

Are we ready for NBC ?

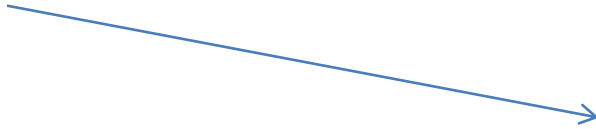
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NRBC $\approx$ NBC

- **N**



- **R**



- **B**



- **C**



Global Incident Map display of NBC or suspicious events since 9/11



in Europe



in US

Examples of terrorist events include:

- **Nuclear** explosion
- aerosolised release of Anthrax (**Biological**)
- dissemination of Sarin (**Chemical**)
- **radiological dispersion device (RDD)** “dirty bomb” (combined explosive and **radiological**)

Understanding the Terrorist Threat



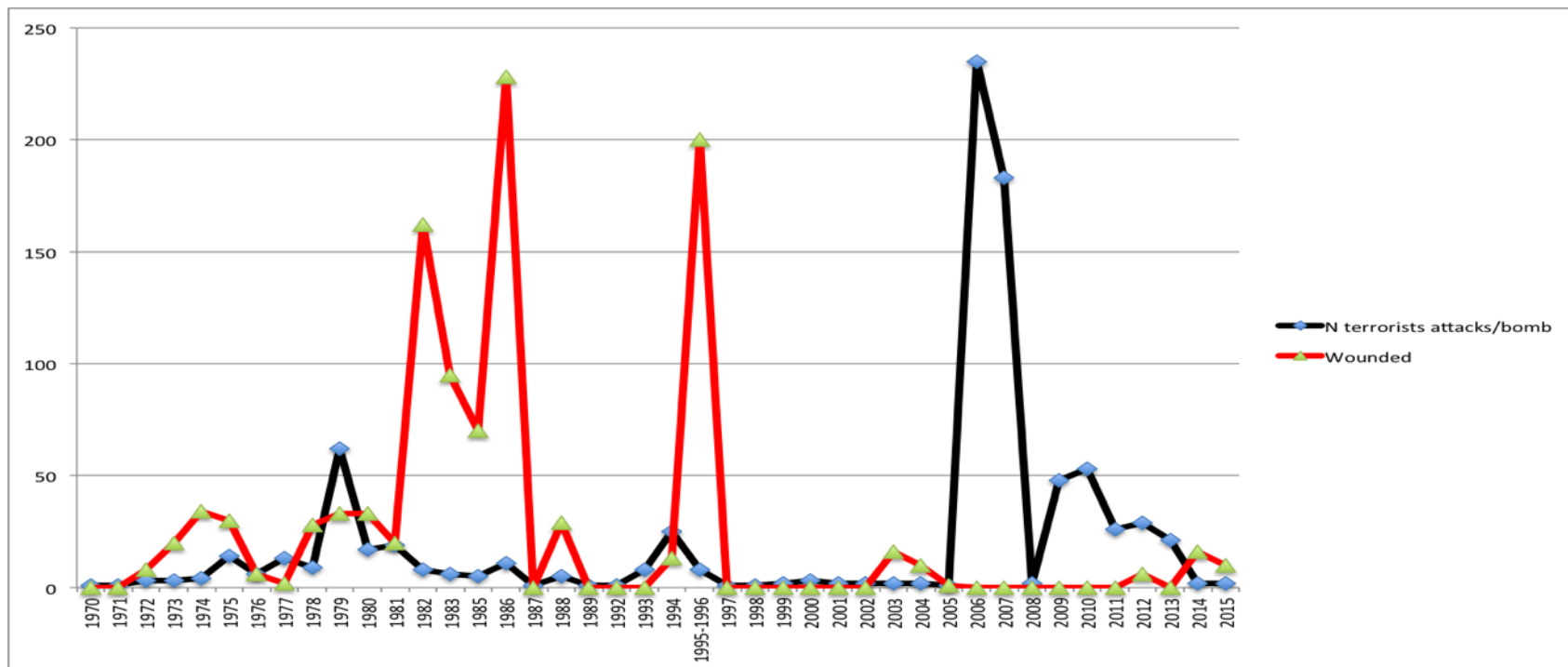
- Adequate **preparation**
- **rapid logistical response**
- short transport times
- **immediate access** to operating rooms
- methodical **multidisciplinary** care
- and good fortune ...

