



IDAHO DEPARTMENT OF
HEALTH & WELFARE

Disease Bulletin

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VOLUME 17 NUMBER 5 • DECEMBER 2010

Diphtheria in Idaho

Diphtheria is a clinical illness usually caused by toxin-producing strains of *Corynebacterium diphtheriae*, but also rarely due to *Corynebacterium ulcerans*. Respiratory diphtheria presents as a sore throat with low-grade fever and an adherent membrane of the tonsils, pharynx, or nose. Severe clinical manifestations result from absorption of toxin (either local or systemic) produced by infection at an epithelial site (usually pharynx, occasionally nasal lining, or skin). The onset of disease is insidious. Following an incubation period of 1–5 days, low-grade fever begins and a pharyngeal pseudomembrane develops over 2–3 days, along with lymphadenopathy and diffuse systemic toxicity, resulting in tachycardia, weakness, and irritability. Although the systemic effects of diphtheria can occur in the first week of illness, they usually occur later (1–2 weeks after onset for myocarditis, 2–8 weeks for neuritis). The hallmark of suspected diphtheria is a febrile, membranous pharyngitis of insidious onset. In a minority of instances, diphtheria can result from an isolated diphtherial infection in the larynx, nasal lining, or skin. Other diseases that can occasionally produce a similar membranous pharyngitis include streptococcal pharyngitis and infectious mononucleosis.

Neck swelling is usually present in severe disease. In addition to myocarditis and polyneuritis, complications include airway obstruction: death occurs in 5%–10% of respiratory cases. Cutaneous diphtheria presents as infected skin lesions without a characteristic appearance and has a milder course. Treatment consists of antitoxin and antibiotics: penicillin or erythromycin are most commonly used. Swabs or membrane tissue for culture, and serum for measurement of antibodies to diphtheria toxin should be obtained prior to treatment.

Diphtheria is rarely reported in Idaho (Fig-

ure) or in the United States. Since the wide use of vaccine beginning in the 1940s, incidence has decreased from 100–200 cases to 0.001 cases per 100,000 population. From 1980 to 1989, only 24 cases of respiratory diphtheria were reported in the United States: 2 cases were fatal, and 18 (75%) occurred among persons greater than or equal to 20 years of age.

Only 0–5 cases a year have been reported annually in the United States since 1990. Diphtheria remains endemic in many parts of the developing world, including some countries of the Caribbean and Latin America, Eastern Europe, Southeast Asia, and the sub-Saharan belt in Africa.

In the pre-vaccine era, children were at highest risk for respiratory diphtheria. Recently, diphtheria has primarily affected adults in the sporadic cases reported in the United States and in large outbreaks in Russia and other countries in the former Soviet Union. A complete vaccination series substantially reduces the risk of developing diphtheria, and vaccinated persons who develop disease have milder illnesses. Protection lasts at least ten years. Vaccination does not, however, eliminate carriage of *C. diphtheriae* in the pharynx or nose or on the skin.

In August 2010, an elderly Idaho resident was diagnosed with diphtherial illness due to *C. ulcerans* after presenting with nasal congestion and bilateral soft tissue obliteration of his nasal cavities. The patient received debridement, antibiotics, and diphtheria antitoxin with good clinical response. He was not sure if he had been vaccinated with any diphtheria-containing vaccines. Unlike *C. diphtheriae*, *C. ulcerans* is not known to be spread from person-to-person.

Diphtheria antitoxin (DAT) was first produced in the 1890s and is still produced using serum from horses hyperimmunized with diphtheria toxoid. The evidence for efficacy of

