Midterm Report

A Comparative Study of Four States’ Public Health Systems: Interview Results from State Health and Agriculture Officials

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Table of Contents  Page
I. Objective of the Project .................................................. 3
II. Overview of Project Activities ........................................ 4
   Table A. Background Data for Surveys ................................ 5
III. Current Results of the Project Activities .......................... 8

1. What are the Incidence Rates of Vaccine-Preventable Diseases such as
   Chickenpox, Measles, Meningococcal Disease and Influenza in These States?.....8

   Table 1. Estimated Vaccination Coverage Among Children 19-35 Months of Age by State, US National Immunization Survey, Q3/2002-Q2/2003 (CDC data) .................................................. 11

   Table 2. Rates of Selected Communicable Diseases (per 100,000 population) .................................................. 11

   Table 3. Average Annual Incidence (1999-2001) Rates of Food Borne and Water Borne Diseases (per 100,000 population) .................................................. 12

   Table 4. Rates of Sexually Transmitted Diseases and Tuberculosis (per 100,000 population) .................................................. 12

   Table 5. Population Characteristics (2000 US Census data and 2002 estimates)* and Number of Epidemiologists .................................................. 13

2. Who are the designated leaders of the local emergency response teams in the event of a bioterrorist attack and what are their qualifications? ..................15
   Table 6. State Leaders in the Event of a Severe Infectious Disease Outbreak or Bioterrorist Attack (According to Interviewees) .................................................. 15

3. How have state and local health departments implemented the mandate for bioterrorism surveillance? .................................................. 18

4. Is surveillance of animal diseases being integrated into bioterrorism surveillance? .................................................. 22

5. What are the current laboratory/diagnostic capabilities at the state and local levels? .................................................. 23
   Table 7. State Laboratories and Biosafety Levels .................................................. 24

6. How do state and local health departments plan to communicate with health professionals, other state and local agencies, federal officials, and the public in the event of a bioterrorist attack? .................................................. 25

IV. The Significance of the Project to the Recipient and the Potential Application and/or Generalization of its Results Beyond The Project .................................................. 26
I. Objectives of the Project

The objectives of this project are to obtain a picture of how four northeastern states, New Hampshire, New Jersey, New York, and Pennsylvania are preparing for future infectious disease outbreaks and bioterrorist attacks. Since the anthrax attacks of 2001, the federal government has allocated millions of dollars to states to improve their capabilities. Have these funds been adequately distributed? Have state and local capabilities actually improved as a result? Short of an actual event, how can the states’ capabilities be adequately assessed?

This is a cross-sectional, observational study which involves surveying all local health agencies as well as random samples of physicians and veterinarians who practice in these states. In addition, the study includes interviews of state health and agriculture officials. Data presented in this midterm narrative program report are from the state interviews as well as from state and federal level data. The final report will cover the data from the surveys.

Specific questions this study addresses in order to meet its objectives are:
1. What are the incidence rates of vaccine-preventable diseases such as chickenpox, measles, meningococcal disease, and influenza in these states?
2. Who are the designated leaders of the local emergency response teams in the event of a bioterrorist attack and what are their qualifications?
3. How have state and local health departments implemented the mandate for bioterrorism surveillance?
4. Is surveillance of animal diseases being integrated into bioterrorism preparedness?
5. What are the current laboratory/diagnostic capabilities at the state and local levels?
6. How do the state and local health departments plan to communicate with health professionals, other state and local agencies, federal officials, and the public in the event of a bioterrorist attack?

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1 National Association of County and City Health Officials (NACCHO). Bioterrorism Grants Allocation. For FY 2002, total funds allocated and funds to be released June 2002 were: New Hampshire ($8,479,944; $6,783,955), New Jersey ($27,242,380; $21,793,904), New York State ($33,917,260; $27,133,808), New York City ($26,181,040; $20,944,832), and Pennsylvania ($37,348,690; $29,878,952). URL: http://www.naccho.org/general545.cfm
II. Overview of Project Activities

Surveys
This past fall, I developed and pilot tested three different surveys for local health agencies, physicians, and veterinarians. The surveys were written to be as parallel as possible to assess levels of agreement between the respondents, particularly between the local health agencies and the physicians. For example, several questions in the local health survey asked respondents how often they sent information and feedback to local physicians. The physician survey asked the respondents how often they received information from their local health agencies and whether or not they found the information useful. All three surveys asked respondents who would be the leaders in their local communities and state level in the event of a severe infectious disease outbreak.

The local health agency surveys were sent out by mail in mid-February. Through Princeton University’s Office of Information and Technology (OIT), I was able to have all three surveys placed on-line for free so that respondents could choose to either respond on-line or by hard copy through the U.S. mail. Of the local health agencies, there have been 130 responses out of a total of 190 agencies which have yielded a response rate of almost 68%. (Please see Table A). A second survey mailing will be going out soon, and the answers will soon be entered on a computerized database.

I will be telephoning a few of the non-respondents and interview them by telephone. I have already called one non-respondent in New Jersey who provided very useful feedback. He said that he didn’t have enough time to answer the survey (although he spent over twenty minutes talking to me on the telephone). He is quite cynical about public health and bioterrorism preparedness and had some negative comments about the NJ state health department. He stated that he plans to retire soon.

Compiling a list of 5000 physicians and 5000 veterinarians proved to be more challenging than initially thought. Very few professional organizations responded to my requests for lists of their members—not enough for a statistically meaningful sample. Through various contacts, I discovered that three of the states (New Hampshire, New Jersey, and Pennsylvania) sell the names and addresses of all the licensed physicians and veterinarians in their states which I purchased. [Note: Not all of the licensed physicians and veterinarians actually practice in the states in which they are licensed. Only those who have an address and presumably practice in their state will be surveyed.]

For a fee, the Medical Society of the State of New York provided me with a random list of member and non-member physicians. Compiling a statistically rigorous sample of veterinarians in New York has been the most difficult task so far. It was not possible to get a sample from the telephone listings because most do not provide the names of the individual practitioners. The American Veterinary Medical Association sold me the names and addresses of their members in all four states though I will only be using their list for the veterinarians in New York. I recognize that this will provide a biased sample of AVMA member veterinarians for New York, but this was the only option available.

Currently, the physician and veterinarian surveys are ready to be sent out. The Princeton Survey Research Center is in the process of making final preparations. In an effort to increase respondent cooperation (physicians and veterinarians are known to be tough groups to survey), I will be conducting a raffle in which all respondents will be
eligible to win a bottle of Macallan Scotch (worth approximately $100.00, which I will pay for out-of-pocket). One physician and one veterinarian whose names are blindly selected will win one bottle each. There will be one drawing from each group. The drawing will be held sometime in late May/early June to allow enough time for these busy professionals to respond. Table A provides an overview of the surveys.

**Table A. Background Data for Surveys**

<table>
<thead>
<tr>
<th>State</th>
<th>Local Health Agencies</th>
<th>Licensed MD’s</th>
<th>Licensed DVM’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Hampshire</td>
<td>2</td>
<td>43,076+</td>
<td>782+</td>
</tr>
<tr>
<td>New Jersey</td>
<td>115*</td>
<td>30,940</td>
<td>1662</td>
</tr>
<tr>
<td>New York</td>
<td>58</td>
<td>75,067</td>
<td>4207</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>15**</td>
<td>47,238</td>
<td>3500</td>
</tr>
<tr>
<td>Total</td>
<td>190</td>
<td>196,321</td>
<td>10,151</td>
</tr>
</tbody>
</table>

Surveys sent or to be sent 190
Responses to date 130
Pending

+3,147 MD’s and 549 DVM’s are actually practicing in NH. In all 4 states, number of practitioners practicing may not equal the numbers licensed to practice. Only NH has this information.

