Embracing and Relying on the NBS: A Local Health Department’s Experience

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Outline

- Public Health System in Nebraska
- NBS in Nebraska and DCHD
- Brief description of our setup
- “Use cases”
- Strengths and Challenges, Before and After
- Needs
- Recommendations
Nebraska’s Public Health System

2004: 3 HDs conducting comm. disease surveillance (2 population centers and state)  

2006: 18 new HDs conducting comm. disease surveillance

*Local health departments in Nebraska are independent entities, with local boards, and receive contracts from the state for public health activities.
<table>
<thead>
<tr>
<th></th>
<th>Nebraska</th>
<th>DCHD (Local)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (2010)</td>
<td>1,826,341</td>
<td>517,110</td>
</tr>
<tr>
<td>Licensed hospital beds</td>
<td>6292</td>
<td>2590</td>
</tr>
<tr>
<td>General communicable diseases</td>
<td>5,011</td>
<td>1,689</td>
</tr>
<tr>
<td>Chlamydia (2009)</td>
<td>5,443</td>
<td>2,657</td>
</tr>
<tr>
<td>Gonorrhea (2009)</td>
<td>1,376</td>
<td>940</td>
</tr>
<tr>
<td>HIV cases (2009)</td>
<td>146</td>
<td>71</td>
</tr>
</tbody>
</table>
DCHD customized NETSS and used for local needs

Double entry (x 4 yrs) until we could use NBS for all our needs
NE NEDSS Data Flow

NBS ODS

SAS Code (once daily)

NBS RDB

Java and more SAS Code

- Lab Report Datamart
- Investigation Datamart
- Custom Datamarts
  - “Real-time” (public_health_case)
  - Hepatitis
  - Pertussis
  - Enteric illnesses
  - Latent TB Infection
  - Mumps
  - WNV
- Custom “canned” reports
  - Daily lab rpt line list
  - Open investigations
  - Monthly and YTD counts
- Custom data extracts
  - eHARS lab import file
  - Fixed ASCII for STD-MIS

Secure Site: NE Guardian
Access to data

- 2 epidemiologists (one local, one state) has direct access to tables in RDB
  - Able to figure out how variables appear in datamarts (e.g. behavior of dates)
- Epidemiologists and IT work closely together
- State–developed secure web site for NBS custom datamarts and reports
Add local fields to NBS

- State “PAMs”: mumps, enteric illness, WNV
- Outbreak names
- Salmonella serotype
- Track letters sent for pertussis cases
- Public health control measures taken (performance)
**Customizability**

### Custom Fields

- **CDC Case Definitions**
  - Link to Explanation of West Nile Virus Case Classification/Case Status:
  - Link to Nebraska District Health Department Map

#### Choose public health control measure undertaken:

1. Limit activities such as food handling, child care, or clinical work
2. Identified sources of illness
3. Education provided
4. [Select option]

- **Date of first control measure (earliest measure):** 02/05/2008
- **Time of first control measure (nearest half-hour):** 01:00
- **Time of first control measure (AM/PM):** PM

### Condition Specific Custom Fields

**Salmonella serogroup and serotype information**

- **Salmonella serogroup (i.e. A, B, C1, etc):** B
- **Salmonella serotype:**
  - S. Rubislaw
  - S. Saintpaul
  - S. Sandiego
  - S. Schwarzengrund
  - S. Senftenberg

- **Other serotype if not listed above:**
Datamarts:
- lab, investigation, mumps, WNV, pertussis, enteric illness
- Influenza, antibiotic susceptibility

Generate files formatted for upload into other systems
- eHARS import file: implemented, but problematic
- STD import file: not used
Appended SAS programs to ETL process: Customized, canned Reports used by DCHD

- Line lists that look like written lists from labs
  - Line list (by program, jurisdiction, laboratory)
  - Arrange however program desires for work flow

- View updated investigations (real time)
  - Public_health_case table in ODS
  - Last updated date
  - Feel for what is going on

- View monthly disease counts (real time)
  - Customize using reporting criteria (confirmed, probable...
Pre – NBS reporting flow

Laboratories

Faxes, Crystal reports (pdf, xls), excel files,…

- General epidemiology
  - NETSS

- STD
  - STD*MIS

- HIV
  - HARS

- Lead
  - STELLAR
NBS/ELR: effects on non-NBS programs

Laboratories

ELR

NBS

General epi

Pdf line lists
Manual data entry

STD

STD*MIS

Lead

STELLAR

STD

STD*MIS

HIV

eHARS

Excel file imported into eHARS

eHARS – state process to determine new positives for followup

General epi

STD

STD*MIS

STELLAR

HIV

eHARS
STD program chose not to use import – manual data entry was faster
- needed to use other direct reports from laboratories that aren’t in NBS
- didn’t fit with business process
Non-NBS programs needed a “line list” of new lab reports each day.

