Newly Developed Early Warning Outbreak Recognition System (EWORS):

REPRESENTING FIRST JOINT INDONESIAN-AMERICAN PATENT IN SOFTWARE TECHNOLOGY

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What is EWORS?

EWORS is a hospital-based network of computerized linkages that provides surveillance for early detection of outbreaks of infectious diseases, by establishing trend information that distinguishes epidemic from endemic disease.
**EWORS**

- Provides standardized information over time for trend analysis of infectious diseases
- Provides for reliable data
- Provides for real-time data relay
- Provides for early recognition of possible outbreaks
- Provides for identification of outbreaks in both temporal and spatial clustering
- Provides for rational interpretation of data into meaningful presentations and public health response.
FLOW OF EWORS DATA COLLECTION

- PEDIATRIC CLINIC
- INTERNAL MEDICINE CLINIC
- EMERGENCY ROOM

ABDOMINAL DISCOMFORT
ANURIA/OLIGURIA
BLOODY COUGH
BLOODY DIARRHEA
BONE/MUSCLE/JOINT PAIN
BUBO-LYMPHADENITIS
CHILLS
COMMON COLD
CONJUNCTIVITIS
COUGH
CUTANEOUS BLEEDING
DARK URINE
DEHYDRATION
DIARRHEA
DIFFICULT BREATHING
FEVER
HEADACHE
HEMATEMESIS/MELENA
JAUNDICE
MALAISE
MENTAL STATUS DISTURBANCE
NAUSEA
PARALYSIS
RASH
SEIZURE
SORE THROAT
STIFF NECK
VESICLE/BULLAE
VOMITING

NIHRD / CDC / US NAMRU-2*

* Indonesian implementation
FORMULIR ISIAN PASIEN
RSUD JAYAPURA

I. Data Demografi (diisi oleh perawat)

No. Catatan Medik: ________________

1. Bagian:
   □ Poli Penyakit Dalam
   □ Poli Anak
   □ Instalasi Rawat Darurat

2. Tanggal: ___ ___ bulan: ___ ___ tahun: ___ ___

3. Umur: ___ ___ tahun, ___ ___ bulan

4. Jeniskelamin: □ Laki-laki □ Perempuan

5. Tempat tinggal (diisi salah satu)
   a. Dalam Prop. PAPUA, Kabupaten /Kotamadya: __________
   b. Luar Prop. PAPUA, Propinsi / Negara: __________________


II. Data Klinik (diisi oleh dokter)

Keluhan / gejala
   □ Anuria/Oligouria
   □ Batuk
   □ Batuk darah
   □ Bubo-limfadenitis
   □ Dehidrasi
   □ Demam
   □ Diare cair
   □ Diare berdarah/lendir
   □ Gangguan kesadaran
   □ Hematemesis/melena
   □ Ikterus
   □ Kaku kuduk
   □ Kejang
   □ Konjunktivitis
   □ Lumpuh
   □ Malaise
   □ Menggigil
   □ Mual
   □ Muntah
   □ Perdarahan kulit
   □ Perubahan warna urin
   □ Pilek
   □ Ruam kulit
   □ Sakit kepala
   □ Sakit otot/sendi/tulang
   □ Sakit perut
   □ Sesak nafas
   □ Vesikel/bulla

Diagnosis sementara yang dipakai sebagai dasar pengobatan: ____________
Decisional Flow Diagram

**TREND ANALYSIS**

Suspicious rise in cases reflecting suspected outbreak

Analysis based on
- Age group
- Sex
- Time

No dramatic rise in cases

**DATA INTERPRETATION**

Communications with Hospital

Outbreak Investigation

Decesion

No Investigation

Co-ordination Meeting
NIHRD
CDC
NAMRU-2

Investigation
EWORS ORGANIZATION AT EWORS SITE

EWORS SITE ADVISER
(Deputy Director : Dr Ang Kim Long)

EWORS SITE COORDINATOR/CONTACT PERSON
(Dr Sam Sophan)

“OPD” DOCTORS AND NURSES IN CHARGE

Doctor : Dr Chea Sok Veng
Nurse : Hov Sok

Doctor : Dr Reth Chan
Nurse : So Seng Long

Doctor : Dr Ma Chhorly Chandara
Nurse : Ma Sokha

Duty Doctors & Nurses

Duty Doctors & Nurses

Duty Doctors & Nurses

Computer Operator :
1. Chea Sunnalay
2. Sam Sarann

* An example from National Pediatric Hospital, Phnom Penh, Cambodia
EWORS HOSPITAL NETWORK IN INDONESIA, 1998 - 2001

1. RSUD Sanglah, Denpasar, Bali.
2. RS Labuang Baji, Makassar, Sulawesi Selatan.
3. RSUD Dr Soedarso, Pontianak, Kalimantan Barat.
4. RS Dr Pirngadi, Medan.
5. RS Persahabatan, Jakarta.
6. RS Penyakit Infeksi Prof. Dr. Sulianti Saroso, Jakarta.
7. RSUD Jayapura, Jayapura, Papua.
8. RSUD Wamena, Wamena, Papua
9. RS Dr Sardjito, Yogyakarta
FLOW OF EWORS DATA IN CAMBODIA

