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CME ACTIVITY

Detection and Management of Age-Related Hearing Loss

Gloria Y. Kim, MPH

Kenneth E. Wolf, PhD

Tony Kuo, MD, MSHS

Introduction

Age-related hearing loss, or presbycusis, affects approximately 18% of the U.S. population aged 65 years and older.¹ It is a slow, usually progressive sensorineural hearing loss that affects hearing in the frequency range of 1,000 Hz through 8,000 Hz. Early symptoms may include ringing in the ears, voices that sound mumbled or slurred, difficulty with hearing others in noisy places, and a hard time distinguishing high-pitched sounds from one another such as “s” or “th.”² After arthritis and hypertension, age-related hearing loss represents the third most commonly reported chronic condition among older U.S. adults.³ Although not lethal, this condition predisposes a person to diminished quality of life, increasing the risk for social isolation, depression, and declining physical functioning.⁴⁻⁹ In 2002, the direct medical cost for the first year of

treatment of this condition in the U.S. was estimated to be over \$8.2 billion (\$11.7 billion in 2011 dollars after adjusting for health care inflation); this figure is expected to rise to \$51 billion by 2030.¹⁰ The economic as well as public health burden of hearing loss in the aging population, however, are likely under-estimates, as social stigma and the gradual nature of presbycusis often leads to under-detection by friends, family, and even the patients themselves, frequently delaying care until significant social impairment has occurred.¹¹⁻¹³

Although the prevalence of age-related hearing loss in the U.S. has remained relatively stable in the past decade (28%-35% and 43%-50% for the 65-74 and 75+ age groups, respectively), the burden of this condition is expected to intensify in the near future, as the sheer number of baby boomers born between 1946 and 1964 started turning age 65 beginning this year (2011).^{10,13} Many of these baby boomers come from diverse cultural, language, and socioeconomic backgrounds, foreshadowing potential

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Free Continuing Medical Education Credit

To obtain CME credit, complete the eLearning module on “Detection and Management of Age-Related Hearing Loss” at <https://publichealth.lacounty.gov/elearning>

This educational activity is offered by the LA County Department of Public Health (LAC-DPH). The LAC-DPH is accredited by the Institute for Medical Quality and the California Medical Association to provide continuing medical education (CME) for physicians licensed in California and contiguous states. The LAC-DPH takes responsibility for the content, quality, and scientific integrity of this CME activity. The LAC-DPH designates this educational activity for a maximum of 0.5 AMA PRA Category 1 Credit(s)TM toward the California Medical Association's Certification in Continuing Medical Education and the American Medical Association Physician's Recognition Award. Each physician should only claim those hours of credit he/she actually spent in the educational activity.



treatment challenges and a new dimension in health disparities for the future.^{14,15} As the number of older patients presenting with age-related hearing loss grows, primary care physicians may find themselves facilitating and coordinating the care of these patients. This article discusses the latest evidence for screening, case detection, and management of this condition.

To Screen or Not to Screen

In March 2011, the U.S. Preventive Services Task Force (USPSTF) updated its 1996 evidence review on screening for hearing loss in primary care settings in adults aged 50 years or older.¹⁶ Drawing from data sources such as MEDLINE (1950 to July 2010) and the Cochrane Library (through the second quarter of 2010), the task force synthesized the evidence on benefits and harms of screening for and treatments for hearing loss in older adults. In contrast to its 1996 recommendation to screen all adults aged 50 years or older for hearing loss (grade B recommendation), the update concluded that additional research is needed to understand the effects of screening versus no screening on health outcomes. The update also recommended confirming the benefits of treatment under conditions likely to be encountered in most primary care settings. These conclusions were largely based on a systematic evaluation of the current evidence to answer key questions about the hearing-loss screening process, including if screening leads to improved health outcomes (e.g., greater use of hearing aids and/or better hearing-related quality of life); if the various hearing-loss screening methods (e.g., questionnaires such as the Hearing Handicap Inventory for the Elderly – Screening Version or HHIE-S; clinical techniques such as the whispered voice test; and handheld audiometry) have fair to good diagnostic accuracy (they do); if the treatment for hearing loss, namely amplification, is efficacious in improving health; and to what extent can screening and treatment result in adverse effects (e.g., psychological distress) in adults aged 50 years and older.¹⁶

What Does This Mean in the Primary Care Setting?

