Utah Pandemic Influenza Response Plan
Influenza Enhanced Surveillance Plan

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Glossary of Terms

BEMS	**Bureau of Emergency Medical Services**
CDC	**Centers for Disease Control and Prevention**
DFA	**Direct Fluorescent Antibody**
IAH	**Influenza-Associated Hospitalization**
ICP	**Infection Control Practitioner**
ILI	**Influenza-Like Illness**
LHD	**Local Health Department**
OME	**Office of the Medical Examiner**
OTC	**Over the Counter**
P and I	**Pneumonia and Influenza**
PCMC	**Primary Children's Medical Center**
RODS	**Real-time Outbreak and Disease Surveillance**
UDAF	**Utah Department of Agriculture and Food**
UDOH	**Utah Department of Health**
UDWR	**Utah Division of Wildlife Resources**
UPHL	**Utah Public Health Laboratory**
USDA	**United States Department of Agriculture**
USOE	**Utah State Office of Education**

List of Specific Topics	
Sentinel Sites	**. Year-round Reporting** **. Laboratory Testing** **. Geographic Representation** **. Data Elements** **. Incorporation of Specific Sites**
Influenza-associated Hospitalizations	**. Hospital Discharge Data** **Laboratory Testing** **. Isolation and Quarantine**
Absenteeism	**. School Absenteeism** **.**
Chief Complaint/Syndromic Data	**. Reporting Sites** **. Communicable Disease Rule** **. Syndromic Systems**
Laboratory Testing	**. Sample Submission to UPHL** **. Sample Submission to CDC**
Mortality	**. OME** **. Vital Statistics** **. Hospitals** **. Final Disposition Authorization**
All Case Reporting	**. Reactivation**
Medication Sales and Use	**. Antivirals** **. Over the Counter Drugs** **. Vaccine Data**
Influenza-like Illness Outbreaks	**. Specific Facilities** **. Communicable Disease Rule**
Communication and Coordination Procedures	**. Surveillance Partners** **. Human activity** **. Non-Human Activity**
Data Dissemination	**. Distribution Items** **. Distribution Methods**

Introduction

The purpose of this document is to expand on the surveillance elements identified in the Utah Department of Health (UDOH) surveillance scenario document. Utah currently uses a robust surveillance system to monitor seasonal influenza activity and pandemic surveillance would build upon this preexisting system.

Pandemic influenza surveillance includes two primary surveillance systems: virologic surveillance in which rapid detection of novel influenza viruses serves as the primary goal, and general disease surveillance in which estimate and description of disease burden in the community is the primary goal (1).

Data collected from surveillance systems serves numerous purposes both for seasonal and pandemic influenza tracking. Data can assist in the following manners:

- Identify control strategies
- Identify high-risk groups
- Assist in the prioritization of groups for vaccination and antiviral therapy
- Provide description of temporal and severity trends

Surveillance activities will be led by the State Influenza Coordinator who will be the same individual as the seasonal influenza coordinator.

Sentinel Sites

Introduction

Utah sentinel healthcare providers sites are part of a 1,600-member nationwide network of sentinel surveillance sites sponsored by the Centers for Disease Control and Prevention (CDC). Influenza-like illness (ILI) is typically defined as the presence of fever (>100° F) and cough or sore throat in the absence of a known cause. Sites are asked to at a minimum report October through May, with year-round reporting being the ideal. Sites are asked to tally and report all patient visits for ILI weekly, classifying counts into four age groups: 0-4 years, 5-24 years, 25-64 years, and ≥ 65 years. A percentage of total visits due to ILI is then calculated using a total patient census also provided by sites. During the 2005-06 season, data collection was expanded for certain sites to include age-group specific patient census counts, allowing for age-specific ILI percentages to be calculated.

Influenza coordinators at each local health department (LHD) work directly with sites to initiate reporting. LHDs then send data to the UDOH for compilation and further analysis. Data are often not collected at the very start and end of the reporting period. ILI visits will typically peak at the height of influenza activity during a given season. There is strong correlation between reported ILI and lab-confirmed influenza in Utah and ILI reports are considered reliable indicators of influenza-like illness activity.

Year-Round Reporting

Current: Twelve sites representing three health-districts are year-round reporters as of present. These sites have implemented electronic reporting of data to the UDOH and involved LHDs. The UDOH has the ability currently to conduct year-round surveillance, including specimen collection/ testing at UPHL and ILI case counting.
Expansion: The demand for the number of year-round reporters will increase during a pandemic, as viral circulation will most likely occur outside the normal seasonal influenza time period. The expansion of electronic reporting will assist in efforts to implement year-round reporting. Sites currently not reporting year-round will be identified and health department personnel will assist in efforts to collect ILI and specimens for lab testing.
Method: Activation of sentinel clinician site network for year-round reporting would require LHDs to work closely with sites in their jurisdiction to initiate the data/ specimen collection process to extend the reporting timeline. Data collection requirements would remain the same at sites for year-round reporting (i.e. counting of visits for ILI unless and specimen collection on patients meeting ILI case definition unless otherwise noted.)

