Emergency Electronic Tracking and Triage for Adverse Public Health Threats
• Arthur Yancey II MD, MPH, FACEP; Emory University, Department of Emergency Medicine; Grady EMS, Atlanta, USA.
• Jyl McGunigal, Superintendent, Toronto Paramedic Services, Toronto, Canada
• Brian Schwartz, MD, MScCH; University of Toronto; Public Health Ontario, Canada
• Todd Stout, FirstWatch, San Diego, USA.
Disclosures

• Arthur Yancey is a member of the College of Fellows of the International Academies of Emergency Dispatch
• Jyl McGunigal has received honoraria as an instructor for the International Academies of Emergency Dispatch
• Todd Stout is CEO of FirstWatch
Objectives

• To impart knowledge on methodically gathering threat information and its flow through the foregoing sequential categories;

• To discover issues of organizing threat information flow
  • The components themselves
  • Organization of their sequence
  • Flow to appropriate recipients
Objectives

• To generate discussion & recommendations on internationalization of the foregoing framework from its jurisdictional genesis to global reach
Toronto Paramedic Services

- Cover 650 sq. km land area
- Resident Population of 2.79 million
  - can swell to over 4 million during week
- Central Ambulance Communication Centre (CACC) processes over 425,000 calls per year with 368,000 responses
- Largest “sole provider” municipal EMS service in North America
- 110 Transport Units & 18 ERUs at peak periods
Medical Protocols/Triage for Call Receiving

ProQA

The location is: 1900 EGLINTON AV E
The phone number is: 416-615-2027
The problem is: 
With the patient now: No
The number of hurt (sick) is: 1
The patient’s age is: 45 year(s)
The patient’s gender is: Male
Is he conscious? Yes No
Is he breathing? Unknown
The Chief Complaint is: 31 Unconscious / Fainting (Near)

If consciousness is unknown, immediately verify whether the patient is breathing.
TORONTO PARAMEDIC SERVICES

SARS AN EMERGENCY MEDICAL DISPATCH PERSPECTIVE

- Dispatch staff quarantined for 2 days
- SARS screening required for all staff
- Restrictions imposed for entry to HQ facilities, specifically control centre - necessary precaution to protect integrity of the dispatch system
- 4 EMD's were screened out but were ultimately determined not to be infected
EMERGENCY CALL MANAGEMENT

- Shortness of Breath/Breathing Problems (including cough)
- General Malaise
- Fever
- Severe Headache

All CACCs in the Province directed to have dispatch staff ask the additional questions when requests for ambulance service are received.
MPDS PROTOCOLS IDENTIFIED WHAT WOULD REQUIRE ADDITIONAL SARS SCREENING QUESTIONS:

◆ # 6 BREATHING PROBLEMS
◆ #18 HEADACHE
◆ #26A1 SICK PERSON
“Has the patient (have you) had contact with a person known to have SARS in the last 10 days?”

“Is the patient (are you) under quarantine, or has the patient (have you) been contacted by public health and put on home-isolation?”

“Has the patient (have you) been to any of the affected areas in the last 10 days?” (CACC Administrative Staff will supply an updated list weekly.)
If there are healthcare facilities that are closed or have been closed in the last ten (10) days due to SARS, all CACCs will ask:

“In the last 10 days has the patient (have you) been to a health care facility that is closed due to SARS?”
◆ Ontario Patient Transfer Authorization Centre (PTAC) initially set up in communications centre
If the Chief Complaint is:

◆# 6 BREATHING PROBLEMS
◆#18 HEADACHE
◆#26A1 SICK PERSON

• ask the SRI questions from ProQA:
• If the answer is ‘yes’ to two or more questions use the short hand comment /FS = Flu Symptom in Comments/Notes Tab
• If the answer is ‘yes’ to two or more questions use the short hand comment /FS Flu Symptom in Comments/Notes Tab
<table>
<thead>
<tr>
<th>Case no.</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>0009000154</td>
<td>GLR</td>
</tr>
</tbody>
</table>

**Chief Complaint:** 18 - Headache

**Location:** 500 YONGE ST

**Caller Statement:**

You are responding to a patient complaining of a headache. The patient is a 36-year-old male, who is conscious and breathing. **Code: 18-C-7:** Change in behavior (<= 3hrs).

3. He is completely alert (responding appropriately).
4. He is breathing normally.
5. He is able to talk normally.
6. There was no sudden onset of severe pain.
7. There is no numbness or paralysis.
8. There has been a recent change in behavior:
9. agitated pt.
10. **Severe Respiratory Infection (Flu-Like) Symptoms:**
   1. chills
   2. unusual sweats
   3. sore throat
   4. contact with someone with the flu (or flu-like symptoms)
   5. traveled recently (if so, where?)
11. Pts friend was in Mexico last week.