Although the latest evidence for hearing-loss screening in older adults remain equivocal, physicians should remain vigilant for risk factors of presbycusis (e.g., family history, repeated exposure to loud noises, and smoking),² and should use their best clinical judgment to determine if and when they should selectively assess and refer a patient with suspected hearing loss for further testing and treatment. Promptly referring patients with suspected age-related hearing impairment to an audiologist for further audiometric evaluation, for example, is prudent practice regardless of guideline recommendations or which screening tool is used if case history, clinical observation, and/or corroborating reports from friends or family are consistent with the condition.^{17,18}

Management of Presbycusis

Presbycusis is generally not amenable to medical or surgical intervention and is typically managed with hearing aids—

the primary treatment modality for this chronic condition.^{2,18} In more advanced cases, other interventions such as the use of telephone amplifiers, sign language, and/or speech reading (lip reading) may be needed. In general, the primary focus of most hearing-loss treatment plans is to maintain or improve the patient's daily function and to prevent social impairment.²

Hearing Aids: Types, Styles, and Costs

Upon diagnosis, most patients with age-related hearing loss will need to choose a type of hearing aid and find a way to pay for the device, which can be prescribed as a single apparatus or as a pair.^{19,20} Although audiologists work with patients in the selection and fitting of hearing aids, many patients may ask primary care physicians for the initial referral or to provide troubleshooting advice throughout the course of hearing-loss management. Understanding the common types of hearing aids may help primary care physicians counsel patients about this chronic condition.

Hearing aids are either analog or digital. Analog hearing aids receive sound waves through a microphone, convert them into electrical signals, and amplify and convert them back into an acoustic signal (sound wave) through a receiver (a speaker) into the ear canal to the tympanic membrane. Generally, analog devices are less expensive than digital models. Analog models also may be conventional (the oldest type) or programmable. Conventional hearing aids use basic analog technology to provide amplification to patients with hearing loss, while programmable hearing aids use basic analog conventional circuits that are set and adjusted by a hearing health care professional on a computer.²⁰

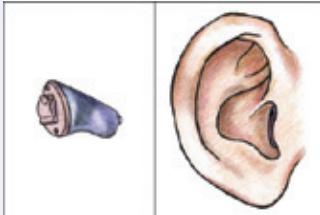
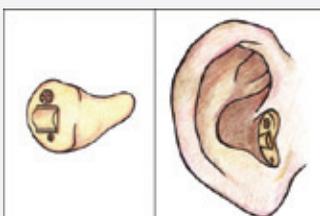
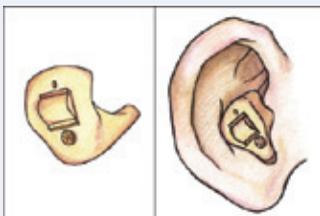
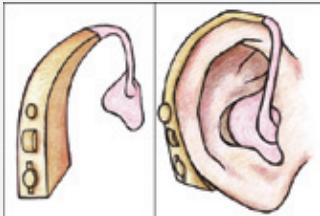
In contrast, digital hearing aids use more advanced technology. These hearing aids actually contain a computer chip that has multiple programs that can be selected by the user or be operated automatically and adaptively. Programs may be able to reduce acoustic feedback, reduce background noise, detect and automatically accommodate for different listening environments, control multiple microphones for spatial hearing, and shift from high to low frequencies based on the acoustic environment. In addition, some digital devices may have wireless capability.²⁰

There are four basic styles of hearing aids available to patients based on the placement of the instrument in relation to the ear: 1) Completely in the Canal (CIC); 2) In the Canal (ITC); 3) In the Ear (ITE); and 4) Behind the Ear (BTE). *Table 1* summarizes the basic uses, differences, key advantages and disadvantages, and general costs of each style of hearing aid.²⁰

