



ED Preparedness in Mass Casualty





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Objective: *Primum non nocere, and Save Lives*



- * "To Separate The Wheat From The Chaff"

Matthew 3.0

- * To Separate Things of Value From things of NO VALUE!!



Objectives:

- What is a Mass Casualty Incident ?
- Review Incident Management from Pre Hospital and Emergency Department perspective
- Review Triage

Mass Casualty Incident (MCI)

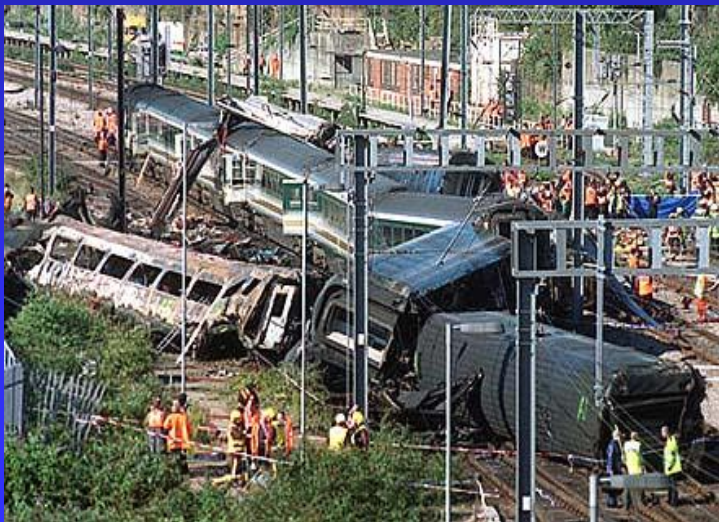


- ◆ *Multiple Casualties That Overwhelm the System and produce Unacceptable Morbidity and Mortality*

Goal

- To Save The Largest Number Of People in Multiple Casualty Incident with Fewest Complications





GLOBAL TREND

1. Kobe Earthquake, Japan 1995
2. Sarin attack in Tokyo, 1995
3. New York 911 Tragedy, 2001
4. Iraq Crisis, 2003
5. Terrorism – WMD
6. Asian Tsunami
7. Leyte Landslide, 2006



Overview of Mass Casualty

WORLD

Since 1900

%

**Top 5 hazards by
frequency of
occurrence**

**mass accidents
wind storm
flood
earthquake
drought**

**32.8
19.6
18.0
7.5
6.0
83.9**

ASIA

**Top 5 hazards by
frequency of
occurrence**

**mass accidents
wind storm
flood
earthquake
epidemic**

**37.2
19.7
18.4
8.0
4.0
87.4**

CRED Disaster Data

Mass Casualty Incident

- **Produces Several Patients**
- **As Few As Six Or As Many As Several Hundred**
- **Affects Local Hospitals**
- **Patients Are Greater Than Resources Of The Initial Responders**

Preparation for Mass Casualty

- Pre-planning And Training Are Critical
- Establish Guidelines And Procedures
- Early Implementation Of Incident Command
- First Five Minutes Will Determine Next Five Hours



Problems in Mass Casualty Incidents

- **Perimeter Establishment Delayed Or Not Done At All**
- **Large Crowds Of People**
- **Media Involvement**
- **Political Involvement**
- **Inadequate Resources**

How do you start?

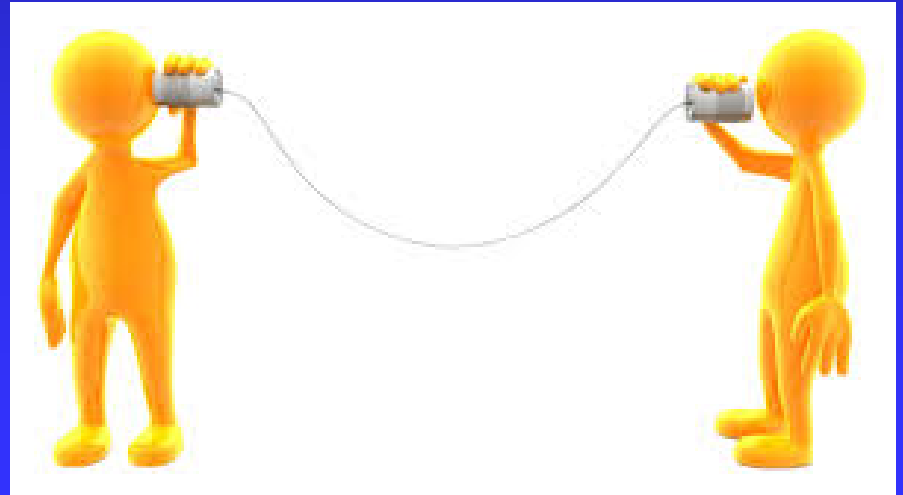
- Command
- Safety
- Triage
- Staging
- Communication
- Treatment



Communication

- Obstacles
 - ◆ Terrain
 - ◆ Different Frequencies
 - ◆ Voice VS Text
 - ◆ Overloaded channels

