

Epi Report

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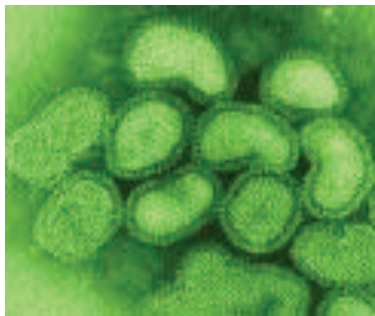
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The H5N1 avian influenza virus.

Image courtesy of:
medicineworld.org

Avian Influenza A (H5N1)

By Rod Norrish, Epidemiologist

Avian Influenza A (H5N1) has become known simply as “Avian flu” or “bird flu” in our current discussions of pandemic flu. To date, Avian Influenza A (H5N1) has not demonstrated efficient or frequent transmission from bird to human or human-to-human but as the virus continues to circulate and evolve, transmission efficiency may improve to create a real pandemic threat.

Migrating waterfowl seem to be the natural reservoir for avian influenza viruses. These birds can carry the virus without developing signs of infection, but they can shed the virus in feces, saliva and respiratory secretions. Because of their migratory habits, these birds spread the virus over great geographic distances. Since 2003, more than fifty countries have reported H5N1 infections in wild or domestic birds. Three continents; Europe, Asia and Africa, have reported migratory waterfowl infected with the virus. There have not been any reported cases in North American but there is no assurance our continent will be able to avoid the threat of avian flu.

Once introduced into domestic poultry flocks, this virus can cause severe disease known as highly pathogenic avian influenza (HPAI) with a flock mortality rate of nearly 100%.

Influenza viruses have the ability to circumvent human immunological responses in a couple of ways. Antigenic shift (one cell infected with two different flu viruses) in the genetic make up of the flu virus is a continuing possibility, resulting in a pandemic in a non-immune population. Periodic annual epidemics can also develop if there are small genetic mutations in the viral genome over time (antigenic drift), allowing the virus to escape the current human immune response.

At least 12 countries have reported human cases of H5 N1 virus since 2003 with Pakistan the latest to report two human deaths. The World Health Organization (WHO) has reported 328 confirmed human cases with a 60% mortality rate. Half of these infections occur in young healthy populations under the age of 20 years. The highest mortality rates are between ages 10 and 19.

The current epidemiological case definition as recommended by the WHO for suspect, probable and confirmed H5N1 cases is as follows:

Suspect case – unexplained acute lower respiratory illness with documented fever >38 degrees C with cough, SOB or difficulty breathing, and at least one of the following: Close contact with a suspect, probable, or confirmed case; exposure to poultry, or their remains, or environments with their feces in area with active H5N1 infections; consumption of raw or undercooked poultry in an area with active H5N1 infections; close contact with confirmed H5N1 infected animal other than birds (e.g. cat or pig); or handling samples suspected of containing H5N1 virus in a laboratory or other setting.

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Probable case – a person dying of unexplained acute respiratory illness with epidemiological link to a probable or confirmed H5N1 case **OR** a person meeting criteria for a suspect case and one of the following: evidence of acute pneumonia on chest radiograph plus evidence of respiratory failure; laboratory confirmation of influenza A infection but not confirmed as H5N1.

Confirmed case – a person meeting criteria for a suspected or probable case AND one of the following positive results in an influenza laboratory whose H5N1 test results are accepted by WHO as confirmatory: isolation of H5N1 virus; positive H5 PCR results from 2 different PCR targets; a 4-fold or greater rise in neutralization antibody titer for H5N1; a microneutralization antibody titer for H5N1 of 1:80 or greater in a single serum collected at day 14 or later post symptom onset.

Patients with avian influenza (H5N1) infection present with fever and respiratory symptoms, a broad spectrum for differential diagnosis, which makes laboratory confirmation of H5N1 essential. Since human influenza strains H1, H2 and H3 will most likely be circulating at the same time as H5N1, laboratory testing is even more important. Travel history should be obtained from cases meeting the clinical criteria listed above. All suspect, probable and confirmed H5N1 cases must be reported to the Pima County Health Department at 520-243-7797, Monday to Friday 8am to 5pm or afterhours at 520-743-7987. Further reporting will be made to the Arizona Department of Health Services, CDC and WHO.

Original article appeared in LABMEDICINE Paula A. Revell, PhD, D (ABMM). Avian Influenza A (H5N1): Pandemic Potential and the Role of the Clinical Microbiology Laboratory. LABMEDICINE 2007 Dec 38; 12: 740-744.



