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BIOTERRORISM PREPAREDNESS AND RESPONSE IN KENTUCKY

Brennan O'Banion

The Federal Bureau of Investigation (FBI) defines terrorism as "the unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives." It can be divided into two categories: international and domestic, depending on the objectives and affiliations of the terrorist. A number of domestic terrorist acts have occurred within U.S borders, the most memorable being the Oklahoma City bombing in the spring of 1995. In an attack of this type there is an immediate catastrophic effect and damage to both person and property can be immediately assessed. However, this is not necessarily true with other mediums of terrorism, more specifically of biological terrorism. The most probable scenario for the release of a biological agent will be covertly in a populated area. In this scenario, the after-effects of the release will not be known until long after the exposure. For example, if a biological agent were released into the ventilation system of a college basketball arena, symptoms of those exposed my not appear until days or weeks later. By this time, those individuals will have dispersed throughout the state, possibly infecting others. Thus, the question of how Kentucky can prepare to detect and respond to the silent release of a potentially deadly biological or chemical agent becomes a vital question.

In past years little thought was given to bioterrorism preparedness and response throughout the United States. However, after the Gulf War and Oklahoma City the real threat of a bioterrorist attack was realized. Therefore, the Department of Justice (DOJ) conducted an assessment of the nations public health infrastructure. The following list addresses the key focus areas of the assessment of public health capacities and capabilities outlined by the DOJ.

1. Workforce capacity
2. Information systems capabilities
3. Public health surveillance capacities
4. Epidemiological investigation expertise
5. Laboratory services and other diagnostic resources
6. Local hospital capacities for responding to an emergency
7. Availability of privately owned assets (ambulances, home health care providers, emergency care facilities, and university equipment and personnel)
8. Veterinary and environmental resources (personnel and/or equipment)
9. Regional and state assets available to local jurisdictions
10. Overall strength of public health infrastructure

This assessment showed that the current U.S. public health infrastructure was ill equipped to effectively cope with a bioterrorist attack. To address this deficiency, grants through the Center for Disease Control and Prevention (CDC) were awarded to each state for the development of new methods and protocols for the detection of, and response to, a biological or chemical release. There are five (5) focus areas, designated A-E, for this purpose and they are as follows:

A. Preparedness and Prevention
B. Detection and Surveillance
C. Diagnosis and characterization of biological and chemical agents (lab capacity)
D. Response
E. Communication

The Kentucky Department for Public Health (KDPH) is in its second year of funding for focus area B and has recently applied for funds in focus areas C and E. These funds have been used to hire new personnel to address the detection, surveillance, and response to a biological or chemical release as well as distribute information and training materials on biological and chemical terrorism to local health departments (LHD). A complete list of year one and two activities can be found at www.bt.cdc.gov/STAndLocal/.

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BIOTERRORISM PREPAREDNESS AND RESPONSE IN KENTUCKY (continued)

As of March 01, 2001, a bioterrorism surveillance coordinator was hired at the KDPH in the Division of Epidemiology and Health Planning. Mr. Brennan O'Banion has taken an aggressive approach in developing and improving on existing methods of disease surveillance. Surveillance systems using school absenteeism and morbidity are currently under development. With the assistance of Douglas L. Holt, branch manager for the Division of Management Information Systems, base-line data for an antibiotic surveillance system is currently being collected using Medicaid data.

The current system for reportable disease is also a target for improvement, by changing the current *paper-based format to an electronic, web-based reporting system. Mr. O'Banion's intent is to develop a website that can be used to complete and transfer an encrypted form to the appropriate responder. The responder may investigate the report for case confirmation if needed, add any pertinent information to the electronic form, and forward it to the appropriate individual at the state level. The final product of these efforts will be to have all reportable disease forms accessible and transferable via the Internet and summary data from disease reporting posted for public viewing. Plans are also in progress to design an electronic reportable disease form that can be imported into the National Electronic Telecommunication System for Surveillance (NETSS) for direct upload to the CDC.