- Hospital
 - ◆ Medical Control
 - ◆ Patient Routing
 - ◆ Transportation Officer
 - ◆ Staging Officer

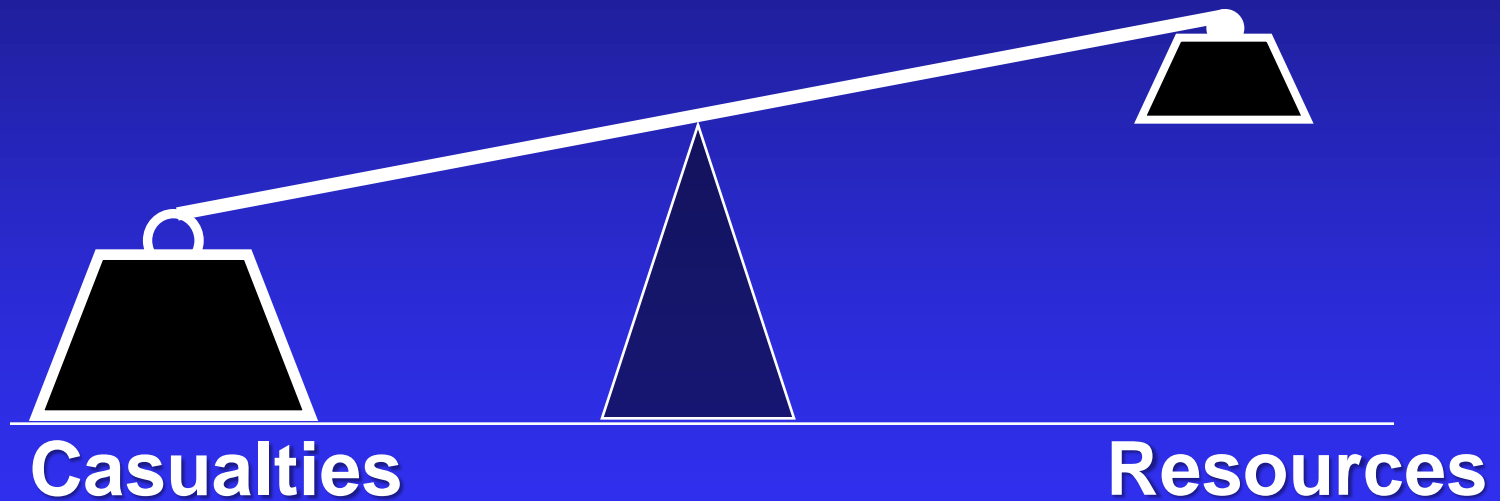


Things to Remember...

- Maintain strict radio procedures
- Enroute communications ONLY urgent matters
- Transport patients:
 - ◆ in adequate vehicles
 - ◆ with adequate escort staff
 - ◆ **SOMEtimes POV Works**
- Maintain a log of all Patients (PCR)



THE INITIAL PROBLEM ON SCENE



THE INITIAL PROBLEM ON SCENE



Police can transport trauma victims





THE OBJECTIVE



BUT - HOW IS EMS TRAINED?

- CPR, BLS, ALS **CARDIAC**
- PALS **PEDS**
- PHTLS, BTLS **TRAUMA**
- CFR, EMT, EMT-I, EMT-CC, EMT-P

***How Many Patients Are You
Taught To Treat At One Time?***

WHAT CHANGES WHEN YOU HAVE AN Mass Casualty?

- What Are My Resources?
- Who Is A Patient?
- Which Patient Do I Treat First?
- Who Can Be Salvaged?
- Who Gets Transported First?
- Who Needs A Trauma/Specialty Center?
- Who Can Help Care For Others?

TIME IS VERY IMPORTANT



THE GOLDEN HOUR

“Critical Trauma Patient Has 60 Minutes From The *Time Of Injury* To Reach Definitive Surgical Care, Or Odds for Successful Recovery Diminish Dramatically”

ACTUALLY More than 15-20 min is BAD

Time management

- Arrival of resources
- Distribution of resources
- Effective patient treatment



Scene Management

■ *Command*

Who is in Charge?

***DO I WANT TO BE IN
CHARGE?***

Who is in charge of what?
MEDICAL vs. Non Medical

Who is going to do what?

Who else needs to be here?



Scene Management



■ *Safety*

Is there a hazard or threat?

Should I be here?

Am I protected?

What should I worry about?

Scene Management

■ *Assessment*

What is going on?

How big is this, how many people?

What do I need?

■ *Communications*

Who needs to know?

Does Command & Ops know?

Do the other players know?

Scene Management

■ *Triage*

Who is doing it?

Where are they doing it?

What are they finding?

■ *Treatment*

What is AVAILABLE?

How much can we do?

Scene Management

Transport

- Who is doing it?
- From where are they doing it?
- Where are the patients going?
- How many patients going where?
- Hospital Limits

Triage in the Field

- “Large scale triage is the hardest job anyone in pre-hospital care will ever do.”