* 16 County Health Departments, 7 Regional, 41 Multi-Municipal, 51 Municipal (There are over 500 Local Boards of Health in NJ which constitutes approximately 1/3 of all Local Boards of Health, Nationally). Information obtained from Sylvia Bookbinder, MPH, “Role of a New Jersey Local Board of Health,” presented at UMDNJ School of Public Health Center for Public Health Preparedness meeting on April 8, 2004.

** 6 County Health Departments, 4 Municipal Health Departments, 5 Districts.

**Interviews**

As of April 30, 2004, I have interviewed officials in New Hampshire, New York State, New York City, Pennsylvania, New Jersey, Philadelphia, and Allegheny County (Pittsburgh, PA). I re-interviewed Dr. Clifton R. Lacy, the New Jersey Commissioner of Health and Senior Services on Wednesday, April 14th and interviewed Mr. Joseph Cronauer, the Assistant Commissioner of Health in Philadelphia on April 15th. I interviewed Dr. Bruce Dixon, the Director of the Allegheny County Health Department based in Pittsburgh, Pennsylvania by telephone on April 29th.

All of the interviews went well except for the interview with Dr. Lacy, the New Jersey Commissioner of Health. He was initially not willing to cooperate and demanded extensive, detailed answers about the nature and purpose of the study. I sought help from Pamela Hersh, the Director of Princeton University’s Office of Community and State Affairs. She contacted Patrick Brannigan, the Governor’s Deputy Chief of Management and Operations. Mr. Brannigan also had misgivings about my study and felt it was biased. I assured him that none of the other interviewees had expressed these concerns.
(Indeed, all of the other state and city interviews were extremely cordial and open). Mr. Brannigan then contacted the state Assistant Attorney General, Larry O’Reilly, who is the Chair of the New Jersey Homeland Security Task Force. Several days after this, Dr. Lacy’s office called to reschedule another appointment. During the follow-up appointment, Dr. Lacy and his staff were still reluctant to cooperate and continued to question what the study’s goals and methods were. Eventually, they agreed to participate. The level of suspicion was unexpected, especially since this state has arguably done more to prepare for future bioterrorist attacks than the others in the study.\(^2\) Dr. Lacy is essentially devoting his whole tenure as commissioner to this one issue.

The New Hampshire interviews yielded unexpected answers. I asked the Commissioner of Agriculture, Steven Taylor, why he thought New Hampshire was ranked the “healthiest state” in the nation. He said that there were several reasons. First, New Hampshire has a stellar healthcare institution, the Dartmouth-Hitchcock Medical Center which is committed to family medicine, and it has a series of community centers which cover the whole state. Also, New Hampshire has an excellent system of school nurses. Primary and secondary schools all have full-time nurses. However, even with these assets, Mr. Stevens attributed much of New Hampshire’s health to the fact that it has no pockets of extreme poverty and has a strong sense of community spirit.

Indeed, when I checked the U.S. census bureau on percent of people in poverty by state from 2000 to 2002, New Hampshire had the lowest three-year average (5.6%) compared with any other state in the nation. Minnesota came in next (6.5%) and it, not surprisingly, was tied with New Hampshire as being rated the “healthiest state” in the nation in 2003. [Of the other states in the study, New Jersey had 7.8%, Pennsylvania had 9.2%, and New York had 14.0% persons living in poverty.\(^3\)]

The other issue that Mr. Taylor emphasized was New Hampshire’s strong sense of community spirit. Investigating this claim further, I found some useful information. In Robert Putnam’s book “Bowling Alone,” New Hampshire was ranked among the states with the highest levels of “social capital” meaning that there is a very high rate of civic engagement and volunteerism. States with very high levels of social capital are noted to have many benefits, among them, healthier citizens. Whether or not high social capital would improve a state’s ability to prepare for future outbreaks or bioterrorist attacks is not known and was not a specific part of this study. Although the surveys did ask the local health agencies if they were seeking volunteers and if physicians and

\(^2\) On April 29\(^{th}\), I attended a lecture at Princeton University by Steven Aftergood who directs the Federation for American Scientists (FAS) Government Secrecy Project. During his talk, he discussed three types of secrecy: “genuine,” “political,” and “bureaucratic.” He considers “genuine” secrets to be the only forms of legitimate secrets; these secrets include war plans, intelligence sources, and advanced military technologies. “Political” secrets are used to shield programs from unwanted controversy and oversight. “Bureaucratic” secrets are a reflexive type of hoarding of information often seen in bureaucracies. He developed this third definition from the writings of the German sociologist Max Weber. I believe that the New Jersey response reflects this third type of secrecy. This is a maladaptive behavior and appears to be confined to the New Jersey Department of Health and Senior Services, at least in this study. The New Jersey Department of Agriculture did not demonstrate any degree of bureaucratic hoarding of information nor did any of the agencies from the other states.

Veterinarians were volunteering in public health preparedness activities, but they did not include questions about general civic engagement and volunteerism.

However, this question could be of paramount importance because past experience indicates that civic involvement and volunteerism is vital for a successful response to a major outbreak. The success of the New York City response to smallpox in 1947 was largely due to a high level of cooperation and volunteerism by the city’s populace. Over 3000 people, who were not necessarily doctors and nurses, volunteered to help with the mass vaccination campaign both in terms of helping to run the clinics and in getting people vaccinated. Public involvement in future efforts should not be underestimated, yet few of the bioterrorism preparedness plans seek to include this potentially enormous untapped resource. Indeed, all that has been asked so far of the public in the war against terrorism is to go shopping for duct tape and plastic sheets.

Of concern in Putnam’s book is the fact that social capital has been declining dramatically over the past forty years. Members of the “greatest generation” were unusually good citizens who got involved with organizations—and they still do in their retirement. The “baby boomers,” on the other hand, are largely responsible for the decline in civic engagement that began in the 1960’s. Factors that have contributed to this decline include: family disintegration, generational change, increased time spent at work, television, urban sprawl, and the decline of local businesses and rise of multinational corporations.4

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III. Current Results of the Project Activities

1. What are the Incidence Rates of Vaccine-Preventable Diseases such as Chickenpox, Measles, Meningococcal Disease and Influenza in These States?

The capabilities to control everyday public health problems, such as vaccine-preventable diseases, food-borne illnesses, sexually transmitted diseases, and tuberculosis should be preparatory for an unusual outbreak, such as SARS, avian influenza, or smallpox. All require good surveillance mechanisms, contact tracing capabilities, quarantine, and mass vaccinations. In order to do this, there must be well-trained and qualified individuals who can do this work.

The challenge of evaluating public health is that successful public health is the prevention or absence of disease. Since one cannot measure an absence, the opposite must be measured: the presence of disease. Public health agencies are supposed to provide ten essential public health services such as monitoring health status to identify community problems and diagnosing and investigating health problems and health hazards in the community. These essential services translate into specific activities such as providing vaccinations, food and restaurant inspections, septic tank inspections, and sexually transmitted disease and tuberculosis control. Measuring the success or failure of these public health activities is a challenge, especially since access, or the lack of access, to medical care plays such an important role in disease control and reporting. Also, depending upon the severity of illness, not all individuals seek medical care.