Out-of-Pocket Costs

Similar to most private health plans, Medicare currently does not cover hearing aids for adults. This is not likely to change, as the Patient Protection and Affordable Care Act of 2010 contains no specific provisions for Medicare coverage of hearing aids.²¹ A few states, however, have implemented mandates regarding hearing aid insurance for adults (e.g., Kentucky, Missouri, and Rhode Island); California is not

Table 1. Styles of Hearing Aids

Style	Advantages	Disadvantages	Cost per Pair
<p>Completely in the Canal (CIC)</p> 	<ul style="list-style-type: none"> Discrete; smallest of custom-made hearing aids Reduced distortion, occlusion effect, and acoustic feedback Easy to remove, comfortable and secure fit 	<ul style="list-style-type: none"> Only for individuals with large enough ear canals to accommodate the instrument Not suitable for individuals with severe hearing loss Tends to be the most expensive Requires good manual dexterity because the instrument has a very small battery and manual volume controls Most susceptible to damage by ear wax and ear drainage 	<p>Analog \$1,600 Digital \$1,800-\$4,400</p>
<p>In the Canal (ITC)</p> 	<ul style="list-style-type: none"> Visible but still discrete because it fits in the ear canal Works well for individuals with mild to moderate hearing loss Uses a slightly larger battery than the CIC 	<ul style="list-style-type: none"> Tends to be expensive Requires good manual dexterity for changing battery Susceptible to damage by ear wax and ear drainage 	<p>Analog \$1,000 Digital \$1,200-\$4,200</p>
<p>In the Ear (ITE)</p> 	<ul style="list-style-type: none"> Largest of custom-made hearing aids Accommodates larger sound amplifiers and other features, including a telephone switch Fits a wide range of patients (for individuals with a wide range of hearing loss) Inexpensive 	<ul style="list-style-type: none"> Not cosmetically appealing Susceptible to damage by ear wax and ear drainage 	<p>Analog \$800 Digital \$1,000-\$2,100</p>
<p>Behind the Ear (BTE)</p> 	<ul style="list-style-type: none"> For individuals with a wide range of hearing losses; can even be used for individuals with severe to profound hearing loss Most powerful of hearing aids: provides more amplification due to larger battery and stronger amplifier Most economical Can be used easily with training Less susceptible to damage by ear wax and drainage because it is located away from the ear canal Available in several different colors 	<ul style="list-style-type: none"> Not custom made Not as cosmetically appealing because it is placed behind the ear instead of inside the ear canal 	<p>\$800 and up</p>

Source: Multiple peer-reviewed^{19,20,22} and online sources (e.g., www.entusa.com/hearing_aids.htm)

Illustrations by G.Y. Kim

among them. Additionally, several Federal Employee Health Benefits insurance plans provide coverage for adult hearing aids. Some nonprofit organizations are known to provide financial assistance for new, used, or refurbished hearing aids to individuals based on need.²²

Barriers to Hearing Aid Use

Typically, inadequate management of age-related hearing loss stems from a number of modifiable factors including patient minimization or lack of perceived need, perceived or real inability to afford the device, fear of social stigmatization, misinformation about the effectiveness of the hearing aids, and/or patient dissatisfaction associated with environmental conditions, such as difficulty understanding speech in adverse listening conditions (i.e., background noise and speaker located at some distance away).^{12,23} Since most of these factors are amendable to correction, primary care physicians can facilitate improved compliance by asking about these barriers during routine clinic visits and by helping patients to mitigate some of these perceived and real obstacles to proper hearing aid use. When utilized as prescribed, hearing aids typically achieve the intended benefits within a few weeks of use and tend to stabilize shortly thereafter; these benefits can be further enhanced by audiologic rehabilitation if these services are available to the patient.⁸

Implications for Clinical Practice

Primary care physicians can play an important role in improving the quality of life for older adults with age-related hearing loss. This can be accomplished through sound clinical judgment to determine if and when a patient with suspected hearing loss should be referred to an audiologist, and through following up with these patients to ensure proper use of hearing aids once the diagnosis has been made. Additionally, reducing the risk of further disease progression is essential. Although family history cannot be modified, smoking and reducing repeated exposure to loud noises throughout the remaining life course are key health messages that should be part of routine patient counseling during all clinic encounters, especially during health maintenance visits. 