When do we triage

- When casualties exceed the number of skilled rescuers



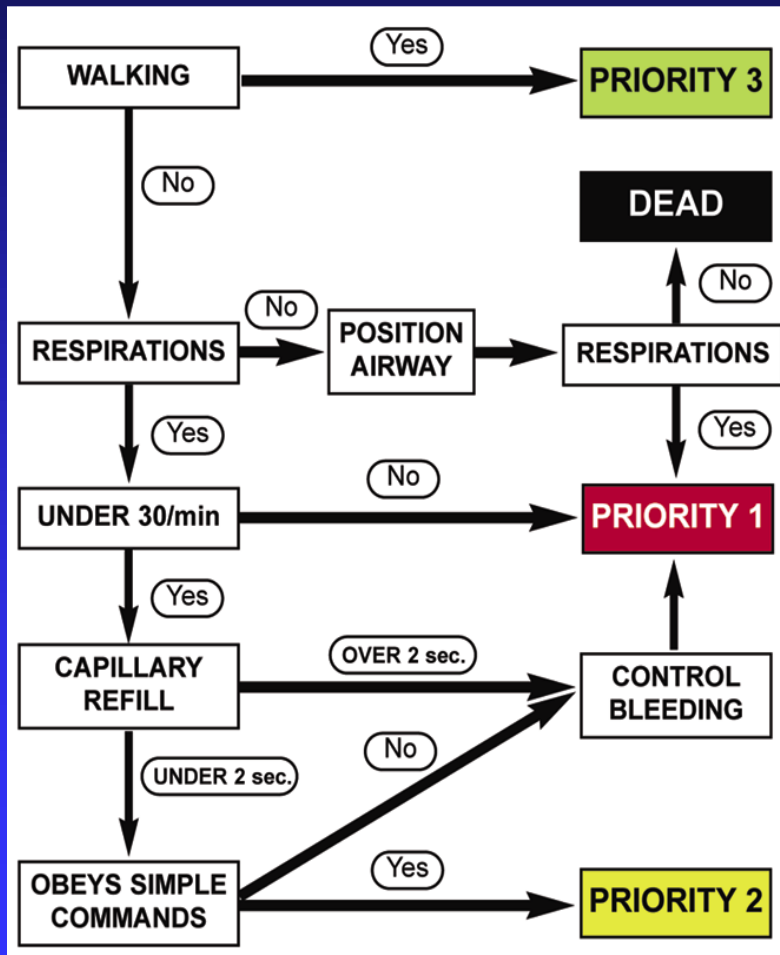
How often should you triage?

- Primary
 - ◆ On scene
- Secondary
 - ◆ Time of transport



Triage Protocol (START)

Simple Triage And Rapid Treatment



The Triage Sieve flow chart on the reverse should only be used for an adult.
For Paediatric Triage (0 to 10 years) use the Smart Paediatric Triage Tape.

Cross the next number in each row as you find a new casualty






PRIORITY 1	1	2	3	4	5	6	7	8
IMMEDIATE	9	10	11	12	13	14		
	15	16	17	18	19	20		

PRIORITY 2	1	2	3	4	5	6	7	8
URGENT	9	10	11	12	13	14		
	15	16	17	18	19	20		

PRIORITY 3	1	2	3	4	5	6	7	8
DELAYED	9	10	11	12	13	14		
	15	16	17	18	19	20		

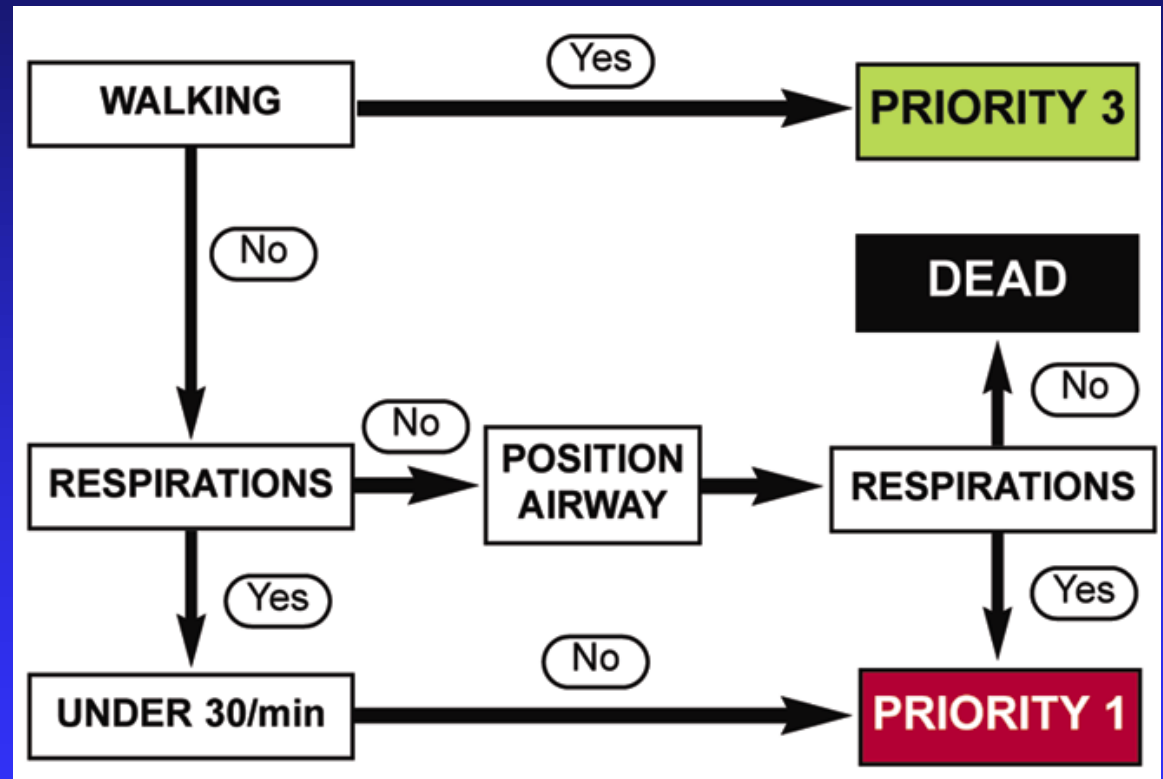
DEAD	1	2	3	4	5	6	7	8	9	10
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Triage Tags

