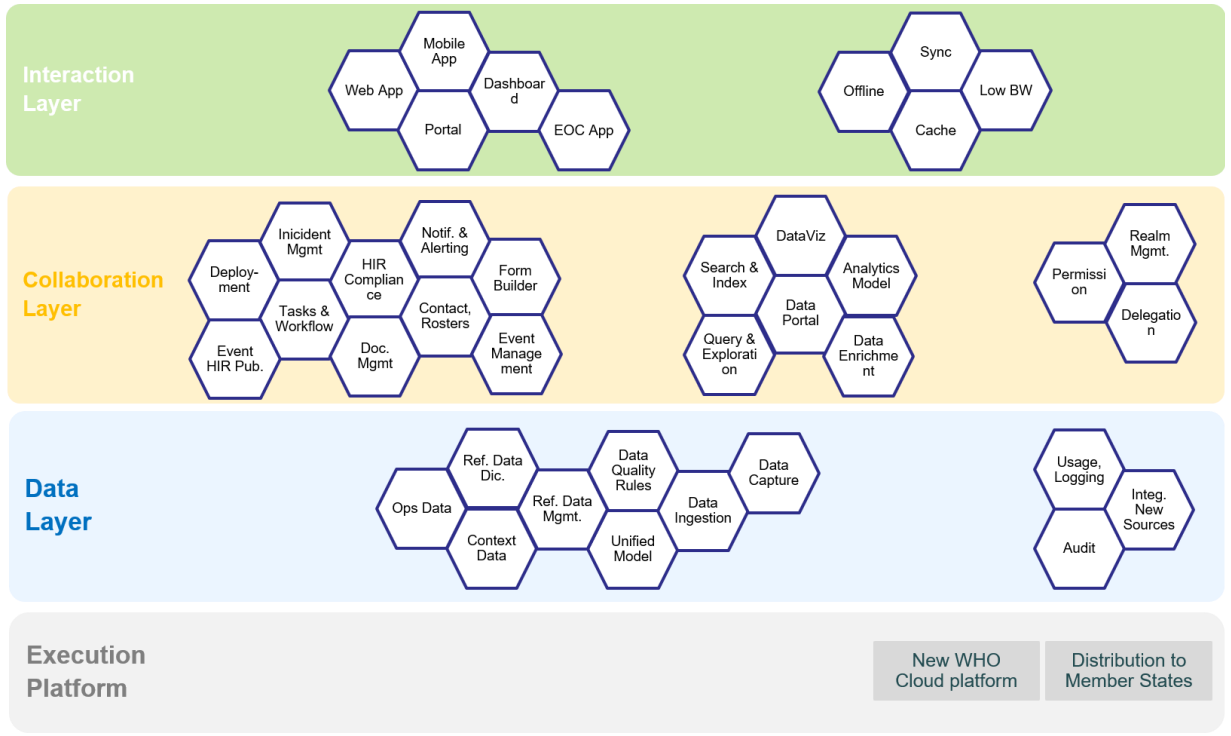
Indicator	Value
Events	143
Public Health Risk (PHR)	92
To be assigned	33
None / Not applicable	18
Emergencies	41
Grade 1 / Protracted 1	13
Grade 2 / Protracted 2	18
Grade 3 / Protracted 3	8
Ungraded PHEIC/Emergency SOPs	2
Deployments	565

Filter: Type to filter...

Flag	Event Title	Last Update	Status/Grade	National Risk	EMS	vSHOC	EIS
	Venezuela (Bolivarian Republic of) Diphtheria 2016	2018-09-17	Substantiated	Very High	LINK	-	2018-04-21
	Yemen Diphtheria 2017	2018-08-03	Substantiated	Very High	LINK	-	2017-12-22
	Haiti Diphtheria 2016	2018-09-14	Substantiated	Very High	LINK	-	-
	Niger (the) Cholera 2018	2018-09-19	Substantiated	Very High	LINK	-	-
	Democratic Republic of the Congo (the) Cholera 2018	2018-03-28	Substantiated	Very High	LINK	-	2018-01-29
	Democratic Republic of the Congo (the) Cholera 2015	2018-08-20	Grade 3	Very High	LINK	LINK	2015-12-10
	Bangladesh Diphtheria 2017	2018-04-11	Substantiated	Moderate	LINK	-	2017-12-13
	China Influenza due to identified avian or animal influenza virus 2013	2018-02-24	Substantiated	Moderate	LINK	-	2018-02-24
	United Republic of Tanzania (the) Cholera 2015	2018-09-18	Protracted 1	Moderate	LINK	LINK	2017-12-19
	Republic of Korea (the) Coronavirus infection 2018	2018-09-17	Substantiated	Low	LINK	-	2018-09-13

What are we trying to achieve?





- A continuum of activities
- 4 independent systems with limited
- 4 different teams

- A continuum of activities
- Services integrated in a common platform
- A common team

Solution Statement

Emergency management and response system(s) built in a modular manner, using common reference data, document structure as well as permissions and access control. System(s) that are effective at all levels of WHO, working with partners and are built in a manner that allows for distribution to members states in the future.

