Emergency Preparedness: Surge capacity, all-hazards, and the Republican National Convention

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Background

- Minnesota Department of Health
  - Supporting the Republican National Convention

- Surge Capacity Models
  - Rand Study
  - Interest in validating surge capacity models
Homeland Security Exercise Evaluation Program

HSEEP Mission

The Homeland Security Exercise and Evaluation Program (HSEEP) is a capabilities and performance-based exercise program that provides a standardized methodology and terminology for exercise design, development, conduct, evaluation, and improvement planning.

The Homeland Security Exercise and Evaluation Program (HSEEP) constitutes a national standard for all exercises. Through exercises, the National Exercise Program, supports organizations to achieve objective assessments of their capabilities so that strengths, and areas for improvement are identified, corrected and shared as appropriate prior to a real incident. To learn more about the HSEEP program, click on the About HSEEP tab listed above.

The HSEEP is maintained by the Federal Emergency Management Agency's National Preparedness Directorate, Department of Homeland Security.
Homeland Security Exercise Evaluation Program

- Design team at MDH

- Documentation
  - ExPlan
  - AAR/IP
  - Shared and adapted
Exercise Design

- Engaged Partners, Including Individuals From:
  - CST
  - Military LRN Laboratory
  - US Postal Inspection Service
  - FBI
  - Regional Public Health Surveillance Team
  - State Public Health Preparedness Team
  - BioWatch

- Followed HSEEP ‘Functional Exercise’ Plan
  - Laboratory was the sole focus, partners gave support, but were not included in the evaluation
Multi-State Planning

- Conference calls with other potential participants (FL, MI, NC)
- Design team at other states
- Conference calls to determine logistics
  - Wanted to be able to compare apples to apples
  - Some scope creep at other locations
- Sharing of documents
Exercise Design

- 3+ day exercise
  - Day 1: 5 unknown environmental samples
  - Day 2: 100 environmental swabs for *B. anthracis* PCR and Culture
  - Day 3: 100 environmental swabs for *B. anthracis* PCR and Culture
  - Day 4+: read cultures, finish confirmation, results reporting
Assumptions

- Exercise design a little different at each location
- 8 hour work day
- Ordered extra supplies
- Most staff knew about the exercise
  - Michigan did not know
- Staff is prepared
Sample logistics

- Various methods were used for sample prep
  - Powders were not spiked until in the lab
  - Spiked sample suspension substituted for white powder suspension just prior to testing
  - Surfaces swabbed, then swab dipped into *B. anthracis* Sterne strain suspension, then placed into transport medium
  - Unknowns and swabs were prepared 1 day before exercise – viability not an issue
Surge Capacity Model

- Staffing
- Equipment
- Time
- Want to compare # staff used, equipment used, etc
- Doesn’t consider organism
Process for Unknown Environmental Samples - MN
All-hazards testing

- Teams
  - One micro
  - One chem
- Clean person
- Pictures
- FTIR
- Split samples (PCR, TRF, Micro, and chem)
- Reams of paperwork per sample!
- Require field Rad and explosive screen
Process for Unknown Environmental Sample - MI, FL & NC

- Bio only
- Multi-agent panel and culture
- Require various degrees of chemical, radiological and explosive screening from HazMat or FBI
Minnesota Department of Health

- July 14-18, 2008
  - 5 day event
    - Day 1: 5 Powders
    - Day 2: 100 Swab samples
    - Day 3: 100 Swab samples
    - Day 4: No new samples
    - Day 5: Clean up
Minnesota: 5 Powder Samples

- **Staff**
  - 1 paperwork, administration, lead controller, observer, timekeeper
  - 11 Laboratory staff
    - 4 two person teams for sample opening and processing
    - 2 extraction/PCR
    - 1 TRF
    - 1 Culture reading
  - 12 total staff

- **Equipment**
  - Magna pure compact (2 runs)
  - ABI 7500 fast (2 runs)
  - Lightcycler (confirmatory)
  - Victor 2
  - 4 BSC’s
Findings: Minnesota
Time to process unknown samples

