

# Rural Hospital Preparedness and Response to Multi-victim Events

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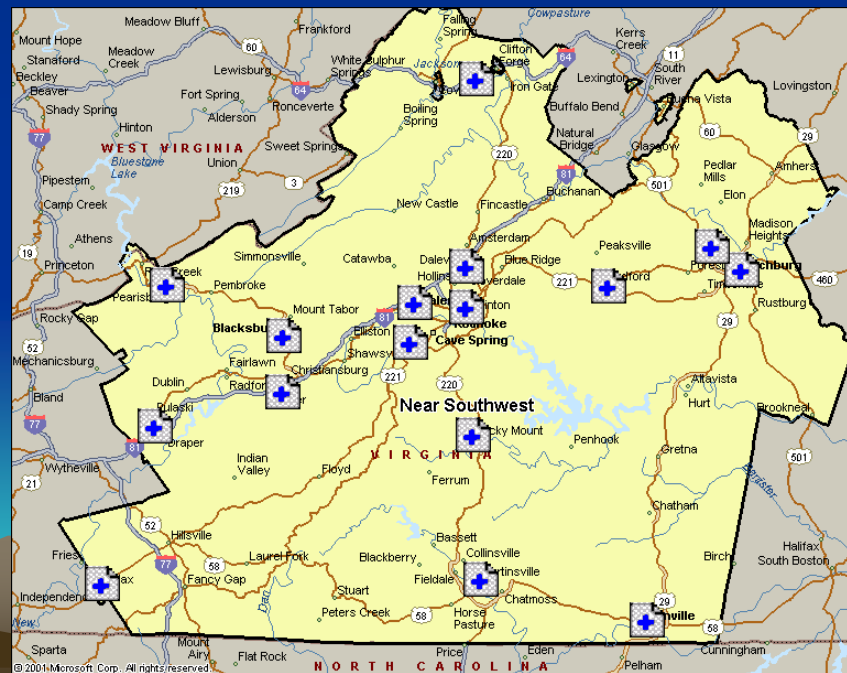
# A warm and pleasant evening in August

- A lone gun man kills one and critically wounds another before escaping and running towards the main Virginia Tech campus in Blacksburg.
- The campus goes onto lockdown
- Hours pass before the situation is clarified...



# Virginia Tech – April 16

- Campus located in Blacksburg Virginia
- Day of shooting cold and extremely windy
- Closest two hospitals level III trauma centers



# Incident

- First contact: sick individual in dormitory
  - Responding EMS units identified 2 critically injured individuals
  - Transported 2 individuals with GSW to level III center
    - One died at level III
    - One transported to Level I - died shortly after arrival



# Incident

- Gunman in lecture hall
  - SWAT teams respond
  - EMS agencies respond
    - Back-ups to EMS agencies
    - Wind prohibited air response- teams sent by ground
  - RHCC in situ response
  - Area hospitals implement ICS and disaster plans



# Incident

- Some victims self extricate and begin to arrive at closest hospital
- Gun man is killed (self inflicted GSW)
- Patients are extricated and transported
  - 25 patients survived to hospital
    - Most penetrating
    - Two head wounds to level one
    - Two abdominal wounds level three
    - Orthopedic injuries to level three



# Response

- Pre-Hospital
  - 14 agencies
  - 27 ALS ambulances
  - >120 EMS personnel
- ICS implemented
- Five Hospitals



<b>Montgomery Regional Hospital</b>	<b>(Level III)</b>
GSW L Hand fx finger	OR and admit
GSW R Chest hemothorax	Chest tube in OR admit
GSW R flank	OR ICU admit
GSW elbow thigh	Admit
GSW x 2 leg	OR admit
GSW arm graze chest wall	Admit
GSW femoral artery	OR ICU
GSW abdomen and buttock	OR ICU
GSW bicep	Treat DC
GSW face hand	Transfer to RMH
Asthma attack	Treat DC
Fx tib fib related to jump	OR admit
First degree burns to chest wall	Treat DC
Back Pain related to jump	Treat DC

<b>New River Valley (Level III)</b>	
GSW Face head	Cricothyrotomy transfer to RMH
GSW flank R arm	OR small bowel resect admit
GSW chest arm buttock thigh	OR open femur
GSW thigh	Admit