Concurrent with the development of new surveillance systems, Mr. O'Banion has also been working with Dr. Betty Olinger and Ms. Lynn Owens, from the Division of Local Health Department Operations, to submit a grant application for focus area E funds. These funds are renewable over three (3) years and, if awarded, will contribute approximately $320,000 toward implementing new communication technologies for the state and local health departments, also known as the Health Alert Network (HAN). The HAN is a system in which individuals within that network can send and receive information concerning health related issues as well as receive training from either the CDC or the state health department. The network that Mr. O'Banion has designed will have two components; a centralized computer in each health department to be used by rapid responders and infection control personnel for training, communication, and disease surveillance and a two way pager system that can send or receive text to and from personnel in the field. Since this "pager net" is web-based, an infection control nurse could effectively communicate, from his/her computer, with an environmentalist in the field. Due to its web-based properties it can also be used as a broadcast system with the use of e-mail groups. Therefore, in the event of a crisis the KDPH could communicate important information to health departments across the state simultaneously. The first stage of the HAN development will be to purchase one computer for independent and district health departments that have a minimum service area of 50,000 people. This translates to approximately 70% of the total service area for Kentucky. Two pagers will also be purchased for each of these 19 health departments. In the second and third grant years, at least 1 computer and 2 pagers will be purchased for the remaining 36 health departments

The final effort of the KDPH to increase its level of preparedness and response is the improvement of the state laboratory facilities. To date the state laboratory has received no funding from the CDC to improve its proficiency in handling and identifying biological agents that may be used by terrorists. Despite this, they have participated in training and purchased equipment to significantly increase their level of biological terrorism preparedness using existing funds. With the acquisition of Focus Area C grant monies, the state laboratory intends to hire personnel and purchase materials and equipment that will qualify it as a Biosafety Level III laboratory for handling anthrax, plague, Q-fever, and brucella specimens.

History has shown us that, in the correct frame of mind and with the proper resources, man can do the impossible. Unfortunately, this also applies to the unthinkable. Biological terrorism is no longer a problem specific to foreign governments and British secret agents, but of any man, woman, or child who eats at a restaurant or attends a public event. That is why we must put forth our best efforts to prepare for a very real threat, the threat of biological and chemical terrorism.

For further information please contanct Brennan O'Banion at 502-564-3418 ext.3584 or brennan.o'banion@mail.state.ky.us.

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*The Kentucky Reportable Disease Form can be obtained from the Internet by going to the Kentucky Public Health web site (http://publichealth.state.ky.us/), click "Reportable Disease Form" in the left hand column, and print.

TRANSMISSIBLE SPONGIFORM ENCEPHALOPATHIES

Sally Slavinski, DVM, MPH

In 1986, British veterinarians identified a new, strange disease in cattle. Affected animals exhibited nervousness, heightened senses, weight loss, and diminished milk production. As the disease progressed they had difficulty walking and holding up their heads. Pathologists named it bovine spongiform encephalopathy (BSE), and the media named it "mad cow disease". By 1992, nearly 1,000 cases were reported each week in Britain, and epidemiologists finally identified the causative agent as a prion. The one factor that all cases had in common was their consumption of a meat and bone meal feed which contained rendered sheep and cattle offal. Further investigation of the feed revealed that in 1981 a solvent normally used in treatment of the meat and bone had been reduced in concentration. The incubation period for BSE is three to five years, which is consistent with the introduction of a contaminant previously destroyed by the solvent. A ban put in effect eliminating the use of ruminant-based feeds to ruminants resulted in a dramatic reduction in the number of cases. There was a 30% drop from 1993 to 1994, and a 42% drop from 1994 to 1995.