Laboratory Testing

Current: Sites enrolled in the sentinel network are also asked to submit nasopharyngeal swabs from suspect ILI cases for testing at the Utah Public Health Laboratory (UPHL). Typically, sites are provided with three testing kits and are asked to collect specimens during three staggered time periods during the season (beginning, middle, and end). A full respiratory panel using direct-fluorescent antibody (DFA) is conducted at UPHL. Positive specimens are then sent for culture.
Expansion: In order to provide accurate virologic characterization, swabs would need to be collected on a more frequent basis. Patients with specific risk factors such as poultry exposure or unusual travel history would especially warrant additional specimen collection.
Method: Expansion of this process would involve UPHL providing additional testing kits to the sites and LHDs working to ensure specimens are collected and then sent to UPHL.

Geographic Representation

Current: 6 counties and 6 health districts were represented from sites with consistent reporting during the 2005-06 season.
Expansion: Broadening of sentinel site network for improved geographic representation would involve both reactivation of dormant sites that have ceased to report regularly as well as the inclusion of additional sites. Additional sites in rural areas of the state may be of particular need.
Method: UDOH would work in coordination with LHDs to identify geographic areas needing site representation and then eligible facilities in these areas. Sites that are currently not reporting data, but have in the past, may serve as starting-points.

Additional Data Elements

Current: The only data point collected for identified ILI cases is age.
Expansion: New data points could also be incorporated such as poultry exposures, laboratory employment, travel histories, particularly if the presentation of ILI is outside the normal influenza season. This would allow assessment of poultry to human transmission and out-of-country exposure in the case of influenza circulation outside the United States. Specimen collection would be a direct result of any reported unusual travel history or avian exposure.
Method: Expanded data collection would occur via UDOH and LHDs working directly with sites to identify data collection and reporting.

Incorporation of specific sites

Current: The majority of reporting sites as of present are family practice, pediatric, and general urgent-care facilities.
Expansion: ILI data from specific outpatient settings may be desired and new sites incorporated into the sentinel network:

- Travel clinics
- Poultry occupational settings
- Wildlife agents and hunters

Method: Collaboration between UDOH and LHDs would be needed to identify specific sites of interest. LHDs would take the lead in recruiting and establishing new sites. Consultation with the Utah Department of Agriculture and Food (UDAF) and the Utah Division of Wildlife Resources (UDWR) may also be needed if specific animal exposures are of interest.

Influenza-Associated Hospitalizations

Introduction

Laboratory-confirmed influenza-associated hospitalizations (IAHs) remain a reportable condition in the state. A laboratory-confirmed IAH is defined for surveillance purposes as a hospital admission associated with at least one laboratory or rapid diagnostic test result indicative of influenza. This surveillance system does not seek to definitely determine whether the hospitalization is due exclusively to influenza. However, it remains a reliable indicator of disease severity and influenza circulation levels. IAHs are primarily identified by Infection Control Practitioners (ICPs) through laboratory testing results. Typically, ICPs then work with LHDs to collect needed data.

IAHs are expected to occur in high-risk individuals each season. Individuals can be high risk due to age (< 2 years, ≥ 65 years) and/or comorbidities such as metabolic, cardiovascular, and respiratory diseases. Data points collected include demographics (age, sex, race, ethnicity, etc.) and high-risk factors, including travel histories. As frequency reporting varies by hospital, additional communication between UDOH, LHDs, and ICPs is needed to ensure consistent

reporting. In the situation that staffing is limited in hospitals, LHD and UDOH staff could provide in-house support for data collection.

Hospital Discharge Data

Current: The current IAH surveillance system does not directly utilize hospital discharge data. However, discharge data is available, but not on a real-time basis.
Expansion: If influenza activity warrants utilization of this system, real-time data would be needed. Evaluation of hospital discharge data has indicated a wide variety of ICD-codes need to be utilized for influenza surveillance. These include codes associated with influenza, pneumonia, and general respiratory/ circulatory conditions.
Method: Incorporation of discharge data would occur primarily at the state level with UDOH making data available to LHDs.

Laboratory Testing

Current: During the 2005-06 season, 70% of reported IAHs were identified using rapid tests. Less than 10% were identified using culture methods. Since rapid test reliability decreases proportionately to influenza circulation, rapid tests are not the preferred method for laboratory confirmation.
Expansion: During circulation of novel influenza strains, proper identification of viruses would be essential. Increased use of confirmatory DFA and/or culture results would be warranted.
Method: Increasing isolate submission would involve coordination between hospital laboratories, ICPs, LHDs, UDOH, and UPHL.

Isolated and Quarantined Persons

Current: The UDOH does not collect information on isolated and quarantined persons in relation to influenza.
Expansion: During circulation of novel influenza strains, the ability to quantify persons being isolated and quarantined in the hospital setting would be needed.
Method: Data collection would be similar to current collection for influenza-associated hospitalizations with ICPs and LHDs collaborating to quantify and investigate patients who are isolated or quarantined.