Gloria Y. Kim, MPH, is a research analyst, Office of Senior Health, Los Angeles County Department of Public Health. **Kenneth E. Wolf**, PhD, is associate dean for Faculty Affairs, Charles R. Drew University of Medicine and Science, College of Medicine. **Tony Kuo**, MD, MSHS, is director, Office of Senior Health, Los Angeles County Department of Public Health, and assistant professor, Department of Family Medicine, David Geffen School of Medicine at UCLA.

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PROTECTING PATIENTS AND PERSONNEL

Improving Health Care Worker Flu Vaccination Rates

Julia Heinzerling, MPH

Wilbert H. Mason, MD

Mary Virgallito, MSN

In 1859, Florence Nightingale stated, “It may seem a strange principle to enunciate as the very first requirement in a hospital that it should do the sick no harm.” More than 150 years later, health care providers and administrators continue to explore strategies for protecting patients in health care settings. One strategy that has been proven to protect patients and health care personnel is vaccinating personnel against influenza.

The Advisory Committee on Immunization Practices (ACIP) recommends that all individuals 6 months of age and older be vaccinated against influenza, with an emphasis on health care personnel, as they are at risk for being infected with the flu, spreading the flu to patients, and causing institutional outbreaks that can lead to morbidity and mortality in patients who are at risk for flu complications.¹

Impact of Influenza Among Health Care Personnel

Hospital-acquired flu infections result in longer stays, higher costs, patient morbidity, outbreaks, and sometimes death. In 2009, H1N1 flu outbreaks in two acute care facilities in Los Angeles County might have been linked to transmission from health care staff to patients during the pre-symptomatic infectious period. Six immunocompromised patients, including three children, were infected with influenza. Regrettably, three died as a result of the infections.²

In one study, nearly 25% of health care personnel had serologic evidence of flu infection after a mild flu season, but only about 40% remembered having the flu,³ suggesting that many worked while infected. In fact, health care personnel may be more likely than individuals in other professions to work through or return to work earlier during illness.⁴ Thus, the best way to prevent transmission to patients is to prevent personnel from being infected in the first place.

Benefits of Vaccinating Health Care Personnel

Vaccination is the most effective way to prevent the flu. When well matched to the virus strains in circulation, Trivalent Influenza Vaccine prevents flu illness for 70%-90% of healthy adults <65 years of age.³ Vaccinating health care personnel can reduce lost workdays by up to 45%³ and may be a better way to protect hospitalized patients than vaccinating the patients themselves.⁵ In one acute care setting, when the staff flu vaccination rate climbed from 4% to 67% over 12 years, the proportion of nosocomial flu infections in hospitalized patients dropped from 32% to 0%.³

Improving Health Care Personnel Vaccination Rates

When used in combination, the following strategies have been found to increase flu vaccination coverage levels among health care personnel⁶:

- Staff education that addresses concerns and highlights the benefits of vaccination/risks of declining vaccination
- Mandatory signed declination statements that acknowledge the risks of not getting vaccinated
- Easily accessible vaccine at no cost to staff, in areas where staff congregate, during conferences, and through mobile carts
- Mandatory vaccination, with a requirement that those declining vaccination wear a respiratory mask or be reassigned to nonpatient care roles during the flu season.