<b>Lewis Gale Hospital (Undesignated)</b>	
GSW shoulder graze, lodged in occiput without entry to cranium	OR Debridment
GSW R arm	Admit Observe
GSW shrapnel spray to hair	Treat Release
Soft tissue injuries related to jump	Treat Release
Fx tib fib related to jump	OR next day

RMH (Level I)	
GSW head	Died in ED
GSW head and jaw fx	OR transfer to facility closer to home
GSW head and face	OR

Community (undesignated)	
Ankle contusion from jumping (delayed self referral)	Treat and release



# Timeline

- 0721 Pt fallen out of bed
- 0946 Rescue dispatched to Norris hall –”multiple shootings
- 0950 ERT arrives tactical medics begin triage
- 1009 “Shooter down” may enter hall
- 1051 triage complete and all live patients transported
- 1603 Transport of dead from Norris hall to Roanoke approx 40 miles away
  - 33 dead identified over next 3 days

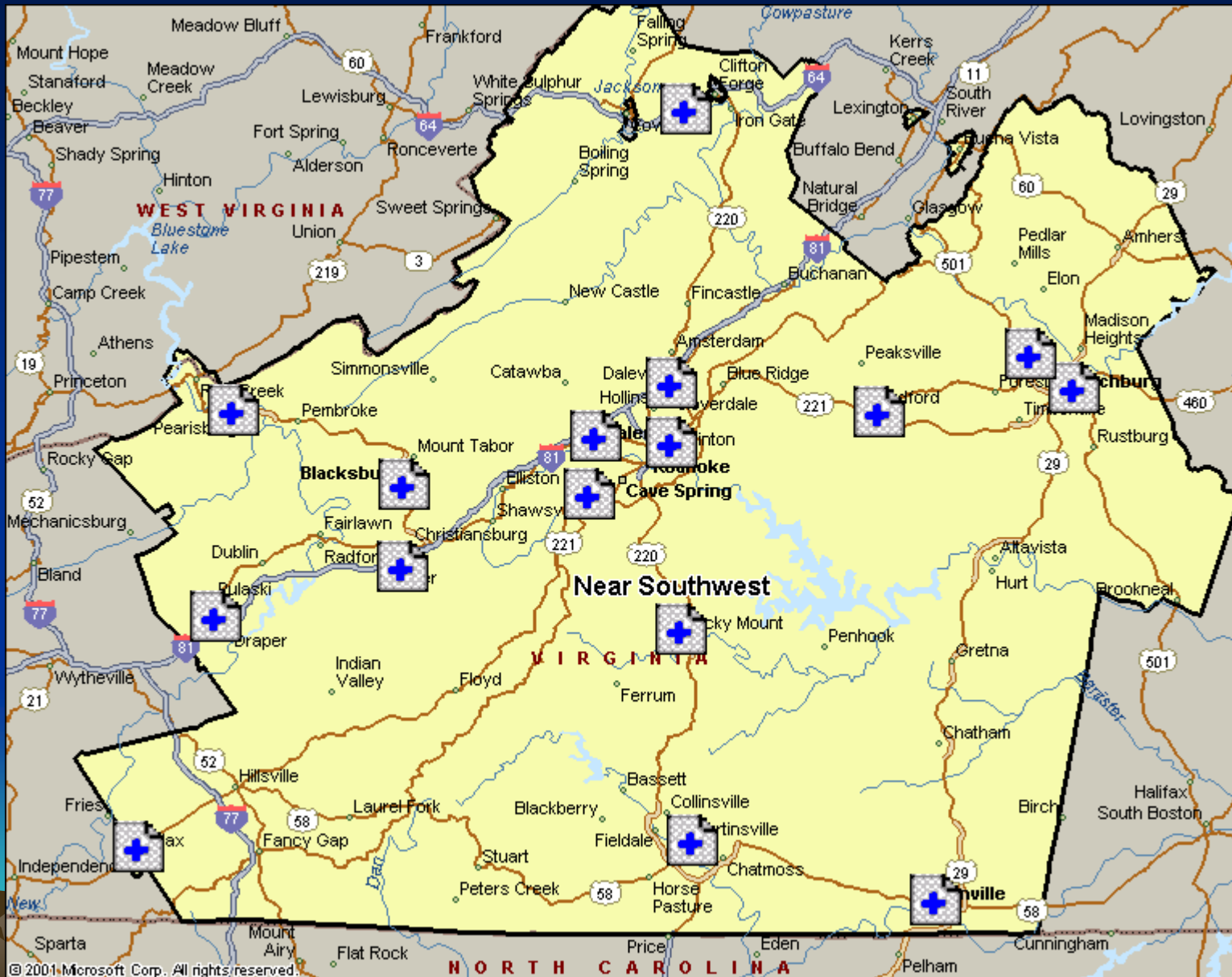


# Background

- Near Southwest Preparedness Alliance
  - Formed in 2002
  - Designated by VHHA as coordinating group for 16 hospitals
    - Trauma centers
      - 1 level I
      - 1 Level II
      - 2 Level III
    - 1 Veterans administration hospital
    - 2 Critical access hospitals



# Regional Planning



# NSPA Activities

- Coordination of disaster preparedness activities among regional hospitals
  - Standardization of equipment
  - Training opportunities
- Maintain regional hospital coordination
  - Development of regional hospital disaster plan
  - RHCC management – regional healthcare control center

# RHCC Management

- Phased activation
  - In situ
  - Fixed location
  - Mobile with or without fixed location
- Web EOC
- Tiered response
  - Hospital to hospital
  - RHCC's in state
  - ESF 8 chair at State EOC



# Close involvement with EMS

- Geographic area includes two EMS regions
- NSPA partners with regions in many areas
  - Training
  - Co-location of offices
  - Cooperative funding projects