In addition, even if medical care is available, evidence suggests that the number of outbreaks reported is directly related to the number of epidemiologists employed. A recent study by Lane et al. found that the number of food borne outbreaks reported in Georgia increased from 3 in 1995 to 43 in 2000 because federal grant funding paid for an increase in the number of epidemiologists who were monitoring these diseases. In New Jersey, federal bioterrorism funds have prompted the hiring of 22 epidemiologists: one for each county. The presence of these individuals would almost certainly increase the number of diseases and outbreaks reported in their jurisdictions because there would be people in place to monitor them. With these caveats in mind, the different disease rates across the four states should be viewed with a certain level of skepticism because they might not reflect actual disease rates. More likely these rates demonstrate differing surveillance capabilities.

Therefore, even with the inherent confounding factors and biases, a few notable findings have emerged so far. First, varicella (chickenpox) is not a reportable disease, and therefore data on the incidence rates were not available for any of the states or cities—except Philadelphia. It will become reportable in the Commonwealth of Pennsylvania starting in January 2005. This is unfortunate because this disease was most

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frequently responsible for the misdiagnosis of smallpox when it existed in the human population. Three of the four states have varicella vaccination requirements upon daycare and/or elementary school entry. New York’s and New Hampshire’s varicella vaccination laws for daycare entry took effect in January 2001 and 2003, respectively. Pennsylvania’s varicella vaccination laws for daycare entry have been in place since 1997. New Jersey does not have any varicella vaccination laws in place.7

The most recent CDC vaccination coverage data is available for late 2002/early 2003 which may not reflect these relatively recent changes for varicella. However, as mentioned previously, since this disease is not reportable, the success or failure of any varicella vaccination efforts cannot be known. (Please see Tables 1 and 2).

All four states have measles vaccination coverage (MMR) over 90% which meets the World Health Organizations vaccination coverage goals.8 Influenza is not a reportable disease; disease incidence is monitored by voluntary sentinel sites such as physicians’ offices. State specific data is not available by the states or by the CDC. (Please see Table 2).

Because data for varicella and influenza was either not available, or sketchy, I decided to examine other diseases that might shed light on surveillance capabilities. Since virtually all local public health agencies are responsible for food and restaurant inspections, water purity inspections, sexually transmitted diseases (STD), and tuberculosis control, I selected several of the diseases associated with these activities.

Pennsylvania provides on its web site the average annual incidence rate data (1999-2001) for campylobacter, giardia, hepatitis A, salmonella, shigella, syphilis, chlamydia, gonorrhea, AIDS, and tuberculosis, so I decided to inquire about the rates for these diseases from the other states as well.9

The New York State web site provided an extensive list of reportable diseases I received a pamphlet during my New York City interview which has the reportable diseases incidence rates from 1982 to 2001.10

New Hampshire provides no data on its web site nor did it have a booklet with this information. I had to request the disease rates from the state epidemiologist, Dr. Jesse Greenblatt.

New Jersey’s web site provides case counts of reportable diseases, but not incidence rates. I have requested this information from the Senior Assistant Commissioner, Mr. James Blumenstock. In the meantime, I have calculated the incidence rates for 2001 to 2003 from the cases listed on the New Jersey web site.

I asked Joe Cronauer, the Assistant Commissioner of Health in Philadelphia and Dr. Bruce Dixon in Allegheny County for disease incidence rates to check with Pennsylvania’s quoted disease rates on its web site.

7 Immunization Action Coalition. Varicella Prevention Mandates. URL: http://www.immunize.org/laws/varicel.htm
9 Pennsylvania Department of Health. 2003 County Health Profiles. URL: http://www.dsf.health.state.pa.us/health/cwp/view.asp?a=175&q=235098
In examining the rates of diseases in each state, one must keep in mind that their populations differ in terms of their levels of poverty, immigrants, and sexually active adults. These factors would affect rates as much as the quality of the surveillance systems. As mentioned earlier, the number of epidemiologists doing disease surveillance is likely a major factor in disease rates. (Please see Table 5) Unfortunately, asking the simple question, “how many epidemiologists do you have?” seems to be a challenging question.

Dr. Morse from NYS Department of Health stated:

“Unfortunately, there is no easy answer to your question on the number of epidemiologists...The difficulty is that there is no job series for us to count, many people do some epi work as part of their job duties, not everyone has formal training and there are a wide range of jobs that ‘epidemiologists’ work in. For example, I consider myself an epidemiologist, but spend only 20% of my time doing epidemiology. The state has infectious disease, environmental, occupational, MCH and chronic disease, etc. epidemiologists who could be listed.”

I asked a former internal medicine residency colleague and current President of the New York State Association of County Health Officials (NYSACHO), Dr. Michael Caldwell who is the Commissioner of Health in Dutchess County, how many epidemiologists New York State has. He asked his staff at NYSACHO. They responded:

“No, we don’t have this [information] at this time. Although it is a best guess that only the big ten health departments employ epidemiologists. The next layer of large departments use public health nurses and of course the small departments are dependent on the regional offices of the NYSDOH.”

Of note, none of the state agriculture departments had any data on the incidence rates of diseases in animals in their states. I inquired with the USDA if they had any data. They did not. It appears that either no one collects this information or that they do not make it available. There is no information on vaccination rates of animals. In general, there is rather informal local veterinary health oversight in the four states surveyed. Oversight is primarily done by state employees or by federal employees who work for the federal US Department of Agriculture in the Animal Plant Health Inspection Service (APHIS). These APHIS veterinarians frequently get called in to help the states out.

New Hampshire has one state veterinarian who covers the whole state.

New York State veterinary oversight was the victim of its own success. According to the NYS state agriculture officials whom I interviewed, there were county level veterinarians approximately 50 years ago who focused on controlling tuberculosis and brucellosis. They succeeded in controlling these diseases and then lost their jobs (their funding was cut). Currently, NYS plans to double its veterinary field force, but “there is never enough.”

New Jersey is a small state with not much agriculture. New Jersey’s local communities are informally covered by three state veterinarians who cover the parts of the state that is easiest for their commutes into work.

Pennsylvania Department of Agriculture has divided the state into seven regions, each of which is covered by a regional veterinarian. The local veterinarians are supposed to call this person in the event of a problem.

<table>
<thead>
<tr>
<th>State</th>
<th>Varicella</th>
<th>MMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Hampshire</td>
<td>75.1±5.8</td>
<td>93.6±3.7</td>
</tr>
<tr>
<td>New Jersey</td>
<td>79.1±5.6</td>
<td>93.4±3.4</td>
</tr>
<tr>
<td>New York (includes NYC)</td>
<td>79.8±4.2</td>
<td>94.7±2.2</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>86.4±4.2</td>
<td>93.9±3.0</td>
</tr>
</tbody>
</table>

Note: Meningococcal vaccine is not recommended for children in this age group. Statistics of estimated coverage for meningococcal vaccine in college students or influenza vaccine in high risk populations are not available. [MMR = combination measles, mumps, and rubella vaccine]

Table 2. Rates of Selected Communicable Diseases (per 100,000 population)

<table>
<thead>
<tr>
<th>State</th>
<th>Varicella</th>
<th>Measles</th>
<th>Menin Dz</th>
<th>Influ/Pneu**</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Hampshire</td>
<td>Not Reported</td>
<td>0.1*</td>
<td>1.1</td>
<td>16.7</td>
</tr>
<tr>
<td>New Jersey</td>
<td>Not Reported</td>
<td>0.00</td>
<td>0.4#</td>
<td>N/A</td>
</tr>
<tr>
<td>New York State (excluding NYC)</td>
<td>Not Reported</td>
<td>0.03</td>
<td>0.7</td>
<td>N/A</td>
</tr>
<tr>
<td>New York City</td>
<td>Not Reported</td>
<td>0.1</td>
<td>0.6</td>
<td>N/A</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>Not Reported</td>
<td>0.02*</td>
<td>N/A</td>
<td>18.9</td>
</tr>
<tr>
<td>Philadelphia</td>
<td>81.9</td>
<td>0.2 or .02?</td>
<td>1.1</td>
<td>20.6</td>
</tr>
<tr>
<td>Allegheny County</td>
<td>Not Reported</td>
<td>0.05</td>
<td>P</td>
<td>19.5</td>
</tr>
</tbody>
</table>