Absenteeism

Introduction

Since influenza often begins circulating among school-aged children, reports of student absenteeism are collected. Schools are asked to report October through May at a minimum. LHDs work directly with schools to initiate reporting. Data are then sent to UDOH for compilation and further analysis. The UDOH also receives data from the Utah State Office of Education (USOE).

Participating schools report total enrollment, number of days in the school week, and total numbers of students absent for any reason. Additionally, select schools also report absences identified due to any illness and ILI specifically. Total absences include absences due to illness, vacation, and other causes not necessarily related to influenza. Thus, absences due to illness provide a more specific measurement of influenza activity.

School Absenteeism

Current: The majority of schools collecting absenteeism data for influenza surveillance do so from October-May. This leaves absenteeism occurring at the very beginning and end of the school year unmeasured. Data collected during these months would assist in both developing baseline measurements and also identifying novel influenza strain circulation.
Expansion: Expansion of this system may include the incorporation of additional sites for increased geographical representation and/or refinements of data collection methods to better ascertain absenteeism due to illness. In the event of massive school absenteeism, surveillance could also shift from measuring individual absenteeism to counting the number of schools closed.
Method: The UDOH and LHDs would work to identify new sentinel schools to incorporate and/or refine existing data collection methods. The UDOH may also work directly with the USOE to expand data collection.

Chief Complaint/Syndromic Data

Current: Chief complaint data at select emergency departments and urgent care facilities are collected year-round on a real-time basis as part of the Real-time Outbreak and Disease Surveillance system (RODS). These visits are classified into syndromic categories. Two categories are of interest for seasonal influenza surveillance: respiratory and constitutional. Analyses have suggested both categories are strongly correlated with influenza transmission. The majority of facilities collecting data for this system are located in urban areas of Utah. LHDs and UDOH are able to access this data.
Expansion: Incorporation of additional reporting sites may be needed for better geographic representation and general morbidity characterization. Emergency rooms and urgent-care clinics would be of high interest since acutely ill individuals visit these facilities and chief complaint data is routinely collected. Although chief complaint data is electronically collected and processed in RODS, expansion of this system may include non-electronic methods similar to current ILI data collection at many sentinel sites.
Method: Expanded data collection would occur via UDOH and LHDs working directly with sites to initiate reporting. Reporting of syndromic data can be mandated by Utah's Communicable Disease Rule R702-3(2). In the situation that staffing is limited in hospitals and urgent care facilities, LHD staff could provide in-house support for data collection. Syndromic data is also available through the BioSense surveillance program sponsored by CDC. This system collects data from governmental facilities and can be easily incorporated into surveillance efforts. Additionally, the Bureau of Emergency

Medical Services (BEMS) of the UDOH for collects syndromic-like data for emergency responses. These data would yield information related to severe cases requiring immediate attention.

Laboratory Surveillance

Current: UPHL provides respiratory panel testing, culture, and typing/subtyping of samples. This includes providing culture for DFA positive samples for Primary Children's Medical Center (PCMC), the major pediatric hospital in Utah. PCMC DFA results from in-house testing are also made available to UDOH. During an influenza season, the Office of the Medical Examiner (OME) submits samples from all pediatric death investigations to the UPHL. UPHL reports the number and type of viral isolates to the CDC weekly and submits select viral isolates for subtyping. This is a system primarily driven by CDC requests. Typically, approximately six isolates are requested at three time points in an influenza season (early, middle, late). CDC analyzes the isolates to determine (the) specific circulating strain(s). CDC may request additional isolates if needed.

Expansion: The number of samples submitted to UPHL for typing would increase when a novel influenza strain is circulating. LHDs and the UDOH would work with local health care providers and hospital ICPs to collect and send samples. Enhanced laboratory surveillance would be warranted for patients with an increased risk of infection with a novel virus. Private laboratories would be strongly encouraged to forward samples from such patients to the UPHL. These patients would need to meet any existing created CDC/WHO case definitions and/or epidemiological criteria as follows:

1. Patients who are severely ill (i.e. hospitalized) with no identified high-risk factors and/or onset dates outside traditional seasonal influenza activity
2. Patients (hospitalized or ambulatory) with influenza-like illness returning from areas where novel influenza viruses are circulating
3. Patients with exposure risk factors specific to possible avian influenza viruses (i.e. poultry workers).

Method: Increasing isolate submission to CDC would depend on CDC demand. UPHL would need to be prepared to submit samples as needed. Similar to PCMC providing viral data to UDOH, additional hospitals, private laboratories, and urgent care facilities could be incorporated into a sentinel laboratory system where in-house testing results would be made available to UDOH. Clinicians would be encouraged to immediately contact public health authorities when they suspect a human case of infection with a novel human influenza strain. The use of rapid antigen tests would be discouraged during the initial beginnings of a pandemic due to the inability of these tests to identify a novel influenza virus.