# Mass Casualty Response – Conventional Weapons

- Original HRSA/ASPR grant required capability to accommodate 50 major burns or trauma patients.
- Assumptions
  - Presence 50 major patients implies up to 5 times as many less severely injured
  - Trauma center resources will be used best if minor /moderate injuries handled in smaller hospitals
  - Regional response to trauma will be inclusive

# Inclusive Response

- TICP – Trauma Injury Cooperative Program
  - Co-operation with State OEMS trauma committee
- Regional equipment caches available to all hospitals
  - Coordinated by RHCC
  - Mobile medical assets
    - STIP – Stabilization and Treatment in Place
    - Mobile command center



# Regional Response

- RHCC *in situ* activation
  - Notified State OEMS
  - Activated web EOC
  - Verbal communications with hospital
  - Communications with site itself very limited
  - STIP on stand-by
  - Media interaction
  - Debriefing



# Improvements

- Communication
  - with scene especially
  - EMS to hospitals
  - Cell phones not working
    - System busy
    - Architecture prevent cell phone use under best of conditions
    - Site communication interoperability
- Patient identification and tracking
- Family assistance and outreach
- Media management



# Disaster Stages

- Hospital
  - Undefined: incident known but not the extent
  - Defined: incident and full impact known



# Stages – pre hospital

- Chaotic:
  - Prior to EMS arrival
  - Minor injuries leave
- Reorganization
  - EMS establishes control
  - *Undefined phase* for hospitals



# Stages – pre hospital

- Site clearing
  - Patients sorted and removed
  - Duration depends on entrapment
  - *Hospital phase – defined*
- Late phase
  - 24 to 48 hours
  - People realize they have minor injuries



# Overtriage

- Critical mortality: patients who are admitted who are critically ill who go on to die
- Critical mortality is directly related to proportion of overtriage