As of December, 2000, more than 180,376 cases of BSE had been confirmed in the UK alone, and additionally in cattle in twelve other European countries. BSE is a transmissible spongiform encephalopathy (TSE) and, though it is fairly new, there are other transmissible spongiform encephalopathies that have been recognized for hundreds of years. TSE's are progressive degenerative diseases that affect the brain and are caused by prions. The incubation period lasts for years, and the presence of symptoms occurs just prior to a rapid decline, eventually ending in death. Prions are still not well understood. Stanley Prusiner, a neurologist at the University of California, San Francisco, won the 1997 Nobel Prize in Medicine for his research on prions. According to him, they are thought to be similar to proteins found naturally on the surface of certain brain cells, differing only in structural configuration. Chemically, some types of normal brain proteins form open coils that allow them to be destroyed by enzymes when they become damaged. From the study of diseased animal brains, however, Prusiner concluded that prion proteins form sticky sheets, or coverings, that are impermeable to this defense system. When sticky proteins affected by prions come into contact with normal proteins, the sticky ones seem to induce the normal ones to assume the new configuration. Over long periods of time, the sheets will eventually kill surrounding nerve cells leaving tiny holes in the brain. The faulty prions are believed to be transmitted either from one animal to another, or genetically, or iatrogenically through medical procedures.

IN ANIMALS:

There are at least four recognized, transmissible spongiform encephalopathies that occur in animals. They include; scrapie of sheep and goats, transmissible mink encephalopathy, chronic wasting disease of hooved animals, and bovine spongiform encephalopathy (BSE). Scrapie has been a recognized disease in sheep and goats for over 300 years. Along with progressive degenerative brain disease, the affected animal will scratch at its itself to the point of self mutilation, hence the name scrapie. During the 300 years, there have been no accounts of scrapie in humans or other animals.

Chronic wasting disease (CWD) primarily affects deer, but has also been diagnosed in elk. The animals become listless, emaciated, polyuric and polydipsic, and salivate excessively. The disease first became apparent in 1967 at research facilities in Colorado and Wyoming. Initially, the deer were thought to be suffering from a nutritional deficiency. Then, between 1974 and 1979, the two facilities lost 57 of 67 captive deer. In 1978, a veterinary pathologist discovered lesions in the brain compatible with those of transmissible spongiform encephalopathy (TSE). To date, CWD has been identified in free ranging deer and elk in areas of Wyoming and Colorado, as well as in captive, farmed herds of elk in Nebraska, South Dakota, and Oklahoma. Surveillance systems have been established to monitor CWD in captive and hunted deer and elk.

The United States has had a BSE surveillance system in place for more than 10 years on both the state and federal levels. There is strict enforcement of import restrictions on ruminant and ruminant products from any countries where BSE exists, and a domestic FDA ban on animal derived feeds. Trace-backs are used to identify cattle originating from BSE infected countries that, if identified, are purchased and inspected or closely monitored for evidence of BSE. Brain samples from cattle exhibiting neurologic disease are submitted

TRANSMISSIBLE SPONGIFORM ENCEPHALOPATHIES (continued)

to The United States Department of Agriculture (USDA) and histologically reviewed by pathologists. In July, 2000, a flock of imported Belgian sheep suffering from an unidentified TSE was identified in Vermont through the surveillance system. USDA acquired the sheep and is currently performing diagnostic tests to determine the cause of the TSE.

IN HUMANS:

There are also four recognizable spongiform encephalopathies that occur in humans. They include; Creutzfeldt-Jakob disease (CJD), Gerstmann-Straussler-Scheinker syndrome, kuru, and fatal familial insomnia. The causes of these are thought, at least in part, to be inherited. Kuru may be an exception in that victims have been confined to a cannibalistic tribe in New Guinea where the brains of departed relatives are eaten. CJD, while extremely rare, is the most common prion disease occurring in man, at a rate of one per million population worldwide. Cases of CJD initially present with dementia followed by rapid mental deterioration. Symptoms include myoclonus, rigidity, nystagmus, tremor, and visual deficits. CJD is not contagious person to person, although cases have arisen from various types of tissue transplants and from human growth hormone injections.

