Disaster-Recovery of the New York Citywide Immunization Registry following the World Trade Center Tragedy

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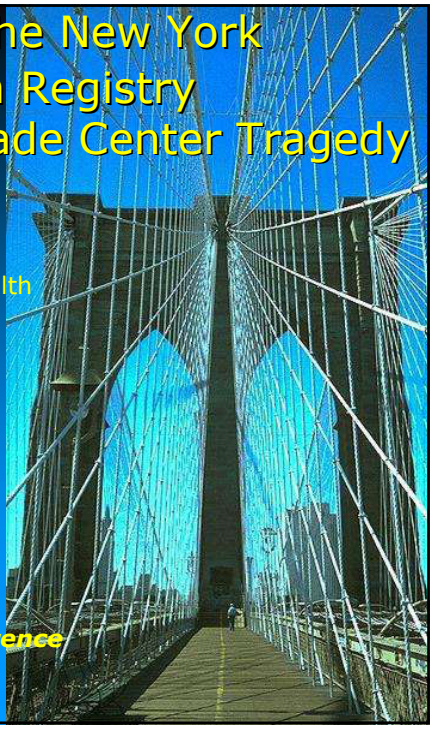


Background

Due to its proximity to the World Trade Center (WTC) tragedy on 9/11/01, the NYC Citywide Immunization Registry (CIR) had to implement a number of emergency solutions to continue normal functioning

Objectives

- To describe the problems that impacted CIR technology and provider relations due to 9/11
- To describe the solutions that were implemented in order to continue functioning despite limited resources

Background of the CIR

- Reporting mandated by NYC Health Code beginning in January 1997
- Population-based registry
  - Yearly birth cohort ~125,000 children
- Contains over 1.5 million children with over 13.4 million immunization events

Components of the CIR

Technology:

- Oracle database with server at vendor location outside of NYC (pre-9/11/01)
  - connection between NYC office to server via T1 line

Dissemination of immunization information:

- to physicians, parents. foster care agencies, WIC
  - via phone and fax
  - via online (intranet)—direct connection to server at vendor location
- to MCOs
  - via in-house batch data exchange application

CIR Projects

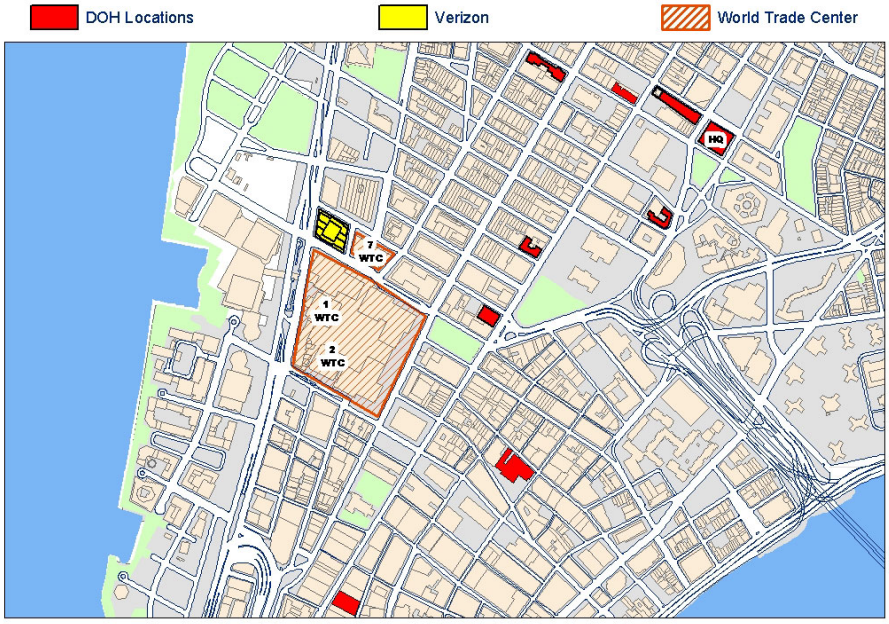
Major Current Projects:

- Integration of CIR with Lead Registry to form the Master-Child Index (a child health registry)
- Outreach to non-UTD children participating in Medicaid managed care
- Ongoing QA work, including de-duplication of CIR records in database
- Batch data exchange of immunization records to MCO's
- Moving online provider application from Intranet to Internet

CIR Staff

- 22 Core CIR staff including:
  - Provider Liaisons
  - Public Health Epidemiologists
  - Computer Specialists
  - Research Scientists
- Plus college aides (n=8)

Location of DOH Buildings and World Trade Center



Disaster Recovery Plan

- Developed in Spring 2001
- Followed DOH template
- Topics covered:
  - Emergency Contact List
  - Supporting Documents
  - Disaster Avoidance Procedures
  - Disaster Recovery Procedures
  - Vendor Contact List

Disaster Recovery Plan - con't

- Types of failure covered:
  - Partial server component failure
  - Total server component failure
  - Total server failure
  - Multiple server failure
  - Loss of physical plant
- Types of failure *not* covered:
  - Loss of communications
  - Loss of CIR office materials
  - Loss of administrative information

Challenge #1

- Loss of physical space
  - Duration: 1 month
  - Implications:
    - –Inability for program staff to function normally
    - –No access to office records, work in process
    - –Generally, no access to e-mail
    - –Transportation complications
    - –Communication with staff compromised

Solution

- Space adjustments:
  - DOH operated from temporary mid-town location
  - Vendor site in mid-town used for some meetings
  - Some staff worked from home
  - Offsite vendor software development activities proceeded routinely
  - Many staff allocated to other DOH disaster-related activities

Challenge #2

- Loss of all phone lines
  - Duration: 2+ months
  - Implications:
    - –Inability for public and providers to contact CIR
    - –Disabled dissemination of immunization information to providers and parents by telephone and fax

Solution

- Protocol changes on how providers should access the CIR:
  - To retrieve immunization information, providers and parents should call vendor outside NYC
  - Requests could also be sent to CIR via email since this avenue remained unaffected once access to physical offices restored

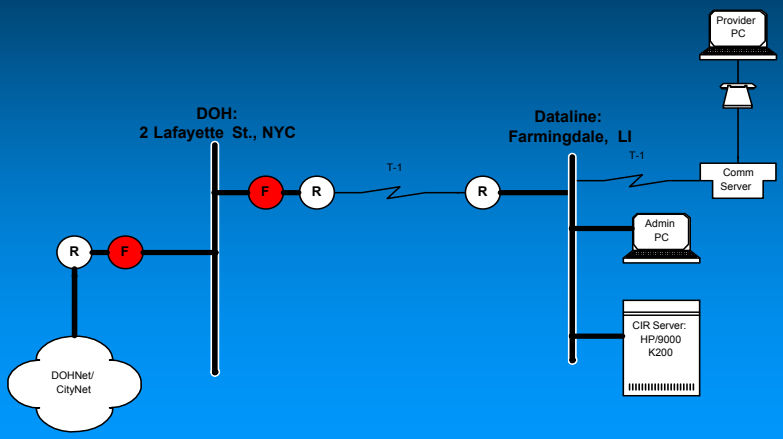
Solution - con't

- Broadcast fax sent to all providers from a remote location about protocol changes (n=2900)
- Individually contacted from home telephones the most frequent CIR users (providers) based on analysis of phone logs (n=100)
- Alerts and info placed on CIR webpage
- Heavy reliance on cell phones, but no DOH-wide directory and (at least initially) limited service