ACIP identified the following as key components of the most successful campaigns: education that combats fears and misperceptions, use of reminder/recall systems, removal of administrative and financial barriers, and role modeling. Use of modest incentives has also been associated with vaccine acceptance.³

A 2010 California Department of Public Health survey identified best practices for improving health care personnel seasonal influenza vaccination rates. Hospitals in the top quartile (>74%) offered vaccine at no cost during all shifts through mobile vaccination carts and/or congregate area clinics, required staff to complete a flu educational program, and/or required staff who were vaccinated off-site to provide documentation. Hospitals with a 90% or higher staff vaccination rate mandated that personnel receive a flu shot, or sign a declination and wear a mask. Other promising strategies included competition between units/departments, support from supervisors, and ordering vaccine from multiple manufacturers to reduce the risk of shortages.⁶

What we can learn from Children’s Hospital Los Angeles

For the 2010-2011 influenza season, Children’s Hospital Los Angeles (CHLA) vaccinated an impressive 97% of personnel against influenza, including 99% of physicians, residents, interns, and fellows. The previous flu season, only 53% of personnel had been vaccinated. The hospital implemented a coordinated vaccination campaign to achieve the 2010-2011 coverage levels. The campaign paid off. There were no hospital-acquired flu infections during the 2010-2011 flu season.

Consider integrating the following lessons from CHLA into your own staff vaccination campaigns:

“No one works at Children’s Hospital to harm children”

Build on personnel’s commitment to protecting the patients they are charged with caring for. CHLA’s campaign used examples of past nosocomial infections to help hospital leaders and personnel realize the real risk that flu poses for the vulnerable children treated in the hospital.

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Making the right choice to protect personnel and patients

The CHLA campaign was not a mandatory vaccination campaign, but the campaign leads and hospital management staff made it clear to personnel that getting vaccinated was a choice to protect themselves, coworkers, patients, and their own families. Featuring hospital personnel on all campaign materials showed that coworkers also supported the campaign.

Did you know that California law, the Cal/OSHA Aerosol-Transmissible Disease Standards, and the Joint Commission Standard all require hospitals to offer employees flu vaccinations?

To help protect patients, those personnel who declined vaccination or could not receive vaccine for medical reasons were required to wear a mask in patient areas. To easily identify these staff members and assure compliance, CHLA provided them with a new badge that had a green dot, denoting unvaccinated status.

Making it easy for personnel to get vaccinated

Consider setting up a vaccination clinic in an area where personnel pass by daily. At CHLA, the clinic was set up in the area where most personnel entered the hospital and was open from 5:30 am to 2:30 pm. This made it easy for personnel to get vaccinated at the start or end of their shift and for vaccinators to grab personnel they knew had not yet been vaccinated.

Walking the talk

Be a role model, get leadership on-board early, and enlist the help of unit and department managers. CHLA convened a task force composed of leaders from many disciplines, including Human Resources, Emergency Health Services, Infection Control, Infectious Diseases, Quality Improvement, Patient Care Services, and Medical Staff to develop the plan and update policies and procedures.

Infection control staff involved administrators early and used past nosocomial cases to illustrate the importance of reducing hospital-acquired infections. Most administrators and frontline managers supported the campaign because they understood that vaccinating personnel could prevent flu cases, complications, lawsuits, and deaths.

Walking the floors

Infection control staff visited personnel who had not yet been vaccinated to respond to questions and concerns in a nonjudgmental manner. Often fence-sitters agreed to be vaccinated.

Staying on track

Monitor your progress throughout the season and follow-up with personnel who have not yet been vaccinated. Before implementation, the hospital's executive leadership detailed consequences for not adhering to the flu vaccination policy, and the project team clearly delineated consequences.

A critical tool was the use of a single reliable data system to track vaccination for all personnel, including volunteers, contracted employees, housekeeping staff, and non-staff physicians with hospital privileges. The system was updated on an ongoing basis and results were shared regularly with the management team and frontline managers. This helped the hospital assess progress and follow-up with staff who had not yet been vaccinated.

Together these strategies are credited for an impressive increase in health care personnel vaccination rates from 53% to 97% in just one flu season.