Mortality

Introduction

Deaths in high-risk groups are expected and do occur each influenza season. However, only pediatric influenza-associated mortality is currently actively monitored. This is a nationally notifiable condition as of October 2004. This condition is defined as a death occurring in a person aged < 18 years resulting from a clinically compatible illness confirmed to be influenza by an appropriate laboratory test.

Current: All pediatric deaths investigated by the OME in Utah include submission of samples to UPHL for respiratory panel testing. Identification of influenza viruses will then accompany cause of death investigation. Only one pediatric influenza-associated death per season was reported to the UDOH both during the 2004-05 and 2005-06 influenza seasons.

Two Utah cities (Ogden and Salt Lake) currently participate in the national 122 Cities Mortality Reporting System. Vital statistics offices in 122 U.S. cities report pneumonia- and influenza- (P and I) related deaths on a weekly basis to CDC. Although data from this system remain available to state health departments, analytic methods to determine appropriate epidemic thresholds would need to be developed prior to state-level use in Utah. Specifically, epidemic thresholds would need to be created to determine the proportion of deaths considered attributable to influenza. As of the 2006-07 season, electronic death records have been made available to the Bureau of Epidemiology from Vital Statistics for simple quantification of P and I related deaths.

Expansion: During a pandemic influenza event, proper description of mortality would be needed to fully describe disease burden. Since mortality data collection is currently limited for seasonal influenza, expansion of collection would involve the identification of systems that do not currently exist or are not fully utilized.

OME

The existing surveillance system used for the identification of suspect pediatric-mortality could be expanded beyond the pediatric aged population. Automatic submission of samples for respiratory panel at UPHL could occur for all potential respiratory-related deaths. Depending on the circumstances, further data collection related to the actual cause of death may need to occur.

Method: This would require frequent and systematic communication between the UDOH, UPHL, OME, and involved LHDs.

Vital statistics

Quantifying excess influenza-related deaths as identified by creating an epidemic threshold specific to Utah would determine excess mortality. Electronic death records are already received and this system would require no further expansion.

Method: Coordination between the UDOH (Vital Statistics representatives included) and involved LHDs would be needed. Possible involvement of analytical consultants to better determine threshold may also need to occur.

Hospitals

The IAH surveillance system could be supplemented with a stronger mortality component. Although mortality is a data point currently collected, IAH surveillance is not

presently considered a system that serves to monitor mortality. However, influenza-associated deaths could be better enumerated using this system if investigatory procedures were expanded.

Method: This would involve the same coordination between LHDs, ICPs, and UDOH. In the situation that staffing is limited in hospitals, LHD and/or UDOH staff could provide in-house support for data collection. A case definition for an influenza-associated death in a hospitalized patient may include the following elements:

1. Laboratory-confirmation of influenza
2. Hospital admission
3. Death while hospitalized
4. Clinical presentation consistent with influenza-like illness

Final Disposition Authorization

Authorization for the disinterment or re-interment of a dead body is issued in Utah by the local registrar of the district or by the State Registrar. This system could be used during a pandemic as another quantifier of influenza-related deaths.

Method: Forms could be distributed to designated burial agents with instructions for identifying deaths where influenza was an underlying or contributing cause. Data collection would then occur with transmission of completed forms to the UDOH directly or to the involved LHD.

All Case Reporting

Current: Non-hospitalized, lab-confirmed cases were reportable during seasons prior to the 2005-06 season, but the reporting burden created by increasing use of rapid tests led to removal of this condition from the reportable disease list. However, incidental case reporting does currently occur and the data collected is used in analysis.

Expansion: Non-hospitalized, lab-confirmed influenza cases could again become a reportable condition. This would provide a more systematic enumeration of influenza cases in the community as well as a comparison population to hospitalized and other severe cases. An alternative would be for numbers-only reporting to limit the reporting burden. LHDs could be consulted in choosing reliable reporters of lab-confirmed cases in their communities that could be a mixture of established sentinel sites and other health-care facilities. Similar to influenza-associated hospitalizations, case investigation would be initiated by LHDs.

Method Case reporting would occur in conjunction with UDOH, LHDs, and reporting partners. Faxing or phone collection of numbers-only cases may be the most non-burdensome method of data collection. Currently the UDOH does not have an electronic disease reporting system, but is developing a NEDSS product. The UDOH would have the responsibility of altering the Communicable Disease Rule.

Medication Sales and Use

Introduction

During the 2005-06 season, data for sales of antivirals were obtained from a national pharmacy chain. The data were supplied on a monthly basis and contained weekly sales totals for major antivirals. Data were available for a limited time period, however. Initiation of this data collection involved UDOH directly contacting major pharmacy chains serving Utah and requesting sales information. Collected data were only available on a statewide basis.

RODS also provides over-the-counter (OTC) medication sales data. Major retail pharmacies provide these data. The data are made available through general categories such as cough/cold on a real-time basis. Data are divided between un-promoted sales and all sales due to the possible confounding caused by price reduction. LHDs have access to OTC data through RODS.

Vaccination status is collected for IAHs. Data are specifically collected as to whether the individual received the vaccine for the current season. The type and date of vaccination are not collected.