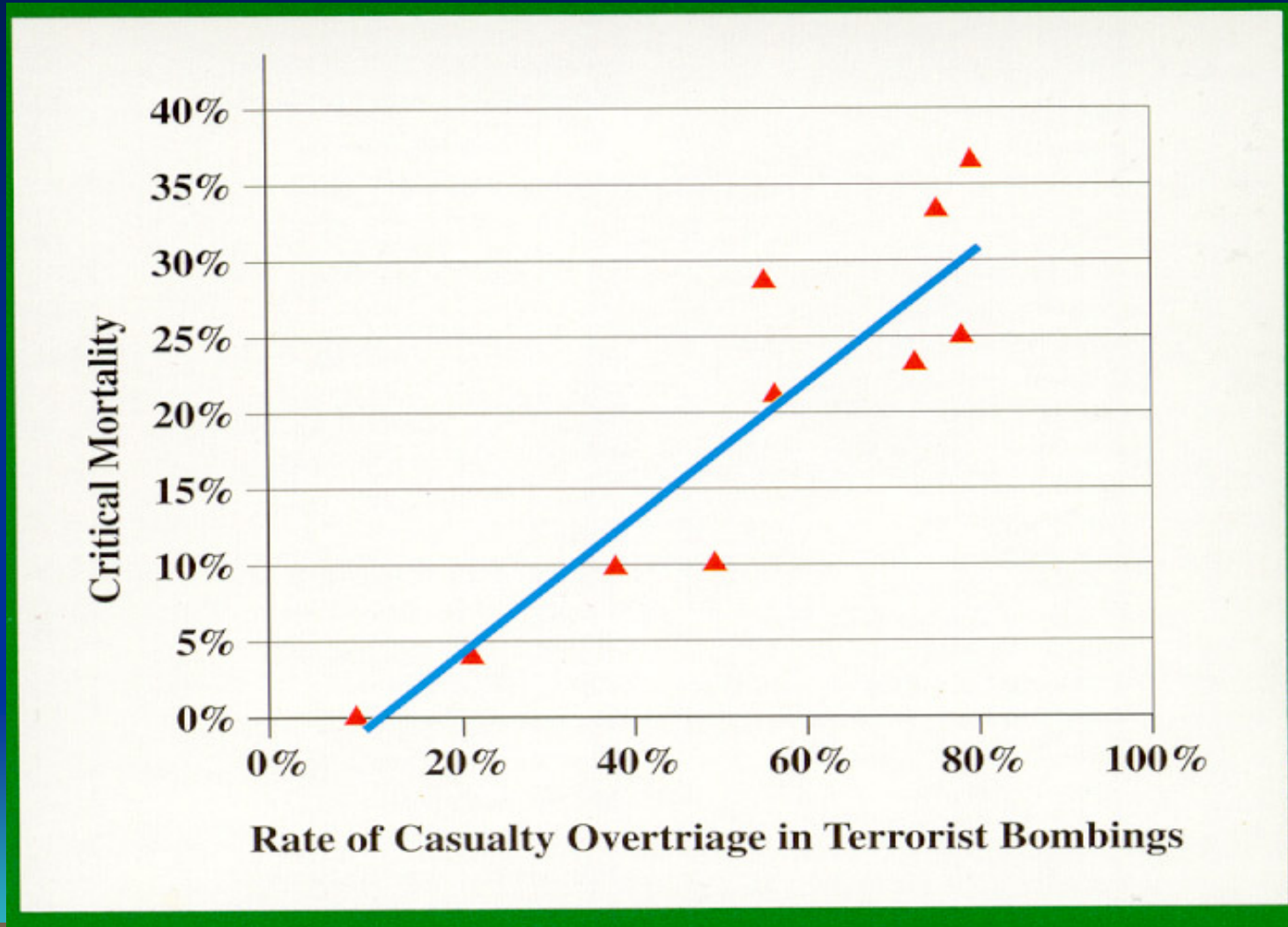


# Overtriage and resource consumption

- Overtriage leads to resource consumption
- Delay treatment of all but the sickest patients until incident is defined
- In wartime situations the international red cross reports that up to 70% of civilian wounded survive a week without care



# Critical Mortality and Overtriage



# Rural Disaster Planning

- Rural areas are not perceived as targets
  - Not always correct: Targets are where terrorists identify messages of importance
    - 1992 Aum Shinrikyo – Matsumoto Japan – Sarin
    - 1980 The Dalles Oregon – Salmonella
- Small targets population spread over wide geographic area
- Access to all resources requires widespread participation and planning



# Good news

- Importance of establishing and developing formal and informal relationships prior to event
- Training
- Funding
- Capacity – without going to another level another 50 patients could have been handled immediately
- Timing of incident was optimal



# Moving Forward

- Continue to focus on unique issues associated with rural systems
- Regional and state infrastructure
- Focus
  - Alternate care sites
  - Mobile medical assets
  - Fatality management
- Train, train, TRAIN

