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ADOLESCENT ALCOHOL AND SUBSTANCE USE AND ABUSE

Why Is It Important to Screen for Adolescent Alcohol and Substance Use?

Alcohol and substance use is associated with deaths, injuries, and health problems among US teenagers. Use is associated with leading causes of death, including unintentional injuries (eg, motor vehicle crashes), homicides, and suicides. More than 30% of all deaths from injuries can be directly linked to alcohol. Substance use also is associated with a wide range of non-lethal but serious health problems, including school failure, respiratory diseases, and high-risk sexual behaviors.

Alcohol and substance use is common among adolescents. Studies show that 46% of adolescents have tried alcohol by eighth grade, and by senior year in high school 77% of adolescents have begun to drink. Moreover, 20% of eighth graders and 58% of seniors have been drunk.

Adolescents have recently reported increasing misuse of prescription drugs, including psychostimulant medications and oral opioid analgesics.

Two factors can predict increases in the prevalence of use of specific illicit drugs.

- An increase in the perceived availability of the drug
- A decrease in the perceived risk of harm associated with use of the drug

Misuse of alcohol and drugs is found among all demographic subgroups. Higher risk of misuse is associated with being male, white, and from middle to upper socioeconomic status families.

Early age of first use of alcohol and drugs can increase the risk of developing a substance use disorder during later life.

Recurrent drunkenness, recurrent cannabis use, or any use of drugs other than cannabis are not normative behaviors, and health care practitioners should always consider them serious risks. However, experimentation with alcohol or cannabis or getting drunk once can arguably be considered developmentally normative behaviors.

When Should You Evaluate an Adolescent's Alcohol or Substance Use?

Substance use should be evaluated as part of an age-appropriate comprehensive history. Reviewing the adolescent's environment can identify risk and protective factors for the development of alcohol or drug abuse.

Risk Factors

- A family history of substance abuse or mood disorders. One in 5 children grows up in a household where someone abuses alcohol or other drugs. Substance use by a family member is associated with higher rates of substance use in adolescents.
- Poor parental supervision and household disruption are associated with involvement in substance use and other risk behaviors.
- Low academic achievement and/or academic aspirations.
- Untreated attention-deficit disorder (ADD) and attention-deficit/hyperactivity disorder (ADHD).

- Perceived peer acceptance of substance use and substance use in peers.

Protective Factors

- Parents who set clear rules and enforce them.
- Eating meals together as a family.
- Parents who regularly talk with their children about the dangers of alcohol and drug use.
- Having a parent in recovery.
- Involvement in church, synagogue, or community programs.
- Opportunities for prosocial involvement in the community, adequate community resources.

How Should You Evaluate an Adolescent's Alcohol or Substance Use?

Use Informal Methods

- Ask about alcohol and substance use. Many adolescents do not discuss their substance use with their physician. The most common reason given for not discussing substance use during a clinic visit was never being asked. Evidence shows that 65% of adolescents report a desire to discuss substance use during clinic visits.
- Begin with open-ended questions about substance use at home and school and by peers before progressing to open-ended questions about personal use. Two questions that can readily screen for the need to ask further questions include

  Have you ever had an alcoholic drink?

  Have you ever used marijuana or any other drug to get high?[1]
- Recognize the importance and complexity of confidentiality issues. Providing a place where the adolescent can speak confidentially is associated with greater disclosure of risk behavior involvement. Time alone with the physician during the clinic visit is associated with greater disclosure of sensitive information.

At the same time, the confidentiality of your conversation is limited by an adolescent's reports of threat to self, threat to others, and abuse. After reviewing the severity of an adolescent's substance use, you can judge the seriousness of a threat to self.

Discuss the need to disclose sensitive information with the adolescent before disclosing to parents or other people (treatment specialists, for example).

Use Screening Tools

The evidence supporting screening for substance misuse in adolescents is Type IV (Expert Opinion) because no clinical trials support the efficacy of screening during clinical encounters. However, several tools are available, and the CRAFFT screener (Boxes 1 and 2) has high sensitivities and specificities for identifying a diagnosis of substance problem use, abuse, or dependence.[2]

Consider using a pen and paper (GAPS screening tool, Problem-Oriented Screening Instrument for Teenagers [POSIT]) or computerized screening tool before clinic appointments.

Or use a structured interview designed to detect serious substance use in adolescents, such as the CRAFFT screener.

A positive CRAFFT should be followed by a more comprehensive alcohol and drug use history, including age of first use; current pattern of use (quantity and frequency); impact on physical and emotional health, school, and family; and other negative consequences from use (eg, legal problems).

Taking a good substance use history begins the process of therapeutic intervention. Helpful questions include

- What's the worst thing that ever happened to you while you were using alcohol or drugs?
- Have you ever regretted something that happened when you were drinking or taking drugs?
- Do your parents know about your alcohol and drug use? If so, how do they feel about it? If not, how do you think they would feel about it?
- Do you have any younger brothers or sisters? What do (or would) they think about your alcohol and drug use?

The assessment should also include a screening for co-occurring mental disorders and parent/sibling alcohol and drug use.

Box 1. The CRAFFT Screening Interview

Begin: "I'm going to ask you a few questions that I ask all my patients. Please be honest. I will keep your answers confidential."

Part A

During the PAST 12 MONTHS, did you:	**No**	**Yes**
1. Drink any alcohol (more than a few sips)? (Do not count sips of alcohol taken during family or religious events.)	☐	☐
2. Smoke any marijuana or hashish?	☐	☐
3. Use *anything else* to *get high*? ("anything else" includes illegal drugs, over the counter and prescription drugs, and things that you sniff or "huff")	☐	☐

For clinic use only: Did the patient answer "yes" to any questions in Part A?

No ☐ → **Ask CAR question only, then stop**

Yes ☐ → **Ask all 6 CRAFFT questions in Part B**

Part B

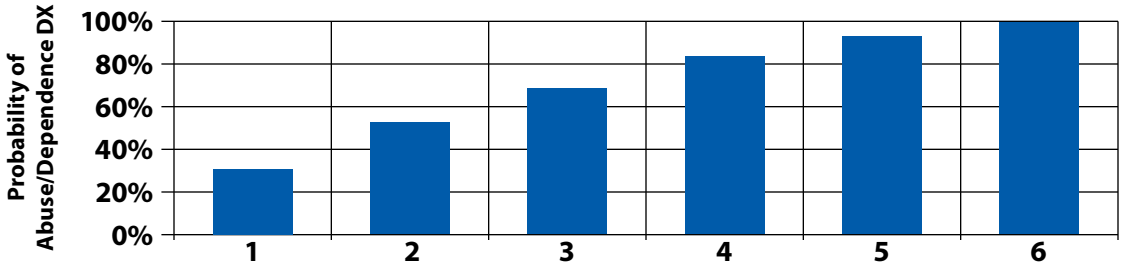
	No	**Yes**
1. Have you ever ridden in a **CAR** driven by someone (including yourself) who was "high" or had been using alcohol or drugs?	☐	☐
2. Do you ever use alcohol or drugs to **RELAX,** feel better about yourself, or fit in?	☐	☐
3. Do you ever use alcohol or drugs while you are by yourself, or **ALONE**?	☐	☐
4. Do you ever **FORGET** things you did while using alcohol or drugs?	☐	☐
5. Do your **FAMILY** or **FRIENDS** ever tell you that you should cut down on your drinking or drug use?	☐	☐
6. Have you ever gotten into **TROUBLE** while you were using alcohol or drugs?	☐	☐

CONFIDENTIALITY NOTICE:
The information recorded on this page may be protected by special federal confidentiality rules (42 CFR Part 2), which prohibit disclosure of this information unless authorized by specific written consent. A general authorization for release of medical information is NOT sufficient for this purpose.

Table 2. The CRAFFT Screening Interview Scoring Instructions: For Clinic Staff Use Only

CRAFFT Scoring: Each "yes" response in **Part B** scores 1 point.
A total score of 2 or higher is a positive screen, indicating a need for additional assessment.

Probability of Substance Abuse/Dependence Diagnosis Based on CRAFFT Score[1,2]



DSM-IV Diagnostic Criteria[3] **(Abbreviated)**

Substance Abuse (1 or more of the following):

- Use causes failure to fulfill obligations at work, school, or home
- Recurrent use in hazardous situations (e.g. driving)
- Recurrent legal problems
- Continued use despite recurrent problems

Substance Dependence (3 or more of the following):

- Tolerance
- Withdrawal
- Substance taken in larger amount or over longer period of time than planned
- Unsuccessful efforts to cut down or quit
- Great deal of time spent to obtain substance or recover from effect
- Important activities given up because of substance
- Continued use despite harmful consequences

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2. Knight JR, Sherritt L, Shrier LA, Harris SK, Chang G. Validity of the CRAFFT substance abuse screening test among adolescent clinic patients. *Arch Pediatr Adolesc Med.* 2002;156(6):607–614
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What Should You Do With an Abnormal Result?