*Reported Incidence and Average Annual Rate (per 100,000) for 1999-2001
#New Jersey rate for meningococcal disease is for years 2001-2003.
[Note: Philadelphia data were obtained from the Philadelphia DOH except for Influenza/Pneumonia death rates. Philadelphia states that their department does not track this information yet the Pennsylvania DOH provides an Influenza/Pneumonia death rate. Also, Philadelphia DOH provided an average annual rate of measles of 0.2 while the Pennsylvania DOH provided an average annual rate of 0.02 for the same three years (a ten-fold difference!). The rates for the other diseases were either the same or very close.]
[Note: P=pending; N/A= not available]
### Table 3. Average Annual Incidence (1999-2001) Rates of Food Borne and Water Borne Diseases (per 100,000 population)

<table>
<thead>
<tr>
<th>State</th>
<th>Campyl</th>
<th>Giardia</th>
<th>Hep A</th>
<th>Salmonella</th>
<th>Shigella</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Hampshire</td>
<td>13.1</td>
<td>4.3</td>
<td>1.5</td>
<td>12.3</td>
<td>0.9</td>
</tr>
<tr>
<td>New Jersey*</td>
<td>5.4</td>
<td>6.0</td>
<td>2.7</td>
<td>11.7</td>
<td>5.2</td>
</tr>
<tr>
<td>New York State</td>
<td>13.1</td>
<td>14.5</td>
<td>2.0</td>
<td>12.7</td>
<td>5.1</td>
</tr>
<tr>
<td>New York City</td>
<td>10.2</td>
<td>21.7</td>
<td>5.9</td>
<td>17.0</td>
<td>7.2</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>10.4</td>
<td>8.9</td>
<td>3.0</td>
<td>11.9</td>
<td>3.0</td>
</tr>
<tr>
<td>Philadelphia</td>
<td>8.2</td>
<td>8.0</td>
<td>9.3</td>
<td>21.1</td>
<td>8.3</td>
</tr>
<tr>
<td>Allegheny County</td>
<td>8.9</td>
<td>8.6</td>
<td>3.8</td>
<td>9.3</td>
<td>1.0</td>
</tr>
</tbody>
</table>

*New Jersey rates are for years 2001 to 2003.

### Table 4. Average Annual Incidence (1999-2001) Rates of Sexually Transmitted Diseases and Tuberculosis (per 100,000 population)

<table>
<thead>
<tr>
<th>State</th>
<th>AIDS</th>
<th>Syphilis</th>
<th>Chlamydia</th>
<th>Gonorrhea</th>
<th>Tb</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Hampshire</td>
<td>3.0</td>
<td>1.6</td>
<td>94.1</td>
<td>10.8</td>
<td>1.6</td>
</tr>
<tr>
<td>New Jersey</td>
<td>20.9</td>
<td>2.4*</td>
<td>167.0*</td>
<td>93.0*</td>
<td>6.2*</td>
</tr>
<tr>
<td>New York State</td>
<td>13.5</td>
<td>0.4**</td>
<td>152.6*</td>
<td>78.7</td>
<td>3.7</td>
</tr>
<tr>
<td>New York City</td>
<td>64.1</td>
<td>6.9**</td>
<td>344.7</td>
<td>152.3</td>
<td>16.9</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>13.1</td>
<td>0.7</td>
<td>220.4</td>
<td>110.7</td>
<td>3.2</td>
</tr>
<tr>
<td>Philadelphia</td>
<td>69.3</td>
<td>4.9</td>
<td>876.2</td>
<td>530.2</td>
<td>11.2</td>
</tr>
<tr>
<td>Allegheny County</td>
<td>6.5</td>
<td>0.3</td>
<td>241.7</td>
<td>130.8</td>
<td>2.7</td>
</tr>
</tbody>
</table>

*Includes congenital syphilis syndrome

*Data for year 2002 only.  Syphilis includes primary, secondary, and congenital.  Tb includes active cases only.

**Early

*Data available for 2001 only.
Table 5. Population Characteristics (2000 US Census data and 2002 estimates)\textsuperscript{a} and Number of Epidemiologists

<table>
<thead>
<tr>
<th>State</th>
<th>% Poverty</th>
<th>Foreign Born</th>
<th>Sexually Active\textsuperscript{+}</th>
<th>Epidemiologists</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Hampshire</td>
<td>6.5%</td>
<td>4.4%</td>
<td>63%</td>
<td>3</td>
</tr>
<tr>
<td>New Jersey</td>
<td>8.5%</td>
<td>17.5%</td>
<td>62%</td>
<td>34++</td>
</tr>
<tr>
<td>New York State</td>
<td>14.6%</td>
<td>20.4%</td>
<td>62.4%</td>
<td>37++</td>
</tr>
<tr>
<td>New York City\textsuperscript{&amp;}</td>
<td>20.0%</td>
<td>31.7%</td>
<td>64.0%</td>
<td>37++</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>11.0%</td>
<td>4.1%</td>
<td>60.6%</td>
<td>24#</td>
</tr>
<tr>
<td>Philadelphia County</td>
<td>22.9%</td>
<td>9.0%</td>
<td>60.6%</td>
<td>4-5</td>
</tr>
<tr>
<td>Allegheny County</td>
<td>11.2%</td>
<td>3.8%</td>
<td>60.3%</td>
<td>3</td>
</tr>
</tbody>
</table>

\textsuperscript{a}US Census Bureau. State and County Quick Facts. URL: [http://www.census.gov/](http://www.census.gov/)

\textsuperscript{+}Calculated by subtracting the % of persons 65+ and <18 years from 100. This will obviously be a gross underestimate since there are certainly people who are sexually active in these age groups, but this detailed information is not available.

\textsuperscript{&}NJ now has 1 epidemiologist in all 22 LINCS agencies (Most have MPH’s. 1-2 MD’s.) There are at least 12 epidemiologists at the state level.

\textsuperscript{++}Gross estimate of number of local epidemiologists from communication with Dr. Dale Morse. 25% of all 57 counties have a contact person for communicable disease outbreaks (.25 X 57 = 14). There are at least 23 epidemiologists at the state level as of 2002. (CDC. Terrorism Preparedness in State Health Departments—United States, 2001—2003. MMWR. October 31, 2003; 52(43): 1051-1053.

\textsuperscript{#}New York City’s characteristics averaged over the 5 counties: New York, Bronx, Queens, Kings, and Richmond. For example, % foreign born ranged from a high of 46.1% in Queens County to a low of 16.4% in Richmond County.

\textsuperscript{#}The New York City Department of Health has a total of 97 epidemiologists; 51 are infectious disease epidemiologists who work in the Bureaus of Tb, STD, HIV or Communicable Disease.

\textsuperscript{#}Estimate of epidemiologists in PA by Joel Hersh, Director, Bureau of Epidemiology. (23 full-time MD or PhD epidemiologists in Harrisburg, and 1 MD epidemiologist in Western PA. Goal is to hire 1 MD epidemiologist to cover the central and eastern parts of the state each). [Note: NYC data is still pending (P)]

Without uniformity across the state jurisdictions in regards to epidemiologists and disease surveillance systems, it is extremely difficult, if not impossible, to compare disease incidence rates across states. Rates might be higher in one state simply because there is better reporting or because there are more qualified epidemiologists who are doing the monitoring. In addition, syphilis is a disease that has many presentations (e.g. primary, secondary, tertiary, and congenital) and is reported differently in each state. Some states, such as New Hampshire, include congenital syphilis, while others do not. New York uses the term “early” syphilis which is not used by other states.