Ann Surg. 2014 Dec;260(6):960-6. doi: 10.1097/SLA.0000000000000914.

The initial response to the Boston marathon bombing: lessons learned to prepare for the next disaster.

Gates JD¹, Arabian S, Biddinger P, Blansfield J, Burke P, Chung S, Fischer J, Friedman F, Gervasi A, Goralnick E, Gupta A, Larentzakis A, McMahon M, Mella J, Michaud Y, Mooney D, Rabinovici R, Sweet D, Ulrich A, Velmahos G, Weber C, Yaffe MB.

What have we learned ?



Paris 1986
bombing rue de Rennes



Paris 2015 shooting Charlie's
newspaper office

National plan for MCI

“White” Plan (hospitals)
1995 PIRATOX: CB events
2002 BIOTOX : NBC events
2003 BIOTOX for SARS

Prehosp Disaster Med. 2003 Apr-Jun;18(2):92-9.
Terrorism in France. [Carli P, Telion C, Baker D.](#)

ORIGINAL RESEARCH

Open Access

The shootings in Oslo and Utøya island July 22, 2011: Lessons for the International EMS community

- **'Lone Wolf' incidents** = difficult to predict
Oklahoma (1998) , Sweden, Austria (1990), London (1999), Finland (2007,2008)
- **Multiple sites** : Istanbul (2003), Madrid (2004) , London (2005) , Mumbai (2008)

Lessons learned :

- **failure of communication**
- **improved triage** and low mortality with physician-paramedic teams on scene
- importance of air ambulances
- **national triage guideline** is required
- identify the medical lessons learned from major incidents to propagate to the **international EMS community**

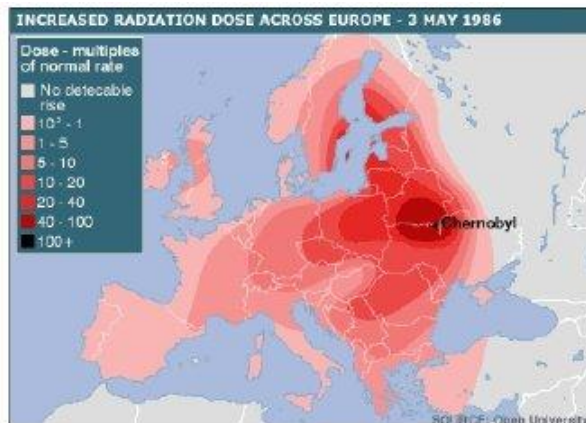


Radiation Incidents



<http://www.globalincidentmap.com/>

Chernobyl disaster in April 1986



Fukushima Daiichi nuclear disaster 2011



- (1) effective **planning, preparation and training**
- (2) interaction, **exercises, evaluation** among the sectors involved
- (3) effective and timely **response and communication**
- (4) **continuous improvements** based on new science, technology, experience, and ideas





Biological / Anthrax threats



U.S. Food and Drug Administration
Protecting and Promoting Your Health



EUROPEAN MEDICINES AGENCY
SCIENCE MEDICINES HEALTH



Biological /anthrax threats in Europe since 9/11*



BACTERIA

Anthrax (*Bacillus anthracis*)

Brucellosis (*Brucella abortus*, *Brucella suis* and *Brucella melitensis*)

Glanders (*Burkholderia mallei*)

Melioidosis (*Burkholderia pseudomallei*)

Tularaemia (*Francisella tularensis*)

Plague (*Yersinia pestis*)

Q Fever (*Coxiella burnetii*)

Typhus Fever (*Rickettsia prowazeki*)

FUNGI

Coccidioidomycosis (*Coccidioides immitis*)

VIRUSES

Venezuelan equine encephalomyelitis

Smallpox (*Variola virus*)

*Source : <http://www.globalincidentmap.com>



Biological Terrorist Threats



- 50 kg anthrax/tularemia **aerosolised** over population of 5 million = 250,000 people
- Risk of deaths $\approx$ 100,000 anthrax vs 19,000 tularemia

Lessons Learned from Anthrax Threats

- Inadequate **internal communication system**
- Need **real time communication** with most physicians
- **Public communication** strategy essential
- Full time **central coordination** essential



Chemical incident/attack



Chemical incident/attack since 2001 *



Tokyo subway sarin attack
(March 20, 1995)



12 killed, 50 severely injured
1,000 people vision problems

≈ over **50 chemical agents**
can be used as weapons
with high probability of injury.