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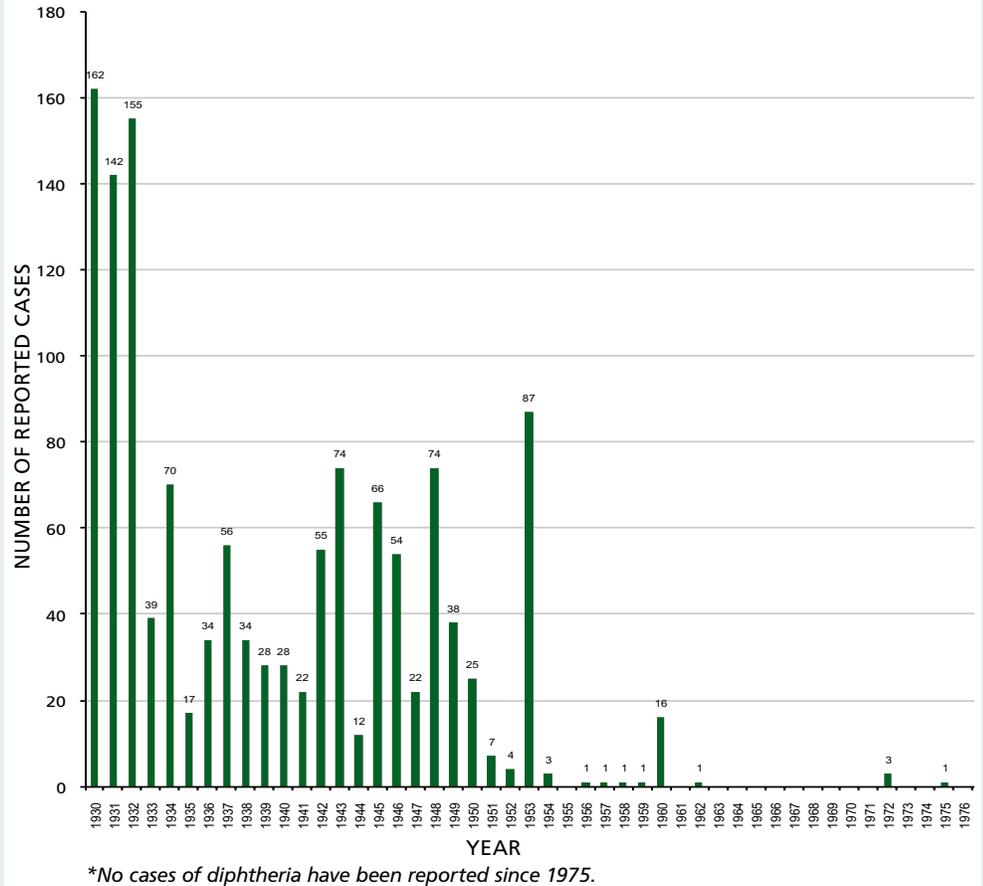


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DAT is based on observations and studies done several decades ago. Mortality rates for clinical diphtheria frequently exceeded 50% in the pre-antitoxin era. Almost as soon as antitoxin was available, clinical experience showed dramatic declines in mortality in groups of patients treated with antitoxin compared to historical control groups or groups treated at hospitals not using antitoxin. In 2008, the Centers for Disease Control and Prevention (CDC) sought and obtained Investigational New Drug (IND) approval for a DAT product manufactured by the Instituto Butantan in São Paulo, Brazil since DAT is no longer manufactured in the United States.

This case underscores the need for providers to consider diphtheria in the differential diagnosis of cases of membranous pharyngitis, and to ensure that adult patients remain up to date on their diphtheria-containing vaccines (either Td or Tdap as appropriate). Diphtheria is reportable in Idaho. Suspected cases should be reported to public health epidemiologists, who can assist in arranging for the organism to be sent to CDC, obtaining diphtheria antitoxin from CDC, and evaluating the need for immunization and prophylaxis of contacts.

Figure. Reported Diphtheria in Idaho, 1930–1976*



Idaho Public Health and Meaningful Use of Health Information Technology

The American Recovery and Reinvestment Act (ARRA) was signed on February 17, 2009 by President Barack Obama. Title XIII of ARRA, entitled “Health Information Technology for Economic and Clinical Health Act” (HITECH) focuses on health system reform to improve patient outcomes and reduce costs. Specifically, HITECH includes provisions for the use of health information technology (HIT) to meet health reform goals. The goals of HITECH are to improve the quality, safety, and efficiency of the health system while reducing health disparities; engage patients and families; improve care coordination; ensure adequate privacy and security protections for personal health information; and improve population and public health¹.