Concluding Thoughts

Vaccinating health care personnel against influenza is the best strategy for protecting patients as well as staff and their families from a serious and sometimes deadly disease. Hospitals and other health care facilities are encouraged to tailor evidence-based strategies to fit their needs, capitalize on the lessons learned by hospitals like CHLA, and develop and share their own promising practices for improving vaccination rates among health care personnel. 

Julia Heinzerling, MPH, is a policy and advocacy specialist, Immunization Program, Los Angeles County Department of Public Health. **Wilbert H. Mason**, MD, is chief medical quality officer, and **Mary Virgallito**, MSN, is manager, Infection Prevention and Control, Children's Hospital Los Angeles.

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West Nile Virus Update for 2011

Van Ngo, MPH

Rachel Civen, MD, MPH

The recent detection of dead birds and mosquitoes positive for West Nile virus (WNV) in Los Angeles County marks the return of WNV season for 2011. The number of human WNV infections reported to the Department of Public Health each season is difficult to predict and has varied markedly from year to year; however as of August 18, the County Health Officer confirmed the season's first four human cases of WNV.

Two peaks have been recorded since WNV's arrival to the county with a single case in 2003. WNV incidence peaked in 2004 with 309 cases and declined to 16 in 2006. The second peak occurred in 2008 with 170 reported cases and dropped to only four cases in 2010. Notably, the level of WNV detected in mosquito samples and dead birds in the county in July 2011 was the highest it has been since the last epidemic year in 2008.

A number of factors have affected the level of transmission each year including, but not limited to, weather patterns, the population of bird species able to carry WNV, and the number of neglected swimming pools in localized areas. Cases reported to Public Health represent only the tip of the iceberg of all WNV infections. Approximately 80% of all those infected with WNV have no symptoms and most of the remainder have mild symptoms, and so often go undetected. Even in years with low case counts, WNV remains enzootic in LA County. Providers should be aware of proper diagnostic procedures, understand the importance of prompt reporting, and educate their patients on how to protect themselves against infection.

West Nile Virus Serological Screening Tests

WNV screening tests are recommended only for patients with signs or symptoms compatible with West Nile fever, aseptic meningitis, encephalitis, or acute flaccid paralysis. Specimens positive for acute WNV infection from commercial labs generally do not require confirmation by the LA County Public Health Laboratory. Excellent correlation has been found between WNV positive tests from the majority of commercial labs and subsequent confirmation at reference public health laboratories. The Public Health Lab will continue to be available for initial screening diagnostics and confirmation of ambiguous results on serum specimens; however, this year, the laboratory will no longer be testing cerebrospinal fluid (CSF) for routine diagnosis of neuroinvasive WNV infection, as the antibody test is not approved for CSF. WNV testing can be requested for CSF under special circumstances (e.g., confirmation of ambiguous serum results) and will be forwarded to the Centers for Disease Control and Prevention.

Reporting of Human WNV Cases

Public Health tracks occurrences of West Nile fever, neuroinvasive disease, and asymptomatic blood donors. Physicians and laboratories are required to report all positive

Los Angeles County Public Health Laboratory: Submitting Sera for West Nile Virus Diagnostic Testing

WNV testing is available at the Public Health Laboratory for individuals with the following signs or symptoms:

- Encephalitis
- Aseptic meningitis (individuals 18 years of age or older)
- Acute flaccid paralysis or atypical Guillain-Barré syndrome
- Febrile illness compatible with West Nile fever syndrome
 - Case must be evaluated by a health care provider.
 - Symptoms associated with West Nile fever syndrome can be variable and often include headache, fever (>38°C), and muscle weakness, rash, swollen lymph nodes, eye pain, nausea, or vomiting.

For instructions on sending specimens to the Public Health Lab, go to www.publichealth.lacounty.gov/acd/docs/West%20Nile/WESTNILEVIRUSFORM.pdf.

laboratory findings of WNV, whether they are confirmed or not, to the LA County Department of Public Health within one working day. A standard Confidential Morbidity Report (CMR) may be used to report suspected cases; the CMR may be faxed to Public Health's Morbidity Unit at 1-888-397-3778. During normal business hours, a report may also be phoned in at 1-888-397-3993. The CMR is available at www.publichealth.lacounty.gov/acd/reports/CMR-H-794.pdf.