Prehosp Disaster Med. 2003 Apr-Jun;18(2):106-14.

Terrorism in Japan.

Asai Y¹, Arnold JL.

Prehospital management of sarin nerve gas terrorism in urban settings: 10 years of progress after the Tokyo subway sarin attack.

Tokuda Y¹, Kikuchi M, Takahashi O, Stein GH.

Toxicol Appl Pharmacol. 2005 Sep 1;207(2 Suppl):471-6.

The Tokyo subway sarin attack--lessons learned.

Okumura T¹, Hisaoka T, Yamada A, Naito T, Isonuma H, Okumura S, Miura K, Sakurada M, Maekawa H, Ishimatsu S, Takasu N, Suzuki K.

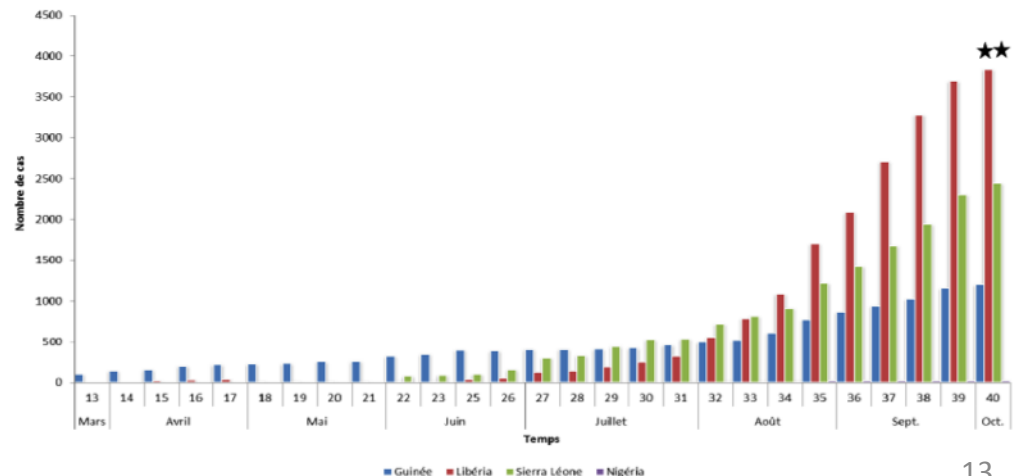
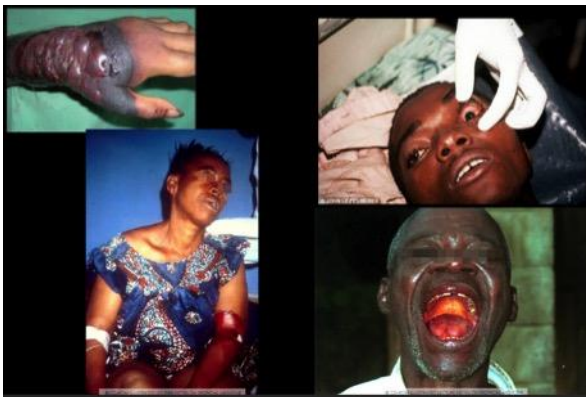
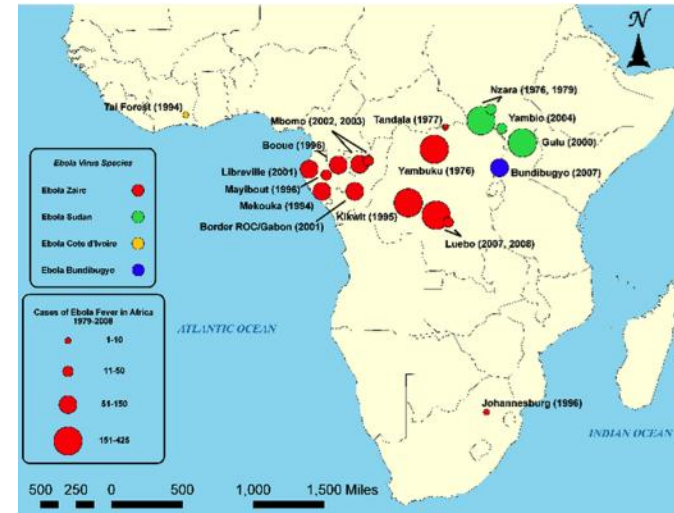
- 1) integration and cooperation through **disaster drills**
- 2) **poison information centers**
- 3) real-time, multidirectional **communication system**
- 4) multiple **channels of communication** for disaster care
- 5) access to **mobile decontamination** facilities
- 6) respiratory protection and chemical-resistant suits for **out-of-hospital providers** during chemical disasters.