- 5 unknown samples
  - Login and Chain of custody: 2.5
  - Processing (5 - 2 people teams): 12.5
  - Extraction (2 people): 3.0
  - PCR prep: 1.5
  - Interpret results (add run time): 2.5
  - Results reporting (RM): 2.5
  - Total PCR: 24.0 Hours

- TRF (6 hours)
- PCR Confirmation on day 1 (2 hours)
- Culture confirmation on day 2 (1 hour)
- Additional time was used for meetings throughout the day (1 hour)

- Grand total = 34 hours
Minnesota: 100 Swab Samples

- **Staff**
  - 1 paperwork, administration, lead controller, observer, timekeeper
  - 8 Laboratory Staff
    - 2 two person teams for sample receipt and processing
    - 2 extraction/PCR
    - 2 culture reading
  - 9 total staff

- **Equipment**
  - Magna pure compact
    - 64 samples (8 runs)
  - Manual Spore Extraction
    - 36 samples
  - ABI 7500 fast (4 runs)
  - 4 BSC’s
Findings: Minnesota
Time to process swab samples

- 100 swab samples
  - Login and Chain of custody: 1.5 hours
  - Processing (2-2 people teams): 4.0 hours
  - Extraction (2 people): 17.0 hours
  - PCR prep: 2.5 hours
  - Interpret results: 5.0 hours
  - Results reporting (RM): 10.0 hours
  - Total PCR: 40.0 hours

- Culture
  - Culture set up: 1.0 hour
  - Culture reading (2 person team): 3.0 hours
  - Culture confirmation: 2.0 hours

Grand total: 46 hours
Summary of findings in MI, FL, and NC

- Similar findings in MI and FL
- NC staff of only 2! Limited testing ability!
- Michigan tracked cost = ~$7200
- Florida used automated equipment
  - MagNa Pure LC
  - Utilized full robotics
- North Carolina tested BDS cartridge
Michigan
Rough Cost Estimate*

- Culture: $413
- PCR: $5705
- Misc supplies: $1098

Grand total: $7216

*Does not include personnel costs
NCRRL - Pitt County
Staffing = 2
Findings: North Carolina Summary

Based on Data Collected and Review of Workflow:
- Unknown sample capacity ~ 3 letters/day/2 person team
- Swab sample capacity
  - LightCycler is largest limiting factor (2 runs/each letter if processed individually)

<table>
<thead>
<tr>
<th>Process</th>
<th>8 HOURS</th>
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<tr>
<td>Processed and queued for cell lysis</td>
<td>30</td>
</tr>
<tr>
<td>Processed through DNA Extraction</td>
<td>21</td>
</tr>
<tr>
<td>Completed through PCR</td>
<td>10</td>
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</tbody>
</table>
Lessons Learned
What Went Well

- Staff
  - 2 people teams

- Communication
  - Meeting prior to sample receipt and daily once things started
  - Spread sheet from CST with all sample information that could be jumped to MDH
Lessons Learned
What Went Well

Automation
- Tube roller for hands-off external lysis
- Roche MagNA Pure Compact
  - Automated DNA extraction for 8 samples (30 min)
- Roche MagNA Pure LC
  - Automated DNA extraction for 32 samples (90 min)
  - Robotic pipetter
    - Loaded master mix into 96 well PCR plates
    - Loaded samples into PCR plates
Lessons Learned
Limitations - Safety

- Acknowledging Safety Concerns
  - PPE
    - Storage and Re-use of Respirators
    - Biosafety Risk to Staff and Submitters
  - Glovebox Decontamination
  - Processing in BSL-2 w/ BSL-3 practices
- Removing paperwork from BSL-3
Lessons Learned
Limitations - Data Handling

- Data handling *VERY* time consuming
- IT needs in BSL-3
  - Need computers in every room for documentation and to reduce paperwork
  - Networking would allow PCR and TRF reports to be printed outside BSL-3 suite
Lessons Learned

Limitations

- Prioritization of multiple samples
- Space limitations – Incubator, BSC,
- More supplies needed in BSL-3 (vortex, racks, tubes, etc)
Rate Limiting Step