Antiviral Sales and Efficacy

Expansion: More frequent collection of data (i.e. weekly versus monthly) may be needed. Data sources would be expanded to include the larger retail chains and small non-chain pharmacies. OTC medication sales would continue to be actively monitored using RODS. The antiviral surveillance system could also be expanded to measure items related to adverse events and overall efficacy of the products.

Method: If tracking of antiviral sales were desired reestablishing contact with major pharmaceutical chains would be the most likely starting point. If additional data collection beyond this were desired, then other data sources would need to be identified. LHDs could within their communities identify and then directly work with pharmacies of interest. Antiviral use for influenza-associated hospitalizations may be of particular interest for assessing efficacy. Other sources may include utilization of antiviral stockpiles. It is assumed that distributors of the antiviral stockpile would provide data to the UDOH and LHDs pertaining to the amounts distributed to various entities. Cohorts of individuals receiving antivirals could be followed to assess efficacy.

Vaccine Data

Expansion: Related to these efforts could be the expansion of vaccine data collection. More specific data points such as type, date, and presence of adverse effects could be collected to better describe general vaccination status and issues with efficacy/adverse effects. Additionally, collection could be expanded outside the IAH population into the non-hospitalized population. Vaccine efficacy measures in the case–control studies range from preventing hospitalizations due to pneumonia and/or influenza, to preventing hospital deaths from pneumonia and influenza, preventing hospital deaths from all respiratory conditions, and preventing deaths due to all causes.

Method: Due to present collection of data related to influenza-associated hospitalization, prevention of influenza-associated hospitalizations may be a logical starting point for evaluating vaccine efficacy. Age-and sex matched control groups could be created. However, hospital surge capacity issues would need to be considered due the impact on the actual availability of hospital beds.

Influenza-like Illness Outbreaks

Current: When influenza is introduced into contained, institutional settings, nosocomial outbreaks may result. These outbreaks may result in very high attack rates that lead to significant morbidity and mortality, especially among high-risk populations. These outbreak events, though reportable as per Utah's Communicable Disease Rule R386-702, are significantly underreported in Utah and are not considered a consistent data-point for seasonal influenza monitoring. However, as of the 2006-2007 influenza season, efforts are being made to establish a reporting system for these events through a pilot project in four health districts, primarily focusing on nursing home facilities.

Expansion: Full utilization of this system would mandate the incorporation of more surveillance sites. These may include:

- Facilities catering to high-risk groups (i.e. the elderly and/or immunocompromised).
- Facilities catering to children such as schools and camps.
- General clustering of febrile respiratory illness in health-care facilities such as hospitals.

Method: Better reporting of influenza-associated outbreaks could occur via increased marketing of these events as reportable conditions. Likewise, LHDs could work within their jurisdictions to identify facilities meeting criteria and then establish outbreak-reporting mechanisms for identified sites. Once sites have been established and reporting mechanisms put into place, reported outbreaks would then be investigated (especially those occurring outside the normal October through May seasonal influenza timeline) by LHDs and the UDOH if need be. Specimen collection also would be of interest for laboratory testing.

Communication and Coordination Procedures

Surveillance for seasonal and pandemic influenza requires a coordinated approach by all involved partners. Frequent and systematic communication ensures the proper exchange of information and use of collection, analytic, and dissemination procedures. Primary surveillance partners include:

- UDOH Bureau of Epidemiology
- UDOH Immunization Program
- Vital Statistics
- UPHL
- LHDs
- Hospitals
- Sentinel sites
- Sentinel schools
- OME
- UDAF
- UDWR
- USOE

- CDC

Systematic communication may utilize several mechanisms. Regularly scheduled conference calls have been established as effective mechanisms through their use during arboviral seasons in Utah. Use of scheduled calls has included establishing a site for in-person meetings, allowing participants to choose the most effective means of participation. The use of the Utah Notification Information System (UNIS) will also be used to ensure surveillance partners are regularly aware of any major surveillance activity developments. Health care providers and other surveillance partners reporting data will be provided with telephone, fax, and e-mail addresses in order to communicate with UDOH and local health departments. Communication and reporting to CDC from the UDOH would require phone, fax, or e-mail. Utah does not currently have the ability to report electronically besides the NETSS system, although a NEDSS system is being developed currently. If data fields of interest can be captured in NETSS and transmitted to CDC through that preexisting system, then transmission will occur through that method.

Human influenza activity

Increased collaboration and communication with public health partners for better implementation of all surveillance-related activities, including more frequent dissemination of data, articulation of specific activity levels, and recommendation for disease control and reporting measures. Specific items will involve communication with specific partners. For example, regular communication with the OME would be essential for mortality surveillance. General communication with all partners to highlight the heightened need for timely and complete surveillance data will be essential for operations. Further communication with neighboring states and national surveillance partners would also be warranted. Partners will also include public information officers (PIO) to interpret and release surveillance data.