Ebola

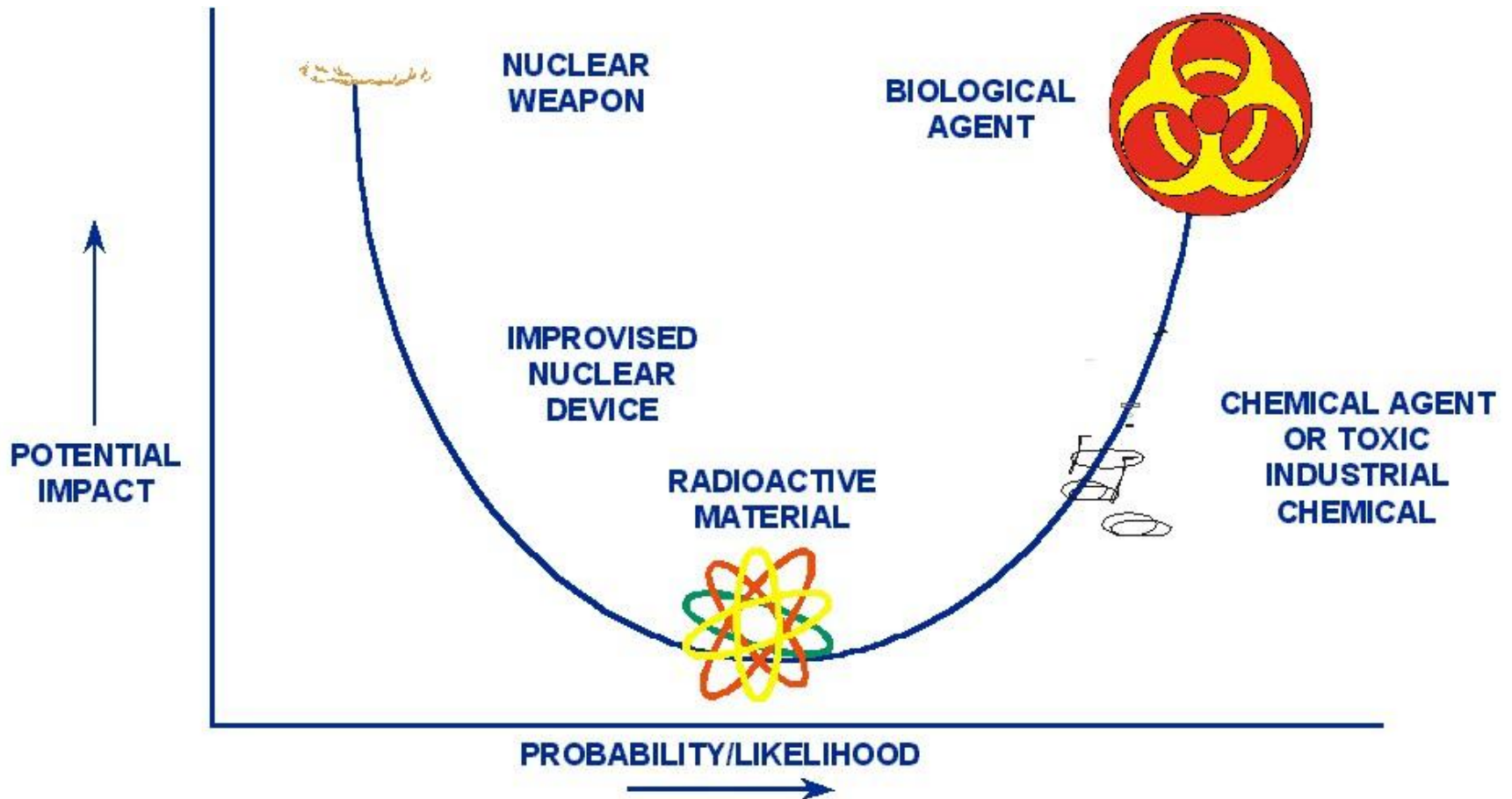
Many epidemics events

- Republic Democratic of Congo (1976, 1977, 1995, 2007, 2012)
- Soudan (1976, 1979, 2004)
- Gabon (1994, 1996, 2001, 2002)
- Ouganda (2000, 2007, 2012)
- Republic Democratic of Congo (2001, 2002, 2003, 2005)
- Ivory Coast 1994
- South Africa



Source : Paris Fire Brigade (BSPP)

What (and who) 's next ??



What/Where/How/Why Disaster plans ?

- **No hospital can stand alone in such events**
- process of planning, training, implementation
- resources to support active response
- broad representation from the institution
- interdependence of institutions

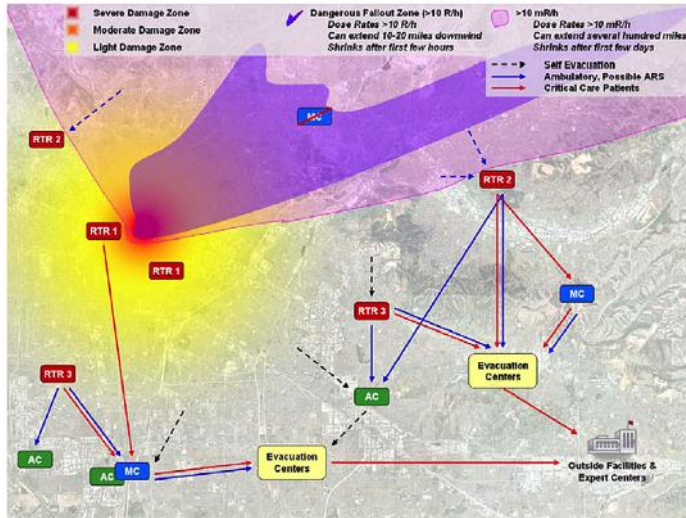


Mass Casualties Incidents and NBC



- number of patients > capabilities of local resources
- Key challenges = identify the most gravely injured and prioritize their treatment
- **This is not easy**
- We need to practice till we get it right
- **There are not second chance**

Who should run the Show?



The RTR system for a nuclear detonation response: theoretical zones in a 10 KT nuclear explosion at ground level



- Perimeter establishment delayed or not done !
 - Large crowds of people
 - Media and Political involvement
 - Inadequate resources
- Who is in command ?
 - Location of the Command Post ?
 - Lack of communication between agencies
- ➔ conflicting priorities and orders

Planning needs to include 4 phases

1. mitigation (preplanning)
2. preparation
3. response
4. Recovery



Emerg Med Clin North Am. 2002 May;20(2):477-500.
Bioterrorism preparedness. III: State and federal programs and response.
[Mothershead JL](#), [Tonat K](#), [Koenig KL](#).

Preparation for NBC event

- **First five minutes will determine next five hours**
- Pre-planning and training are critical
- Establish guidelines and procedures
- Early implementation of Incident Command

Table 1. Chemical versus Biological Terrorism Attack Characteristics

Chemical	Biological
Immediate symptoms	Symptoms delayed
Lights and siren response	Public health emergency/ epidemiologic investigation
Discrete location(s)	Initial cases may be unrecognised
Easily detected	Detection more dif cult
Secondary contamination	Only a few are contagious



NBC challenges

Manage the “Chaotic” phase for 15–30 minutes

Table 2. Critical Actions for Nuclear, Biological and Chemical (NBC) Incident Management

