WHO-EM/CSR/045/E

Report on the

Subregional meeting on syndromic surveillance

Dubai, United Arab Emirates
18–20 December 2011

World Health Organization
Regional Office for the Eastern Mediterranean

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CONTENTS

1. BACKGROUND

Surveillance in its classical definition can be described as: information for action. In all instances time is a crucial attribute for early response to outbreaks and reducing preventable morbidity and mortalities. However, for a number of reasons the performance of these systems is not currently optimal. Shortage of trained health workers, limited financial resources, and the aspiration for the application of sophisticated systems, which cannot be sustained over time are among the reasons for delayed outbreak detection and containment.

Many countries of the WHO Eastern Mediterranean Region have well-developed disease surveillance systems in place. Nevertheless, existing limitations in surveillance systems hinder the timeliness of the appropriate response.

The International Health Regulations (2005), known as IHR (2005), require that all State Parties have the capacity to detect, investigate and verify any public health event that may constitute a public health emergency of international concern through their existing surveillance systems. They must also notify WHO within 24 hours of an assessment of the public health information. In light of the above, strengthening early detection of, and response to, emerging outbreaks is essential for fulfilling the requirements of the IHR (2005) as well as saving lives and reducing other costs.

Overcoming these inadequacies requires the application of surveillance systems using new approaches that are modest, affordable and participatory. Appropriate application of syndromic surveillance as an integral part of the national disease surveillance system is a correct response. Syndromic surveillance uses both health and non-health data from different sources, and thus requires strong partnerships to be developed with all relevant stakeholders. Syndromic surveillance has the ability to detect any deviation from the natural trend of diseases well in advance, and triggers prompt investigation before an outbreak establishes itself. Moreover, as it shares the burden of the surveillance system, sustainability is guaranteed.

Syndromic surveillance can be defined as the use of routinely available data, both health and non-health related, for public health surveillance purposes. It is based on the timely collection, collation, analysis, interpretation and dissemination of routine data from different sources to enhance the early detection of outbreaks and other important public health events; hence mitigating the impact of these events by reducing associated morbidity, mortality and the economic impact of such events. The key attributes of a public health syndromic surveillance system are:

- The system works in “real-time”
- There is no burden of data collection on the public health system as pre-existing data sources are utilized
- Standardized analytical approaches are employed with pre-defined thresholds that generate alerts
- System alerts are rapidly investigated and result in public health action if required
- Regular feedback is provided to stakeholders
- Syndromic surveillance is integrated with existing public health surveillance systems such as infectious disease notifications and laboratory surveillance.

Syndromic surveillance systems can provide added benefit to communicable and non-communicable disease control and prevention activities; especially in detecting events, outbreaks and other public health emergencies that are of national and international concern and associated with significant increased morbidity and premature preventable mortality. An increasing number of countries are developing and implementing syndromic surveillance systems.

2. INTRODUCTION

To help the national health authorities of countries of the Eastern Mediterranean Region in establishing a syndromic surveillance system for epidemic-prone communicable diseases in their countries, the WHO Regional Office for the Eastern Mediterranean organized a subregional meeting on syndromic surveillance in Dubai, United Arab Emirates on 18–20 December 2011. The directors of communicable disease control responsible for disease surveillance systems and the Directors of the Central Public Health Laboratory of the ministries of health of Afghanistan, Egypt, Islamic Republic of Iran, Iraq, Morocco, Pakistan, Saudi Arabia, Sudan, South Sudan, Tunisia, United Arab Emirates and Yemen participated in the meeting. Experts from WHO headquarters and the U.S. Naval Medical Research Unit No. 3 (NAMRU-3) also participated in the meeting.

The main objectives of the meeting were to:

- discuss the concepts and principles of syndromic surveillance and the experiences of some countries in the Region;
- reach consensus on the list of targeted syndromes (along with their case definitions) based on the national notifiable disease list (including nosocomial infections and antimicrobial resistance surveillance);
- develop a framework for implementation of syndromic surveillance and its integration into the routine public health surveillance system.

Dr Hassan El Bushra, Regional Adviser for Communicable Disease Surveillance, Regional Office for the Eastern Mediterranean, welcomed the participants on behalf of Dr Hussein A. Gezairy, WHO Regional Director for the Eastern Mediterranean. He then invited Dr Mahmoud Fikri, Executive Director of Health Policy Practices at the Ministry of Health, United Arab Emirates to chair the session and address the meeting. In his speech Dr Fikri welcomed the participants and referred to the fact that healthy people were every nation’s valuable asset and protecting their health was a crucial responsibility of all governments. He stated that due to shorter travelling times, disease could become a global problem in a shorter time period. In order to rapidly detect and promptly respond to public health threats, countries of the world needed to work together and share information using a sensitive, effective and innovative public health surveillance system, such as syndromic surveillance.

Dr El Bushra presented the objectives of the meeting and the method of work. Dr Ali R. Mafi was appointed Rapporteur of the meeting.

3. PROCEEDINGS

3.1 Introduction to the syndromic surveillance system

Dr Zuhair Hallaj, WHO Regional Office for the Eastern Mediterranean

Syndromic surveillance is different from a "syndromic approach" in routine disease surveillance, which has been used in surveillance for sexually transmitted infections for a long time. We are introducing a new concept: syndromic surveillance. It is defined as a novel system that began in the late 20th century. Syndromic surveillance uses pre-diagnostic data, before confirmation of a diagnosis, and statistical algorithms to detect outbreaks or health events earlier than traditional surveillance. It is real-time (or near real-time) collection, analysis, interpretation and dissemination of health-related data (from health and non-health systems) to enable early identification of the impact (or absence of impact) of potential human or veterinary public health threats that require effective rapid public health action. The data are continuously arriving within minutes. Sometimes detecting an outbreak takes 2-3 weeks and a certain period of time is lost when one interferes, during which the outbreak could have been contained or mitigated. Due to this deficiency in the routine surveillance system we need new systems for earlier detection of the outbreaks of diseases and syndromic surveillance is the solution.