### EPI Lab Line List for 2006-09-07

**Lab Report=Automated ELR**

<table>
<thead>
<tr>
<th>Obs</th>
<th>Report Created By</th>
<th>Testing Lab/Ordering Facility</th>
<th>Patient Name</th>
<th>Patient DOB</th>
<th>Patient Address</th>
<th>Test/Result/Specimen</th>
<th>Event Date</th>
<th>Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>nedss_elr/09:07:2006</td>
<td>Univ of Neb Med Center/ [6w] ()</td>
<td>[Redacted]</td>
<td></td>
<td>Apt S, Omaha, NE, 68131/</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>nedss_elr/09:07:2006</td>
<td>Univ of Neb Med Center/ [7csel] ()</td>
<td>[Redacted]</td>
<td></td>
<td>Ave, Omaha, NE, 68111/</td>
<td>HEPATITIS C VIRUS AB/Hepatitis C Virus, /</td>
<td>Collect: 09/06/2006, Reported: 09/07/2006</td>
<td>KRISTINE E. RANDSON/Emale At 42nd St, Omaha, NE, 68108</td>
</tr>
</tbody>
</table>
Health Director to staff at the end of the day:

“How many new cases did we get today?”

<table>
<thead>
<tr>
<th>EVENTNAME</th>
<th>01</th>
<th>02</th>
<th>03</th>
<th>04</th>
<th>05</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amebiasis</td>
<td>.</td>
<td>2</td>
<td>1</td>
<td>.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Animal exposure (confirmed exposures)</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>9</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Aseptic meningitis</td>
<td>.</td>
<td>6</td>
<td>.</td>
<td>1</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Bacterial meningitis, other</td>
<td>.</td>
<td>1</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>1</td>
</tr>
<tr>
<td>Campylobacteriosis (incl. probable and confirmed)</td>
<td>8</td>
<td>1</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>28</td>
</tr>
<tr>
<td>Cryptosporidiosis (confirmed and probable)</td>
<td>.</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>.</td>
<td>4</td>
</tr>
<tr>
<td>Giardiasis</td>
<td>10</td>
<td>2</td>
<td>12</td>
<td>5</td>
<td>.</td>
<td>29</td>
</tr>
<tr>
<td>Group A Streptococcus, invasive</td>
<td>1</td>
<td>.</td>
<td>1</td>
<td>2</td>
<td>.</td>
<td>4</td>
</tr>
<tr>
<td>Group B Streptococcus, invasive</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>.</td>
<td>11</td>
</tr>
<tr>
<td>Haemophilus influenzae, invasive</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>.</td>
<td>7</td>
</tr>
<tr>
<td>Hepatitis A, acute</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Hepatitis B, acute</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Hepatitis B, chronic (incl. probable and confirmed)</td>
<td>9</td>
<td>8</td>
<td>12</td>
<td>8</td>
<td>8</td>
<td>45</td>
</tr>
<tr>
<td>Hepatitis C Virus Infection, chronic or resolved</td>
<td>32</td>
<td>31</td>
<td>26</td>
<td>46</td>
<td>30</td>
<td>165</td>
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<tr>
<td>Histoplasmosis</td>
<td>3</td>
<td>.</td>
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<td>.</td>
<td>3</td>
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<tr>
<td>Kawasaki disease</td>
<td>.</td>
<td>.</td>
<td>2</td>
<td>.</td>
<td>.</td>
<td>2</td>
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<tr>
<td>Legionellosis</td>
<td>.</td>
<td>.</td>
<td>1</td>
<td>.</td>
<td>.</td>
<td>1</td>
</tr>
<tr>
<td>Lyme disease</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Malaria</td>
<td>.</td>
<td>1</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>1</td>
</tr>
<tr>
<td>Mycobacterium Avium</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>Mycobacterium, non-TB (organism)</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>Noroviruses</td>
<td>7</td>
<td>8</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>25</td>
</tr>
<tr>
<td>Pertussis (includes conf,prob, susp)</td>
<td>.</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>Rotavirus</td>
<td>.</td>
<td>.</td>
<td>2</td>
<td>7</td>
<td>.</td>
<td>9</td>
</tr>
</tbody>
</table>

(Continued)
What investigations have been added or updated today?