Given the importance of qualified epidemiologists in disease surveillance, how many epidemiologists should there be for a given population? There have been no studies asking this question; however, some estimates have fallen somewhere between 1 per 500,000 to 1 per 1 million. (Ruth Berkelman, MD, Personal communication, April 28, 2004). If one uses the estimate of 1 per 500,000 then the four states should have the following number of epidemiologists based on the 2000 US Census: New Hampshire 2-3, New Jersey 17, New York 38, and Pennsylvania 25. For New York City, Philadelphia and Pittsburgh, the estimated number of epidemiologists should be 16, 12, and 5,
respectively. The approximate actual numbers of epidemiologists are listed in Table 5. New Jersey now has approximately twice as many epidemiologists as calculated according to its population; the other states are, more or less, on target using this criterion.

New York City has 51 out of a total of 97 (53%) epidemiologists who work only on infectious diseases. However, given the density and composition of the New York City population, this impressive number of infectious disease epidemiologists (approximately 1 per 160,000 population) is probably what is needed for adequate communicable disease surveillance. Should this be the standard for high density populations? Philadelphia and Pittsburgh have fewer epidemiologists than the estimated number.

Yet despite the evidence that the states are adequately endowed with epidemiologists, data quantity and accessibility on the Internet vary considerably. Only New York City and New York State provided extensive information on disease rates over years. New York State provides case numbers and incidence rates for almost 50 infectious diseases. While New York City does not have data available on the Internet, it does provide a pamphlet with extensive information.11 New Jersey provides case numbers, but not incidence rates, for over 60 infectious diseases. New Hampshire does not provide any data on the Internet. Data had to be obtained by request through the state epidemiologist. Pennsylvania provides summary rates for 16 infectious diseases even though 39 infectious diseases are reportable under Pennsylvania law.12 Given the importance of this data, the qualifications and training of the people generating such information should be regulated. Just as physicians should be licensed to practice medicine, epidemiologists should meet certain qualifications and be licensed.

Ideally, infectious disease data should be reported consistently across state lines. Syphilis needs to be well-defined in reporting. In addition, it would help if data were age-adjusted based on a standardized population. While data is not usually poverty adjusted, this might help in comparing rates of diseases known to be correlated with this factor such as tuberculosis, AIDS, and other sexually transmitted diseases.

12 Pennsylvania Department of Health web site, URL: http://www.dsf.health.state.pa.us/health/lib/health/guide/NOTIFIABLE_DISEASES.html
2. Who are the designated leaders of the local emergency response teams in the event of a bioterrorist attack and what are their qualifications?

The following table presents the leaders at the state level according to the state officials.

Table 6. State Leaders in the Event of a Severe Infectious Disease Outbreak or Bioterrorist Attack (According to Interviewees)

<table>
<thead>
<tr>
<th>State</th>
<th>Health</th>
<th>Agriculture</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Hampshire</td>
<td>Director, Bureau of Emerg. Manag.</td>
<td>State Veterinarian</td>
</tr>
<tr>
<td>New Jersey</td>
<td>Governor of New Jersey</td>
<td>State Veterinarian</td>
</tr>
<tr>
<td>New York State</td>
<td>Commissioner of Health</td>
<td>Commissioner of Agriculture</td>
</tr>
<tr>
<td>New York City</td>
<td>Commissioner of Health</td>
<td>N/A</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>Governor of PA</td>
<td>Secretary of Agriculture</td>
</tr>
<tr>
<td>Philadelphia</td>
<td>Commissioner of Health</td>
<td>N/A</td>
</tr>
<tr>
<td>Allegheny County</td>
<td>Director of County Health Dept.</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Four out of the six state and city health agency officials stated that a political appointee, the commissioner or secretary, would be the leaders in the event of a public health emergency. The interviewee for New Hampshire indicated that the director of emergency management would serve as the leader. He did not seem to understand the differences in capabilities needed to control a severe infectious disease outbreak versus a chemical/explosion-type crisis. He was not the only respondent who assumed that a severe outbreak/bioterrorist attack would present as a single event similar to an explosion. (The individuals who assumed this were not epidemiologists or public health physicians). The anthrax attacks presented over weeks and virtually all of the cutaneous forms of the disease went undiagnosed until the first case of inhalational anthrax was reported. Since anthrax is not a communicable disease, the response required for the 2001 attacks were more closely related to a chemical attack rather than a communicable disease attack such as smallpox.

Almost all respondents mentioned that the Incident Command System (ICS) would be used during a crisis. The Incident Command System was developed from a Congressionally funded study (Firefighting Resources of Southern California, FIRESCOPE) that analyzed the problems from a response to a series of wildfires that devastated Southern California in the fall of 1970. Many of the fires burned simultaneously on federal, county, and city jurisdictions which hindered the response coordination. The study found that there was a lack of common organization, poor inter-agency communications, inadequate joint planning, inadequate recourse management, among others. ICS has a flexible design allowing for single and multiple jurisdictions and agencies to work together during an emergency. ICS components include: command, operations, planning, logistics, and finance. There should be one Incident Commander

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who is in overall charge of the event with overall authority. There are many problems with this system. Few public officials actually understand how it works. The ICS system was designed just for emergencies, and few, other than the fire services, use it routinely. Many organizations will be trying to implement this unfamiliar system during a crisis. In addition, when multiple agencies share a jurisdiction, it might not be clear who should be the incident commander, especially when the event is not as clear-cut as a fire: as would be the case with an infectious disease outbreak.\textsuperscript{14}

New Jersey and Pennsylvania are unique in that the Governors of these states would serve as the leaders/spokespersons. The Commissioner/Secretary of Health would serve as advisors. New Jersey has arguably the most powerful governor in the nation. Before 1947, the New Jersey governorship was the weakest in the nation, and at the close of World War II, the government buckled under its antiquated foundation. In 1947, New Jersey state legislators decided to change the state constitution to give the New Jersey governor unsurpassed powers to appoint judges, veto or rewrite legislation, and control the executive branch budget.\textsuperscript{15} All other states elect at least one other statewide executive branch official, which dilutes the power of the governor to some extent, but does provide for a substitute in the event the governor is temporarily unavailable to fulfill his or her duties.

Unfortunately, the problem with having the Governor or other elected official as the designated leader of an outbreak is that he/she usually does not have the education, training, or experience to function as an effective leader in such a scenario. During a cryptosporidium outbreak in Milwaukee in 1993, the mayor served as the de-facto leader, with input from others, which lead to a less than optimal outbreak containment response.\textsuperscript{16} (This outbreak will be discussed later).

One could argue that the best situation is when a qualified physician leads the effort, and the elected official provides the necessary political and financial support such as the case in 1947 in New York City when the Commissioner of Health, Dr. Israel Weinstein, served as leader and the mayor provided the necessary resources to get the job done. Unfortunately, there is not much research in the area of leadership in infectious disease outbreak control. From my interviews, it seems as though there is a movement to lead by committee and consensus. (However, in New York City, Dr. Frieden stated that he would be the leader). Leadership by committee might not be the best arrangement when rapid decisions need to be made and committee members cannot agree on a plan of action.