The vision and goals outlined in HITECH are a tall order, especially in

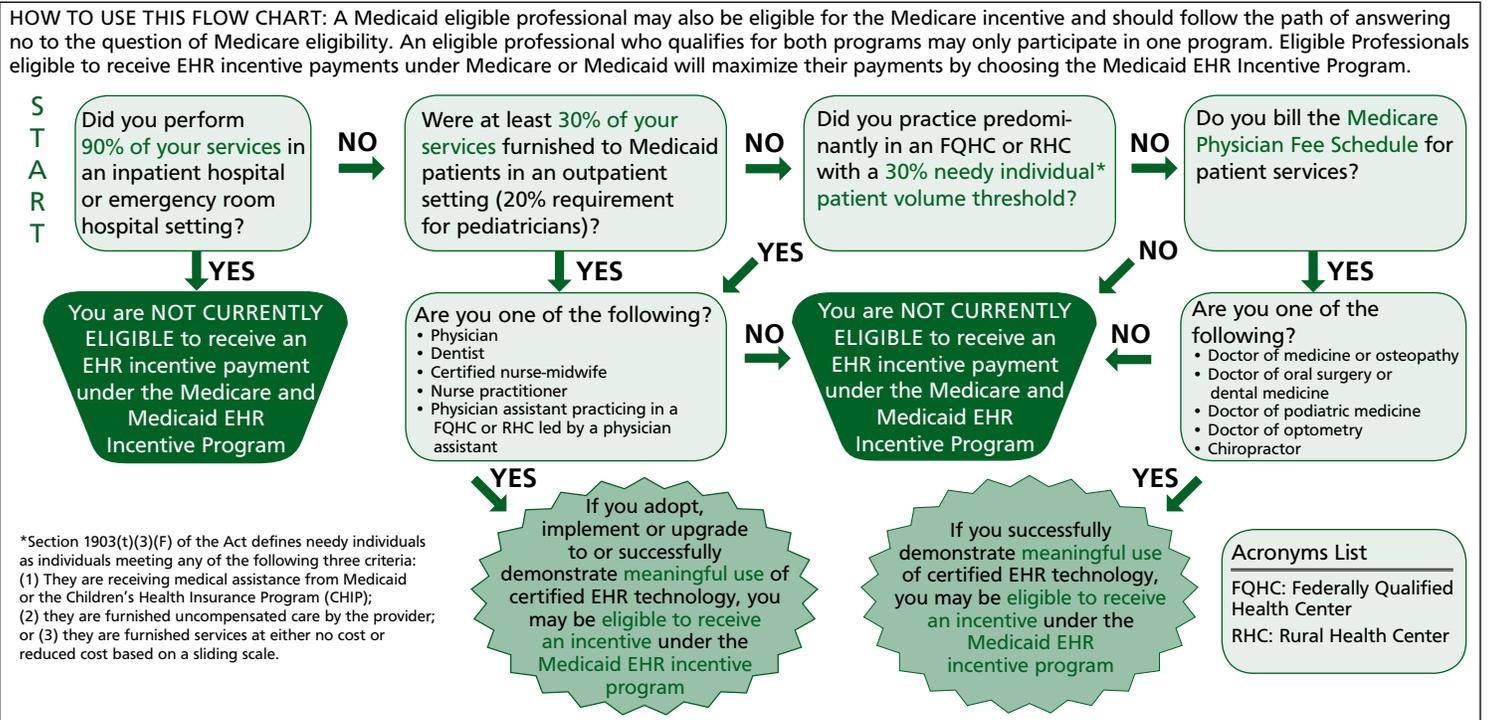
light of the current state of HIT across the nation. Based on data from the National Ambulatory Medical Care Survey conducted by the National Center for Health Statistics, it is estimated only about 6.3% of physicians had a fully functional electronic health record (EHR) system in 2009, although 43.9% were using EHR technology for billing². One major barrier to adoption of EHR use in providers’ offices is the cost associated with a comprehensive EHR system, which can be \$30,000 or more per physician³. Similarly, a recent survey among AMA members published in the *New England Journal of Medicine* reported only 1.5% of U.S. hospitals have comprehensive EHR systems (e.g., present in all clinical units) and an additional 7.6% have a basic or non-comprehensive system⁴. Barriers for hospitals, like providers, include high upfront costs as well as ongoing maintenance costs

and future costs for upgrades⁵.

To help offset the financial burden the HITECH objectives might place on providers and facilities to implement EHR technology, HITECH legislation includes provisions for a financial reward for eligible providers and facilities for adopting use of qualified, certified EHRs used in a meaningful way to achieve significant improvements in care. These payments will be administered by the federal Medicare and state Medicaid programs, depending upon which program(s) providers and facilities are eligible to participate in. The federal agency overseeing the payments is the Centers for Medicare and Medicaid Services (CMS). Rules were released in July 2010 defining criteria for determining which providers (see Figure) and facilities are eligible for payments as well as the criteria for EHR certification.



Figure. Flow Chart to Help Eligible Professionals Determine Eligibility for the Medicare and Medicaid Electronic Health Record (EHR) Incentive Program.



What is Meaningful Use?

As part of the incentive payment criteria, EHRs must be certified to meet the standards of "Meaningful Use" or, simply put, using EHR technology to achieve significant improvements in care. To standardize the criteria, the Office of the National Coordinator for Health Information Technology (ONC) published standards, specifications, and measurement criteria for receiving certification for EHR technology in July this year. These rules complement the rules published by the CMS and outline exactly how meaningful use objectives will be measured (see Table for a list of the objectives). Very recently, ONC named specific bodies that are authorized to evaluate a physician or hospital EHR system and certify it as meeting Meaningful Use criteria.