Diabetes: The Facts

By Francelli Lugo, Epidemiologist

Diabetes continues to be the sixth leading cause of death in the United States. It now affects nearly 21 million Americans – or 7 percent of the U.S. population – and more than 6 million of those people do not know they have diabetes, according to the latest prevalence data released today by the Centers for Disease Control and Prevention (CDC). This number represents an additional 2.6 million people with diabetes since 2002. Another 41 million people are estimated to have pre-diabetes, a condition that increases the risk of developing type 2 diabetes – the most common form of the disease – as well as heart disease and stroke.

Diabetes mellitus is a group of diseases characterized by high levels of blood glucose resulting from defects in insulin production, insulin action, or both.

Diabetes is classified by specific types. Type 1 diabetes was previously called insulin-dependent diabetes mellitus (IDDM) or juvenile-onset diabetes. Type 1 diabetes develops when the body's immune system destroys pancreatic beta cells, the only cells in the body that make the hormone insulin that regulates blood glucose. This form of diabetes usually strikes children and young adults, although disease onset can occur at any age. Risk factors for type 1 diabetes may include autoimmune, genetic, and environmental factors.

Type 2 diabetes was previously called non-insulin-dependent diabetes mellitus (NIDDM) or adult-onset diabetes. It usually begins as insulin resistance, a disorder in which the cells do not use insulin properly. As the need for insulin rises, the pancreas gradually loses its ability to produce insulin. Type 2 diabetes is associated with older age, obesity, family history of diabetes, history of gestational diabetes, impaired glucose metabolism, physical inactivity, and race/ethnicity. Gestational diabetes is a form of glucose intolerance that is diagnosed in some women during pregnancy. During pregnancy, gestational diabetes requires treatment to normalize maternal blood glucose levels to avoid complications in the infant. According to data sources from the Center for Disease Control and Prevention National Center for Chronic Disease Prevention and Health Promotion, after pregnancy, 5% to 10% of women with gestational diabetes are found to have type 2 diabetes.

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Other specific types of diabetes result from specific genetic conditions (such as maturity-onset diabetes of youth), surgery, drugs, malnutrition, infections, and other illnesses.

Diabetes clinical management includes insulin, oral medications, as well as physical activity and dietary changes. To survive, people with type 1 diabetes must have insulin delivered by injections or a pump. Many people with type 2 diabetes can control their blood glucose by following a careful diet and exercise program, losing excess weight, and taking oral medication. Many people with diabetes also need to take medications to control their cholesterol and blood pressure. Diabetes self-management education is an integral component of medical care.

Research studies have found that lifestyle changes can prevent or delay the onset of type 2 diabetes among high-risk adults. Lifestyle interventions included diet and moderate-intensity physical activity (such as walking for 2 1/2 hours each week). Studies have also shown that medications have been successful in preventing type 2 diabetes in some population groups. There are no known methods to prevent type 1 diabetes.

Diabetes can affect many parts of the body and can lead to serious complications such as blindness, kidney damage, and lower-limb amputations. Working together, people with diabetes and their health care providers can reduce the occurrence of these and other diabetes complications by controlling the levels of blood glucose, blood pressure, and blood lipids and by receiving other preventive care practices in a timely manner.

From 1980 through 2005, the prevalence of diagnosed diabetes increased in all age groups. In general, throughout the time period, people aged 65-74 years had the highest prevalence, followed by people aged 75 or older, people aged 45-64 years, and people less than 45 years of age. In 2005, the prevalence of diagnosed diabetes among people aged 65-74 (18.5%) was about 12 times that of people less than 45 years of age (1.4%).

- Data show that minority populations are disproportionately affected by diabetes. Compared to non-Hispanic whites, diabetes continues to be more common (1.7 to 2.2 times more common) among American Indians and Alaska Natives, non-Hispanic blacks, Hispanic/Latino Americans, and Asian Americans and Pacific Islanders. From 1980 through 2005, the age-adjusted prevalence of diagnosed diabetes was higher among blacks than whites and highest among black females. During this time period, age-adjusted prevalence increased 116% among white males, 81% among white females, 100% among black males and 69% among black females. Among Hispanics, the age-adjusted prevalence among males increased 16% and females increased 21% from 1997 through 2005.

The United States spends approximately \$132 billion each year on diabetes – \$92 billion in direct medical costs and another \$40 billion each year in indirect costs because of missed work days or other losses in productivity.

For more information on Diabetes, please visit the Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion: <http://www.cdc.gov/diabetes/>.

Content Source: National Center for Chronic Disease Prevention and Health Promotion Division of Diabetes Translation.