Planned Functionality

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Workflow Orchestration

This theme includes arrangement of multiple, interrelated tasks and processes to one another to support a single outcome, coordination of execution of these tasks and management/overseeing the execution using computer systems – workflow orchestration engines. Workflow orchestration seeks to resolve a larger, holistic, end-to-end objective within the event or emergency – overall efficiency, traceability of activities and decisions as well as accountability. Example: orchestration of activities in epidemic intelligence process between actors on all three levels of WHO and external partners, including surveillance, detection, verification and public health risk assessment, as well as publishing of relevant information products. Workflow orchestration also includes event/alert management and notification mechanisms

Activities and Task Management

The end goal of activities and task management is to complete a single workflow. It is markedly different from the workflow orchestration which seeks to manage execution of multiple interrelated tasks and activities. This theme includes assignment, monitoring and managing the tasks, following up on them and getting a snapshot of current, past and future activities. It includes notification and system alerts. Examples: assignation of work to do by incident manager (implemented as the task tracker in vSHOC)

Document Management

Actors in geographically dispersed locations need to contribute to or access relevant documents and other electronic content. Centrally accessible repository of all electronic media generated by the WHE for storing digital assets (such as documents, images or videos). Documents are tagged for search and workflow with a clear “state” such as draft or published. Documents and other contents should be linked in the context of a given event or emergency. Searching of the content of the documents is also possible by the modern content/document management systems. Offline access to documents and synchronization with centrally accessible online storage

Permissions and Confidentiality

Role and permission model for deciding who can access what and what they are allowed to do with data. This theme includes confidentiality rules which limit access (including removal/hash of personal data when exchanging datasets). The solution provide methods for requesting, granting and revoking access to internal WHO as well as external actors

Workspace and Collaboration

A space where different stakeholders (internal and external) can come together and share work – such as joint authoring of a document, instant messaging, discussions. It includes communication through instant messaging, threads and discussions on common topics, etc. When used well this is a way to reduce email traffic. It provides a convenient support for organized and traceable collaboration on drafting and aligning the information and related activities. It can be used for quick notifications and alerting, setting up and conducting video and audio conferences, ad-hoc sharing of the electronic content etc.

Search

Global search for the content of structured and unstructured datasets, including documents, people, images and other content. Well defined data models and indexed database schemas are prerequisites for implementing structured data search. Search of the unstructured content (documents, images, videos, etc.) heavily relies on consistent categorization. It is based on well-defined content metadata model and uses values of relevant tags to discover the required content

User Configurable Data Structure

Situations and events are unpredictable by nature. In any new situation new specific type of (reference) information may need to be captured and treated, new relationships between the information may need to be established and new data processing and storing rules may need to be implemented. This happens regularly for both emergencies as well as it may happen during the prevention and preparedness activities. The applications include creating the forms to enter data including the rules for data validation (checking format, type of data, standardized values such as WHO country name, erroneous values etc.) and data importing. This theme includes online as well as offline data capture

Data Management and Integration

Integration of data stored in different systems, internally and externally, and a common cross-system reference data enables quick creation, discovery and sharing of key information crucial to successful collaboration and timely decision making in an event or emergency response. Actors may need to create and categorize or find a document (e.g. Situation Report), raw data (e.g. information about laboratories in Liberia) or analytic data (number of persons deployed from January to October). Standard fields for cholera (common reference data), ability to add extra new fields and their data rules, linking data stored in different systems in the context relevant to the event or emergency, tagging datasets so that we know what they are and can search for them makes information accessible for efficient collaboration and effective decision making

Data Analytics and Visualisation

Data analytics is a process of examining data sets in order to draw conclusions about the information they contain using statistical methods and visualization. It answers the following questions: Why did something happen? Will it happen again? What will happen if we change a variable x? What else does the data tell us that we never thought to ask? It includes statistical or quantitative analysis, data mining, predictive modelling, multivariate testing, big data analytics, text analytics. Business intelligence, reporting and online analytical processing is not in the scope of this theme. It is covered by the Reporting/KPIs one. Advanced data analytics applications include data mining and text mining tools, machine learning algorithms and predictive analytic tools

Reports / KPIs

This theme includes business intelligence, reporting and online analytical processing – a process for collection and preparation of data and creation of reports, dashboards and visualisations for senior management and operational staff. It answers the following questions: What happened? Where? When? Who? How many? It includes reporting (KPIs, metrics), automated monitoring and alerting (thresholds), dashboards, scorecards, OLAP (data marts, cubes), ad-hoc querying, operational and real-time BI. BI applications can combine a broad set of data analysis applications, including ad hoc analytics and querying, reporting, online analytical processing (OLAP), operational BI, collaborative BI and location intelligence

Distribution to Member State - Definition

Different, non-mutually exclusive, ways to ‘distribute’ to

Documents : Guidelines, policies, requirements, architecture, lesson learnt etc.

Code : WHO developed **code** made available along with documentation

Packaged Solution **:** Code and product **designed** to be shared with Member states (installation and setup guide etc.)

Service : Solution made available and accessible on internet. The solution is not only designed for distribution but is also **operated** by WHO.

For EMRS, the current assumption is option 3 with a possible fallback on 2.

EMS2 - Event Management Suite 2