A new variant of CJD was detected in 1995, now referred to as vCJD. It differs from CJD both epidemiologically and clinically. Ninety-nine percent of CJD victims are more than 35 years of age, while vCJD victims are younger, with a median age of 27.5 at the time of death. Clinical presentation of vCJD differs in that psychological disorders and sensory deficits are pronounced at the time of presentation. Symptoms may include pain or paresthesias , psychosis, depression and anxiety. Histologically, vCJD patients tend to develop amyloid plaques in the brain, an uncommon finding in CJD. Establishment of a causal link between BSE and vCJD seems justified on the basis of research and epidemiologic studies. 1) There are no reports of vCJD in areas free of BSE. 2) The incubation period for vCJD is consistent with the time frame for the use of contaminated feed in cattle and the onset of human cases. 3) Laboratory based studies have proven the prion responsible for BSE to be identical to the vCJD prion in certain biological and molecular characteristics, and 4) In one study macaque monkeys developed a vCJD-like illness after inoculation with brain tissue from BSE infected cattle. To date there have been 91 confirmed or probable human cases reported; 87 in the UK, three in France, and one in Ireland.

Surveillance for CJD and vCJD in humans is ongoing. According to an analysis by the CDC of the CJD cases reported in the US, none has been identified as vCJD. New reports of CJD diagnoses in persons younger than 55 years of age are fully investigated to determine if any are potential cases of vCJD. Stories that have linked cases of CJD to the consumption of squirrel brains or deer or elk meat are inaccurate and have been sensationalized by the media. Investigation into these allegations indicate that the cases are not a variant form of CJD, as might be expected if acquired from a TSE infected animal. Nor was an association between eating habits of the cases and the infections proven. To further protect the public's health, the FDA has placed restrictions on blood donation, and the production of vaccines and biologic products derived from bovine materials. While transmission of vCJD by blood in humans has not been proven, there are animal models that have shown TSE's are transmissible through blood, thus blood is not acceptable for transfusion from anyone who has spent a total of six months or more in the United Kingdom between 1980 and 1996. Similarly, vaccine manufacturers have been requested to use only materials derived from cattle in countries with no evidence of BSE.

To date there have not been any reports of BSE or vCJD occurring in the US. Surveillance and preventive measures are in place to minimize the risk of both, but only time will tell if the measures imposed have been adequate.

Reprinted from: Mississippi Morbidity Report. Mississippi State Department of Health. Volume 19, Number 8, March 2001