Assess the Level of Severity of Use

These abuse and dependence criteria are adapted from the *Diagnostic and Statistical Manual of Mental Disorders,* fourth edition.

- Experimentation: first use of psychoactive substance, most commonly alcohol, marijuana, or inhalants
- Non-problematic use: sporadic use, usually with peers and without negative consequences
- Problem use: adverse consequences first appear (eg, decline in school performance, suspension, accident, injury, arguments with parents or peers)
- Abuse: defined by one or more of 4 criteria occurring repeatedly over the course of the previous 12 months, but not meeting criteria for diagnosis of dependence
  - Substance-related problems at school, work, or home
  - Use of substance in hazardous situations (eg, driving a car)
  - Substance-related legal problems
  - Continued use despite problems or arguments with friends or family
- Dependence: defined by meeting any 3 of 7 criteria during the previous 12 months
  - Tolerance
  - Withdrawal, which may be either physiological or psychological
  - Using more of substance or for longer periods than intended
  - Unsuccessful attempts to quit or cut down use of substance
  - Spending a great deal of time obtaining, using, or recovering from effects of the substance
  - Giving up important activities because of substance use
  - Continued use of substance despite medical or social problems caused by the substance

Deliver a Therapeutic Intervention

Stage-specific goals are presented in the table below. See following text for specific interventions.

Stage	Intervention Goal
Abstinence	Positive reinforcement, anticipatory guidance
Experimentation	Education about risks
Non-problematic use	Risk-reduction advice (eg, driving/riding while impaired)
Problem use	Brief intervention (BI)—see below
Abuse	BI, outpatient counseling, follow-up
Dependence	Referral to intensive/residential treatment
Secondary abstinence	Positive reinforcement, support, follow-up

For those who are abstinent, provide positive reinforcement.

For those at the stages of experimentation and non-problematic use, it is most productive to focus on risk reduction:

- Begin a discussion of the serious risks associated with drinking and driving, or riding with an intoxicated driver.
- Suggest strategies for safe transportation home following events where alcohol or drugs are present.

For those at the stages of problematic use or abuse, office-based brief interventions have been shown to be effective among adults. Less is known about the effectiveness of these strategies among adolescents and among those who use drugs.

Most brief interventions include 6 key steps.

1. **Feedback:** Deliver feedback on the risks and/or negative consequences of substance use.
2. **Education:** Explain how substance use can lead to consequences that are relevant to the adolescent (ie, immediate rather than long-term consequences).

3. **Recommendation:** Recommend that your patient completely stop all use of alcohol and drugs for a specified time (eg, 3 months).
4. **Negotiation:** If your recommendation is declined, attempt to elicit some commitment to change. For example, try to have your patient commit to stopping drugs (if she or he refuses to stop drinking), or cutting back use of alcohol or drugs.
5. **Agreement:** Secure a specific, concrete agreement. Ask for a brief written contract that both of you will sign that specifies the change and the time.
6. **Follow-up:** Make an appointment for a follow-up meeting to monitor success (or need for more intensive treatment), and consider use of laboratory testing to verify abstinence.

Some adolescents, such as those with alcohol/drug dependence and co-occurring mental disorders, will require more directive intervention, parental involvement, and referral to intensive treatment.

Become familiar with treatment resources in your community. Adolescent-specific treatment is uncommon in many communities but, if possible, refer adolescents to programs that are limited to adolescents or have staff specifically trained in counseling adolescents.

Effective treatment programs should offer treatment for co-occurring disorders and include parents in treatment. These programs are offered on outpatient or inpatient basis.

- Outpatient treatment
  - Behavioral therapies: Individual, group, or family counseling. Cognitive behavioral therapy and multi-systemic family therapy appear promising.
  - Pharmacotherapies: Are seldom used in adolescents. Naltrexone appears promising for relapse prevention among adults with alcohol disorders
  - 12-step fellowships (eg, Alcoholics Anonymous). Adolescents may need an adult guide or temporary sponsor to make attendance at AA groups meaningful.
- Inpatient treatment
  - Detoxification: 2 to 3 days of medical treatment for physiological withdrawal symptoms, indicated only for acute management of alcohol, sedative-hypnotic, benzodiazepine, or opioid dependence.
  - Rehabilitation: 2 to 3 weeks of intensive behavioral therapy, usually including individual and group counseling, psycho-educational sessions, family therapy, and introduction to 12-step fellowships.
  - Long-term residential treatment: These include residential schools, therapeutic communities, and halfway houses. Most offer 3 to 12 months closely supervised aftercare (ie, following completion of a detoxification and/or rehabilitation program), which includes weekly counseling and group therapy, behavioral management strategies, and required attendance at school and/or work.
  - Unproven programs: Some families may choose to send their adolescent children to wilderness programs or "boot camps," which have not been scientifically evaluated.

ICD-9-CM Codes	
V70.3	School/sports physical
305.00	Alcohol abuse, unspecified
303.00	Alcohol intoxication, acute, unspecified
291.81	Alcohol withdrawal
303.91	Alcoholism, chronic, continuous
304.41	Amphetamine dependence, continuous
304.11	Barbiturate dependence, continuous
305.22	Cannabis abuse, episodic
304.31	Cannabis dependence, continuous
305.62	Cocaine abuse, episodic
304.21	Cocaine dependence, continuous
305.90	Drug abuse, unspecified
304.90	Drug dependence, unspecified
292.11	Drug-induced paranoia
292.0	Drug withdrawal
305.52	Opioid abuse, episodic
304.01	Opioid dependence, continuous
305.1	Tobacco abuse

The American Academy of Pediatrics publishes a complete line of coding publications, including an annual edition of *Coding for Pediatrics.* For more information on these excellent resources, visit the American Academy of Pediatrics Online Bookstore at **www.aap.org/bookstore/.**

What Results Should We Document?

Document the CRAFFT score, follow-up assessment, therapeutic intervention used, referrals made, and treatments received.

Resources

Scales

American Academy of Pediatrics Committee on Substance Abuse. Indications for management and referral of patients involved in substance abuse. *Pediatrics*. 2000; 106:143–148. http://aappolicy.aappublications.org/cgi/content/full/pediatrics;106/1/143 (see *DSM-IV* abuse and dependence criteria)

Screening Tools

A CRAFFT total score of 2 or higher has the following sensitivities and specificities for identifying a diagnosis of substance problem use, abuse, or dependence[2]:

- Any substance problem (problem use, abuse dependence): sensitivity: 0.76, specificity: 0.94, positive predictive value (PPV): 0.83, negative predictive value (NPV): 0.91
- Substance abuse or dependence: sensitivity: 0.80, specificity: 0.86, PPV: 0.53, NPV: 0.96
- Substance dependence: sensitivity: 0.92, specificity 0.80, PPV: 0.25, NPV: 0.99

GAPS Screening tool (public domain for clinical use) http://www.ama-assn.org/ama/pub/physician-resources/public-health/promoting-healthy-lifestyles/adolescent-health.shtml
This screener includes 6 forms (Younger Adolescent Questionnaire in English and Spanish, Middle-Older Adolescent Questionnaire in English and Spanish, and the Parent/Guardian Questionnaire in English and Spanish). Also see *AMA Guidelines for Adolescent Preventive Services (GAPS): Recommendations and Rationale*. The questionnaires and monograph are considered master copies that you can reproduce but not alter, modify, or revise without the expressed written consent of the Child and Adolescent Health Program at the American Medical Association.

Resources for Professionals

Web Sites

The Center for Adolescent Substance Abuse Research: http://www.ceasar-boston.org/

National Clearinghouse for Alcohol and Drug Information: http://www.health.org
(includes a special section for health professionals)

National Institute on Alcohol Abuse and Alcoholism: http://www.niaaa.nih.org

National Institute on Drug Abuse: http://www.nida.nih.gov

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Books

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Resources for Parents

Web Sites

A Family Guide To Keeping Youth Mentally Health and Drug Free: http://family.samhsa.gov/

Mothers Against Drunk Driving: http://www.madd.org

Parents: The Anti-Drug: http://www.theantidrug.com/

Partnership for a Drug Free America: http://www.drugfreeamerica.org

Books

Keeping Your Kids Drug Free: A How-to Guide for Parents and Caregivers: available online at http://ncadi.samhsa.gov/govpubs/phd884/

Keeping Youth Drug Free: available online at: http://ncadi.samhsa.gov/govpubs/phd711/

Treating Teens: A Guide to Adolescent Drug Programs. Washington, DC: Drug Strategies; 2003. http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/1a/da/9a.pdf

Resources for Teens

Web Sites

Check Yourself: http://www.checkyourself.com

NIDA for Teens (National Institute on Drug Abuse): http://www.teens.drugabuse.gov/

Students Against Destructive Decisions: http://saddonline.com

What's Driving You? http://www.whatsdrivingyou.org/

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CERVICAL DYSPLASIA

Why Is It Important to Screen for Cervical Dysplasia?