- DNA extraction instruments proved to be rate-limiting step
- Staff was rate-limiting factor in NC
HSEEP AAR/ IP

- Develop a written document that reflects lessons learned and improvement actions
- Complete document in a timely manner
- Implement change
- Retest
Parting Thoughts

- Safety must be first and foremost
- Easily scaled up or down
- Modify staff schedule to optimize efficient work flow
- Cross-training is critical for laboratory surge capacity
- Automation increases sample throughput and reduces both operator fatigue and operator error
- Rotate duties to alleviate repetitive stress injuries
Parting Thoughts

- What if this was not *B. anthracis*?
- Do you really have enough BSC’s for plate reading *and* sample processing
- How long could you really do this???
Value of Exercises

- Novel A/H1N1
  - Knew PCR capacity
  - Set delivery times to allow for batching samples
  - Automation
  - Documentation
  - Communication
Republican National Convention

Planning and Response Roles for an LRN Laboratory

- Convention statistics
- Planning, planning, planning
- Early preparations
- Selected planning groups
- Federal assets and operation centers
- PHL role and responsibilities
- BioWatch
- Unknown environmental samples
- Lessons learned
- Recommendations
Convention Statistics

- September 1 – 4, 2008
- Xcel Center – St Paul
- Delegates (including alternates) – >4,500
- Conference staff/media – 45,000
- Law Enforcement -- 4,000
  - Mounted horse patrols
  - Bicycle cops
  - MiniVan Squads
- Protesters – 15,000
  (~7% were extremists)
The Facts

- 50,000 protestors marched
- 818 arrests
  - 40 to 50 were media
  - 25 felony or gross misdemeanor charges
  - 2 lawsuits
- Police used tear gas, pepper spray, smoke grenades with tear gas, rubber and foam projectiles, and flash bangs (percussion bombs) for crowd control
Early Preparations—Public Health

- Identify planning groups and roles
- Review, revise and exercise plans
- Memoranda of understanding and mutual aid agreements for local jurisdictions
- Asset inventory
- Operations center staffing
- Calls to previous convention cities and the PHL’s
Pre-event Laboratory Preparation

- Update plans
- Surge Capacity Exercise
- Training
- Supplies
- Communication
- United States Secret Service meetings
DHS designated the RNC as a National Special Security Event

- Based on the number of dignitaries, size of the event, and its significance
- Examples: inaugurations, state funerals, super bowls, political conventions.

Secret Service becomes the lead agency for security planning at the event
17 official subcommittees co-chaired by USSS
- *Health/Medical/EMS*
- *Hospital subgroup*

*MMRS*

*Public Health Integrated Planning*

Multijurisdictional Event Committee

Metro EMS

*State Agency Group*
Federal Assets: FBI

- 400 additional agents, scientists, technical support
- Including the Hazardous Materials Response Unit (HMRU) from Quantico, Virginia
  - Full HMRU capabilities (bio, chem, rad)
- 800 cameras watching the area
- 11 Federal/State arrests with respect to WMD (all Molotov cocktails)
Federal Assets: Civil Support Team

- Teams from MN, ND, Iowa.
  - Select members from WI, AK, MD, MO, SD, etc.
  - MN onsite 24/7 at the venue
  - All other teams assisted local hazmat

- Exercise with CST Prior to RNC
  - 5 Samples; 100 Swabs
Federal Assets: HHS and CDC

- 30 to 40 staff at the request of Secret Service
  - Strategic National Stockpile (SNS)
  - Chempack
  - Disaster Medical Assistance Team
Federal Assets: EPA

- EPA Region 5 (Chicago)
  - Searchable LC/MS/MS library
  - Drugs of abuse, pesticides, select pharmaceuticals

- National Decontamination Team (Cincinnati)
  - Dedicated to WMD Decon
  - Bio, Chem, Rad
  - Responsibility (RNC venue, Outside the venue, Training)
  - Training: Bio, Chem, Rad field equipment demos; Table top workshops included 3 scenarios
    - Dirty bomb near the convention center
    - Anthrax at the state capitol
    - Pesticide Fire
Operations Centers