In Pennsylvania, the current Secretary of Health, Dr. Calvin Johnson is a pediatrician and public health physician; the former Secretary was not a physician. The Secretary will be the Governor’s advisor during a crisis. Mr. Brad Hersh, the Director of Epidemiology said that it really helps to have someone lead the department “who knows how to spell ‘epidemiology’ and who doesn’t need to have the ABC’s explained to


them.” The Pennsylvania Department of Health is directly responsible for 57 of the 67 counties across the state.

In Philadelphia, the mayor would control the Emergency Operation Center. During 9/11, Mayor Rudolph Guiliani worked in the Emergency Operation Center. His political leadership and media presence was vital for the city to cope with the crisis.

Dr. Bruce Dixon, the Director of the Allegheny County Health Department in Pittsburgh, PA, would be the leader in the event of a severe infectious disease outbreak. He is unique from the other respondents in that he is a full-time faculty member in internal medicine and public health at the University of Pittsburgh. Through this arrangement, he has considerable legitimacy and close ties with the medical community because, as he stated, “I trained most of them.”

In contrast, politicians are usually not considered legitimate leaders by the public when health is the issue (except when the politician is a physician). This problem was illustrated when Tom Ridge attempted to serve as the leader, rather than Dr. Jeffrey Koplan, the Director of the CDC, during the anthrax attacks. This led to leadership confusion and anger among the press and public.

Interestingly in the case of New Jersey, the state veterinarian, and not the Governor, would serve as the leader in the event of an animal outbreak—at least, this was the plan as discussed during an interview with a newly hired veterinarian, Dr. Jeff Hamer, in the New Jersey Department of Agriculture.

Dennis Wolff, an experienced dairyman who is the Secretary of Agriculture of Pennsylvania, stated that the feds would take over so fast that leadership wouldn’t even be an issue. This was apparently the case with mad cow disease in Washington State. I pointed out to him that if there were multiple outbreaks around the country, the feds might be too short staffed to take the lead. Mr. Wolff and John Enck, VMD, the State Veterinarian, would serve as the leaders in Pennsylvania.

3. How have state and local health departments implemented the mandate for bioterrorism surveillance?

<table>
<thead>
<tr>
<th>State</th>
<th>Human Disease Surveillance Mechanisms</th>
</tr>
</thead>
</table>
| New Hampshire       | Emergency Dept. Surveillance  
Over-the-Counter drug surveillance (RODS)  
NH Medical Examiner data  
Death certificate data  
Occupational and school surveillance  
National Electronic Telecommunications System for Surveillance (NETSS): data for CDC requirements (usual reportable diseases)  
Influenza sentinel physician practices                                                                                                                                 |
| New Jersey          | RODS: Over-the-Counter Drug Sales Monitoring  
Hospital ER volume surveillance  
Hospital ER Data monitoring (selected diagnosis data)  
Communicable Disease Reporting System  
Syndromic surveillance of ER data  
Influenza surveillance using sentinel schools and nursing homes                                                                                                                                 |
| New York State      | ECLRS (Electronic Clinical Laboratory Reporting System)  
Health Provider Network—infusion control nurses report  
Case Investigations—MD and County Health Dept. interactions  
Health Information Network—Counties report to State                                                                                                                                 |
| New York City       | Traditional Surveillance of providers and labs for >70 diseases  
Syndromic Surveillance—911 ambulance call data, ER data, OTC drug sales data from large retail chain, absenteeism data sources  
Unexplained death surveillance—death certificates  
ECLRS—being implemented at every licensed laboratory                                                                                                                                 |
| Pennsylvania        | NETSS—Internet-based laboratory and provider reporting system  
RODS  
Syndromic Surveillance                                                                                                                                                                                                                           |
| Philadelphia        | Currently electronic reporting by network of providers.  
Plan to join NETSS                                                                                                                                                                                                                           |
| Allegheny County    | Electronic laboratory reporting  
Emergency room surveillance  
Physician reporting                                                                                                                                                                                                                           |

All the states have several, and in some cases, overlapping disease surveillance systems. New Hampshire reported having seven surveillance systems, New Jersey six, New York City five, New York State four, and Pennsylvania two.
Mr. Hersh, in the Pennsylvania Department of Health, was extremely proud of the NETSS program that he helped to implement. He received two national awards for NETSS. Carnegie Mellon University developed this database for the state using federal and state funds. This Internet based system cost $700,000 to build. It is a two-way electronic reporting system that is based on the zip code of the patient. Physicians can report cases as well as do research on the system. According to Mr. Hersh, Pennsylvania is the only state in the nation to have such a dynamic system.

Despite all of the elaborate syndromic surveillance systems, past experience indicates that the most likely source of outbreak detection will be an astute physician who recognizes that there is a problem and calls the appropriate public health authorities. For example, when a large Hepatitis A outbreak occurred in Western Pennsylvania in 2003, an emergency room physician called the state’s 800 number after he saw a growing number of patients with this disease.

Dr. Marcelle Layton, Assistant Commissioner at the New York City Department of Health, learned during the anthrax attacks that reporting by health care providers was the key to identifying the outbreak. Further, she determined that the anthrax cases would have been unlikely to be identified by emergency department based syndromic surveillance because there were so few cases in New York City.18 Indeed, the first case of inhalational anthrax was reported by an infectious disease physician in Florida, and the first case of human West Nile virus was reported by an intensive care physician in New York City.

Dr. Dixon recognizes the importance of physician participation and believes he knows the why physicians often do not comply. “They’re busy, and they need to see a direct benefit before they’ll report,” he said. As a result, the Allegheny County Health Department provides inducements such as paying for the medications (e.g. antibiotics) when the physicians report. He claims that he has 100% reporting compliance from the medical community.

In contrast to health, none of the State Departments of Agriculture had elaborate reporting or surveillance systems. They depend upon veterinarians (or farmers, or whomever) to call them. As mentioned earlier, they have either no data or no data to share. According to Dr. Nan Hanshaw-Roberts at the Pennsylvania Department of Agriculture (PDA):

“[The Pennsylvania Department of Agriculture does] daily surveillance testing as part of certification and non-certification programs. Certification programs include brucellosis, pseudorabies, tuberculosis, and chronic wasting disease. Non-certification programs include West Nile virus and others where animals are tested for disease but don’t get certified for being negative. Certification is required in some states for movement of animals without further testing, or with reduced testing.”

Dr. Hanshaw-Roberts explained that disease surveillance strategies for humans do not necessarily apply to animals.

“Immunization rates do not apply to avian influenza (AI), pseudorabies (PRV) in pigs, and probably not to bovine diarrhea. Some diseases, especially if they affect international trade, have vaccine protocols under control of USDA and/or PDA. AI is a good example. Only USDA can give permission to vaccinate against AI. There are issues of availability, trade, and strain-
specific effectiveness. PRV varies by state. Since Pennsylvania is PRV free, no one vaccinates here. In other states, I believe it is up to the Agriculture personnel there to decide.

For rabies, dogs and non-feral cats must be vaccinated at 3 months of age, then yearly, then enough to keep current. It might be useful if owners had to show proof of rabies vaccination to get a dog license. For West Nile virus, the answer is education to persuade the diverse equine community to vaccinate. The incidence rates for West Nile virus, rabies, avian influenza, mycoplasma gallisepticum in poultry, bovine diarrhea, pseudorabies, etc. could be estimated, but would take some effort.”