Cervical cancer can be prevented. Cervical cancer is the second most common cancer in women worldwide. Routine Papanicolaou (Pap) tests can detect most pre-invasive lesions before they progress to cancer. Since routine Pap screening began in the 1950s, the incidence of cervical cancer has decreased more than 70% in the United States.

Risk factors for developing cervical cancer include, but are not limited to, persistent infection with high-risk human papillomavirus (HPV) type, impaired immunity, cigarette smoking, increased parity, and prolonged oral contraceptive use.

Screening and observation have increased in importance because of changes to treatment guidelines for cervical dysplasia. These guidelines, updated in 2009, take into consideration that in adolescents with normal immunity, cervical cell abnormalities are mostly transient and regress spontaneously. In the US, only .1% of cases of cervical cancer occur before age 21, with less than 15 cases annually of invasive cancer in teens ages 15–19 years.

Therefore, there has been a shift from aggressive therapy of LSIL with colposcopy to closely monitored observation. Likewise, HPV DNA testing is now recommended as an adjunct to the Pap test only to screen for cervical cancer in women aged 30 years and older.

What Is the Relationship Between Cervical Cancer and HPV?

Infection with HPV is a necessary factor in the development of cervical cancer. More than 30 HPV types can infect the genital tract and are divided into 2 groups based on their association with cervical cancer.

- Low-risk types (such as 6 and 11, which cause 90% of genital warts)
- High-risk types (such as 16 and 18, which cause 70% of cervical cancers)

Most genital HPV infections are transient, asymptomatic, and have no clinical consequences. However, more than 99% of cervical cancers have HPV DNA detected within the tumor. The time from initial HPV infection to carcinoma in situ is 7 to 15 years.

Human papillomavirus is the most common sexually transmitted infection (STI) in the United States. At least one-half of sexually active individuals will be infected with HPV at some point in their lifetime. The HPV rates are highest in adolescents, with a cumulative incidence of up to 44% among 15- to 19-year-olds over 3 years and 60% at 5 years.

Risk factors for acquisition of HPV include, but are not limited to, multiple sex partners, younger age at sexarche, young age, and a sex partner with multiple partners.

Immunization can prevent HPV infection. Prophylactic HPV vaccines significantly reduces the rates of HPV infection and cervical cancer. Bivalent vaccines are used against types 16 and 18. Quadrivalent vaccines are used against types 6, 11, 16, and 18.

When Should You Screen for Cervical Dysplasia?

The American Cancer Society (2002)[1] recommends the first Pap test approximately 3 years after onset of vaginal intercourse, but no later than age 21. Screening should be done annually with conventional Pap test or liquid-based cytology until age 30. After age 30, Pap tests may be done every 2 to 3 years after 3 normal tests.

The US Preventive Services Task Force (USPSTF)[2] recommends the first Pap test within 3 years of onset of sexual activity or age 21, whichever comes first. Screening should be done at least every 3 years with conventional Pap test. The USPSTF found insufficient evidence for the use of liquid-based cytology.

The American College of Gynecology[3] recommends that cervical cancer screening begin at age 21 with either a conventional Pap test or liquid-based cytology regardless of the age of onset of sexual intercourse. Screening should be done every 2 years until age 30 and subsequently every 3 years after 3 consecutive normal tests. More frequent screening may be required for those who are immunosuppressed or infected with human immunodeficiency virus (HIV). Cervical cytology screening should be initiated in HIV-infected women at the time of diagnosis rather than deferring until age 21.

This new recommendation from ACOG was made because invasive cervical cancer is rare in women younger than age 21 (estimated incidence 1–2 cases per 1 million females aged 15–19). In addition, there has been overuse of follow-up procedures with an increase in premature births in women who previously had excisional biopsy for dysplasia.

How Should You Perform Cervical Dysplasia Screening?

Pap Test

Obtain a Pap test during a speculum examination with the cervix in full view, before STI tests, without lubricant, and preferably not during menses or in the presence of a known STI. The sample must include the squamocolumnar junction and the endocervix.

A Pap test can be performed using 1 of 2 methods: (1) the conventional method using slides or (2) liquid-based cytology. Instead of spreading cells onto a slide as in a conventional Pap test, in liquid-based cytology (Thinprep or SurePath), the cells are suspended in a preservative fluid. Liquid-based cytology can reduce cell overlap, obscuring blood, mucus, and inflammation. This test also allows for HPV DNA testing, although not recommended for adolescents.

Conventional Method: Spatula and Cytobrush

- Rotate a spatula with pressure around the cervix and spread the sample onto one slide.
- Insert a cytobrush into the cervical os and rotate gently. Roll the sample onto a second slide.
- As an alternative, both samples can be put on one slide per instructions from the laboratory.
- Fix the slides immediately with a spray fixative or place into a bottle of Pap fixative.

Conventional Method: Cervical Broom

- Rotate a cervical broom device with pressure around the cervix to collect both a cervical and endocervical sample simultaneously.
- Spread the collected material thinly on a slide.
- Fix the slides immediately with a spray fixative or place into a bottle of Pap fixative.

Liquid-Based Cytology: Spatula and Cytobrush Method

- Rotate a spatula with pressure around the cervix.
- Rotate a cytobrush gently in the cervical os.
- Vigorously swirl the spatula in the preservative medium and rub the cytobrush against the side of the collection vial to remove cells from the device.

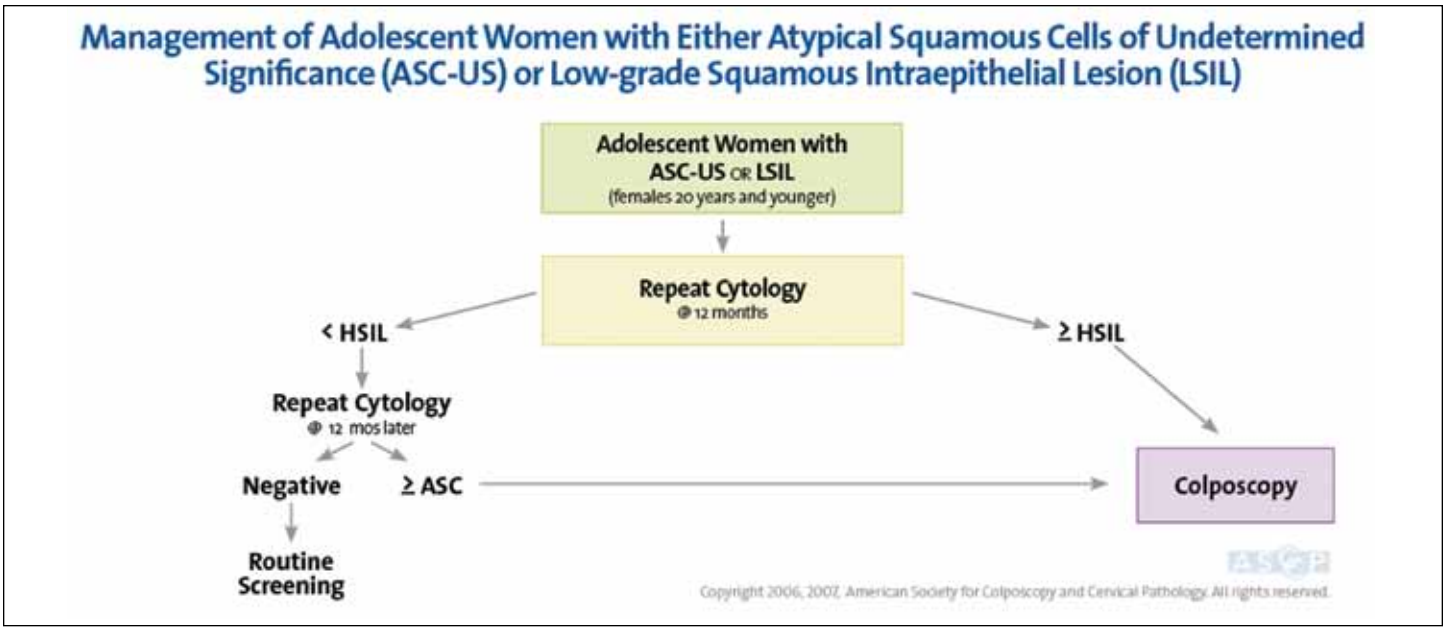
Liquid-Based Cytology: Cervical Broom Method

- Rotate a cervical broom device with pressure around the cervix to collect both a cervical and endocervical sample simultaneously.
- Vigorously compress broom against the base of the collection vial 10 times to separate the cells from the device.

What Should You Do With an Abnormal Result?

If choosing to do a pap smear on an adolescent, guidelines from 2007, provide the following guidance for women ages 20 years and younger:

- For women with LSIL and aytpical squamous cells of undetermined significance (ASCUS), a repeat Pap is recommended in 12 months.



Used with permission from the American Society for Colposcopy and Cervical Pathology.