Syndromic surveillance uses health related indicators that are available before obtaining confirmed diagnoses or laboratory confirmation, to identify outbreaks or health events and to monitor the health status of the community. These indicators are based on non-specific health information including clinical signs, symptoms, as well as proxy or surrogate measures such as absenteeism from school or work, drug sales, animal production collapse, etc.

Syndromic surveillance is not a replacement for routine traditional public health surveillance or a substitute for direct physician reporting of unusual or suspect cases of public health importance. Syndromic surveillance is an addition to routine surveillance. Potential data sources include clinical data, signs and symptoms of patients and laboratory requests for investigation, as well as alternative proxy data such as absenteeism from school and work. The wider the range of data sources the more likely the early detection of outbreaks, so intersectoral collaboration is essential. These latter sources are not included in the routine surveillance system.

Syndromic surveillance depends to a large extent on automated data systems. Meanwhile accessing data from those who receive them is as important.

Defining optimal data sources, appropriate syndromic definitions, standardized signal-detection methods and thresholds, developing acceptable response protocols and resource commitments are the main challenges facing implementation of the syndromic surveillance system. Low specificity for syndromes of interest, high probability of influence by factors unrelated to human health and difficulty in tracing data aberration (noise) to individual patients are some of the problems of surrogate data.

Dr Hallaj referred to the scarcity of resources and asked the participants to understand syndromic surveillance and advocate for it as a complementary system to routine disease surveillance.

3.2 Establishing syndromic surveillance in the Eastern Mediterranean Region

Dr Hassan El Bushra, WHO Regional Office for the Eastern Mediterranean

Syndromic surveillance is the "collection and analysis of health-related data that precedes diagnosis and signals a sufficient probability of cases for an outbreak or health event, to warrant further public health response and/or the monitoring of the health status of a community".

Syndromic surveillance focuses on the early symptom (prodromal), before clinical or laboratory confirmation of a particular disease and uses both clinical and alternative data sources. The syndromic surveillance systems monitor surrogate data sources, such as over-the-counter prescription sales or school absenteeism and do not monitor specific disease syndromes. It uses pre-existing health data that offers immediate accessibility and poses a limited burden on the providers and health-care institutions.

The rationale for implementing syndromic surveillance is that traditional national surveillance systems are often cumbersome and complex. Also, many notifiable conditions require laboratory confirmation and the transportation of specimens to overseas laboratories, which creates further delays in reporting. Syndromic surveillance decreases dependence on limited laboratory resources before initiating an effective public health response and accelerates and simplifies reporting. Nonetheless, developing protocols to address alerts from data sources, in which individual cases are unidentifiable, such as for over-the-counter medication sales, is particularly challenging.

He then referred to the important role of electronic surveillance systems that need to be in place to use existing health data in real-time and to provide immediate analysis and feedback that can also be applied to the investigation and follow-up of potential outbreaks.

The data types include surveillance of community patient self-assessments, information seeking such as web-clicking and contacting hotlines, over-the-counter sales, school and work absenteeism, prescriptions, medical consultations, visits to emergency departments, hospitalizations, laboratory test requests and clusters of diagnosis as well as data from other non-human health sectors such as veterinary organizations, unions and the ministry of agriculture.

In this regard, functional syndromic surveillance should be able to provide earlier detection and rapid response to public health threats; be as simple and user friendly as possible, using a standardized line-list and be easily mastered by new staff and it should continuously monitor and evaluate data and generate feedback to front-line health workers, particularly all clinical staff.

Elements of successful syndromic surveillance can be identified as standardization of forms and tally sheets, case management and logistics; coordination in identifying potential partners and ensuring access to sources of data; a strong IT component to ensure adequate use of pre-existing data and automated data systems; access to laboratory services for confirmation; high levels of community awareness; integration with other surveillance sytems; a flexible system allowing expansion as required; and clinicians' understanding of case definitions and their application.

Nevertheless, there are several analytical challenges to syndromic surveillance for outbreak detection such as: the identification of threshold signals for outbreaks/cluster in the presence of substantial "background noise" in the data; the extremely low positive predictive value of signals based on the high level of system sensitivity; the investigators' relative lack of experience with syndromic surveillance under real-world conditions; the temporal and spatio-temporal methods used to assess day-to-day and day and place variability; and the complex programmatic requirements for effective signal response.

Dr El Bushra concluded his presentation by summarizing the further research that needs to be done on defining the role and scope of a national syndromic data repository This includes: defining optimal data sources; evaluating appropriate syndromic definitions; standardizing signal-detection methods; integrating laboratory testing and laboratory information; developing appropriate response protocols; bridging any potential analytic gaps in syndromic versus traditional surveillance; and clarifying the use of simulation data sets to test systems. In his closing statement he referred to the differences between syndromic and event-based surveillance, and explained that the latter is based on rumours and does not provide detailed information on the event.