Non-human influenza activity

Prevention and control of avian influenza requires that surveillance data be shared rapidly among participants to facilitate effective interventions, including public education and disease control. However, for that to occur, each agency needs to understand and adhere to the data release and confidentiality provisions that govern use of those data. Due to the implications for human health, detection of H5N1 in animals affects human disease surveillance. For instance, in this case, active ILI surveillance may need to be initiated in humans with close contact with affected animals, such as wildlife agents, hunters, and poultry farm workers.

When animal influenza activity is of interest, regular coordination and communication with UDAF and the UDWR would be warranted. Similar to arboviral surveillance communication procedures, regularly scheduled conference calls would occur (at a minimum) between the UDOH, LHDs, UDAF, and the UDWR. This would ensure better dissemination of related surveillance data, articulation of specific activity levels, and recommendation for disease control and reporting measures (H5/H7 avian influenza is a disease reportable to the State Veterinarian's office by all licensed or otherwise legally practicing veterinarians in the State and all laboratories). The calls would be facilitated by

the UDOH. Participants may be expanded to include federal agencies such the United States Department of Agriculture (USDA).

Conference calls will be warranted based on certain developments in animal surveillance in Utah, including the following:

- Unexplained die-offs in primary and secondary wild bird candidates for Asian H5N1 (2)
- Detection of H5N1 in wild bird populations (high-pathogenicity (HP) and low-pathogenicity (LP)) (2)
- Declaration of premise suspect-positive for H5N1 in domestic poultry settings (3)
- Declaration of a premise positive for HP/LP Asian H5N1 during a confirmed H5N1 outbreak (3)

Preliminary Data Analysis

During the early period of pandemic influenza virus introduction and spread the following data analyses will be performed and reported to CDC in a timely manner:

- Attack rate in early case or cluster investigations,
- Case fatality rate,
- The numbers of hospitalized patients with pandemic influenza or rate of pandemic influenza-associated hospitalizations,
- The number of newly isolated or quarantined persons, and
- The number of pandemic influenza-associated deaths.

Data Dissemination

Currently, seasonal influenza data is analyzed on a weekly basis. General temporal trends and characterization of season severity are the primary purposes. Data is disseminated in major ways during the week:

- Internal categorization of activity level (using both geographic and severity indexes)
- Public website postings
- Internal Audience Statistics

During a pandemic, data may need to be analyzed on a daily basis to best capture possible rapid changes in activity levels and respond to public demand for information. Analyses would focus primarily on severity measures once circulation begins in the state, as rapid geographic expansion would be expected. Furthermore, demand for information from the public and the media would warrant more frequent characterization of activity levels.

Specific items may be of increased interest during a pandemic:

- Summary categorization of disease severity
- Case counts of deaths

- Case counts of hospitalizations
- Monetary loss created by pandemic (i.e. loss of productivity)
- Demographic characteristics of deaths and hospitalizations
- Identification of high-risk groups
- Vaccine and antiviral efficacy
- Virologic characterization of circulating strands
- Unusual modes of transmission
- Geographic variation in morbidity (Utah vs. neighboring states, Utah vs. United States)
- General measures of non-hospitalized morbidity (i.e. absenteeism)

Methods for data distribution:

- Website postings
- Media briefings and press releases
- Internal briefings
- Internal statistics for public health audience
- Conference calls with partners
- Daily e-mails with summary information

References

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2. Utah Division of Wildlife Resources. 2006. Interagency Surveillance and Implementation Plan for the early Detection of Asian HPAI and H5N1 in Wild Migratory Birds in Utah.
3. Utah Department of Agriculture and Food. Utah Avian Influenza Surveillance and Response Plan.

Appendix A: Influenza Enhanced Surveillance Plan Glossary

Communicable Disease Epidemiology Program
June 22, 2007

Utah's first potential signal of early pandemic/avian influenza activity cannot be known in advance. For example, the signal could follow isolation, from a single infected person, of an influenza virus with certain genetic and antigenic features (such as a virus with surface proteins derived from an avian influenza virus and internal genes derived from a human influenza virus), or detection of an expanding cluster of human cases of avian influenza closely related in time and place, or detection of a community outbreak of respiratory illness of unknown etiology. Because these and other scenarios are plausible signals that a pandemic virus may be emerging, maintaining vigilance, a high degree of suspicion, and a capacity for rapid expert assessment and reporting are the most reliable way to ensure that signals are not missed.

This plan, developed by the Utah Department of Health's (UDOH) Communicable Disease Epidemiology Program (CDEP), describes both current influenza surveillance activities and proposed enhanced surveillance activities, which may be implemented during the following potential scenarios:

- ***Scenario A*:** Novel avian influenza virus subtype has been detected in animals and humans outside the U.S. (neither animals nor humans have become infected in the U.S.).
- ***Scenario B*:** Novel avian influenza virus subtype has been detected in wild birds in or around Utah (neither domestic poultry nor humans have become infected in the U.S.).
- ***Scenario C*:** Novel avian influenza virus subtype has been detected in poultry in or around Utah (humans have not become infected in the U.S.).
- ***Scenario D (Level A)*:** Widespread transmission of novel human pandemic influenza virus subtype in humans outside North America.
- ***Scenario E (Level B)*:** Human cases of novel pandemic influenza virus subtype have been detected in North America, but not Utah.
- ***Scenario F (Level C):*** Human cases of novel pandemic influenza virus subtype have been detected in Utah.
- ***Scenario G (Level D):*** Novel human pandemic influenza virus subtype is actively circulating in humans in Utah with established epidemics.
- ***Scenario H (Level E):*** Initial wave of human pandemic activity has occurred in Utah.