While Idaho cannot currently support efforts to receive syndromic (clinical) surveillance data, we can receive both immunization data and electronic laboratory report (ELR) data. Idaho public health has been on the leading edge in adopting of the ability to receive ELR data for some time now, but with the adoption of Meaningful Use, we expect more facilities will approach us with plans to implement ELR from their hospital laboratories. We have capacity to receive ELR in HL7 2.5.1

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Table. Stage 1 Meaningful Use core and menu objectives for Eligible Professionals (EP) and Hospitals (H)

Core Objectives – must meet all	Entity	Menu Objectives – must meet 5	Entity
Use CPOE for medication orders	EP; H	<i>1 must be a public health objective (denoted with an *)</i>	
Implement drug-drug and drug-allergy checks	EP; H	*Submit electronic immunization data to immunization registries or immunization information systems	EP; H
Maintain current problem list of current / active diagnoses	EP; H	*Submit electronic syndromic surveillance data to public health agencies	EP; H
Record smoking status of patients 13 years of age and older	EP; H	*Submit electronic data on reportable laboratory results to public health agencies	H
Provide clinical summaries or electronic copy of discharge instructions	EP; H	Incorporate clinical lab test result into EHR	EP; H
Provide electronic copy of health information	EP; H	Implement drug formulary checks	EP; H
Record and chart changes in vital signs	EP; H	Send reminders for prevention / follow-up	EP
Record demographics	EP; H	Record advance directives for patients 65 years of age or older	H
Capability to electronically exchange clinical info with other providers	EP; H	Provide summary of care record for patients transitioned to another provider or setting	EP; H
Implement one clinical decision support rule along with the ability to track compliance with that rule	EP; H	Generate lists of patients by specific conditions for quality improvement, disparity reduction, research or outreach	EP; H
System protects privacy / security of patient data in EHR	EP; H	Use EHRs to identify patient-specific education resources and provide as appropriate	EP; H
Report clinical quality measures to CMS or states	EP; H	Provide patients with timely electronic access to health information	EP
Maintain active medication list	EP; H	Perform medication reconciliation between care settings	EP; H
Maintain active medication allergy list	EP; H		
Generate / transmit electronic prescriptions	EP		



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ROUTINE 24-Hour Disease Reporting Line
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EMERGENCY 24-Hour Reporting Line
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An electronic version of the Rules and Regulations Governing Idaho Reportable Diseases may be found at <http://adm.idaho.gov/adminrules/rules/idapa16/0210.pdf>.

Current and past issues are archived online at www.epi.idaho.gov.

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message format that meets Meaningful Use criteria. The Idaho Immunization Reminder Information System (IRIS) is being upgraded to support immunization data provided using HL7 2.5.1 and the ability to exchange data with providers on patient immunization history.

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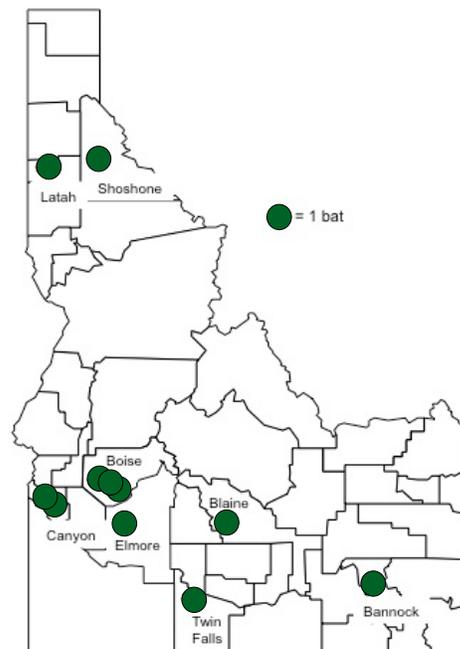
Data Snapshot: Rabid Bats—Idaho, 2010

Bats are the only rabies reservoir in Idaho, although other animals can be infected by bat strains. This summer, three fishermen reported daytime exposures to aggressive bats in separate incidents. Aberrant, daytime bat activity is unusual, suggesting illness. One of the bats was captured and tested positive for rabies. According to the Centers for Disease Control and Prevention, human rabies deaths in the United States are most often associated with a bat rabies variant. Careful questioning of circumstances surrounding bat exposures is prudent: in high-risk exposures, such as these fishermen experienced, rabies post-exposure prophylaxis is indicated even if the bat is not captured and tested.

The Idaho Bureau of Laboratories (IBL) accepts bats or other mammals for rabies testing only if a human exposure to the animal has or is likely to have occurred. Prior approval from public health district or state-level epidemiologists is required. As of October 15, 2010,

11 rabid bats have been identified by the IBL. (Figure).

Figure. Location of Identified Rabid Bats, by County—Idaho, 2010*



*As of December 1, 2010.