Nº 565989		Nº 565989	
EVACU-AID™ TRIAGE TAG		CONTAMINATION: NO YES Circle type below   	
Respiration <input type="checkbox"/> Yes <input type="checkbox"/> No Perfusion <input type="checkbox"/> +2 SEC <input type="checkbox"/> -2 SEC Mental Status <input type="checkbox"/> Can do <input type="checkbox"/> Can't do Walk = ORIENTED <input type="checkbox"/> DISORIENTED <input type="checkbox"/> UNCONSCIOUS <input type="checkbox"/>		 	
Time	Place	SNP	Respiration
Time	Drug Solution	Dosage	
Major Injuries:		Notes:	
Destination:		Allergies:	
		Prescriptive Medication:	
		Personal Information:	
		Name:	
		Address:	
		City:	State Zip Phone:
		Male	Female Age Weight:
DECEASED		DECEASED	
IMMEDIATE		IMMEDIATE	
DELAYED		DELAYED	
MINOR		MINOR	

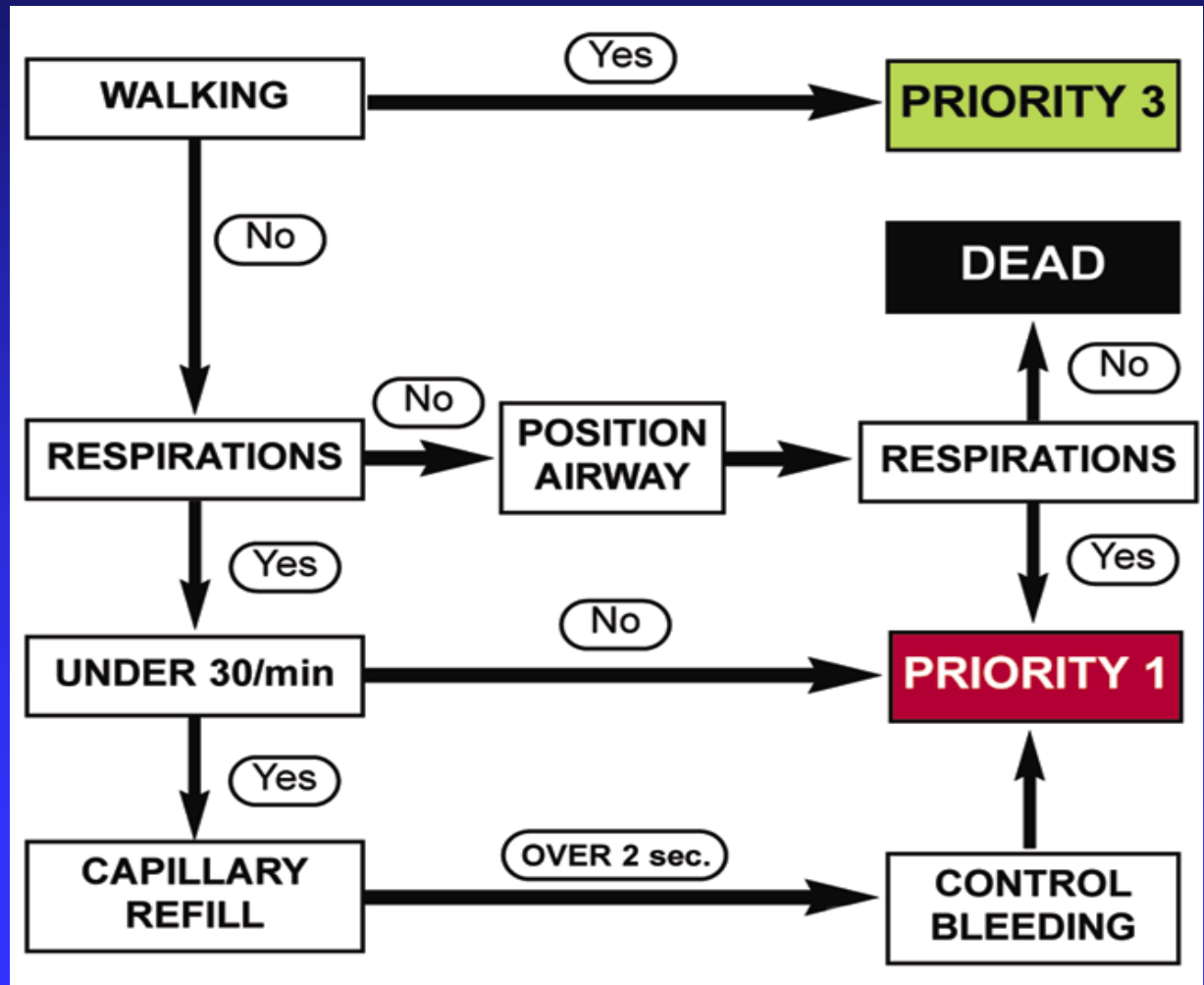
Primary Triage

- Airway
- Breathing



Primary Triage

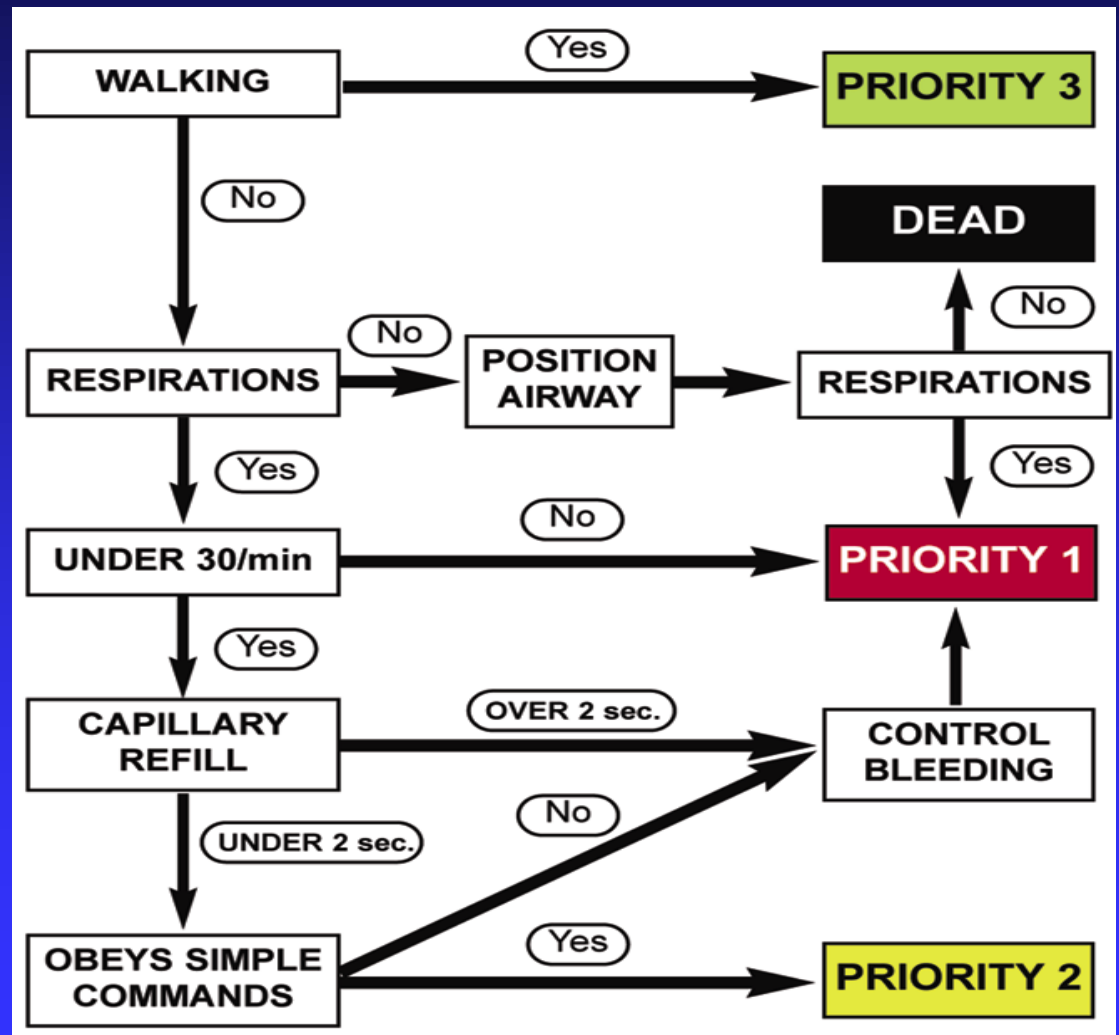
■ Circulation



Primary Triage

- Mental Status

- GLASGOW
COMA SCORE



Victims

- Female, 30's, walking
- Female, teens, walking, pale, complaining of severe abdominal pain
- Male, teens, walking, confused
- Male, teens, you open airway, does not breathe
- Male, 20's, unconscious, breathing, RR 36, radial pulse absent
- Male, 20's, holding left ankle, cannot walk, RR 20, CRT 1, responds to instructions

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NiteClub Rhode Island, US

Feb 2003

- 100 fatalities
- 230 people were injured
- 132 escaped uninjured.