---

**Responder Script/KQ Answers**

<table>
<thead>
<tr>
<th>GLR 0009000154</th>
<th>C: NAE - STD</th>
</tr>
</thead>
<tbody>
<tr>
<td>36 year old, Male, Conscious, Breathing. Code: 18-C-7: Change in behavior (&lt;= 3hrs).</td>
<td>500 YONGE ST, 416-555-1212</td>
</tr>
</tbody>
</table>
Emerging Infectious Disease Surveillance Tool (SRI/MERS/Ebola) will be triggered by any of the following chief complaints:

- Abdominal Pain (Protocol 1)
- Breathing Problems (Protocol 6)
- Chest Pain (Protocol 10)
- Headache (Protocol 18)
- Hemorrhage/Laceration—medical only (Protocol 21)
- Sick Person (Protocol 26)
- Transfer/Interfacility/Palliative Care-only use if complaint 1,6,10,18,21,26 (Protocol 33)
Listen carefully and tell me if s/he has any of the following symptoms:

- difficulty breathing or shortness of breath
- persistent cough
- measured body temperature > 101.5°F (38.6°C)
- chills
- unusual sweats
- hot to the touch in room temperature
- unusual total body aches
- headache
- sore throat
- nasal congestion (blocked nose)
- runny or stuffy nose
- recent onset of any diarrhea, vomiting, or bloody discharge from the mouth or nose
- abdominal or stomach pain
- unusual (spontaneous/non-traumatic) bleeding from any area of the body
- contact with someone with the flu or flu-like symptoms (if so, when?)

Ask only in early phases when new flu, respiratory illness, or hemorrhagic fever is emerging from specific areas:
- traveled in the last 21 days (if so, where?) Note: (If travel timeframe questionable) Was it roughly within the past month?

Ask only if a higher-risk exposure is suspected (close contact with sick persons, dead bodies, or exotic African animals):
- needlestick, scalpel cut, or similar injury in treating or caring for Ebola patients
- blood or body fluid exposure to eyes, nose, or mouth (mucous membranes) in treating or caring for Ebola patients
- skin contact with, or exposure to, blood or body fluids of an Ebola patient
- direct contact with a dead body without use of personal protective equipment in a country where an Ebola outbreak is occurring
- handling of bats, rodents, or non-human primates in or recently received from Africa

**Infection Prevention Instructions:**  
(Keep isolated) From now on, don't allow anyone to come in close contact with her/him.
- Infection Prevention Instructions given

© 2014 IAED  Current as of: 9 October 2014
Listen carefully:

Ask only in early phases when new flu, respiratory illness, or hemorrhagic fever is emerging from specific areas:

- has s/he traveled in the last 21 days (if so, where?) Note: (If travel timeframe questionable) Was it roughly within the past month?

- confirmed travel from a known infected ("hot") area
- contact with a person who has traveled from a known infected ("hot") area in the past 21 days
- contact with someone with the flu or flu-like symptoms (if so, when?)

Now tell me if s/he has any of the following symptoms (*Note: red indicates Ebola-essential symptoms):

- measured body temperature ≥ 100.4°F (38.0°C)
- fever (hot to the touch in room temperature)
- chills
- unusual sweats
- unusual total body aches
- headache
- recent onset of any diarrhea, vomiting, or bloody discharge from the mouth or nose
- abdominal or stomach pain
- unusual (spontaneous/non-traumatic) bleeding from any area of the body
- difficulty breathing or shortness of breath
- nasal congestion (blocked nose)
Emergency Medical Services Data

- Emergency Medical Dispatch data
- EMS / Paramedic Services data is rich with information and robust
- Near Real Time
- Geographically Specific
- Large footprint from single EMS provider vs many hospitals
What are we looking for?

• Abnormality defined by deviation from a baseline
• In Emergency Medical Services (EMS / Paramedic Services) systems there are almost always patterns of demand by hour of day and day of week
Patterns of Demand - Temporal

- Toronto, Canada:
  - Emergency Medical Services (EMS) call volume (blue) vs historical average (green)
Patterns of Demand - Temporal

Community in Washington State

Community in Minnesota

Community in California

Community in Tennessee

Community in Colorado

Community in Florida
What’s “Normal”

• In public safety there are almost always patterns of demand by hour of day and day of week
  – And Geographic patterns, too…
Patterns of Demand - Geographic

20 weeks of calls for Monday 5 - 6am
Patterns of Demand - Geographic

20 weeks of calls for Monday 6 - 7am
Patterns of Demand - Geographic

20 weeks of calls for Monday 7 - 8am
Relatively Standardized Data

- Approaches to EMS data surveillance, have been applied to several diseases including H1N1, MERS and Ebola
Real-time Influenza Surveillance

Regional Influenza Network (RIN)

• Early warning for local, regional and national areas

• Protection of the Workforce

• Alternative Planning
  – assessment, pickup and delivery models
  – providing a resource (Card 36)

• Respiratory vs. Non-respiratory symptoms

• Similar to MERS & Ebola, without travel criteria
IAED EIDS Tool

Emerging Infectious Disease Surveillance Tool (SRI/MERS/Ebola)

Listen carefully:

Ask only in early phases when new flu, respiratory illness, or hemorrhagic fever is emerging from specific areas:

- Has s/he traveled in the last 21 days (if so, where?)
  - Note: (If travel timeframe questionable) Was it roughly within the past month?
- Confirmed travel from a known infected (“hot”) area
- Contact with a person who has traveled from a known infected (“hot”) area in the past 21 days
- Contact with someone with the flu or flu-like symptoms (if so, when?)