- At the 12-month follow-up, those with high-grade squamous intraepithelial lesions (HSIL) or greater should be referred for colposcopy.
- At the 24-month follow-up, those with ASCUS or greater should be referred for colposcopy.

Human papillomavirus DNA testing is not recommended for adolescents. If HPV testing is inadvertently performed, the results should not influence management. Colposcopy is not recommended for initial evaluation of LSIL or ASCUS cytology results in adolescents.

- All patients with atypical squamous cells that cannot be excluded as high-grade squamous intraepithelial lesions are referred directly for colposcopy.
- All patients with atypical glandular cells are referred directly for colposcopy.
- All patients with HSIL are referred directly for colposcopy.

What Results Should We Document?

Date of Pap test, Pap test results, recommendations for next Pap test, and referral for colposcopy.

ICD-9-CM Codes	
795.01	Pap test with atypical squamous cells of undetermined significance (ASCUS)
795.02	Pap test with atypical squamous cells cannot exclude high-grade squamous intraepithelial lesion (ASC-H)
795.03	Pap test with low-grade squamous intraepithelial lesion (LGSIL)
795.04	Pap test with high-grade squamous intraepithelial lesion (HGSIL)
795.00	Pap test with atyupical glandular cells (AGC)

The American Academy of Pediatrics publishes a complete line of coding publications including an annual edition of *Coding for Pediatrics*. For more information on these excellent resources, visit the American Academy of Pediatrics online bookstore at **www.aap.org/bookstore/.**

Resources

Guidelines

American Society for Colposcopy and Cervical Pathology. *2006 Consensus Guidelines for the Management of Women with Abnormal Cervical Cancer Screening Tests*. American Society for Colposcopy and Cervical Pathology Web site. http://www.asccp.org/consensus/cytological.shtml

Institute for Clinical Systems Improvement. *2008 Revised Guidelines for Initial Management of Abnormal Cervical Cytology and HPV Testing*.

Articles

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Moscicki AB, Schiffman M, Kjaer S et al. Chapter 5: Updating the natural history of HPV and anogenital cancer. *Vaccine.* 2006;S3:S42–S51

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Weinstock H, Berman S, Cates W Jr. Sexually transmitted diseases among American youth: incidence and prevalence estimates, 2000. *Perspect Sex Reprod Health.* 2004;36:6–10

Wright TC, Massad LS, Dunton CJ, et al. 2006 consensus guidelines for the management of women with abnormal cervical cancer screening tests. *Am J Obstet Gynecol.* 2007;197(4):346–355

Web Sites for Health Professionals

The American College of Obstetricians and Gynecologists: www.acog.org

American Cancer Society: www.cancer.org

CDC National Breast and Cervical Cancer Early Detection Program: http://www.cdc.gov/cancer/nbccedp/index.htm

US Preventive Services Task Force: www.ahrq.gov/clinic/uspstfix.htm

Web Sites for Adolescents and Parents

American Academy of Family Physicians: http://www.familydoctor.org/handouts/223.html

Center for Young Women's Health, Boston Children's Hospital: http://www.youngwomenshealth.org/abpap.html

National Women's Health Information Center, US Department of Health and Human Services: http://www.womenshealth.gov/faq/cervical-cancer.cfm

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FRANCES PAGE GLASCOE, MD

DEVELOPMENTAL AND BEHAVIORAL CONSIDERATIONS

Developmental and behavioral surveillance and screening are recommended across the Bright Futures visits, with specific screening at various ages, including autism screening at the 18-month and 2-year visits and a structured developmental screen at the 9-month, 18-month, and 2½-year visits. Use of quality tools rather than informal methods, such as milestones checklists (even if drawn from longer screens), greatly improves detection rates. Rationale, policy, and useful accurate tools are described in this chapter.

Why Is It Important to Screen for Developmental and Behavioral Disabilities?

Screening confirms normal development and identifies developmental risks or disabilities.

Developmental disabilities are the most common disorders among children and adults, rivaling only asthma and obesity.[1,2] Studies indicate that 16% to 18% of all children aged 0 to 18 have developmental disabilities. In the 0 to 2-year age range alone, incidence reaches 13%.[1,2] Approximately 12% of school-aged children receive special education.

Healthy People 2010 identifies developmental disabilities as one of the 6 most important health concerns in the United States.

The most common disability (and also the least detected) is speech-language impairment, followed by learning disabilities and intellectual disabilities. Attention-deficit/hyperactivity disorder is the most common behavioral disorder. Less common (but somewhat more frequently detected) are autism, motor impairment, traumatic brain injury, and visual and hearing impairment.[3]

Poverty and other psychosocial risk factors are the leading cause of school failure and dropping out. Nationally, high school drop out rates average 20%. For inner-city, particularly minority youths, drop out rates often exceed 50% (www.uscensus.gov). Such at-risk children not only have psychosocial challenges but also deficits in skills essential to school success: language, academics, and cognition.[4,5]

Developmental and behavioral screening is recommended. The National Guideline Clearinghouse concludes there is good evidence to recommend screening for a range of conditions.

An American Academy of Pediatrics (AAP) policy statement urges clinicians to screen for developmental-behavioral problems at health supervision visits using quality tools.[6]

The AAP also encourages routine developmental-behavioral surveillance during health supervision visits (see the "Developmental Strengths" chapter). Surveillance provides "the big picture" of children's and families' needs and encompasses

- Viewing and addressing psychosocial risk factors and parents' concerns
- Monitoring developmental and behavioral progress
- Promoting resilience (eg, positive parenting practices) through parent education

- Referring to a wide range of programs (eg, quality day care, parent training classes, social services, etc)[6]

Disabilities can be ameliorated through early intervention and sometimes prevented. Early intervention (EI) takes many forms. Whether through Head Start, Early Head Start, quality day care, or public school services, EI programs lead to dramatically improved outcomes. These include decreases in teen pregnancy, high school dropout, criminality, unemployment, and secondary emotional problems.[4]

Both surveillance and screening can be readily accomplished during health supervision visits. Use of evidence-based tools for both tasks (often one and the same) contain, if not reduce, visit length. It also increases the likelihood of families returning for well visits, improves parent and clinician satisfaction with care, and enhances reimbursement.[7–10]

When and With Whom Should You Perform a Developmental-Behavioral Screen?

Only 25% of those eligible for EI are detected and enrolled.[11] Prevention and intervention depend on the use of accurate screening tools and actions to ensure that the results are used to direct families to needed referral resources.[4,11–14] Informal techniques, such as milestones checklists (even when they are drawn from larger measures), detect fewer than 30% of all children with developmental disabilities—and thus only the more severe cases.[7,11,15]

Routine feedback to health care providers on the accuracy of their early detection methods is lacking. Deploying quality improvement techniques (now a required part of residency training) is helpful. At a minimum, view your referral rates in light of prevalence: About 1 out of every 6 children needs some form of developmental or behavioral intervention.[1,2,11]

Whom to Screen

- Administer screening tests to **asymptomatic** children.

When to Screen

- 9-month visit
- 18-month visit
- 2-year visit (if a 2½-year visit will not be completed)
- 2½-year visit

Following the 2½-year visit, administer a validated, standardized, and accurate screening test at all annual health supervision visits based on developmental surveillance and clinical judgment. The tests should be broad in scope, meaning that they sample all developmental domains.

- At the 18-month and 2-year visits, add an autism spectrum disorder (ASD)-specific tool.

Screens that use only ASD-specific tools will miss most children with other conditions. Therefore, use an ASD screen only in conjunction with a broad-band screen and never as the sole measure of development and behavior.

The AAP policy statement, "Identifying Infants and Young Children With Developmental Disorders in the Medical Home: An Algorithm for Developmental Surveillance and Screening," also recommends screening all children for whom a developmental concern is raised by the parent or pediatrician. In addition, the statement recommends health care practitioners should perform developmental surveillance or formal developmental screening to evaluate a child's readiness for kindergarten at the 4- or 5-year-old health supervision visit.

What to Do

- At every health supervision visit, provide developmental surveillance.
  - Elicit and respond to parents' concerns.
  - Observe child and parent behavior.
  - Review medical history and current health status.
  - Monitor milestones.
  - Promote development through patient education.
  - Periodically screen for parental depression (see "Maternal Depression" chapter).
  - Assess psychosocial risk factors.
- At the visits noted above, administer accurate screening tools. Some tools also provide evidence-based approaches to surveillance. See the Resources section for a table listing evidence-based screening and surveillance measures.

What Should You Do With an Abnormal Result?

When children fail specific screening items or if surveillance activities suggest the presence of a problem, make a prompt referral to either EI services or, **for children 3 and older,** to public school special education. Either agency will provide additional evaluations without charge to families.

A diagnosis is not required by EI services. Only a percentage of delay (eg, 1.5 standard deviations or 40% below chronological age in one developmental domain) is needed to establish eligibility. Criteria vary somewhat by state.

Referrals to private diagnostic services also can be made, but it is inadvisable to delay intervention while children wait for additional evaluations (eg, from an autism specialist). Developmental disabilities are best treated even before the diagnosis is final, particularly in children 5 and younger.