3.3 Examples of syndromic surveillance systems

Dr Richard Peabody, Respiratory Diseases Department, Health Protection Agency – Colindale, London [videoconference presentation]

The syndromic surveillance system is a timely, real-time system that does not impose the burden of data collection on health workers and follows standard analytical approaches. Integrated with existing surveillance systems, other attributes of the syndromic surveillance include: established thresholds with pre-defined alerts, the provision of regular feedback to stakeholders and the fact that it can inform acute public health action.

Experiences with syndromic surveillance in the United Kingdom and Europe include influenza, both pandemic and seasonal, heat waves, preparations for mass gatherings such as the London Olympics 2012, and defined syndromes of interest such as influenza-like illness, severe acute respiratory illness, acute diarrhoea, meningitis and all-cause mortality. The "disease pyramid" and spectrum of disease and used the example of influenza to explain potential sources of routinely available data for each level of the disease pyramid. The disease pyramid with sources of data used in the United Kingdom is shown in Figure 1.

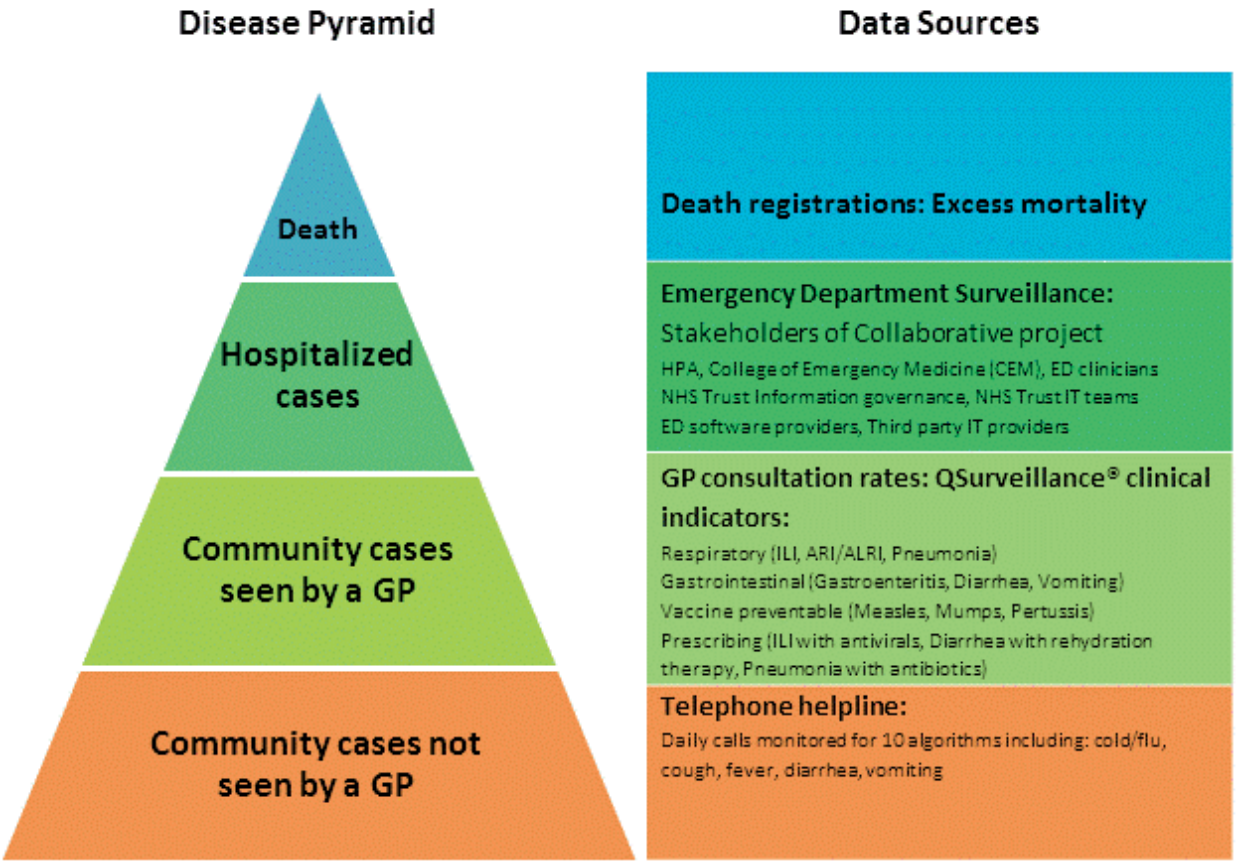

Figure 1. The disease pyramid for influenza and data sources used in syndromic surveillance in the United Kingdom

The "Triple S" is the syndromic surveillance system across Europe. It provides a platform for knowledge exchange through country visits, an inventory of syndromic surveillance across Europe, the development of standardized European definitions for selected syndromes and the development of guidelines for syndromic surveillance. The web site of the Triple S is: www.syndromicsurveillance.eu.

3.4 Plenary discussions

Some of the participating countries at the meeting shared their experiences in the detection and control of outbreaks. They received further clarification on the SSS and asked their questions in plenary sessions led by Dr Hallaj and Dr El Bushra. The following current challenges to surveillance were noted:

- There is a lack of intersectoral collaboration: data are shared very late or not shared at all; the private sector does not share data.
- There is no control over private pharmacies: drug sales are not registered and reported; there are no regulations.
- There is a lack of communication facilities: data from remote areas is not shared; infrastructure and the internet are not available to less advanced communities, which prevents implementation of syndromic surveillance; and a lack of capacity in automated systems in the countries of the Region.