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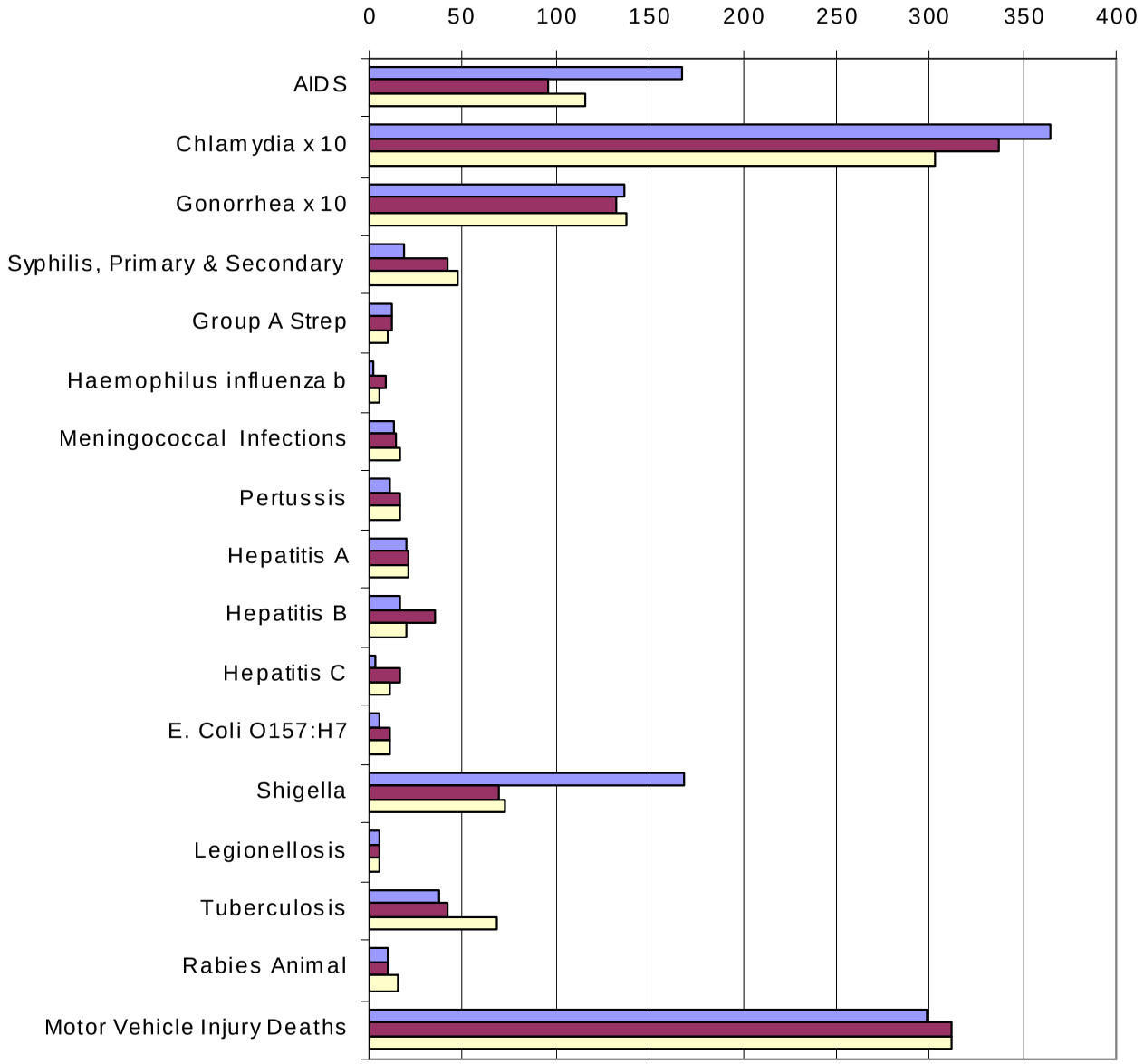
CASES OF SELECTED REPORTABLE DISEASES/CONDITIONS IN KENTUCKY, YEAR TO DATE,(YTD) THROUGH MAY 2001



Diseases Of Low Frequency Occurance	2001YTD	2000 Annual Totals
Diphtheria	0	0
Measles	2	0
Mumps	1	1
Polio	0	0
Rubella	0	1
Tetanus	0	1
VECTOR-BORNE DISEASES		
Arboviral encephalitis	0	2 LAC
Lyme Disease	2	13
Malaria	2	18
Rocky Mountain spotted fever	0	4
Tularemia	0	3

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Ovarian Cancer: A Comparison of the Kentucky and United States Incidence Rates

Kentucky Cancer Registry
University of Kentucky Markey Cancer Center

In Kentucky, more than 300 women are diagnosed with ovarian cancer each year. Incidence rates presented in Figure 1 are calculated from the Kentucky Cancer Registry for 1993-1997 and are compared with data from the Surveillance, Epidemiology, and End Results (SEER) Program at the National Cancer Institute. Data from SEER are often used as an estimate for national incidence rates. For each year during this five-year period, ovarian cancer incidence rates in Kentucky were lower than the corresponding SEER rates.

Figure 1. Ovarian Cancer Rates
KY versus SEER*
1993-1997

YEAR	1993	1994	1995	1996	1997
KENTUCKY	12.4	12.8	13.6	14.1	12.8
SEER	15.0	14.5	14.7	14.3	14.3

*Rates are per 100,000