Early intervention and public school programs often require vision and hearing screening before they can evaluate referred children. Where possible, administer such screens (and also lead screening), and document results along with recommendations for the types of evaluations most needed (eg, audiological, speech-language).

It is important to recognize that early intervention can take many forms. When children do not qualify for special services, refer for other forms of intervention such as Head Start, quality day care, and/or parenting classes.

What Results and Referrals Should You Document?

Documentation

- Unbundle procedure code *(CPT)* 96110 (developmental screening) from the health supervision visit code (typically with modifier 25) and bill separately (2004 Medicaid ruling). Many private payers, as of publication, reimburse 96110 separately. The 2010 Medicare Fee Schedule (non-facility) for 96110 is $7.21, and payments from private payers may be more or less depending on the negotiated fee schedule.
- When screening results are problematic, use general diagnosis codes so as not to interfere with codes used in subsequent evaluations (see examples of general codes in the *ICD-9-CM* codes section).

Referrals

- Most EI programs have a referral form that you can use to document results. Request these forms directly from programs.
- A brief referral letter is sufficient, but it is helpful to suggest the types of evaluations needed (most particularly speech-language). Also document results of hearing and vision screens in your referral letter.
- If possible, establish a 2-way consent process so that parents agree that the referral resource can share results of additional testing with health care providers.
- For locating services for school-aged children, call the school psychologist or speech-language pathologist in the child's school of zone.

***ICD-9-CM* Codes**	
783.42	Delayed milestones
315.8	Other specific delays in development
315.9	Unspecified delays in development
348.30	Unspecified encephalopathy
348.9	Unspecified condition of brain
315.9	Unspecified delays in development (including academic delays)
781.3	Lack of coordination (eg, hypotonia, hypertonia, incoordination)
781.9	Abnormalities of the muscle, skeletal, or nervous system

The American Academy of Pediatrics publishes a complete line of coding publications, including an annual edition of *Coding for Pediatrics*. For more information on these excellent resources, visit the American Academy of Pediatrics Online Bookstore at **www.aap.org/bookstore/.**

Resources

Articles

Sices L, Feudtner C, McLaughlin J, Drotar D, Williams M. How do primary care physicians manage children with possible developmental delays? A national survey with experimental design. *Pediatrics*. 2004;113:274–282

Silverstein M, Sand N, Glascoe FP, Gupta B, Tonniges T, O'Conner K. Pediatricians' reported practices regarding developmental screening: do guidelines work? Do they help? *Pediatrics*. 2005;116:174–179

Tools for Screening and Surveillance

The following table lists of measures that meet standards for screening test accuracy, meaning that they correctly identify, at all ages, at least 70% of children with disabilities while also correctly identifying at least 70% children without disabilities. All included measures were standardized on national samples, proven to be reliable, and validated against a range of measures.

The first column provides publication information and the cost of purchasing a specimen set. The "Description" column provides information on alternative ways, if available, to administer measures (eg, waiting rooms). The "Accuracy" column shows the percentage of patients with and without problems identified correctly. The "Time Frame/Costs" column shows the costs of materials per visit along with the costs of professional time (using the an average salary of $50 per hour) needed to administer and interpret each measure. Time/cost estimates do not include expenses associated with referring. For parent report tools, administration time reflects not only scoring of test results, but also the relationship between each test's reading level and the percentage of parents with less than a high school education (who may or may

Evidence-based Screening and Surveillance Measures

BEHAVIORAL and/or DEVELOPMENTAL SCREENS RELYING ON INFORMATION FROM PARENTS	Age Range	Description	Scoring	Accuracy	Time Frame/ Costs
Parents' Evaluations of Developmental Status (PEDS). (2002) Ellsworth & Vandermeer Press, Ltd. 1013 Austin Court, Nolensville, TN 37135 Phone: 615-776-4121; fax: 615-776-4119 http://www.pedstest.com ($36.00) PEDS is also available online together with the Modified Checklist of Autism in Toddlers for electronic records.	Birth to 8 years	10 questions eliciting parents' concerns with decision-guidance for providers. In English, Spanish , Vietnamese and many other languages. Written at the 4th–5th grade level. Determines when to refer, provide a second screen, provide patient education, or monitor development, behavior/emotional, and academic progress. Provides longitudinal surveillance and triage	Identifies children as low, moderate or high risk for various kinds of disabilities and delays	Sensitivity ranging from 74% to 79% and specificity ranging from 70% to 80% across age levels.	About 2 minutes (if interview needed) Print Materials ~$.39 $1.20 Total = ~$1.59
Ages and Stages Questionnaire-3 (formerly Infant Monitoring System) (2004). Paul H. Brookes Publishing, Inc., PO Box 10624, Baltimore, MD 21285 (1-800-638-3775). ($199.95) http://www.pbrookes.com/	4 to 60 months	Parents indicate children's developmental skills on 25–35 items (4 – 5 pages) using a different form for each well visit. Reading level varies across items from 3rd to 12th grade. Can be used in mass mail-outs for child-find programs. In English, Spanish, French	Pass/fail and monitor score for developmental status	Sensitivity ranged 70% to 90% at all ages except the 4 month level. Specificity ranged from 76% to 91%	about 15 minutes (if interview needed) Materials ~$.40 Admin. ~$2.40 Total = ~$2.80

BEHAVIORAL and/or DEVELOPMENTAL SCREENS RELYING ON INFORMATION FROM PARENTS (continued)	Age Range	Description	Scoring	Accuracy	Time Frame/ Costs
Infant-Toddler Checklist for Language and Communication (1998). Paul H. Brookes Publishing, Inc., P.O. Box 10624, Baltimore, MD, 21285 (1-800-638-3775). (Part of CSBS-DP, $ http://www.pbrookes.com/ ($99.95 w/ CD-ROM)	6–24 months	Parents complete the Checklist's 24 multiple-choice questions in English. Reading level is 6th grade. Based on screening for delays in language development as the first evident symptom that a child is not developing typically. Does not screen for motor milestones. The Checklist is copyrighted but remains free for use at the Brookes Web site although the factor scoring system is complicated and requires purchase of the CD-ROM.	Manual table of cut-off scores at 1.25 standard deviations below the mean OR an optional scoring CD-ROMs	Sensitivity is 78%; Specificity is 84%.	About 5 to 10 minutes Materials ~.$.20 Admin. ~$3.40 Total ~$3.60
PEDS- Developmental Milestones (PEDS-DM (2007) Online at: PEDSTest.comLLC 1013 Austin Court, Nolensville, TN 37135 Phone: 615-776-4121; fax: 615-776-4119 Online at: http://www.pedstest.com ($275.00)	0–8 years	PEDS-DM consists of 6–8 items at each age level (spanning the well visit schedule). Each item taps a different domain (fine/ gross motor, self-help, academics, expressive/ receptive language, social-emotional). Items are administered by parents or professionals. Forms are laminated and marked with a grease pencil. It can be used to complement PEDS or stand alone. Administered by parent report or directly. Written at the 2nd grade level. A longitudinal score form tracks performance. Supplemental measures also included include the M-CHAT, Family Psychosocial Screen, PSC-17, the SWILS, the Vanderbilt, and a measure of parent-child interactions. An Assessment Level version is available for NICU follow-up and early intervention programs. In English and Spanish.	Cutoffs tied to performance above and below the 16th percentile for each item and its domain. On the Assessment equivalent scores are produced and enable users to compute percentage of delays.	Sensitivity (.75–.87); specificity (.71–.88 to performance in each domain. Sensitivity (.70–.94); specificity (.77–.93) across age	About 3–5 Materials ~.$.02 Admin. ~$1.00 Total ~$1.02