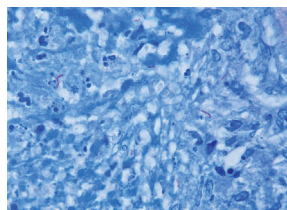
Data Source: Centers for Disease Control and Prevention, National Center for Health Statistics, Division of Health Interview Statistics, data from the National Health Interview Survey. U.S. Bureau of the Census, census of the population and population estimates. Data computed by the Division of Diabetes Translation, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention.

Think Tuberculosis? Think Infection Control

By Michelle McDonald, MD

2007 was a busy year for the Tuberculosis (TB) Control program in Pima County. We had 40 active cases, our highest number since 2001 when we had 45. (Numbers of active TB cases for the past seven years are: 2000: 23; 2001: 45; 2002: 22; 2003: 26; 2004: 21; 2005: 33; 2006: 36; and 2007: 40.) In addition to a higher than average number of cases, our cases were more complex medically in 2007. We had several patients with cancer and our first multiple drug resistant case in over five years, on top of the usual few with HIV/AIDS and/or hepatitis C. Finally we had multiple contact investigations involving medical settings, including emergency rooms, inpatient hospital rooms, dialysis centers and a cancer center. I would like to take this opportunity to point out some of the lessons we have learned with respect to infection control. **The key to preventing exposure to tuberculosis in a medical setting is recognition of the possibility for active disease and prompt institution of infection control measures.**

Patients with immune compromise, from disease or from medication, are at high risk for developing active TB. This includes patients with HIV, certain cancers, diabetes, patients on chronic steroids or other strong immune suppressing medications, particularly tumor necrosis factor blockers and chemotherapy. All patients with immune compromise should receive regular screening for TB.



Mycobacterium tuberculosis
Ziehl-Neelsen stain.

Image courtesy of: upload.wikimedia.org/wikipedia/commons/thumb/...

The screening in general should begin with a symptom and risk review. Concerning symptoms would include a cough lasting longer than three weeks (with no other explanation), hemoptysis, dyspnea, night sweats and unexplained weight loss. A risk review would be for risk of exposure (all immunocompromised patients by definition have an increased risk of progressing to active disease if they have been exposed). Examples of persons with increased risk for exposure include those born in another country where TB is endemic (or regular travel to such a country), people who have been health care workers, who have been homeless at any time, who have ever been incarcerated or institutionalized, who have used illegal drugs or abused alcohol, who have worked in corrections and those who have had close contact with someone known to have active TB.

For persons with chronic immunosuppression, this risk and symptom review should most likely occur annually. The decision to skin test would then be based on either concerning symptoms, or having been in a risky situation since the last screen. All patients with ongoing immune compromise who are found to have a latent TB infection should be offered treatment. If they decline, or if it is medically contraindicated, they should be monitored for the development of signs and symptoms of active disease, and instructed to report to their physician if such symptoms develop.

Unfortunately, we cannot always rely on patients to give all pertinent history in a timely fashion. Thus initial screening in emergency rooms as well as outpatient clinic setting needs to take this into account. **ALL patients who are coughing should be asked to wear a mask.** If the cough is prolonged (over three weeks), consideration should be given to isolating them until their diagnosis is ascertained. Finally, it may be worth asking patients in such settings directly if they have ever been or are currently taking therapy for tuberculosis (a medication screen may alert us to people on current therapy).

When you are asked to decide if a patient suspected of having tuberculosis should be isolated or whether they may be placed in a non negative pressure room in a hospital or in a congregate setting, keep the following in mind. Patients with cavitary disease, or with chest films highly suggestive for tuberculosis truly need to have it ruled out before being allowed in congregate settings or in settings with vulnerable persons. **Having three negative AFB smears does NOT rule out the diagnosis of TB.** To rule out TB, one would either need an alternate explanation for the findings (such as positive IgM serology for cocci or demonstration of cocci in a respiratory specimen), or to treat with four TB drugs for at least two weeks and observe improving clinical status on meds before release to the setting of concern. If four TB meds are started, the patient would need to continue on therapy for tuberculosis until another diagnosis is discovered or until their TB sputum cultures have finalized as negative. (Note: if patients with three negative cultures at two months have improvement in their symptoms and chest Xray on the TB therapy, this may be grounds for diagnosing TB by secondary criteria.)

It is not always possible to identify potentially infectious TB patients promptly. As such, our main tool to recognizing the potential for active TB is to keep the possibility of TB always in the back of our minds, especially for high risk patients such as those with immunocompromise, diabetes, or end stage renal disease.

MRSA

By Babs Johnson, Epidemiologist



Bacteria are image of MRSA.