The following questions were asked:

- Are there minimum requirements for real-time data sharing? Are there possibilities for using alternative forms of communication other than the internet, such as mobiles, PDAs, etc.?
- In detecting outbreaks earlier than routine surveillance, how can we reach the level of families in populations without coverage of health services? Could the use of mobile phones by the families to report cases within their families be a solution?
- How can we deal with low specificity of syndromic surveillance during action taking?
- Are there any modifications of the system itself after reaching the thresholds? And if there are, how it will affect the system?
- Can the system be applied to typhoid fever?
- How in syndromic surveillance does the health system not need to collect data while this new system is collecting signs and symptoms that have not been collected before? Are the health workers/Ministry of Health the coordinators of these data?
- What are the mechanisms for data collection that ensure success?
- With syndromic surveillance, do we expect to be collecting data from all hospitals in the country or from selected sites only? If we select certain regions or hospitals, would that fulfil the purpose of identifying outbreaks for the whole country or not?
- What is the role of the laboratory in syndromic surveillance? Can we use the negative test results from the routine laboratory surveillance on suspected cases?

Dr El Bushra and Dr Hallaj responded to the questions by grouping the questions asked by participants. The main question was “Will it be possible to implement syndromic surveillance in the developing world?” The answer is yes as it has been tested in different developing countries and has proven successful. Syndromic surveillance rests mainly on two foundations: utilizing data from several sources using whatever health indicators are available, and the real-time or near real-time interpretation of these data, which requires automation.

In reality, data are being generated constantly in all health care facilities and the syndromic information is registered in their logbooks but does not reach to higher levels for one reason or another. At the same time, regarding the animal health side, all data are currently registered but not communicated to the health sector. Data from pharmacies are another issue. The replenishment request is a proxy for prescribed or over-the-counter medicine consumption information from the veterinary system and from pharmacies. As they request replenishment of their used medicines data are collected and registered in their respective systems and the health sector needs access to them. Also laboratories have their own logbooks that register lists of patients and the tests that have been done, which could be used as another source of information.

There are two major issues surrounding the collected data and the available information.

- The data are not accessible: mandates establishing and sustaining intersectoral collaboration and discussions on how to access the information are needed as early as possible. Decisions on what syndromes need to be introduced in each of the countries of the Region are also needed.
- The data are accessible but not used.

Concerning the automation systems, each country should adopt the approach that suits the situation in the country best. In turn this requires a careful study of the situation. The capacity and ability of the countries to establish syndromic surveillance should be tested and expanded. Countries should identify what kind of information is available for their use. The number of mathematical algorithms and signals will differ from one country to another. Syndromic surveillance is a system that should be added to the general surveillance systems to assist in early detection of outbreaks.

When an outbreak is suspected, regardless of the cause, there are several actions that need to be undertaken immediately. These include infection prevention and control.

The specificity of health related indicators are affected by a lot of noise. However, the methods for defining thresholds minimize the non-specificity of data to a large extent. Meanwhile, the response has been defined beforehand and the response teams know what to do to respond to the probable outbreaks.

The number of sites for data collection with syndromic surveillance is defined by the syndrome of interest to a large extent and the experience of the country itself. If the syndrome is dispersed then we can have sentinel centres but if it is clustering it might fall out of the sentinel catchment area and we may need to use more sites.

Establishment of any syndromic surveillance in the Member States needs to be piloted to identify what kind of information would be available, how best to access it, the best methods to use and whether you will depend on certain sites to get the information you need. It is important to keep it simple, to use data that are not usually used in the routine surveillance system, to have immediate access to health data, to implement special alert mechanisms to ring the alarm when something is unusual and to work within a pre-defined framework of syndromes that will enable public health workers to provide an appropriate response.

Whenever there is an outbreak, some working definitions are used in the diagnosis of cases using the syndromic approach to the disease. This is different from the case definition used in syndromic surveillance.

Case definitions used in syndromic surveillance should be very sensitive as compared to case definitions used for detection of suspected or probable cases during outbreaks. The latter is referred to as the syndromic approach. For example a case definition used for syndromic surveillance for measles would be simply “fever with rash” while the case definition in the syndromic approach for measles would be “Any person with fever and maculopapular rash (i.e. non-vesicular) and cough, coryza (i.e. runny nose) or conjunctivitis (i.e. red eyes)[1].

[1] http://www.who.int/immunization_monitoring/diseases/measles_surveillance/en/ (accessed on 3 June 2012)

With syndromic surveillance we do not wait for a diagnosis. In the routine surveillance "rash and fever" is a suspected case for measles and this will provoke a series of actions until the reporting of a confirmed case of measles. The case definition will include fever with rash for several days, Koplic's spots, history of contact with a confirmed case and lack of immunization. All these are sufficient to make a non-laboratory diagnosis of measles. However, in syndromic surveillance we stop with "rash and fever" and do not proceed further. It is too sensitive and so captures dengue, meningococcemia and a group of other diseases as well as measles. r. Surveillance for acute flaccid paralysis, used to identify possible cases of poliomyelitis, is another example. In any case, one should not wait for confirmation of the diagnosis to take immediate action. These actions will be general public health interventions for mitigating the outbreak regardless of the cause.

The question and answer session was followed by group work on developing preliminary syndromes for discussion. The materials for discussion were prepared in advance by compiling the list of notifiable diseases used in the participating countries in one table for easy study (see Annex 3). Participants grouped the "diseases" with similarities in signs and symptoms and came out with a preliminary list of a minimum number of "syndromes" of interest to the Region, taking into consideration that one disease may fall under more than one syndrome and one syndrome may cover many diseases.