BEHAVIORAL/EMOTIONAL SCREENS RELYING ON INFORMATION FROM PARENTS	Age Range	Description	Scoring	Accuracy	Time Frame/ Costs
Eyberg Child Behavior Inventory/ Sutter-Eyberg Student Behavior Inventory. Psychological Assessment Resources, P.O. Box 998 Odessa Florida: 33556 (1-800-331-8378) ($120.00) http://www.parinc.com/	2 to 16 years of age	The ECBI/SESBI consists of 36–38 short statements of common behavior problems. More than 16 suggests the referrals for behavioral interventions. Fewer than 16 enables the measure to function as a problems list for planning in-office counseling, selecting handouts, and monitoring progress.	Single refer/nonrefer score for externalizing problems,— conduct, aggression, etc.	Sensitivity 80%, specificity 86% to disruptive behavior problems	About 7 minutes (if interview needed) Materials ~$.30 Admin. ~$2.38 Total = ~$2.68
Pediatric Symptom Checklist. Jellinek MS, Murphy JM, Robinson J, et al. Pediatric Symptom Checklist: Screening school age children for academic and psychosocial dysfunction. http://psc.partners.org/ The Pictorial PSC, useful with low-income Spanish speaking families can be downloaded freely at www.dbpeds.org (included in the PEDS:DM)	4–16 years.	35 short statements of problem behaviors including both externalizing (conduct) and internalizing (depression, anxiety, adjustment, etc.) Ratings of never, sometimes or often are assigned a value of 0,1,or 2. Scores totaling 28 or more suggest referrals. Factor scores identify attentional, internalizing and externalizing problems. Factor scoring is available for download at: http://www.pedstest.com/links/resources.html	Single refer/nonrefer score	All but one study showed high sensitivity (80% to 95%) but somewhat scattered specificity (68%–100%).	About 7 minutes (if interview needed) Materials ~$.10 Admin. ~$2.38 Total = ~$2.48
Parents' Evaluations of Developmental Status (PEDS). (2002) Ellsworth & Vandermeer Press, Ltd. 1013 Austin Court, Nolensville, TN 37135 Phone: 615-776-4121; fax: 615-776-4119 http://www.pedstest.com ($36.00) PEDS is also available online together with the Modified Checklist of Autism in Toddlers for electronic records.	Birth to 8 years	10 questions eliciting parents' concerns in English, Spanish , Vietnamese and many other languages. Written at the 4th - 5th grade level. Determines when to refer, provide a second screen, provide patient education, or monitor development, behavior/ emotional, and academic progress. Provides longitudinal surveillance and triage.	Identifies children as low, moderate or high risk for various kinds of disabilities and delays	Sensitivity ranging from 74% to 79% and specificity ranging from 70% to 80% across age levels.	About 2 minutes (if interview needed) Print Materials ~$.39 Admin. ~$1.20 Total = ~$1.59

BEHAVIORAL/EMOTIONAL SCREENS RELYING ON INFORMATION FROM PARENTS	Age Range	Description	Scoring	Accuracy	Time Frame/ Costs
Ages & Stages Questionnaires: Social-Emotional (ASQ:SE) Paul H. Brookes, Publishers, PO Box 10624, Baltimore, Maryland 21285 (1-800-638-3775). ($125) http://www.pbrookes.com/	6–60 months	Designed to supplement the ASQ, the ASQ SE consists of 30 item forms (4–5 pages long) for each of 8 visits between 6 and 60 months. Items focus on self-regulation, compliance, communication, adaptive functioning, autonomy, affect, and interaction with people	Single cutoff score indicating when a referral is needed	Sensitivity ranged from 71%–85%. Specificity from 90% to 98%	10–15 minutes if interview needed. Materials ~ $.40 ~$4.20 Total = ~ $4.40
Brief-Infant-Toddler Social-Emotional Assessment (BITSEA); Harcourt Assessment, Inc, 19500 Bulverde Road | San Antonio, Texas 78259 |(1-800-211-8378) ($99.00) harcourtassessment.com	12–36 months	42 item parent-report measure for identifying social-emotional/ behavioral. problems and delays in competence. Items were drawn from the assessment level measure, the ITSEA. Written at the 4th–6th grade level. Available in Spanish, French, Dutch, Hebrew	Cut-points based on child age and sex show present/ absence of problems and competence.	Sensitivity (80–85%) in detecting children with social-emotional/ behavioral problems and specificity 75% to 80%.	5–7 minutes Materials ~$1.15 Admin. ~$.88 Total ~$2.03
PEDS- Developmental Milestones (PEDS-DM (2007) PEDSTest.comLLC P.O. Box 68164 Nashville, Tennessee 37206 Phone: 615-226-4460; fax: 615-227-0411 ($275.00) Online at: http://www.pedstest.com	0–8 years	PEDS-DM consists of 6–8 items at each age level (spanning the well visit schedule). Each item taps a different domain (fine/ gross motor, self-help, academics, expressive/ receptive language, social-emotional). Items are administered by parents or professionals. Forms are laminated and marked with a grease pencil. It can be used to complement PEDS or stand alone. Administered by parent report or directly. Written at the 2nd grade level. A longitudinal score form tracks performance. Supplemental measures also included include the M-CHAT, Family Psychosocial Screen, PSC-17, the SWILS, the VAnderbilt, and a measure of parent-child interactions. An Assessment Level version is available for NICU follow-up and early intervention programs. In English and Spanish.	Cutoffs tied to performance above and below the 16th percentile for each item and its domain. On the Assessment Level, age equivalent scores are produced and enable users to compute percentage of delays.	Sensitivity (.75–.87); specificity (.71–.88 to performance in each domain. Sensitivity (.70–.94); specificity (.77 - .93) across age	About 3–5 minutes Materials ~.$.02 Admin. ~$1.00 Total ~$1.02

FAMILY SCREENS	Age Range	Description	Scoring	Accuracy	Time Frame/ Costs
Family Psychosocial Screening. Kemper, KJ & Kelleher KJ. Family psychosocial screening: instruments and techniques. Ambulatory Child Health. 1996;4:325-339. (the measures are included in the article) and downloadable at http://www.pedstest.com (included in the PEDS:DM)	screens parents and best used along with the above screens	A two-page clinic intake form that identifies psychosocial risk factors associated with developmental problems including: a four item measure of parental history of physical abuse as a child; (2) a six item measure of parental substance abuse;and (3) a three item measure of maternal depression.	Refer/nonrefer scores for each risk factor. Also has guides to referring and resource lists.	All studies showed sensitivity and specificity to larger inventories greater than 90%	about 15 minutes (if interview needed) Materials ~$.20 Admin. ~$4.20 Total = ~$4.40
DEVELOPMENTAL SCREENS RELYING ON ELICITING SKILLS DIRECTLY FROM CHILDREN					
Brigance Screens-II. Curriculum Associates, Inc. (2005) 153 Rangeway Road, N. Billerica, MA, 01862 (1-800-225-0248 ($501.00). http://www.curriculumassociates.com/	0–90 months	Nine separate forms, one for each 12 month age range. Taps speech-language, motor, readiness and general knowledge at younger ages and also reading and math at older ages. Uses direct elicitation and observation. In the 0–2 administered by parent report	Cutoff, quotients, percentiles, age equivalent scores in various domains and overall.	Sensitivity and specificity to giftedness and to develop-mental and academic problems are 70% to 82% across ages	10–15 minutes Materials ~$1.53 Admin. ~$10.15 Total = ~$11.68
Bayley Infant Neurodevelomental Screen (BINS). San Antonio, Texas: The Psychological Corporation, 1995. 555 Academic Court, San Antonio, TX 78204 (1-800-228-0752) ($265) http://www.psychcorp.com	3–24 months	Uses 10–13 directly elicited items per 3–6 month age range assess neurological processes (reflexes, and tone); neurodevelopmental skills (movement, and symmetry) and developmental accomplishments (object permanence, imitation, and language).	Categorizes performance into low, moderate or high risk via cut scores. Provides subtest cut scores for each domain	Specificity and sensitivity are 75% to 86% across ages	10–15 minutes Materials ~$.30 Admin. ~$10.15 Total = ~$10.45
Battelle Developmental Inventory Screening Test–II (BDIST)–2 (2006). Riverside Publishing Company, 8420 Bryn Mawr Avenue, Chicago, Illinois 60631 (1-800-323-9540) ($239 www.riversidepublishing.com	0–95 months	Items (20 per domain) use a combination of direct assessment, observation, and parental interview. A high level of examiner skill is required. Well standardized and validated. Scoring software including a PDA application is available. English and Spanish	Age equivalents and cutoffs at 1.0, 1.5, and 2.0 SDs below the mean in each of 5 domains	Sensitivity (72% to 93%) to various disabilities; Specificity (79% to 88%). Accuracy information across age ranges is not available.	10–30 minutes Materials ~$1.65 Admin. ~$20.15 Total = ~$21.80