Two questions arise from the interviews regarding health and agriculture surveillance. First, are all of the health agencies’ multiple surveillance systems really useful, particularly syndromic surveillance? One well-known case in which a surveillance system could have helped in earlier detection of an outbreak was the previously mentioned cryptosporidium outbreak in Milwaukee. This outbreak raged for weeks with over-the-counter anti-diarrheal medications flying off the shelves. The city health department finally learned of the outbreak when an infectious disease physician reported an AIDS patient with this disease.\textsuperscript{19} The delay in recognition resulted in the largest water-borne outbreak in U.S. history. Four hundred thousand people were sickened and one hundred died.

It is not known how many outbreaks have been identified by physician reporting compared to those discovered by syndromic surveillance systems. This would be useful to know since many resources are being put into place for syndromic surveillance systems. One could argue that syndromic surveillance is inherently prone to false positive errors because these systems collect enormous amounts of extraneous data. Just based on the size of the data sets alone, one could find significant findings.

Indeed, there have been very few instances where syndromic surveillance has actually been of any use. One example has been the use of the syndrome, “Acute Flaccid Paralysis (AFP),” which is one of the hallmark symptoms of polio infection. But even this success story has had problems. The surveillance strategy was designed for 100% sensitivity but at the cost of significant specificity. In 1990, the countries of Latin America reported over 2000 cases of AFP, but less than 1% of these cases were confirmed as wild poliovirus.\textsuperscript{20} Although specificity was increased by adjusting case definitions, this change subsequently lowered sensitivity.

While some of the diseases of bioterrorism have distinctive features, such as the classic rash of smallpox, others do not. Combing millions of bits of emergency room or ambulance data, which might be of questionable quality at best, for poorly defined “unusual” syndromes would more likely pick up countless false positives than meaningful findings. Syndromic surveillance for AFP worked because it was in a well-defined population (e.g. children) and it is relatively rare. Even under these conditions, only a tiny percentage of patients actually had polio.

Since public health is forever plagued by limited resources, one could argue that funds and staff time spent on syndromic surveillance systems could be better spent in other ways. In addition, these systems imply that physicians will not have the

\textsuperscript{19} Kahn, LH. Health Affairs 2003.
wherewithal to rapidly report unusual diseases. Perhaps the funds used for syndromic surveillance would be better spent the way Dr. Dixon in Pittsburgh recommends: provide physicians with incentives to report diseases rapidly such as by providing money for patients' medications. This would give the physicians and patients tangible benefits and ensures that the infectious diseases get treated especially if the patients cannot afford to pay for the medicines.

In regards to agriculture, if tracking animal vaccine-preventable and non-preventable diseases is not done, then how can disease control efforts be evaluated? This issue appears to be an unexplored problem that is worthy of further study. For example, in some states, such as Pennsylvania, dogs do not need to show proof of rabies vaccination in order to be licensed. Cats, which are also susceptible to rabies, are not required to show proof of vaccination against this disease. It would make sense to monitor the vaccination rates of these animals just as health departments monitor the vaccination rates of children.

Many of the emerging infectious diseases are zoonotic diseases, such as mad cow disease and SARS. If states cannot monitor and track the known vaccine-preventable diseases of animals, how capable would they be to monitor newly emerging zoonotic diseases? It would make sense to place as much resources in tracking animal diseases as human diseases.
4. Is surveillance of animal diseases being integrated into bioterrorism surveillance?

The short answer for this question is “yes.” Virtually all of the officials said that they have good working relationships with their counterparts in either health or agriculture. New Hampshire has plans to extend surveillance into the veterinarian community.

New Jersey Senior Assistant Commissioner James Blumenstock said, “Agriculture handles food from “farm to gate,” and Health handles food from “gate to plate.” New Jersey has a unique advantage in that the Departments of Health and Agriculture share the same building. According to Mr. Blumenstock, the New Jersey Dept. of Health is planning on sharing some of its funding to the Departments of Agriculture and Education to help them out. There are plans to coordinate animal surveillance with human health surveillance systems. They have Geographic Information System (GIS) capabilities in development that would allow them to geographically map outbreaks. In addition, the New Jersey Department of Health and Senior Services has a few veterinarians on staff.

In New York State, Dr. Morse stated that many of the reportable diseases are zoonoses. Many have been added since September 11th. The human cases get reported to health. There are no specific plans to include veterinarians in the surveillance systems, although NYS Department of Health does employ two public health veterinarians.

Mr. Hersh in Pennsylvania mentioned that there are plans to incorporate veterinarians into the NETSS system. Dr. Dixon has a veterinarian on his staff in the Allegheny County Department of Health. This veterinarian works on rabies and other zoonotic diseases. The department uses a passive reporting system with the local veterinarians.

Dr. Nan Hanshaw-Roberts at the Pennsylvania Department of Agriculture stated that their laboratories are being upgraded and people are being trained for testing certain diseases that may be utilized in bioterrorism. She said, “Data information systems used for daily disease programs are being upgraded to allow rapid tracking of animals, and an Emergency Management Resource System (EMRS) is being developed to allow incident management and reporting to USDA. In addition, GIS capabilities are being developed, and farms are being geocoded.”
5. What are the current laboratory/diagnostic capabilities at the state and local levels?

Laboratories are a critical part of disease surveillance because they conduct the tests that definitively identify the pathogens. In 1999, the U.S. General Accounting Office (GAO) issued a report on the states’ public health laboratory capacities.\(^{21}\) According to this report, “Every state has at least one state public health laboratory to support its infectious disease surveillance activities and other public health programs. Some states operate one or more regional laboratories to serve different parts of the state.” These regional laboratories often involve academic institutions, such as university medical and veterinary schools, to provide public health laboratory services.

The mission of state laboratories is to conduct tests for: routine public health surveillance, special clinical or epidemiologic studies, diagnosis of rare or unusual pathogens, identification of low-incidence, high risk diseases (e.g. botulism and tuberculosis), and outbreak investigations. In addition, many state public health laboratories provide licensing and quality improvement oversight of commercial laboratories.\(^{22}\) Recently, in addition to their usual responsibilities, public health laboratories are now considered the vanguards in identifying agents of bioterrorism.

In 1999, the Centers for Disease Control and Prevention (CDC) established the Laboratory Response Network (LRN) which is a network of federal, state, local, military, food safety, environmental, veterinary, and international laboratories.\(^{23}\) This network’s mission is to provide laboratories that are fully equipped and able to respond to acts of biological and chemical terrorism as well as other public health emergencies. Since many of these agents of bioterrorism are highly pathogenic and communicable, working with them requires biosafety level 3 (BSL 3) capabilities.

The CDC has published guidelines for biosafety standards and practices in work performed on infectious agents. These guidelines were developed to protect both laboratory workers and the public from dangerous pathogens; biosafety levels are graded from 1 to 4. Pathogens that are extremely virulent, communicable, and/or exotic, and expose the laboratory worker to potentially life-threatening diseases require the highest level of safety containment such as a full-body, air-supplied positive-pressure personnel suit. Hemorrhagic fever viruses, such as Ebola and Marburg, have BSL 4 requirements.\(^{24}\)

Biosafety Level 3 laboratories require specialized enclosed chambers for pathogen testing rather than open table tops which are acceptable for biosafety levels 1 and 2. In addition, they require special ventilation systems that minimize the risk of release of agents from the laboratory. (BSL 3 and 4 assume pathogens’ have aerosol transmission capability).

\(^{22}\) ibid.
During the interviews, virtually all of the state officials said their respective departments have plans/grants to upgrade their laboratories to include BSL 3 capabilities. Information regarding the local laboratories will be forthcoming after the surveys are analyzed.