This SAS program runs every hour on the public_health_case tables

<table>
<thead>
<tr>
<th>Obs</th>
<th>NAME</th>
<th>EVENTNAME</th>
<th>REPORTED</th>
<th>ADDED</th>
<th>ADDEDBY</th>
<th>UPDATEDT</th>
<th>UPDATEDBY</th>
<th>STATUS</th>
<th>PROGRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Salmonellosis</td>
<td>05/30/2012</td>
<td>05/30/2012</td>
<td>Y Savala</td>
<td>01JUN12:03:55 AM</td>
<td>J Sison</td>
<td>Confirmed</td>
<td>Closed</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Pertussis</td>
<td>05/31/2012</td>
<td>05/31/2012</td>
<td>Y Savala</td>
<td>01JUN12:09:00 AM</td>
<td>J Sison</td>
<td>Confirmed</td>
<td>Closed</td>
</tr>
<tr>
<td>3</td>
<td>CAS15415010NE01</td>
<td>Hepatitis C Virus infection, chronic or resolved</td>
<td>06/01/2012</td>
<td>06/01/2012</td>
<td>Y Savala</td>
<td>01JUN12:09:04 AM</td>
<td>Y Savala</td>
<td>Confirmed</td>
<td>Closed</td>
</tr>
<tr>
<td>4</td>
<td>CAS15415011NE01</td>
<td>Hepatitis C Virus infection, chronic or resolved</td>
<td>05/31/2012</td>
<td>06/01/2012</td>
<td>Y Savala</td>
<td>01JUN12:09:28 AM</td>
<td>Y Savala</td>
<td>Confirmed</td>
<td>Closed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Obs</th>
<th>NAME</th>
<th>EVENTNAME</th>
<th>REPORTED</th>
<th>ADDED</th>
<th>ADDEDBY</th>
<th>UPDATEDT</th>
<th>UPDATEDBY</th>
<th>STATUS</th>
<th>PROGRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>CAS15374077NE01</td>
<td>Hepatitis C Virus infection, chronic or resolved</td>
<td>12/07/2011</td>
<td>12/07/2011</td>
<td>Y Savala</td>
<td>31MAY12:08:35 AM</td>
<td>D DHHS</td>
<td>Not a case</td>
<td>DELETED</td>
</tr>
<tr>
<td>6</td>
<td>CAS15236182NE01</td>
<td>Hepatitis C Virus infection, chronic or resolved</td>
<td>11/24/2008</td>
<td>11/24/2008</td>
<td>Y Savala</td>
<td>31MAY12:08:35 AM</td>
<td>D DHHS</td>
<td>Not a case</td>
<td>DELETED</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Hepatitis C Virus infection, chronic or resolved</td>
<td>05/31/2012</td>
<td>05/31/2012</td>
<td>Y Savala</td>
<td>31MAY12:08:41 AM</td>
<td>Y Savala</td>
<td>Confirmed</td>
<td>Closed</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Mycobacterium Avium</td>
<td>05/31/2012</td>
<td>05/31/2012</td>
<td>Y Savala</td>
<td>31MAY12:09:08 AM</td>
<td>Y Savala</td>
<td>Confirmed</td>
<td>Closed</td>
</tr>
</tbody>
</table>
## Summary: Pre-NBS

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Challenges</th>
</tr>
</thead>
</table>
| **Local database** *(EpiInfo, STD*MIS, HARS, STELLAR)*  
  ◦ Immediate customizability  
  ◦ Immediate access to data  
  ◦ Ability to produce reports  | **Manual lab reporting and data entry**  
  **No ability to communicate directly with other systems/jurisdictions**  
  **No ELR**  
  **Labs sending results to multiple programs in multiple formats** |
# Summary: Post-NBS

## Strengths

- One system – use by all jurisdictions, easily transfer labs, cases
- Labs – ELR to one place and integrated with general communicable disease
- Customizable –
  - add alter questions in minimal time frame
- Access to data,  
  - rapidly add new fields to datamarts, 
  - customize datamarts and reports

## Challenges

- More complex system  
  - Higher level knowledge and skills required for receiving and directing reports  
  - Higher level data analysis needs locally
- Getting lab reports out to other systems  
  - eHARS  
  - STD*MIS
- Silo challenges are amplified at the local level
Local needs – “deal breakers”

- **Direct access to data** and tools (i.e. SAS) for local epidemiologists (w/ SAS-skills)
- Rapid **customizability** (add a question, get it in the datamart)
- Understand variables’ behavior from data entry to datamart (i.e. many date/time vars)
- Ability to create **customized reports** and datasets
  - Morbidity counts with local criteria
  - Reports to support local business process
- Ability to get **basic case info** (count, status, age, sex) on a “real-time” basis.
My wish list

- NBS would be very difficult for us to replace
- Continue/enhance the user input process (NBSUG) that has developed
- NBS states can collaborate and share modules (Page Builder) – options to use NBS for other programs (i.e. STD, HIV, ...)
- Epidemiologists (w/ state, local experience) and IT professionals should be working closely together in all phases of planning, development, and support
My wishlist

- Increase communication between CDC program staff and local/state program staff
  - Many of their needs are the same as ours
  - If we knew what they are not getting, we could probably get it for them
  - What does their “dream” datamart look like? Have these datamarts be a requirement of any system – produced by the epidemiologists that know the database
Silo issues amplify locally
- Increasing complexity of systems
- Limit flexibility in business processes/staffing

Local HDs have fewer people wearing more hats
Thank you and welcome to Omaha!

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