Mass Casualties

Over 60 Intubated Patients in Brown U ED
40 Ventilator patients transferred in first 4-6
Hours

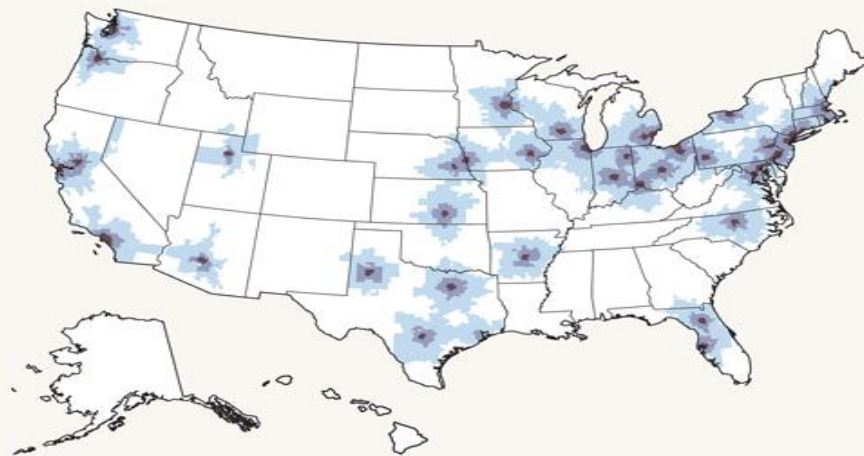
50 Burn Pts Transferred in first 8 hrs

Burn Resources in the U.S.

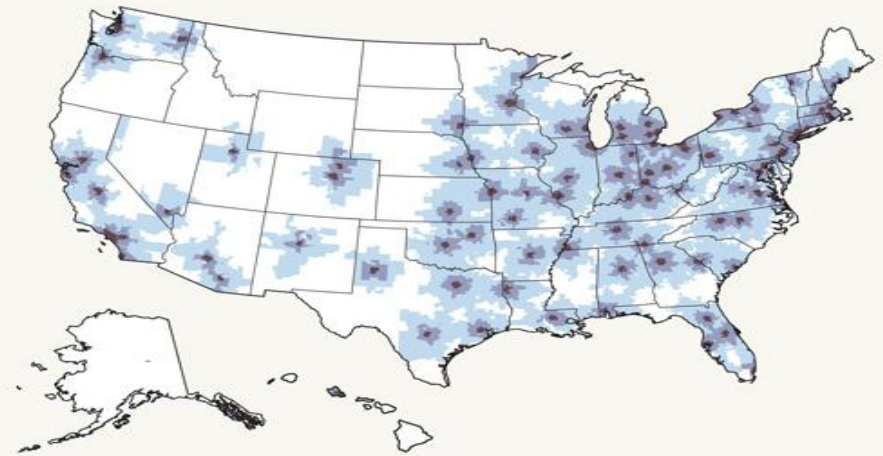
- Just over 100 facilities
- Only 200 open beds at any time
- It only takes a few to make a burn disaster