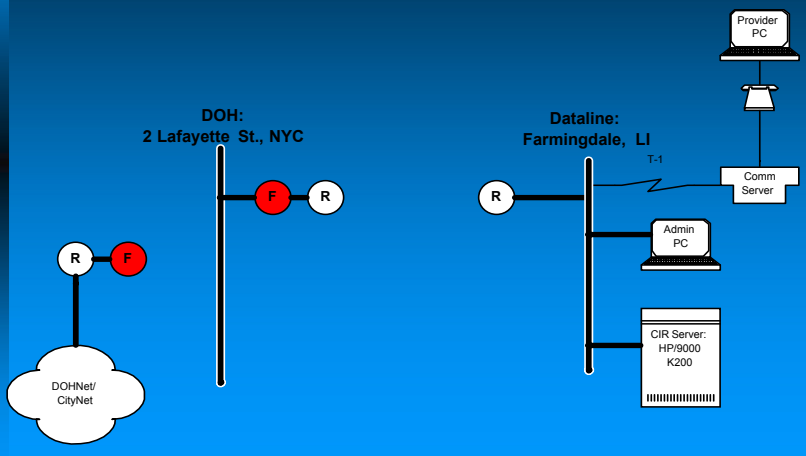
Challenge #3

- Loss of T1 connection to database server from DOH facilities
  - Duration: 7+ months
  - Implications:
    - –No dissemination of immunization information to providers and parents
    - –Disabled in-house processing for all projects that needed access to the CIR

Pre-9/11 Network Configuration (simplified)



Post-9/11 Network Reality (simplified)



Solution

Initial solution:

- Dissemination of immunization information directly from vendor site
  - Some DOH staff at vendor site
  - Transportation difficulties

Other solutions considered:

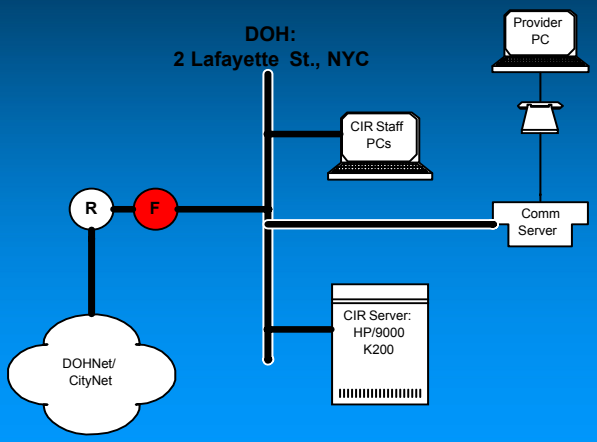
- Access database from software development vendor's facility in Phila.
- Access server over the Internet once back in DOH facilities
- Point-to-point wireless solutions

Solution – con't

Permanent solution:

- Brought server in-house and reconfigured network to maintainable and secure connections
  - As a result, disabled online intranet users at provider sites for 2+ months
  - Notified all online users of interruption in service and when service was restored reconfigured users one-by-one to new server location
- **Dissemination of immunization information brought back in-house**
  - Broadcast fax to all providers (again) about protocol changes (n=2900)
  - Individually contacted by phone (again) the most frequent CIR users (n=100)

Final Network Configuration (simplified)



Challenge #4

- Retaining sufficient staff for CIR core activities since many staff redeployed to DOH recovery work
  - Ground Zero recovery
  - Injury surveillance
  - Bio-terrorism surveillance
  - Anthrax hotline

♦ Duration: ~2+ months

Solution

- Evaluation of the amount of time each staff member could dedicate to both CIR recovery and overall DOH recovery efforts
  - Many staff volunteered to work overtime
- Coordination and collaboration among staff to speed all recovery efforts
- Acceptance of ~ 2 month delay in all major projects

Final Steps

- Emergency protocols and contacts were updated to better respond to future disasters
- Based on evaluation of protocol changes, the decision was made to permanently store the CIR database server in-house

Conclusions

- 7 months after the tragedy, overall functioning of the CIR has returned to almost normal levels
  - Only 4 phone lines currently exist for online intranet users to dial in and access CIR, accelerating move to internet
  - Lack of voicemail service
  - Increased building security with security guard stations, metal detectors, and ID verification
- Experienced and motivated CIR staff enabled a relatively quick recovery for daily CIR functioning

Lessons Learned

- Need to consider *all* possible disaster scenarios, especially loss of telecommunications
- Need to focus on business continuity: it's about people!
  - Balance program needs with emotional impact on staff
  - Be flexible and adaptable regarding staff
  - Implement protocols to train staff to respond to requests for records/information post-disaster

Lessons Learned - con't

- Maintain copies of crucial administrative information (e.g. staff and vendor contact info, payroll info) at secure off-site locations
- Develop a phone tree
- Be prepared to make tough decisions quickly
- Be creative regarding solutions