ACADEMIC SCREENS	Age Range	Description	Scoring	Accuracy	Time Frame/ Costs
Comprehensive Inventory of Basic Skills-Revised Screener (CIBS-R Screener) Curriculum Associates, Inc. (1985) 153 Rangeway Road, N. Billerica, MA, 01862 (1-800-225-0248 ($224.00). http://www.curriculum associates.com/	1–6th grade	Administration involves one or more of three subtests (reading comprehension, math computation, and sentence writing). Timing performance also enables an assessment of information processing skills, especially rate.	Computerized or hand-scoring produces percentiles, quotients, cutoffs	70% to 80% accuracy across all grades	Takes 10–15 minutes Materials ~$.53 Admin. ~$10.15 Total = ~$10.68
Safety Word Inventory and Literacy Screener (SWILS). Glascoe FP, Clinical Pediatrics, 2002. Items courtesy of Curriculum Associates, Inc. The SWILS can be freely downloaded at: http://www. pedstest.com/	6–14	Children are asked to read 29 common safety words (e.g., High Voltage, Wait, Poison) aloud. The number of correctly read words is compared to a cutoff score. Results predict performance in math, written language and a range of reading skills. Test content may serve as a springboard to injury prevention counseling.	single cutoff score indicating the need for a referral	78% to 84% sensitivity and specificity across all ages	about 7 minutes (if interview needed) Materials ~$.30 Admin. ~$2.38 Total = ~$2.68
Narrow-Band Screens for AUTISM and ADHD					
Modified Checklist for Autism in Toddlers (M-CHAT) (1997). Free download at the First Signs Web site: http://www.firstsigns.org/downloads /m-chat.PDF ($0.00) Online for parents and EMRS at www.forepath.org ($1.00) (also included in the PEDS:DM)	18–60 months	Parent report of 23 questions modified for American usage at 4–6th grade reading level. Available in English and Spanish. Uses telephone follow-up for concerns. The M-CHAT is copyrighted but remains free for use on the First Signs Web site. The full text article appeared in the April 2001 issue of the *Journal of Autism and Developmental Disorders.*	Cutoff based on 2 of 3 critical items or any 3 from checklist.	Initial study shows sensitivity at 90%; specificity at 99%. Future studies are needed for a full picture. Promising tool.	About 5 minutes Print Materials ~$.10 Admin. ~$.88 Total = ~$.98
Conners Rating Scales-Revised (CRS-R) Multi-Health Systems, Inc. P.O. Box 950, North Tonawanda, NY 14120-0950 Call 1.800.456.3003 or +1.416.492.2627 Fax 1.888.540.4484 or 1.416.492.3343 http://www.mhs.com/ ($193.00)	3 to 17 years	Although the CRSR can screen for a range of problems, Several subscales specific to ADHD are included: DSM-IV symptom subscales (Inattentive, Hyperactive/Impulsive, and Total); Global Indices (Restless-Impulsive, Emotional Lability, and Total), and an ADHD Index. The GI is useful for treatment monitoring. Also available in French	Cutoff tied to the 93rd percentile for each factor	Sensitivity 78% to 92% Specificity: 84% to 94%	About 20 minutes Materials ~$.2.25 Admin. ~$20.15 Total = ~$22.40

not be able to complete measures in waiting rooms due to literacy problems and thus will need interview administrations).

Please note: Not included are measures such as the Denver-II that fail to meet standards (limited standardization, absent validation, and no proof of accuracy) or measures of single developmental domains (eg, just language or motor).

Web Sites

Administration for Children and Families: www.acf.hhs.gov
To locate social services addressing domestic violence, housing and food instability, child abuse and neglect, adoption, state, and local services, etc.

American Academy of Pediatrics: http://www.aap.org/
Identifying infants and young children with developmental disorders in the medical home: an algorithm for developmental surveillance and screening (2006).

American Academy of Pediatrics Medical Home: http://www.medicalhomeinfo.org/tools/coding.html
Web site with information on coding, reimbursement, and advocacy assistance with denied claims. The broader Web site provides guidance on establishing a medical home for children with special needs.

American Academy of Pediatrics Section on Developmental and Behavioral Pediatrics: http://www.dbpeds.org
Provides information on screening, rationale, implementation, etc.

Bright Futures: http://www.brightfutures.app.org/
Guidelines and information on providing comprehensive health supervision services, case-based learning examples, etc.

Centers for Disease Control and Prevention: Developmental Screening to Improve Child Health: http://www.cdc.gov/ncbddd/child/improve.htm
Offers information on the value of screening with links to research and services, wall charts on milestones (helpful for alerting parents to health care providers' interest in child development).

Child Care Aware: www.childcareaware.org
To find quality preschool and day care programs.

Developmental Screening Tool Kit: www.developmentalscreening.org
Implementation guidance and research, with an excellent video of pediatricians and a hospital administrator at Harvard University showing opinions about screening before and after implementing a quality tool.

Early Head Start National Resource Center: www.ehsnrc.org
For help locating Head Start and Early Head Start programs.

First Signs: www.firstsigns.org
To find services and information about autism spectrum disorders.

Healthy People 2010: http://www.healthypeople.gov/Document/HTML/Volume1/06Disability.htm
Healthy People 2010 Chapter Six Disability and Secondary Conditions. Provides information on the initiative, goals, interventions, etc.

KidsHealth: www.kidshealth.org
For downloadable parenting information.

National Association for the Education of Young Children: www.naeyc.org/
To find quality preschool and day care programs.

National Early Childhood Technical Assistance Center: http://www.nectac.org
Provides links to early intervention and public school services in each state, region, and community.

National Guideline Clearinghouse: http://www.guideline.gov
Provides information on screening for many specific conditions including the American Academy of Neurology autism screening guidelines.

Parents as Teachers: www.patnc.org
For information on parent training programs.

Parents' Evaluation of Developmental Status: www.pedstest.com
Slide shows and other materials for teaching screening measures, a trial of online developmental-behavioral and autism screens, parent education handouts, and an early detection discussion list.

Substance Abuse and Mental Health Services' Administration National Mental Health Information Center: www.mentalhealth.org
For help locating mental health services

YWCA: www.ywca.org
For information on parent training programs.

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HEARING

Although newborn universal screening captures much of congenital hearing loss, acquired hearing loss can manifest itself in childhood and be unrecognizable to the families or others. Thus hearing screening during childhood is recommended selectively based on risk assessment, and universally at designated preschool and school-age visits.

What Is Hearing Loss?

There are several types of hearing loss.

- **Conductive** hearing loss results from problems occurring in the outer and/or middle ears. On the audiogram, bone conduction thresholds are better than air conduction thresholds. This type of loss attenuates sound as it travels from the outer ear to the inner ear.

  Conductive loss is commonly caused by wax in the ear canal, fluid in the middle ear, or a tear in the eardrum, each of which can be treated medically or surgically. Depending on the cause of the loss, the child may experience pain and discomfort, prompting a caregiver to have the child's hearing tested. Less commonly occurring is conductive loss as a result of a congenital syndrome.

- **Sensorineural** hearing loss results from pathology associated with the inner ear and/or auditory nerve. On the audiogram, air conduction and bone conduction thresholds should be essentially the same within each ear, but can sometimes vary across the 2 ears depending on the underlying pathology. This type of loss can attenuate sound as well as distort sounds and speech to some degree.

  Common causes of sensorineural hearing loss in children include congenital factors (genetic, prenatal, perinatal, or postnatal infections) or acquired factors (ie, meningitis, ototoxicity associated with certain drugs).

- **Mixed** hearing loss is diagnosed when a child with sensorineural hearing loss also develops a conductive loss as a result of outer and/or middle ear pathologies. If the conductive hearing loss can be treated, the child may still have a sensorineural hearing loss. In a small portion of children, mixed hearing loss can be permanent and is associated with a congenital syndrome.

- **Central** hearing loss is the result of damage or dysfunction in the central auditory nervous system. This type of loss is due to space-occupying lesions (ie, brain tumors) and perceptual processing difficulties. Auditory neuropathy spectrum disorder is a dysfunction of the synapse of the inner hair cells and auditory nerve, and/or the auditory nerve itself.

Why Is It Important to Screen for Hearing Loss?

Hearing loss is the number one birth defect in the United States. In the United States, nearly 33 babies are born every day with permanent hearing loss and 1 in 1,000 have a profound hearing loss. Another 2 to 3 in 1,000 have partial hearing loss.

Screening based on risk identifies only a small portion of babies with hearing loss. For decades, screening for hearing loss in newborns was only done on those infants who were believed to be at high risk of hearing loss (eg, family history, low birth weight, hyperbilirubinemia, or external ear or facial deformities) or for infants in the neonatal intensive care unit.

However, nearly half of babies born with hearing loss do not exhibit an apparent risk factor. Therefore, risk-based screening programs identified fewer than 20% of infants with hearing loss.

The implementation of universal hearing screening programs has been successful in getting more than 95% of all newborns screened for hearing loss before being discharged from the hospital. Yet not all who fail the screening return for follow-up testing, and not all of those identified with a loss receive appropriate and timely follow-up services.

Delayed identification can affect language development and academic achievement. Studies show that infants and preschoolers with even a mild or unilateral hearing loss are at risk for language and other developmental delays, while school children with similar mild or unilateral losses are at risk for academic, social, and behavioral difficulties.[1–5] As many as 10% to 15% of school-aged children have some degree of hearing loss that affects their language development and learning.

In the past, most children with severe-profound hearing loss but no risk factors were not identified until an average age of 30 months. This is later than the critical period for optimal language development.[6–8]

Children with mild and moderate hearing loss or unilateral hearing loss were typically not identified until they enrolled in school.

Some forms of hearing loss develop after the newborn period. Although newborn hearing screening programs aim to identify newborns with congenital hearing loss, some forms of congenital hearing loss may not become evident until later in childhood. Similarly, hearing impairment can be acquired during infancy and childhood.

Infectious diseases, such as meningitis and otitis media, are two of the leading causes of acquired hearing loss in children.

Be ready to recognize children who may be at risk of late-developing congenital hearing loss or acquired hearing loss. Be prepared to evaluate hearing in these children or refer to hearing professionals (eg, otolaryngologist or audiologist) for evaluation and treatment.