Preah Ket Mealea Hospital (Military Hospital), Phnom Penh
Pediatric Hospital, Phnom Penh

Kampong Siem Kampong Cham Referral Hospital, Kampong Cham Province

HOST / SERVER

SITE COMPUTERS

National Institute of Public Health, Phnom Penh
**ORGANIZATION OF CURRENT EWORS NETWORK**

**REPUBLIC SOCIALIST OF VIETNAM**

**EWORS HOST:**
- The Pasteur Institute, Ho Chi Minh City

**EWORS SITES:**
- Pediatric Hospital #1, HCMC
- Pediatric Hospital #2, HCMC
- Center of Tropical Disease Hospital, HCMC
EWORS SITES:

- An Giang Province Hospital
- Phu Tan District Hospital
- Center of Preventive Medicine, An Giang Province (Sub-host)
FLOW OF EWORS DATA IN VIETNAM

HOST/SERVER

SITE COMPUTERS

HOST
(The Pasteur Institute., Ho Chi Minh City)

SUB-HOST
(Center of Preventive Medicine, An Giang Province)

Pediatric Hospital #1, HCMC
Pediatric Hospital #2, HCMC
Center of Tropical Medicine, HCMC

An Giang Province Hospital
Phu Tan District Hospital, An Giang Prov.
EWORS data entry
EWORS key function analysis of selected variables
This step shows possible diseases that appear from Primary and Additional Sign/Symptoms that you choose in previous step.

**Anthrax**
- Brucellosis
- Measles
- Chickungunya
- Yellow Fever
- Lassa Fever
- Dengue Hemorrhagic Fever
- Diphtheria
- Ebola
- Enterotoxigenic E Coli
- Hantaan
- Hepatitis A-E

**ANTHRAX**
- IN SOUTHEAST ASIA
- NOT YET IN SOUTHEAST ASIA

**Sign/Symptom:**
- a. Vesicle / bullae
- b. Fever
EWORS graphics presentation

Number of Cases with Fever at RSUP Dr. Sardjito - Jogjakarta
From January - April 2001

EWORS Chart

Number of Cases
Month

1 2 3 4

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SEX
Male
Female
EWORS provides for key function mapping for each site location in identifying geographic clustering of outbreak cases.
EWORS database can be analyzed off line using other statistical programs

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Total of Records: 3202

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RECENT EXAMPLE

EWORS depicted raise of diarrheal cases in North Jakarta, 1 – 22 January 2002
Fluctuation of fever by month, 1 May 2000 through 23 January 2001 at the Infectious Diseases Hospital, North Jakarta
Fluctuation of watery diarrhea by week, 1 July 2001 through 23 January 2002 at the Infectious Diseases Hospital, North Jakarta
Fluctuation of watery diarrhea and dehydration by week, 1 July 2001 through 23 January 2002 at the Infectious Diseases Hospital, North Jakarta
Fluctuation of watery fever, diarrhea and vomiting, by week, 1 July 2001 through 22 January 2002 at the Infectious Diseases Hospital, North Jakarta
Fluctuation of watery fever, diarrhea and vomiting, by day, 1 January through 22 January 2002 at the Infectious Diseases Hospital, North Jakarta
Fluctuation of watery fever, diarrhea and vomiting, by sex, 1 July 2001 through 22 January 2002 at the Infectious Diseases Hospital, North Jakarta
Fluctuation of watery fever, diarrhea and vomiting, by age, 1 July 2001 through 22 January 2002 at the Infectious Diseases Hospital, North Jakarta
Geographical Clustering of Cases with Fever, Watery diarrhea, and Vomiting, 1 – 22 January 2002, in North Jakarta

* EWORS data derived from Infectious Diseases Hospital, North Jakarta.

*EWORS data derived from Infectious Diseases Hospital, North Jakarta.*
What EWORS is:

- EWORS collects standardized data for making area-specific and regional comparisons.
- The EWORS concept is predicated on “same day” transfer of information from network hospitals to a central hub.
**What EWORS IS:**

- EWORS employs a syndromic approach to a working diagnosis, which allows for reliable analysis of aggregate data to determine appropriate response measures.

- EWORS reporting insures recognition of an incipient epidemic, by detecting similar signs and symptoms in the index and early cases associated with the same outbreak.
THE IMPLEMENTATION OF EWORS

EWORS study site at Dr Pirngadi Hospital,
Medan, North Sumatra
Initial data entry into standardized EWORS form: nurse at Dr Pirngadi Hospital, Medan interviews patient.
Data entry into specially designed EWORS software in Medan.
What EWORS is **NOT**:

- EWORS does not represent a conventional system for disease surveillance, with a focus on specific etiology.

Most reporting systems involve data transfer from district to provincial to national levels over months or years, for inclusion in large disease-specific compilations used for national or international historical reports.
Validation of EWORS

- Over 500,000 case entries in less than 2 years of pilot implementation in Indonesia, Cambodia and Vietnam.
- Four instances of response in recognition of outbreak occurrence.
Future EWORS Applications

- Refugee and Disaster Situations
- Regional component of WHO Global Network
- Biological Defense
- Palmtop platform