The next step was to define the "parameters" for syndromic surveillance using a proposed list of parameters and a template designed for applying the parameters to the syndromes (see Annex 4). As an entry example Dr Hallaj applied the parameters to "febrile haemorrhagic syndrome". Participants actively contributed to the completion of the template and discussed the parameters that were applied to the syndrome.

On day 2, participants practised applying the parameters to syndromes. They started with "fever and cough" and continued with "fever and rash". The meeting reviewed and finalized the list of parameters after practising their application to those syndromes (see Annex 5). The main outcome of the plenary discussion was to emphasize the objective of syndromic surveillance to detect outbreaks early in order to take action to mitigate the outbreak before awaiting confirmation of the disease. Such actions include the immediate initiation of non-pharmaceutical public health interventions followed by investigation. Specific actions should then be taken as soon as the diagnosis is made.

The importance of identifying thresholds as a step towards triggering the alarm signal within the system and access to the data collected by other disciplines was emphasized. Syndromic surveillance detects syndromic outbreaks and not disease outbreaks. It is pre-diagnostic surveillance and not a substitute for routine surveillance. The data of the syndromic surveillance system is not reported to the health sector as it is entered into the system by those who do not report to the health sector. Even within the sector the disease control unit may not receive data from all units (such as EPI coverage or the cold chain, etc.). Therefore, we need to know what we are looking for.

In continuation, three breakout groups applied parameters to three syndromes: "acute watery diarrhoea", "bloody diarrhoea" and "fever and jaundice". The results were presented in

the plenary and discussed. Using the registries in the logbooks based on the concept of the patients visiting the health centre or increased sales of oral rehydration salts or antidiarrhoeal medicines are examples of data sources that were used in this exercise and can be used in syndromic surveillance.

On day 3 the first experience of the Islamic Republic of Iran in establishing syndromic surveillance was presented. The meeting discussed different facets of the work and Iran's strong points for syndromic surveillance were noted. They included: integrated medical education and health services, IT support, definition and criteria for selecting the list of syndromes, participation and reporting of the private sector, inclusion of early detection of chemical and radionuclide events and integral rapid response teams. The meeting was advised to begin a syndromic surveillance system through a step-wise implementation process starting with a pilot study. Using the limited health data available in the public sector has proven to be a good starting point that could accommodate other systems in the next steps.

The next plenary session was dedicated to discussions on syndromic surveillance in two special situations, namely mass gatherings and points of entry. The parameters of syndromes and the list of syndromes were further discussed to ensure that the syndromes of interest in these two situations were included. Syndromic surveillance is one of the best systems that can be employed during mass gatherings. Currently the active model of this system is applied during Hajj, which is slightly different from conventional syndromic surveillance. During Hajj a huge amount of resources are mobilized to ensure early detection of any clustering of cases and clustering of signs and symptoms. Generally speaking, in mass gatherings, the first presentations are syndromes and not diseases. Also, there is always a high political commitment and strong intersectoral collaboration during major mass gatherings. The fact that mass gatherings happen in a very short period of time and therefore the response system has to be very active and rapid is one reason that when syndromic surveillance is closely attached to the routine system can be used efficiently for the detection of clusters of many public health events. This is providing that the opportunity to take rapid public health actions is capitalized on while the laboratory investigation for identifying the causes is underway. The syndromic surveillance data are also very useful to the home countries of pilgrims for them to be vigilant for possible outbreaks. It was reiterated that syndromic surveillance also applies to unplanned mass gatherings such as in the case of movement of internally displaced populations and refugees. Sharing information should be given the importance it deserves, as through this process the host countries will be more vigilant and prepared for the containment of any possible outbreak.

A copy of Articles 6–11 of the IHR (2005) was distributed and participants reviewed the conclusions and came out with a list of recommendations.

The meeting finalized and participants agreed upon the list of syndromes of common interest among the Region's Member States through the plenary discussion (see Annex 6). The main criteria applied were that if syndromic surveillance will not do much more than the existing routine surveillance it should not be applied. Member States are free to select from among the list and add to the list if required. The case definitions pertaining to the selected syndromes should be developed by the countries with the assistance of WHO. WHO will

provide the definitions used in different countries enabling the Member States to choose the most appropriate definition. The meeting also proposed the development of a list of syndromes that are important for the IHR (2005).

4. CONCLUSIONS

All countries of the Region are currently using communicable disease surveillance systems to detect outbreaks of epidemic prone infections with the main objective of the containment of the disease and the mitigation of the impact on human lives and economics.

These systems are at different levels of development and use a variety of methods for reporting specific diseases requiring diagnostic confirmation. However, in almost all instances, laboratory results for diagnosing the causative agent(s) of the outbreak are available after a considerable lapse of time, during which the non-pharmaceutical public health measures can be applied to reduce the likelihood of the occurrence of extensive outbreaks to lessen the impact of the epidemics.