Current Surveillance Activities

Seasonal influenza in Utah is measured using a multiple component system that includes surveillance of both influenza illness in the general community and viral characterization in the laboratory setting. Current surveillance activities include the following:

1) Sentinel healthcare sites report influenza-like illness (ILI) on a weekly basis to UDOH and submit samples for viral typing to the Utah Public Health Laboratory (UPHL)
2) Healthcare providers report influenza-associated hospitalizations to UDOH as laboratory-confirmed influenza-associated hospitalizations remain a reportable condition in the state.
3) Select schools report weekly absenteeism to UDOH

4) Constitutional and respiratory syndromes are actively monitored at select emergency departments and urgent care facilities by the Real-time Outbreak and Disease Surveillance System (RODS)
5) UPHL reports the number and type of viral isolates to the Centers for Disease Control and Prevention (CDC) weekly and submits select viral isolates to CDC for subtyping
6) Healthcare providers report pediatric influenza-associated deaths, as the deaths remain a nationally notifiable condition
7) Pneumonia and influenza death records are obtained from the state Office of Vital Statistics
8) Healthcare providers continue to incidentally report cases of non-hospitalized, laboratory-confirmed influenza, although this is not a notifiable condition in Utah
9) Over-the-counter medication sales from select retail drugstore chains are obtained by RODS
10) Select long-term care facilities are monitored for influenza-like illness outbreaks.

Additionally, UDOH has other potential data sources that exist for influenza surveillance that are not routinely utilized for analysis. These include the following:

11) Antiviral drug medication sales.
12) Reporting of influenza-associated outbreaks, particularly in institutional/long-term care facility settings (these outbreak events, though reportable as per Utah's Communicable Disease Rule R386-702, are believed to be significantly underreported in the state)

Enhanced Surveillance Activities

In addition to standard influenza surveillance activities described above in the "Current Surveillance Activities" section, enhanced surveillance activities will be considered for implementation during any of the five potential scenarios (A-F) described below.

Scenario A: Novel avian influenza virus subtype has been detected in animals and humans outside the U.S. (neither animals nor humans have become infected in the U.S.). The surveillance objectives for this scenario include the following:

- Continue (or initiate) data collection regarding unusual influenza–associated morbidity in Utah.
- Continue information collection regarding worldwide developments in virus activity.

The following activities would occur during this scenario:

1) The UDOH Surveillance Program would closely monitor worldwide influenza activity
2) UDOH would ensure weekly statewide notification/update of worldwide disease activity via the UDOH listserver and Utah Notification and Information System (UNIS)

Scenario B: Novel avian influenza virus subtype has been detected in wild birds in or around Utah (neither domestic poultry nor humans have become infected in or around Utah). The surveillance objectives for this scenario include the following:

- Monitor for the emergence of novel virus in human populations
- Continue (or initiate) data collection regarding unusual influenza–associated morbidity in Utah

- Continue information collection and exchange regarding developments in Utah avian populations

In addition to the activities described in *Scenario A*, the following enhanced surveillance activities would occur during this scenario:

1) Increased collaboration and communication with the Utah Department of Agriculture and Food and Utah Division of Wildlife Resources for better dissemination of related surveillance data, articulation of specific activity levels, and recommendation for disease control and reporting measures (H5/H7 avian influenza is a disease reportable to the State Veterinarian's office by all licensed or otherwise legally practicing veterinarians in the State and all laboratories)
2) Monitor avian disease spread in U.S. and Utah
3) Ensure weekly statewide notification/update of nationwide and local disease activity via the UDOH listserver and Utah Notification and Information System (UNIS)
4) Activation of sentinel clinician site network for year-round reporting with additional screening for bird exposures
5) Expansion (or initiation) of laboratory testing of suspect ILI cases at sentinel sites
6) Expansion of UPHL isolate submission to CDC

Scenario C: Novel avian influenza virus subtype has been detected in poultry in or around Utah (humans have not become infected in or around Utah.). The surveillance objectives for this scenario include the following:

- Monitor for the emergence of novel virus in human populations.
- Intensify data collection regarding unusual influenza-associated morbidity in Utah with emphasis on populations with close poultry contact.
- Increase frequency of information collection and exchange regarding developments in Utah avian populations.