Image courtesy of: www.envirocair.co.uk

Methicillin Resistant Staphylococcus aureus, (MRSA) was a primary health topic in 2007. We probably received more calls at the Pima County Health Department about MRSA than any other disease. A study recently released by the Centers for Disease Control, (CDC) established the first national baseline by which to assess future trends in invasive MRSA infections. The study may be found in the October 17 edition of the Journal of American Medical Association (JAMA). Invasive MRSA infections occur in approximately 94,000 persons each year and are associated with approximately 19,000 deaths. Of these infections, about 86% are health-care-associated and 14% are community-associated (Klevens et al. *Journal of the American Medical Association* 2007; 298(15):1763-1771).

Methicillin Resistant Staphylococcus aureus was first noted in the 60's only a short 20 years after the advent of the antibiotic. It was initially noted in patients who had been recent recipients of medical care, usually inpatient or nursing home.

Many of these patients had serious underlying medical problems. Basic hygiene practices such as cleaning hands, surfaces and clothing articles are important in the prevention of MRSA. Beginning in the 1990's, MRSA started being diagnosed in patients who had not received recent medical care. Community acquired MRSA (CA-MRSA) became defined as MRSA infections that occur in otherwise healthy people who have not been recently (within the past year) hospitalized or had a medical procedure. The strains involved with CA-MRSA had a slightly different genetic profile than health care acquired MRSA, and is a bit more prone to cause local tissue damage. (Thus a staph infection that looks like a "spider bite" may be more likely to CA-MRSA than health care acquired MRSA.) In recent years, there has tended to be more blurring of this distinction (i.e. MRSA acquired in the community setting may be the strain previously associated with health care infections and vice versa.) Today, in the U.S. a little more than 10% of all MRSA infections are CA-MRSA. CA-MRSA causes serious skin and soft tissue infections in otherwise healthy persons. Hospitalization is required in approximately one out of five CA-MRSA cases. CA-MRSA has been identified most frequently among specific populations, including prisoners, athletes, children, men who have sex with men, military recruits, Pacific Islanders, Alaskan Natives and Native Americans.

As health care providers we need to remain diligent about the use of antibiotics and educate our patients on how and when to take them. For more information on these topics, please visit: <http://azdhs.gov/phs/oids/abx/> or <http://www.tufts.edu/med/apua/Patients/patient.html>. We also need to have a very low threshold for performing a culture on suspected staph infections.

Many hospitals have implemented screening for MRSA in high risk patients being admitted to the hospital. Hospitals screening for MRSA have reported a decrease in the number of MRSA infections acquired within the hospital setting. "Decolonization regimens may have a roll in preventing recurrent infections," according to the American Medical Association "but more data are needed to establish their efficacy and to identify optimal regimens for use in community settings."

For more information on CA-MRSA, the risk factors associated with the infection and control and prevention, please visit Centers for Disease Control and Prevention at: http://www.cdc.gov/ncidod/dhqp/ar_mrsa_ca.html as well as the Los Angeles department of public health at: <http://www.lapublichealth.org/acd/MRSA.htm>.

Summary of Selected Reportable Diseases for Pima County (Year to Date)

| Enteric Diseases: | January- December 2007 | January- December 2006 |
|--|------------------------------|------------------------------|
| Campylobacter | 151 | 143 |
| Shigella | 95 | 122 |
| Salmonella | 226 | 187 |
| Hepatitis A | 26 | 34 |
| Giardia | 68 | 65 |
| | | |
| Vaccine Preventable Diseases: | | |
| Pertussis | 12 | 34 |
| Measles | 1 | 0 |
| Mumps | 0 | 2 |
| Rubella | 0 | 0 |
| Tetanus | 0 | 0 |
| H. Influenzae, serotype b (<5 years of age) | 0 | 0 |
| | | |
| Invasive Diseases: | | |
| Streptococcus pneumoniae | 172 | 189 |
| Streptococcus Group A | 48 | 76 |
| Streptococcus Group B (in infants <90 days old) | 7 | 4 |
| | | |
| Diseases Involving Central Nervous System: | | |
| Meningococcal Infection | 5 | 4 |
| Aseptic Meningitis | 31 | 43 |
| | | |
| Vector-Borne & Zoonotic Diseases: | | |
| West Nile Virus | 15 | 46 |
| Animal Rabies | 58 | 81 |
| | | |

Statistical data for the years 2006 and 2007 reflect communicable disease reports of confirmed, probable, and suspect cases received via the Medical Electronic Disease Surveillance Intelligence System (MEDSIS) from 01/01/2006 to 12/31/2006 and 01/01/2007 to 12/31/2007, respectively. Data are provisional. Report generated on 1/10/2008.

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