At the end of the meeting the following conclusions were made:

- The proposed syndromic surveillance is an innovative system for strengthening a national routine surveillance system that uses available health and non-health related data and will lead to the detection of potential outbreaks earlier than current national routine surveillance systems. This system will not replace the routine surveillance system.
- Implementation of the syndromic surveillance system fulfils the requirements of the IHR (2005).
- Implementation of syndromic surveillance system saves more lives and reduces the health and economic burden of communicable and non-communicable event diseases and unusual events through earlier interventions.
- It requires the following:
  - Strong partnerships with relevant potential sources of health (the health sector) and non-health data/information is critical to its success.
  - Competent and functional computerized data systems and communication networks (mobile phones, PDA, etc.) are necessary.
  - Advocacy to ensure better understanding and collaboration with relevant stakeholders is essential.
  - Use, as appropriate, of standardized syndromes cases and their definitions and protocols for intervention. It makes the interpretation of data from national programmes possible and meaningful.
  - Leadership of the Ministry of Health is essential.
- Syndromic surveillance systems will be introduced gradually, in phases within some defined timeframe based on a country’s resources and capacity.

5. RECOMMENDATIONS

To Member States

1. Use syndromic surveillance to strengthen the early warning function of existing national disease surveillance systems in order to:

- detect suspected outbreaks earlier than the routine national surveillance system
- respond more rapidly to limit the impact of outbreaks
- comply with IHR (2005) requirements
- strengthen coordination with regional and neighbouring countries.

2. Identify a national focal point to coordinate all steps needed towards implementation of syndromic surveillance at the national level. Initiate syndromic surveillance system programmes gradually and in a phased manner.
3. Define the threshold for unusual early warning signs or alerts based on available historical data.
4. Ascertain existence of and easy access to potential health and non-health related data sources. Data flows need to be defined and channels of communication including the use of new advances in telecommunications should be considered.
5. Adopt appropriate advocacy packages and provide training to health care providers at all levels and other partners as requested.
6. Develop and maintain mutually beneficial relationships with partners.

To WHO

7. Finalize the list of generic appropriate syndromes, definitions of syndromes and other related parameters including protocols for interventions through extensive consultations.
8. Share the draft list of proposed syndromes, protocols and parameters with the Member States before finalization.
9. Establish a regional expert group to design training modules and courses.
10. Provide technical assistance during all stages of implementation of syndromic surveillance.

Annex 1

PROGRAMME

Sunday, 18 December 2011

08:30–09:00	Registration	
09:00–09:30	Opening session Opening remarks Message from H.E. the Minister of Health Objectives and agenda of the meeting	Dr H. El Bushra, EMRO
09:30–10:30	Introduction of the syndromic surveillance system Examples of the syndromic surveillance systems (online presentation) Establishing syndromic surveillance in the Eastern Mediterranean Region	Dr Z. Hallaj, EMRO Dr R. Peabody Dr H. El Bushra, EMRO
11:00–13:00	Concepts, principles and practice of syndromic surveillance systems (SSS)	Plenary discussion
14:00–14:45	Identifying all potential syndromes for syndromic surveillance	Group work
14:45–15:30	Defining key parameters in syndromic surveillance Summary of discussions	Plenary discussion
15:45–17:30	Applying parameters to a selected syndrome	Plenary discussion

Monday, 19 December 2011

09:00–10:30	Applying parameters to the second syndrome	Group work
11:00–17:30	Applying parameters to syndromes	Group work and plenary discussion

Tuesday, 20 December 2011

09:00–09:30	National experience of the Islamic Republic of Iran	Dr M. M. Gouya, Islamic Republic of Iran
09:30–10:30	Additional considerations for syndromic surveillance in special situations: mass gatherings and points of entry	Group work followed by plenary discussion
10:30–11:30	Finalizing the list of syndromes and parameters	Plenary discussion
11:30–12:30	Drafting the recommendations of the meeting	Plenary discussion
12:30–13:00	Closing session	

Annex 2

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Annex 3

GENERAL LIST OF NOTIFIABLE DISEASES AMONG PARTICIPATING COUNTRIES

No.	Notifiable diseases	Egypt 34	Pakistan 19 (DEWS)	South Sudan 26	Sudan 38	Tunisia 47	Islamic Republic of Iran 43	Iraq 78
1	Acute flaccid paralysis		x	x	x		x	x
2	Acute flaccid paralysis/poliomyelitis	x						
3	Flaccid paralysis in children under 15 years					x		
4	Polio							x
5	Poliomyélite aigue					x		
6	Acute food poisoning	x						
7	Botulism	x					x	
8	Acute hepatitis	x						
9	Acute jaundice syndrome			x	x			
10	Acute viral hepatitis		x					
11	Blood-borne viral hepatitis (B, C)						x	
12	Hépatites virales					x		
13	Hépatites virales B					x		
14	Hépatites virales C					x		
15	Hépatites virales non typée					x		
16	Food-borne viral hepatitis (A, E)						x	
17	Hepatitis A							x
18	Hepatitis B							x
19	Hepatitis C							x
20	Hepatitis E							x
21	Clinically diagnosed hepatitis							x
22	Viral hepatitis				x			
23	Méningite à méningo.					x		
24	Meningitis	x		x	x			
25	Meningitis (bacterial and non-bacterial)						x	
26	Meningococcal meningitis		x					x
27	Cerebrospinal meningitis				x			
28	Bacterial meningitis (except *Neisseria meningitidis*)							x
29	Encephalitis	x						
30	Viral meningitis							x
31	Acute lower respiratory infection (pneumonia)		x					
32	Acute respiratory infection (ARI)				x			
33	Acute upper respiratory infection		x					
34	Pulmonary anthrax						x	x