West Nile Virus Prevention: Property, Protection, and Products

Prevention is the best protection against mosquitoes infected with the West Nile virus.

- Eliminate standing water on property, as this is where mosquitoes breed. Drain pots, unclog gutters, and keep swimming pools, wading pools, fountains, and other vessels clean and chlorinated or drained and covered.
- Make sure that door and window screens are in good condition to keep the mosquitoes out.
- When outdoors, use an insect repellent containing DEET or picaridin (both equally effective), or oil of lemon eucalyptus (not as long-lasting). Always follow product directions. Updated information (from May 8, 2008) on mosquito repellants is available at www.cdc.gov/ncidod/dvbid/westnile/resources/uprepinfo.pdf.

Patient education materials on WNV prevention, including information about reporting dead birds and mosquito abatement, may be downloaded from and/or ordered free of charge at the following websites:

- www.publichealth.lacounty.gov/acd/VectorWestNile.htm
- www.westnile.ca.gov/
- www.cdc.gov/ncidod/dvbid/westnile/index.htm. 

Van Ngo, MPH, is an epidemiologist, and Rachel Civen, MD, MPH, is a medical epidemiologist, Acute Communicable Disease Control, Los Angeles County Department of Public Health.

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Rx for Prevention

Promoting health through prevention in Los Angeles County

Upcoming Trainings

Immunization Training Resources for Clinicians

The Los Angeles County Department of Public Health Immunization Program, the California Department of Public Health, the CDC and other entities offer a variety of web-based and in-person immunization training programs for clinicians and staff. Some programs offer CMEs Visit www.publichealth.lacounty.gov/ip/trainconf.htm.

Immunization Skills Training for Medical Assistants

The Immunization Skills Institute is a 4-hour course that trains medical assistants on safe, effective, and caring immunization skills. Visit www.publichealth.lacounty.gov/ip, or call (213) 351-7800.

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Comments or Suggestions? If so, or if you would like to suggest a topic for a future issue, e-mail Dr. Jeffrey Gunzenhauser, co-editor, at jgunzenhauser@ph.lacounty.gov.



Office of the Medical Director
241 N. Figueroa St., Suite 275
Los Angeles, CA 90012

Index of Disease Reporting Forms

All case reporting forms from the LA County Department of Public Health are available by telephone or Internet.

Reportable Diseases & Conditions Confidential Morbidity Report
Morbidity Unit (888) 397-3993
Acute Communicable Disease Control (213) 240-7941
www.publichealth.lacounty.gov/acd/reports/CMR-H-794.pdf

Sexually Transmitted Disease Confidential Morbidity Report
(213) 744-3070
www.publichealth.lacounty.gov/std/providers.htm (web page)
www.publichealth.lacounty.gov/std/docs/STD_CMV.pdf (form)

Adult HIV/AIDS Case Report Form
For patients over 13 years of age at time of diagnosis
HIV Epidemiology Program (213) 351-8196
www.publichealth.lacounty.gov/HIV/hivreporting.htm

Pediatric HIV/AIDS Case Report Form
For patients less than 13 years of age at time of diagnosis

Pediatric AIDS Surveillance Program (213) 351-8153
Must first call program before reporting
www.publichealth.lacounty.gov/HIV/hivreporting.htm

Tuberculosis Suspects & Cases Confidential Morbidity Report
Tuberculosis Control (213) 744-6160
www.publichealth.lacounty.gov/tb/forms/cmrv.pdf

Lead Reporting
No reporting form. Reports are taken over the phone.
Lead Program (323) 869-7195

Animal Bite Report Form
Veterinary Public Health (877) 747-2243
www.publichealth.lacounty.gov/vet/biteintro.htm

Animal Diseases and Syndrome Report Form
Veterinary Public Health (877) 747-2243
www.publichealth.lacounty.gov/vet/disintro.htm

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