Ground transport service areas for US burn centers

A Verified burn centers



B All burn centers



Travel time

■ ≤1 h

■ ≤2 h

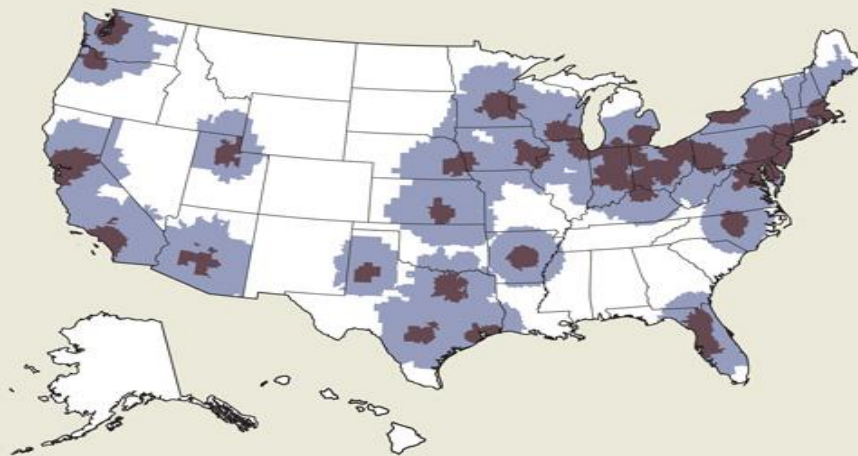
■ ≤4 h

0 250 500 750 1000

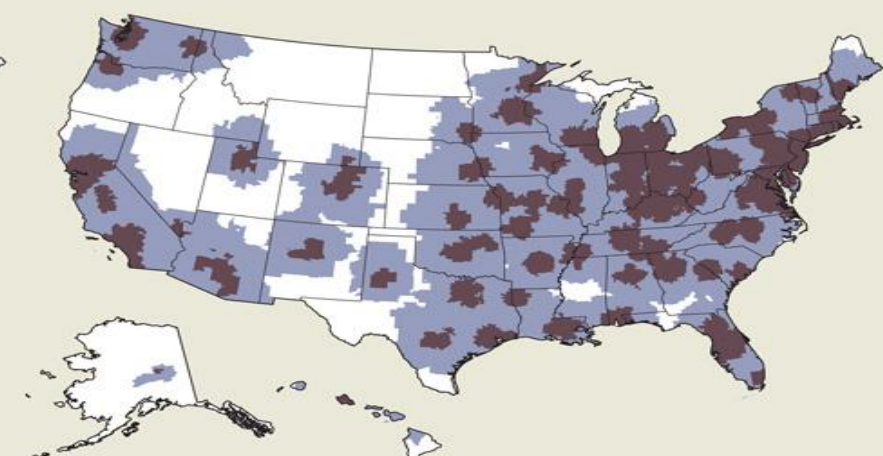
Miles (continental United States)

Rotary air transport service areas for US burn centers

A Verified burn centers



B All burn centers



Travel time

■ ≤1 h

■ ≤2 h

0 250 500 750 1000

Miles (continental United States)

Burn MCI

- Bali Nightclub 2002
 - ◆ Over 200 killed
 - ◆ Additional 250 injured
 - ◆ All burn beds filled in Australia



Triage Decision Table

Benefit-to-Resource Ratio
Based on Age & Total Burn Size

Age/ years	Burn Size (%TBSA)									
	0 – 10%	11-20%	21-30%	31-40%	41-50%	51-60%	61-70%	71-80%	81-90%	91+%
0-1.99	High	High	Medium	Medium	Medium	Medium	Low	Low	Low	Expectant
2-4.99	Outpatient	High	High	Medium	Medium	Medium	Medium	Low	Low	Low
5-19.9		High	High	High	Medium	Medium	Medium	Medium	Medium	Low
20-29.9		High	High	High	Medium	Medium	Medium	Medium	Low	Low
30-39.9		High	High	Medium	Medium	Medium	Medium	Medium	Low	Low
40-49.9		High	High	Medium	Medium	Medium	Medium	Low	Low	Low
50-59.9		High	High	Medium	Medium	Medium	Low	Low	Expectant	Expectant
60-69.9	High	High	Medium	Medium	Medium	Low	Low	Low	Expectant	Expectant
70+	High	Medium	Medium	Low	Low	Expectant	Expectant	Expectant	Expectant	Expectant

Common in most burn MCI

- Up to 40% of casualties
- 50% discharged from ED
- Mortality 5%

EMS considerations

- Terrorism Commonly Has Secondary Devices Targeting Rescuers
- Stage Vehicles Uphill And Upwind



Disposition from scene

- Severe: to burn center
- Moderate: local care facilities
- Minor: any care facility

What does this really mean?

- If burn > 20% and/or inhalation injury, this is severe.
- All others can be triaged again at hospital

Summary

- Mass Casualty require
 - ◆ Change in EMS providers approach
 - ◆ Ability to apply limited resources effectively
 - ◆ Organization, coordination, communication
 - ◆ Appropriate distribution to definitive care
 - ◆ After action evaluation

System Notification/Activation of Emergency Preparedness

- Classified disaster → earthquake, tornado, accident, Terrorist attack
- Notify by radio/pager
- Utilize telephone tree to call staff in
- INCIDENT COMMAND CENTER initiated**



Hospital Role

- 👨‍⚕️ **Commander**
- 👨‍⚕️ **Triage officer**
- 👨‍⚕️ **Medical command physician**



ID ME

Triage	Description	Color
Immediate	Respirations are present, very serious injury that can be fixed quick with out a lot of resources	RED
Delayed	Can wait to be treated for hours to days, dislocations, minor fractures	YELLOW
Minor	“walking Wounded”, cuts, minor wounds	GREEN
Expectant/ Deceased	Not breathing, Massive Head trauma, would take massive resources away from many others to save one	BLACK



Biотerrorism



UAB Center for Disaster Preparedness Director Thomas Terndrup (left) and a team of specialists are addressing the threat of bioterrorism on many fronts. Pictured in the foreground are (clockwise from Terndrup) Bryan Fields, Bryan Breland, Nick Hill II, Shannon Stephens, Charles Turnbough, Margaret Tresler, John Kearney, Sarah McNutt, John Moore, and (center) Stephen Becker. Standing in the background are (left to right) Wayne Littrell, Randall Agee, Shawn Rankin, Jim Walker, and Rod Wilkins.