Now tell me if s/he has any of the following symptoms:

- Measured body temperature ≥ 100.4°F (38.0°C)
- Fever (hot to the touch in room temperature)
- Chills
- Unusual sweats
- Unusual total body aches
- Headache
- Recent onset of any diarrhea, vomiting, or bloody discharge from the mouth or nose
- Abdominal or stomach pain
- Unusual (spontaneous/non-traumatic) bleeding from any area of the body
- Difficulty breathing or shortness of breath
- Nasal congestion (blocked nose)
- Persistent cough
- Sore throat
- Runny or stuffy nose

Note:

Symptoms in red should be considered Ebola-essential symptoms to ask.
Emerging Infectious Disease Surveillance Tool (SRI/MERS/Ebola)

Medical Director-approved additional questions:

☐ 

☐ 

☐ 

Ask only if a higher-risk exposure is suspected (close contact with sick persons, dead bodies, or exotic African animals):

☐ needlestick, scalpel cut, or similar injury in treating or caring for Ebola patients

☐ blood or body fluid exposure to eyes, nose, or mouth (mucous membranes) in treating or caring for Ebola patients

☐ skin contact with, or exposure to, blood or body fluids of an Ebola patient

☐ direct contact with a dead body without use of personal protective equipment in an area where an Ebola outbreak is occurring

☐ handling of bats, rodents, or non-human primates in or recently received from Africa

Infection Prevention Instructions:

☐ (Keep isolated) From now on, don’t allow anyone to come in close contact with her/him.

Medical Director-approved Special Instructions:

☐ 

☐ 

☐
MERS

• First MERS EMS Trigger for Louisville, KY
  – Kentucky Derby

• Second MERS trigger for Orange County, FL
  – Heavy tourism due to Disney World

• Provider training /retraining to capture travel information from caller and/or patient
EMS Ebola Trigger Locations
This patient was tested and did not have Ebola
EMS Ebola Trigger Alert Map
EMS Ebola Trigger Activity

53 Agencies, 77 triggers, 1,100 alerts in 105 days

Aggregated Ebola/EID Screening Time Series
Graphs represent in queue, active or completed calls between the hours of 9/1/2014 and 1/14/2015 11:59:59 PM

Started Development
Averaged 10.6 per day all agencies
13.75 per agency or
1 alert every 7.5 days per agency
Non-communicable diseases

- Environmental
- Chemical toxicity
- Opioid toxicity
Severe Weather

Hurricane Irene — Saturday 27 August 2011

Chesterfield - Severe Weather (Free Text) Current Call Information

- Fire/Hazardous Cond
- Tree Down
- Fire/Hazardous Cond
- Tree Down
- Tree Down
- Tree Down
- Tree Down
- Tree Down
- Fire/Hazardous Cond
- Tree Down
- Fire/Hazardous Cond
- Fire/Hazardous Cond
- Tree Down
- Special Fire
- Tree Down
- Tree Down
- Tree Down
- Tree Down
- Tree Down
- Tree Down

Matched Categories: Severe Weather

Primary Event: Main opened: 11/08/27 12:45 Incident initiated by: E. Crone, SIE SPECIAL FIRE ACROSS FROM ST MICHAELS CHURCH/TV ON FIRE/TV ON FOUNTAIN ROOF GOING TO BE IN THE HOUSE. SPECIAL FIRE, TREE DOWN ON FIRE-LINE POWER OUT but will get someone on way as soon as possible but they are extremely busy per command blocking 11A fire remaining on scene due to tree on fire blocking Boulevard special fire route closed, multi incident closed: 11/09/27 12:12
This trigger is monitoring activity from a 3-county area which includes Seattle, Tacoma and Everett. During a Pepper Spray incident, the system identified the volumetric and geospatial activity.
Opioids

- Clusters of overdose informing public health
- Dispatch code, primary or secondary impression (sensitive)
- Naloxone use (specific)
- Free Text search for Key words
Opiate OD Model
A Nationwide Real-Time Overdose Surveillance System

HIDTA’s Overdose Detection Mapping Application Program – ODMAP, assists public health, fire, emergency medical service and law enforcement agencies track known and suspected overdose incidents using Smartphone technology. ODMAP helps decision makers develop strategies and tactics to curb the spread of substance abuse disorders and reduce overdose occurrences.

The Office of National Drug Control Policy (ONDCP) funded the Washington/Baltimore High Intensity Drug Trafficking Area (W/B HIDTA) to develop ODMAP and provide it free-of-charge to first responders and government agencies.

How Does It Work? This easy to use technology relies on first responders to report overdose
Contact Information

Brian Schwartz, MD
Brian.Schwartz@oahpp.ca

Arthur Yancey, MD
iyancey@emory.edu

Jyl McGunigal
Jyl.Mcgunigal@toronto.ca

Todd Stout
tstout@firstwatch.net