No.	Notifiable diseases	Egypt 34	Pakistan 19 (DEWS)	South Sudan 26	Sudan 38	Tunisia 47	Islamic Republic of Iran 43	Iraq 78
35	Pneumonia	x		x				x
36	Pandemic influenza (H1N1)							x
37	Avian flu						x	
38	Avian influenza	x		x				
39	Bird flu (H5N1)							x
40	ILI (influenza like syndrome)					x		
41	Influenza-like illness	x						x
42	Laboratory-confirmed cases of bird flu (H5N1)							x
43	Laboratory-confirmed cases of pandemic influenza (H1N1)							x
44	Seasonal influenza						x	
45	Severe pneumonia						x	
46	Severe acute respiratory illness	x						
47	Severe acute respiratory syndrome (SARS)				x			
48	Swine influenza				x			
49	Unusual strains of influenza						x	
50	Severe malnutrition				x			
51	Cholera	x	x	x		x		
52	Vibrio cholera						x	
53	Acute watery diarrhoea			x	x			
54	Acute watery diarrhoea (AWD)				x			
55	Acute diarrhoea (non-cholera)		x					
56	Acute diarrhoea							x
57	Diarrheic syndromes (in children and in adults)					x		
58	Bacillary dysentry							x
59	Bloody diarrhoea		x		x		x	
60	Bloody diarrhoea (dysentery)	x						
61	Diarrhoea with blood (Shigellosis)			x				
62	Dysentery				x			
63	Laboratory or epidemiologically confirmed cholera							x
64	Other diarrhoea				x			
65	Suspected cholera							x
66	Sexually transmitted infections (gonococcal urethritis, nongonococcal urethritis, syphilis, non-vesicular genital ulcers, urethral discharge)						x	
67	- à Gonocoque					x		
68	infections sexuellement transmissibles					x		

No.	Notifiable diseases	Egypt 34	Pakistan 19 (DEWS)	South Sudan 26	Sudan 38	Tunisia 47	Islamic Republic of Iran 43	Iraq 78
69	Infections Urogénitales : - chlamydia à					x		
70	Infections Urogénitales : - à gonocoque					x		
71	Infections Urogénitales : - mycoplasmes à					x		
72	Sexually transmitted infections			x				x
73	STI (sexually transmitted infections in the frame of surveillance of risk factors of AIDS)					x		
74	Syphilis sérologique					x		
75	Syphilis symptomatique					x		
76	TIAC					x		
77	Adult tetanus				x		x	
78	Tétanos					x		
79	Adverse Events Following Immunization (AEFI)						x	
80	Animal bite	x					x	x
81	Anthrax				x			x
82	AIDS(HIV)							x
83	HIV positive						x	
84	HIV/AIDS	x		x				
85	VIH/SIDA					x		
86	Bilharziosis					x		
87	Brucellose	x				x	x	
88	Malta fever (Brucellosis)							x
89	Congenital rubella						x	
90	Cutaneous anthrax						x	x
91	Cutaneous leishmaniasis		x					
92	Cutaneous leishmaniasis							x
93	Cutaneous leishmaniasis							x
94	Diphtérie					x		
95	Diphtheria	x	x		x		x	x
96	Dracunculiasis			x				
97	Epidemic plaques				x			
98	Epidemic typhus fever				x			
99	Faschioliasis	x						
100	Fascioliasis hepatica						x	
101	Fever and maculopapular rash							x
102	Fever of unknown origin				x			
103	Fièvre jaune					x		
104	Filariasis	x						
105	Food poisoning				x			x

No.	Notifiable diseases	Egypt 34	Pakistan 19 (DEWS)	South Sudan 26	Sudan 38	Tunisia 47	Islamic Republic of Iran 43	Iraq 78
106	Outbreak of food and water borne disease with gastrointestinal manifestation (more than two cases)						x	
107	Guinea-worm				x			
108	Haemorrhagic fever							x
109	Haemorrhagic fever (DHF/CCHF)		x					
110	Hemorrhagic fevers						x	
111	Dengue fever		x					
112	Laboratory-confirmed haemorrhagic fever							x
113	Rift Valley fever	x						
114	Suspected haemorrhagic fever							x
115	Viral hemorrhagic fever	x		x	x			
116	Yellow fever			x	x		x	
117	Hydatid cyst						x	x
118	Echinococcoses – autre					x		
119	Echinococcoses – hépatique					x		
120	Echinococcoses – pulmonaire					x		
121	Leishmaniasis and Kala-azar						x	
122	Kala-azar			x				
123	Leishmaniose cutanée					x		
124	Leishmaniose viscérale					x		
125	Black fever visceral leishmaniasis, also known as kala-azar							x
126	Leprosy	x		x		x	x	x
127	Injuries				x			
128	Leptospirosis						x	
129	Lymphatic filariasis			x				
130	Malaria	x	x	x	x			x
131	Outbreaks of falciparum malaria						x	
132	Paludisme					x		
133	Malformations in newborns (surveillance of congenital rubella)					x		
134	Neonatal tetanus	x	x	x	x			x
135	Congenital tetanus						x	
136	Tetanus							x
137	Rougeole					x		
138	Measles and German measles (fever and maculopapular rash)							x
139	Measles	x	x	x	x			
140	Measles Suspicious Cases						x	
141	Eruptive fevers (fever eruption)					x		