Types

- 3 major types
 - ◆ Biological
 - ◆ Chemical
 - ◆ Radiation
- 3 minor types
 - ◆ Eco terrorism
 - ◆ Narcotic trafficking to fund terror
 - ◆ Cyber-attacks civilians to draw notoriety to cause

Biological

■ 3 categories

◆ A: high priority

- ◆ easy to spread person to person
- ◆ High death rate
- ◆ Require special action

(anthrax, botulism, plague, smallpox, hemorrhagic fever, tularemia)

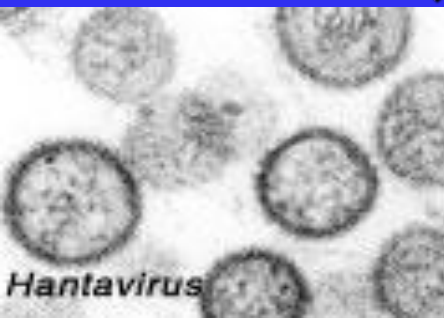
◆ B: second highest priority

- ◆ Moderately easy to spread
- ◆ Moderate illness
- ◆ Low death

(Salmonella, e coli, Q fever, Ricin toxin, etc)

◆ C: third highest priority

- ◆ Easy available
 - ◆ Easy produced
 - ◆ Potential for high death and major health impact
- (hantavirus)



Chemical

- Hazardous chemical released
- Many are industrial
- Some created by military
- Some found in nature

Chemical

■ Types

- ◆ Biotoxins (poison from plant or animal)
- ◆ Blister agents (lewisite, sulfur mustard, nitrogen mustard, etc)
- ◆ Blood agents (hydrogen cyanide, cyanide chloride)
- ◆ Caustics (acid)
- ◆ Choking agents (chlorine, phosgene, etc)
- ◆ Incapacitating agents
- ◆ Long acting anticoagulants
- ◆ Metals
- ◆ Nerve agents (VG, VM, sarin, soman, etc)
- ◆ Organic solvents
- ◆ Riot control agents (tear gas)
- ◆ Toxic alcohols
- ◆ Vomiting agents



Chemical

■ Possible treatment

- ◆ Give antidote if available and if known agent
- ◆ Administer O2
- ◆ CPR
- ◆ Flush eyes
- ◆ DO NOT induce vomiting
- ◆ Take off clothes and wash skin immediately

Radiation

■ Types

- ◆ Dirty bombs
- ◆ Contaminating food water sources
- ◆ Explosion or meltdown at nuclear plant

- ◆ Exposure to radiation is affected by time, distance, and shielding

Radiation

- Possible treatments
- Burn unit
- Possible anticoagulants
- Antibiotics to prevent infection
- Pain management
- Corticosteroids
- surgery
- Psychological support

<http://www.bt.cdc.gov/radiation/crphysicianfactsheet.as>

Radiation Decontamination

- Triage outside the hospital
- Cover floor and use strict isolation precautions to prevent the tracking of contaminants
- Seal air ducts and vents
- Waste is double bagged and put in a container labeled radiation waste
- Staff protection
 - ◆ Water-resistant gowns, 2 pairs of gloves, caps, goggles, masks, and booties

Levels of PPE

- A: highest level for skin, eyes, mucous membranes, and respiratory system
- B: Chemical protective clothing used instead of the fully encapsulated suit
- C: Full face piece with air purifier and chemical resistant clothing
- D: regular clothes

LEVEL A



LEVEL B



LEVEL C



LEVEL D



Decontamination

- Removal of contaminating material
- Areas:
 - ◆ Hot Zone: highest contamination
 - ◆ Warm Zone: contamination reduction corridor
 - ◆ Cold Zone: support zone
- Steps: disrobe completely, step in shower, lather completely including creases, dry off, then dress in hospital gown and go to cold zone

Blast Injuries

- Most severe injuries are to lungs
- Other things include ear drum perforation, bowel perforation, lacerations

Psychological Effects After a Disaster

- Provide active listening and emotional support
- Discourage repeated exposure to media regarding the event
- Encourage return to normal activities and social roles



The point is
to save as
many as you
can



MASS CASUALTY



UAB Center for Disaster Preparedness Director Thomas Terndrup (left) and a team of specialists are addressing the threat of bio-terrorism on many fronts. Pictured in the foreground are (clockwise from Terndrup) Bryan Fields, Bryan Breland, Nick Hill II, Shannon Stephens, Charles Turnbough, Margaret Tresler, John Kearney, Sarah McNutt, John Moore, and (center) Stephen Becker. Standing in the background are (left to right) Wayne Littrell, Randall Agee, Shawn Rankin, Jim Walker, and Rod Wilkins.