Evacuate and secure area
Activate emergency operations
Dispatch response teams
Crisis and emergency risk communication
Do confirmatory testing
Monitor health (short-term)
Begin long-term surveillance and sampling
Address mental health issues



DECONTAMINATION

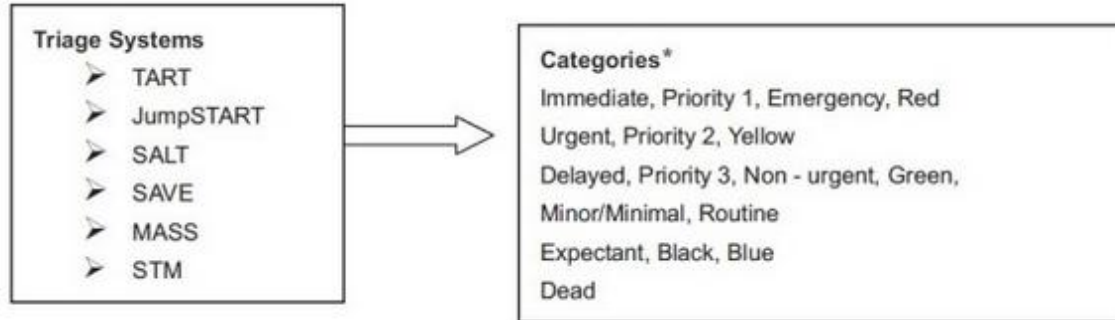
- a) as soon as possible
- b) by priority
- c) only what is necessary
- d) as far forward as possible.

SCENE MANAGEMENT

- Personal protective equipment
- Hazard monitoring strategies
- Mass Casualty Triage
- NBC Triage
 - 1) On-site triage (Level 1)
 - 2) Medical triage (Level 2)
 - 3) Evacuation triage (Level 3)

On scene Triage

When triage does not go well, it can set off a cascade of problems that are difficult to resolve in the middle of a disaster.



- “triage and destination plan” that includes predetermined destinations
- minimal on-scene treatment
- rapid, coordinated transportation to appropriate hospitals
- equal patient distribution when possible.

The form is a vertical triage tag with a pink border. It contains several sections: "Personal Property Receipt" and "Evidence Tag" at the top, followed by "Destination" and "Via". Below these is the "TRIAGE TAG" section with checkboxes for "S" (Serious), "L" (Life-Threatening), "U" (Urgent), "D" (Delayed), "G" (Green), and "E" (Expectant). There is also an "AUTO INJECTOR" section with checkboxes for "1" through "5". The "VITAL SIGNS" section includes fields for "Time", "B/P", "Pulse", and "Respiration". Below this is the "MORGUE" section with checkboxes for "Pulseless/Non-Breathing", "IMMEDIATE" (Life-Threatening Injury), "DELAYED" (Serious, Non Life-Threatening), and "MINOR" (Walking Wounded). The form also includes a "CONTAMINATED" section with a biohazard symbol and a "EVIDENCE" section with a barcode.

What to remember...

- Single commandment interconnection
- Anticipate the evolution of the situation
- Self control & calm
- Do not transport patients to nearest hospitals

Training +++



Assessment and Planning

- Assess existing public health preparedness status
- Prepare Countywide response plan
- Complete Regional response plan
- Plan and implement exercises to test all aspects of response plans.
- Plan for National Pharmaceutical Stockpile use.



Conclusions

“Knowing is not enough; we must apply.

Willing is not enough; we must do.”

—Goethe

- Terrorist incidents continue to occur ...
- Prompt recognition of a possible chemical or biological attack is crucial
- 1st step : limiting the damage basic treatment of the injuries
- appropriate decontamination, treatment, and preventative measures
- Prepare providers to anticipate
- Prepare providers to intervene appropriately

Conclusions :

NBC = be “PREPARED”

- **P**lan development
- **R**egional hospital coordination
- **E**xercise mass prophylaxis plans
- **P**rotocols of statewide EMS
- **A**lert drills
- **R**apid Response Teams
- **E**lectronic syndromic surveillance
- **D**estination guidelines



Ready for NBC !



teşekkür ederim