In addition to the activities described in *Scenarios A* and *B*, the following enhanced surveillance activities would occur during this scenario*:*

1) Consider weekly communication with the Office of the Medical Examiner (OME) to follow up on all potential respiratory-related deaths
2) Collaboration with Local Health Departments (LHDs) to refine and implement screening techniques for respiratory illnesses in poultry occupational settings
3) Incorporation of employee absenteeism surveillance in Utah's poultry industry workforce

Scenario D (Level A): Widespread transmission of novel human pandemic influenza virus subtype in humans outside North America. The surveillance objectives for this scenario include the following:

- Increase monitoring for the emergence of pandemic virus in Utah human population.
- Intensify data collection regarding unusual influenza-associated morbidity and mortality in Utah.
- Increase frequency of information collection and exchange regarding developments in human disease with emphasis on development of prevention and control measures.

The following enhanced surveillance activities would occur during this scenario/level:

1) Expansion of data elements collected at sentinel sites to include travel histories of patients.
2) Broadening of sentinel site network for year-round reporting, improved geographic representation, and incorporation of travel clinics
3) Expansion of laboratory testing of suspect ILI cases at sentinel sites, including further distribution of necessary materials to conduct sample collection
4) Expansion of isolate submission to CDC by UPHL
5) Weekly communication with OME to follow-up on all potential respiratory-related deaths.
6) Increased collaboration and communication with public health partners for better implementation of activities listed above, including more frequent dissemination of related surveillance data, articulation of specific activity levels, and recommendation for disease control and reporting measures
7) Identification and evaluation of potential vulnerable populations in local communities

***Scenario E (Level B)*:** Human cases of novel pandemic influenza virus subtype have been detected in North America, but not Utah. The surveillance objectives for this scenario include the following:

- Intensify monitoring for the emergence of pandemic virus in Utah human population.
- Intensify data collection regarding unusual influenza-associated morbidity and mortality in Utah.
- Increase frequency of information collection and exchange regarding developments in human disease with particular emphasis on implementation of prevention and control measures.

In addition to the activities described in *Scenario D (Level A)*, the following enhanced surveillance activities would occur during this scenario/level:

1) Further expansion of isolate submission for influenza-associated hospitalizations to UPHL, including further distribution of necessary materials to conduct sample collection
2) Further expansion of chief complaint data collection in additional primary care, urgent care and emergency department settings
3) Evaluation of influenza-associated hospitalizations including use of hospital admission/discharge data with assurance that data will be available at local level.
4) Evaluation of potential influenza-related outbreaks in institutional settings in those jurisdictions with preexistence of this surveillance system
5) Evaluation of student absenteeism
6) Increased communication with the OME to evaluate unusual respiratory-related deaths.
7) Increased collaboration and communication with public health partners for better implementation of activities listed above, including more frequent dissemination of related surveillance data, articulation of specific activity levels, and recommendation for disease control and reporting measures

Scenario F (Level C): Human cases of novel pandemic influenza virus subtype have been detected in Utah. The surveillance objectives for this scenario include the following:

- Intensify data collection regarding unusual influenza-associated morbidity and mortality in Utah.
- Increase frequency of information collection and exchange regarding developments in human disease with particular emphasis on implementation of prevention and control measures.

The following enhanced surveillance activities would occur during this scenario/level:

1) Evaluation of influenza-associated hospitalizations, including use of hospital admission/discharge data including creation of new investigation forms in accordance with pandemic activity
2) Evaluation of antiviral data
3) Evaluation of chief complaint data collection in additional primary care, urgent care and emergency department settings
4) Evaluation of influenza-related deaths in and outside of hospitals
5) Evaluation of influenza-related outbreaks in institutional settings
6) Evaluation of school absenteeism
7) Increased collaboration and communication with public health partners for better implementation of activities listed above, including more frequent dissemination of related surveillance data, articulation of specific activity levels, and recommendation for disease control and reporting measures

Scenario G (Level D): Novel human pandemic influenza virus subtype is actively circulating in humans in Utah with established epidemics. The surveillance objectives for this scenario include the following:

- Characterize community impact to refine prevention and control strategies.
- Maintain sustained frequency of information collection and exchange regarding developments in human disease.

The following enhanced surveillance activities would occur during this scenario:

1) Evaluation of influenza-related mortality, including final disposition authorizations
2) Evaluation of influenza-associated hospitalizations, including use of hospital admission/discharge data
3) Retention of surveillance systems for non-hospitalized morbidity only if system requires minimal data collection efforts (school absenteeism, chief complaint data, and influenza related outbreaks)

Scenario H (Level E): Initial wave of human pandemic activity has occurred in Utah. The surveillance objectives for this scenario/level include the following:

- Characterization of community impact to refine prevention and control strategies.
- Maintain sustained frequency of information collection and exchange regarding developments in human disease.

The following enhanced surveillance activities would occur during this scenario:

1) Evaluation of influenza-related mortality, including final disposition authorizations
2) Evaluation of influenza-associated hospitalizations, including use of hospital admission/discharge data
3) Retention of surveillance systems for non-hospitalized morbidity only if system requires minimal data collection efforts (school absenteeism, chief complaint data, and influenza related outbreaks

Appendix B: Contact Lists

As outlined within the complete “Influenza Enhanced Surveillance Plan”.