No.	Notifiable diseases	Egypt 34	Pakistan 19 (DEWS)	South Sudan 26	Sudan 38	Tunisia 47	Islamic Republic of Iran 43	Iraq 78
142	Rash & fever	x						
143	Rubella	x						
144	Rubella suspicious cases						x	
145	Suspected german measels							x
146	Suspected measels							x
147	Mumps	x						x
148	Onchocerciasis			x				
149	Outbreaks of any communicable diseases							x
150	Outbreaks of relapsing fever						x	
151	Pertussis	x	x				x	
152	Coqueluche					x		
153	Whooping cough				x			x
154	Plague	x		x			x	
155	Peste					x		
156	Post-vaccination side-effects which raise the public concerns						x	
157	Pulmonary Smear Positive tuberculosis						x	
158	Pulmonary tuberculosis							x
159	RAA					x		
160	Rabies	x		x	x			x
161	Rage					x		
162	Relapsing fever			x	x			
163	Rickettsioses					x		
164	Scabies		x					
165	Schistosomiasis	x		x			x	x
166	Typhoid						x	
167	Toxoplasmosis							x
168	Trypanosomiasis			x				
169	Tuberculose : extra-pulomonaire					x		
170	Tuberculosis (Smear Negative and Extra Pulmonary)						x	
171	Tuberculose : pulmonaire					x		
172	Tuberculosis	x		x	x			x
173	Typhoid	x				x		
174	Typhoid fever		x		x			x
175	Typhus					x	x	x
176	Unexplained fever		x					
177	Unusual events						x	
178	Unusual health event							x
179	Varicella							x

Annex 4

MATRIX FOR APPLICATION OF PARAMETERS TO SELECTED SYNDROMES

Parameters		Description
Syndrome	Name	
	Group of diseases/differential diagnosis	Differential diagnosis: - helps in selecting the response - list of other diseases that produce outbreaks
Rationale, objectives and usefulness	Justification/criteria for inclusion	Including the situation analysis in the country
	Objectives of Syndromic Surveillance	
Case definition	Current case definition	Syndromic approach
	Revised syndromic case definition	New approach
	Remarks	
Potential sources for non-clinical data	Non-clinical data and/or information	
	Potential sources	
	Potential partners (roles and responsibilities	
	Undesirable background noise	
SWOT	Strengths/opportunities	
	Weakness/challenges	
	Internal/external Environmental threats	
	Actions to be taken	
Early warning and response	Alert signal (threshold)	
	Action to be taken	
	Recommendations	
International public health importance/IHR notification		
Availability of and access to health data and non-health data		

Annex 5

FINAL LIST OF PARAMETERS

Syndrome	Name of the syndrome
	Group of diseases
Rationale, objectives and usefulness	Justification/criteria for inclusion
	Objectives of syndromic surveillance
	Other diseases the produce outbreaks with these signs and symptoms
Case definition	Case definition
	Remarks
Potential sources for non-clinical data	Non-clinical data and/or information
	Potential sources
	Potential partners (roles and responsibilities)
	Undesirable background noise
SWOT	Strengths/opportunities
	Weaknesses
	Internal and external threats
	Actions to be taken
Early warning	Alert signal (threshold)
	Action to be taken
	Recommendations
International public health importance	
Availability of and access to health data and non-health data	

Annex 6

THE PROPOSED GENERIC LIST OF SYNDROMES FOR CONSIDERATION

No.	Syndrome	Differential diagnosis
1	Acute flaccid paralysis	Poliomyelitis
		Guillain-Barré syndrome
2	Fever and neurological symptoms	Meningococcal (epidemic-prone)
		Hemophilus (in close contacts)
		Viral meningo- encephalitis:
		Pneumococcal meningitis (in crowded communities)
		Toxic encephalopathy
		Cerebral malaria
3	Fever with hemorrhagic manifestations	Crimean–Congo haemorrhagic fever (CCHF)
		Rift Valley fever (RVF)
		Yellow fever (YF)
		Ebola haemorrhagic fever
		Marburg haemorrhagic fever
		Lassa haemorrhagic fever
		Hanta virus
		Omsk haemorrhagic fever
		Al-Khumra haemorrhagic fever
		Meningococcemia
		Severe Leptospirososis
		Dengue haemorrhagic fever
4	Fever with rash	Meningococcemia
		Viral exanthemia: measles, rubella, infectious mononucleosis
		CCHF
		Smallpox
		Chickenpox (*herpes zoster)
		Chikungunya
		Dengue fever
		Roseola infantum (etxantum sabitum)
5	Fever with no specific signs and symptoms	Brucellosis
		Typhoid fever
		Malaria
		HIV/AIDS
		Salmonellosis
		Viral infections/hepatitis
		Q fever
		Leptospirosis
		Meningitis

		Kala Azar
6	Influenza-like illness (ILI)	Seasonal/pandemic influenza
		RSV
		Adenoviruses
		Parainfluenza
		SARS
		HMPV
7	Severe acute respiratory infections (SARI)	Seasonal/pandemic influenza
		RSV
		Adenoviruses
		Parainfluenza
		SARS
		HMPV
		Pertussis
		Atypical pneumonias
8	Acute jaundice	Hepatitis: A, E, B, C
		Severe malaria
		Leptospirosis
		Yellow fever
		VHF
		Fascioliasis
		Chemical poisoning
		Mushroom poisoning
9	Food intoxication	Staphylococcus A.
		Chemical agents
		Salmonella
		E. coli
		Bacillus Cereus
		Clostridum sp.
10	Acute watery diarrhoea	Salmonellosis
		Cholera (El Tor)
		Shigellosis
		E. coli
		Staphylococcus aureus
		Clostridium perfringens
		Bacillus cereus
11	Bloody diarrhoea	Shigella
		Amebiasis
		E. coli
		Salmonellosis
		Campylobacter
		Yesinia entrocolitica
12	Unusual health events	Chemical incidents
		Radionuclear accidents

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