Table 7. State Laboratories and Biosafety Levels

<table>
<thead>
<tr>
<th>State</th>
<th>Health/BSL</th>
<th>Agriculture/BSL</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Hampshire</td>
<td>Public Health Lab/BSL 3</td>
<td>Veterinary Diagnostic Lab*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>at Univ. NH./ BSL 3</td>
</tr>
<tr>
<td>New Jersey</td>
<td>Traditional Lab/BSL 2</td>
<td>State Animal Lab/BSL 2**</td>
</tr>
<tr>
<td></td>
<td>(modular BSL 3 planned)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bioterrorism Lab</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Environmental/Chem Lab</td>
<td></td>
</tr>
<tr>
<td>New York State</td>
<td>State Labs/BSL 3+</td>
<td>State Diagnostic Lab at Cornell/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BSL 3 (limited)*</td>
</tr>
<tr>
<td>New York City</td>
<td>Public Health Lab/BSL 3++</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Bioterrorism Lab/BSL 3++</td>
<td></td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>Public Health Lab/BSL 3^</td>
<td>3 Animal/Vet Labs^^</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Equine Toxicology Lab</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Food Safety Labs/BSL 1 &amp; 2</td>
</tr>
<tr>
<td>Philadelphia</td>
<td>BSL 2</td>
<td>N/A</td>
</tr>
<tr>
<td>Allegheny County</td>
<td>BSL 2#</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*NH has an $18,000 grant to raise capabilities.  
**A new lab, along with 2 new necropsy suites, is being planned with the health department.  
^NYS Dept. of Health has a grant to improve public health laboratories. Department of Agriculture is in the process of building a new State Diagnostic Lab.  
++NYC has a $15 M grant for a BSL 3 bioterrorism lab. According to Dr. Tom Frieden, NYC Commissioner of Health, its public health lab is its weakest link since it is in poor repair and has serious gaps in staff.  
^According to Mr. Hersh, the PA lab has been enhanced with bioterrorism funds. It is certified to handle select agents and is part of CDC’s LRN. It is the only lab able to handle forensic cases. Space is an issue, lab is in a leased building.  
^^There are 3 state animal/vet labs (Harrisburg, PENN State, and Univ. of PA). Process 1 million samples per year. Able to do necropsy studies. One is a BSL 2. One is a small BSL 3. One has a grant to enhance capabilities to BSL 3. The equine toxicology lab tests horses that are competing in horse races. The food safety labs could use funds for BSL 3 capabilities, more trained staff, and better laboratory equipment.  
^Building a new public health lab with 500 square feet of BSL 3 capabilities to work on select agents from bioterrorism funds.
6. How do state and local health departments plan to communicate with health professionals, other state and local agencies, federal officials, and the public in the event of a bioterrorist attack?

<table>
<thead>
<tr>
<th>State</th>
<th>Health</th>
<th>Agriculture</th>
</tr>
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<tbody>
<tr>
<td>New Hampshire</td>
<td>Fax</td>
<td>Phone tree System</td>
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<td></td>
<td>e-mail</td>
<td>Milk Truck Drivers</td>
</tr>
<tr>
<td></td>
<td>Telephone</td>
<td>Media</td>
</tr>
<tr>
<td>New Jersey</td>
<td>Blast Fax</td>
<td>Fax to Vets</td>
</tr>
<tr>
<td></td>
<td>Reverse 911</td>
<td>Press/Media/TV/Radio</td>
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<td>CDC HAN</td>
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<tr>
<td></td>
<td>800 MHz radio</td>
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<tr>
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<td></td>
<td>Media</td>
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</table>

The physician and veterinarian survey responses should provide important feedback and additional information regarding state and local agencies plans to communicate with health and veterinary professionals.
IV. The Significance of the Project to the Recipient and the Potential Application and/or Generalization of its Results Beyond The Project

So far, the process of interviewing state officials has been as interesting as the information they have provided (or not provided). For example, the difficulty in getting the New Jersey Department of Health officials to cooperate with this study may be revealing of some of the politics in the state. The state health commissioner would not cooperate until higher level officials were contacted. Their suspicious nature and questions about the study were orders of magnitude beyond any of the other respondents. Such paranoia in state government jeopardizes good will and could harm cooperation with other agencies and the public. This project did not seek to study secrecy in government nor social capital, such as trust in others, yet, I believe, that these are important issues that would be critical for the success of any future effort in responding to a crisis.

As mentioned earlier, some states have been easier to get infectious disease statistics than others. New York State is the only state that provides extensive data on its web site for researchers including rates and multiple years. New Hampshire provides no data on its web site; the state epidemiologist became testy as I asked for additional data. Pennsylvania provides some data on infectious diseases, but not as much as New York and New Jersey. For example, the Pennsylvania Department of Health web site did not have meningococcal disease rates across the state even though the Philadelphia Department of Health readily had this information; the disease is reportable in Pennsylvania. Mr. Hersh, Pennsylvania’s Director of Epidemiology did not have this information, either. In addition, there was a significant discrepancy of the average annual measles rates between the Pennsylvania Department of Health and the Philadelphia Department of Health.

When states report disease rates, it is assumed that they are correct. If local health departments do not calculate their own rates, then it would be impossible to verify this data. Since policy is made from these numbers, this finding could have important nationwide implications.

In addition, none of the states have real-time data that would be useful for actively practicing physicians—and there is no data for veterinarians. For practitioners who need to know what diseases are circulating in their communities at the moment, state level data does not provide daily or even weekly updates. Currently, physicians know what they are seeing in their offices, but their offices are small windows into the whole communities in which they practice. It should be the responsibility of local health departments to provide practitioners with up-to-date infectious disease information so that they can provide better, more informed care. With real-time information, practitioners might be more inclined to participate in reporting cases. Hopefully, the physician and veterinarian surveys will provide more information on this issue.

From the state interviews, I have discovered that most of the case reports come from laboratories rather than from the physicians which provides support to the notion that physicians are not particularly engaged in the public health process. This is a serious problem because, as mentioned previously, physicians are usually the ones to identify
outbreaks. The local health and physician surveys will hopefully provide more information on this issue.

One question that this project did not initially plan to ask is, “how many outbreaks do state and local health agencies actually investigate”? After all, should one assume that “practice makes perfect?” I recently asked this question of the states and large cities in the study.

New Hampshire investigates about 15-20 outbreaks per year. Of these, 90% are food borne. New York State investigates 400-500 food borne complaints per year. Their regional epidemiology program investigates 50-100 outbreaks per year, some of the larger food borne outbreaks are included in this group. The state also investigates approximately 500 nosocomial outbreaks in hospitals and long term care facilities. Pennsylvania receives about 200 outbreak reports per year; the state does not determine the different types of outbreaks actually investigated.

The Allegheny County Health Department investigates about “3 to 4 dozen per year,” according to Dr. Dixon. He said that sometimes they get prejudicial information from the hospitals and medical community. For example, one hospital reported an outbreak as being a food borne outbreak. Dr. Dixon’s team determined that it was not food borne, but instead a person-to-person outbreak of norovirus. The epidemiologists had to go back and re-interview people with additional questions appropriate to the specific type of outbreak. This delay cost time not only for the epidemiology staff’s efforts, but also for appropriate disease control measures.

How many outbreaks should a state or local health agency investigate per year in order to maintain competency? How could one classify an outbreak investigation as a success or failure? Dr. Dixon believed that the Hepatitis A outbreak investigation in Western Pennsylvania should have taken no longer than a week. Instead, it took six weeks. According to Dr. Dixon, the epidemiologists were fixated on a person-to-person rather than a food borne outbreak.

Should outbreak investigations be evaluated for quality improvement? What would be the criteria? Finally, it is not known if there are enough outbreaks requiring forensic epidemiology skills that would provide the skills and expertise necessary to respond to a bioterrorist attack.