- Health & Medical Joint Operations Center
- State Emergency Operations Center
- Multi Agency Communications Center
- Mobile Medical Unit
- Multiple Casualty Incident (MCI) Bus
- Communication Network & Systems
PHL Roles and Responsibilities

- Increased environmental monitoring
  - Biowatch
  - Unknown environmental samples
- Increased disease surveillance
- Large number of extra food/beverage/lodging inspections—many temporary staff
- Preparations for medical care surge
- Preventive measures for crowd health
- MNTrac—resource tracking, pre-hospital care, and real-time communications
LRN (PHL) Activities

- Biowatch
- Unknown sample analysis
- Daily Communication
- Possible Phase 1 sampling
- Increased food borne disease surveillance
Staffing

- Increased on-call staff
  - Paid 27 staff as on-call for 1 week
    - 1 BT person
    - 1 CT person
    - 1 Molecular person
    - TRF Staff on standby

- Created shifts and jobs 20 hours per day

- Always a MDH-PHL staff on-site with BW staff

- Labor day weekend, first week of school
MDH-PHL role in BioWatch

- **Outside monitors**
  - Network remained the same
  - No additional monitors
  - Sampling once a day

- **Inside the venue monitors**
  - First estimate 60+ monitors 3 times a day!!!
  - Reality = 16 monitors - 3 times a day
  - Times not specified until shortly before convention

- Difficult to get details nailed down
Staffing Biowatch

- Switched to Bioplex in June
- 2 new staff with only bioplex training
- 1 state staff with experience in both biowatch platforms
- Staff 3 shifts of biowatch 24/7
  - 2 staff on during day shift
- Flexible shifts!!!
BioWatch Challenges

- Communication
- Request to switch back to Real-Time PCR
- Equipment
BioWatch Challenges

- Request to switch back to Real-Time PCR
- Calls, calls, calls
  - Lab director, biowatch staff, MDH staff and more...
- Information gathered in the night...
- Decided to try to make the switch
- ABI 7000 would not resuscitate
- First samples arrived at noon
- Ah ha moment
- Everything all good
Biowatch samples cross the threshold!

- Machines calibrated and QC’d, but not happy
- Many confirmatories, nothing positive
- LLNL sent new ABI 7000 on Tuesday
Unknown Environmental Samples
Process for Unknown Environmental Samples

- Teams
  - One micro
  - One chem
- Clean person
- Pictures
- FTIR
- Split samples (PCR, TRF, Micro, and chem)
- Reams of paperwork per sample!
Sample 1

- Frozen item from the backpack of a protestor
- Rec’d from the Secret Service
- Suspected fecal material
Sample 1
Sample 1

- Fecal coliform negative (not mammalian feces)
- Microbiology – no growth
- Homogenous matrix in appearance
- Under the microscope it appeared to be a processed food with a molasses type liquid on top
- Was it someone’s lunch or something to throw??
- No further testing
Sample 2

- Sample from MPLS police and fire
- Suspicious gas cylinder found in the street
- No identification, rusty bolt
Sample 2
Sample 2

- Hazmat Team loosened the bolt: a highly corrosive gas/liquid spray released
- We received liquid residue from around the bolt
Sample 2

- pH < 2
- Rad normal
- Metals - Chlorine and Iron significant
- Meth wipe on cylinder exterior - negative
- Pitted stainless steel in < 1 min on our HazMat ID FTIR
- Conclusion - possible metal etching mixture (HCl and Ferric Chloride)
Sample 2

- Contractor cylinder disposal
  - Bolt blew out is it was unscrewed
  - Yellow plume exited cylinder
  - Material auto-refrigerated

- Conclusion: Liquid chlorine not HCl/ferric chloride

- How anyone ever got the liquid chlorine in the cylinder. Was it dropped on the road by accident or to potentially cause harm
Lessons Learned

- Partnerships
- Pre-event planning
- Surge capacity exercise
- Cross training additional staff
- Staffing
Recommendations

- Establish communication with partners early and often
- Get involved early with your agency planning
- Review and revise your plans
- Exercise the system
- Talk with other PHL’s that have done this
  - Interview several people
Contact Info

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