If hearing loss is not detected by 6 months of age, there is an increased risk of delayed speech and language development; poor social, emotional, and cognitive development; and poorer academic development.[3,9,10]

Otitis media with effusion is associated with hearing loss. Otitis media with effusion (OME) can result in a mild to moderate conductive hearing loss, which can lead to a delay in speech and language development. Chronic OME is associated with poorer processing of complex auditory sounds in later childhood.[11,12]

More than 2 million cases of OME are diagnosed annually in the United States, with estimated direct and indirect costs of $4 billion.

Of children with OME, 90% present before school age and 30% to 40% have recurrent episodes. Of children with recurrent episodes, 5% to 10% of the episodes last 1 year or more.[13,14]

Hearing screening is often a covered service. Because state laws mandate newborn hearing screening, parents are not responsible for paying for the test. Diagnostic audiologic procedures beyond the initial newborn hearing screening are covered by Medicare, Medicaid, and most private health insurance plans and will pay for the hearing screen. Some private carriers may inappropriately bundle the hearing screen (*CPT* code **92551**) with the office visit. Hearing aids for infants and children, if needed, are generally covered by state or locally funded agencies and, depending on the health plan, by private carriers.

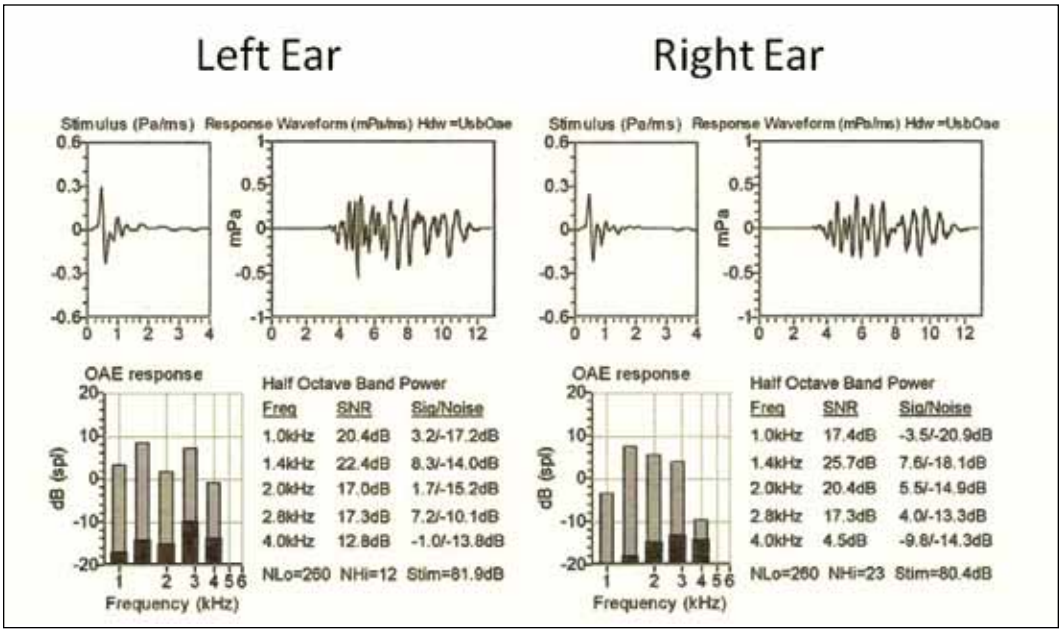
How Should You Screen for Hearing Loss?

Screening for Hearing Loss in Infants

Key benchmarks of the newborn and infant hearing screening process

- Perform a hearing screen no later than age 1 month.
- For infants who do not pass the screening, conduct a diagnostic audiologic evaluation no later than age 3 months.
- For those identified with hearing loss, enroll the infants in an early intervention program no later than age 6 months.

Figure 1.



Source: Ann Clock Eddins, PhD, CCC-A

Types of procedures

Two types of electrophysiologic procedures are used, either alone or in combination, to screen newborns.

- **Otoacoustic emissions (OAE)** are soft sounds produced by most normal inner ears that cannot be heard by other people but can be recorded by sensitive microphones.

Otoacoustic emissions testing is painless and can be completed in about 5 minutes in a sleeping infant.

- Place a small soft probe tip in the ear canal. Present a series of clicks or tones through the probe and record the OAE response.
- Measure 2 common types of emissions: transient-evoked OAE (TEOAE) and distortion-product OAE.

  Both types provide information about the functional status of outer hair cells (OHCs) in the inner ear over a range of frequencies important for speech processing and perception.

  The OAEs are not a test of "hearing" per se, but they are a measure of OHC integrity and are typically present in individuals with normal hearing to a mild hearing loss (30–40 decibel level [dB HL] [hearing level in decibels]).

Figure 1 shows an example of a normal TEOAE. A passed screening is determined by the signal-to-noise ratio (SNR) in dB (SNR, right side, middle) at a specified number of frequency bands.

- Auditory brainstem response (ABR) is electrical brain wave activity that is produced by the auditory brainstem in response to sound introduced to the baby's ears. The responses are recorded by a computer and evaluated to determine whether the auditory system is responding as expected to the sound.

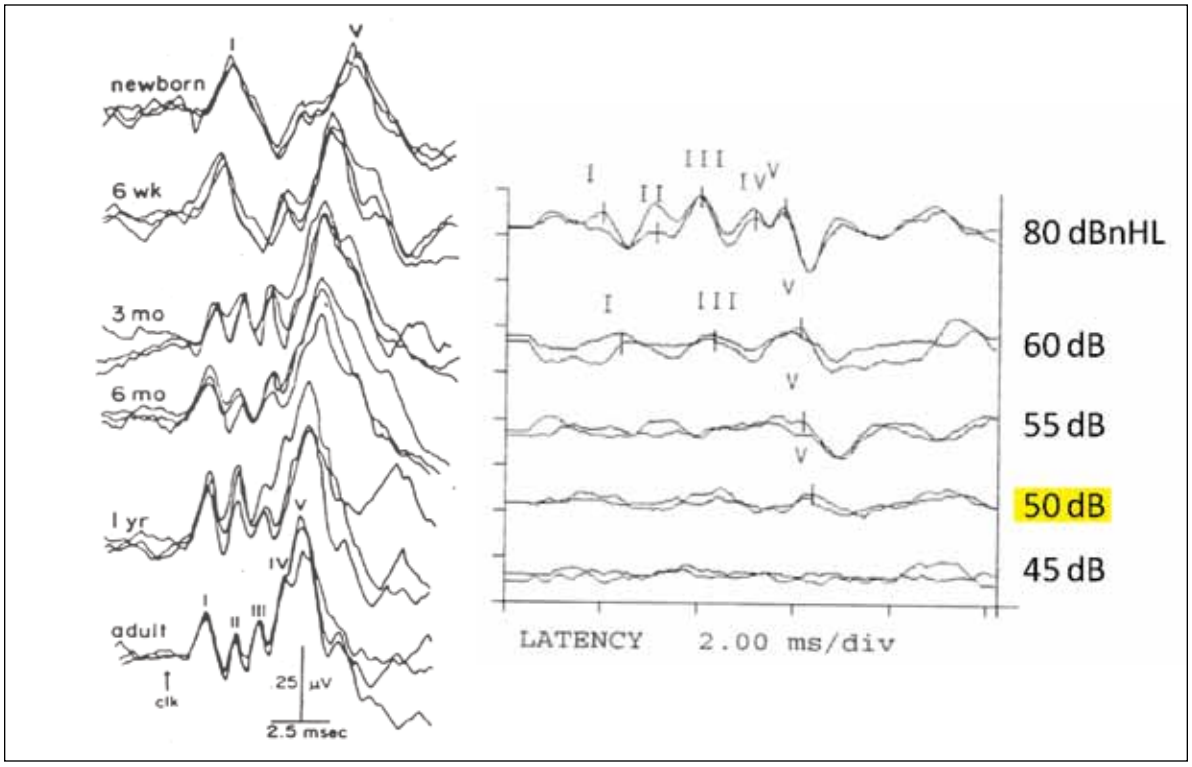
Like OAEs, ABR testing is painless and can be done in a matter of minutes while the infant sleeps.

- Place surface electrodes on the baby's scalp and measure the ABRs.

  In normal hearing infants, responses can generally be obtained within approximately 10 to 20 dB HL of behavioral thresholds.

  Thus, if a response is present at the typical screening level of 35 dB HL, the baby would pass the screening and would be considered to have normal hearing.

Figure 2.



Source: Hall JW. *Handbook of Auditory Evoked Responses*. Boston, MA: Allyn & Bacon; 1992

Source: Ann Clock Eddins, PhD, CCC-A

The left panel of Figure 2 shows a series of ABRs as a function of age. Note the change in the number of peaks that can be identified as well as the decrease in latency of the peaks with age, resulting from neural maturation.15

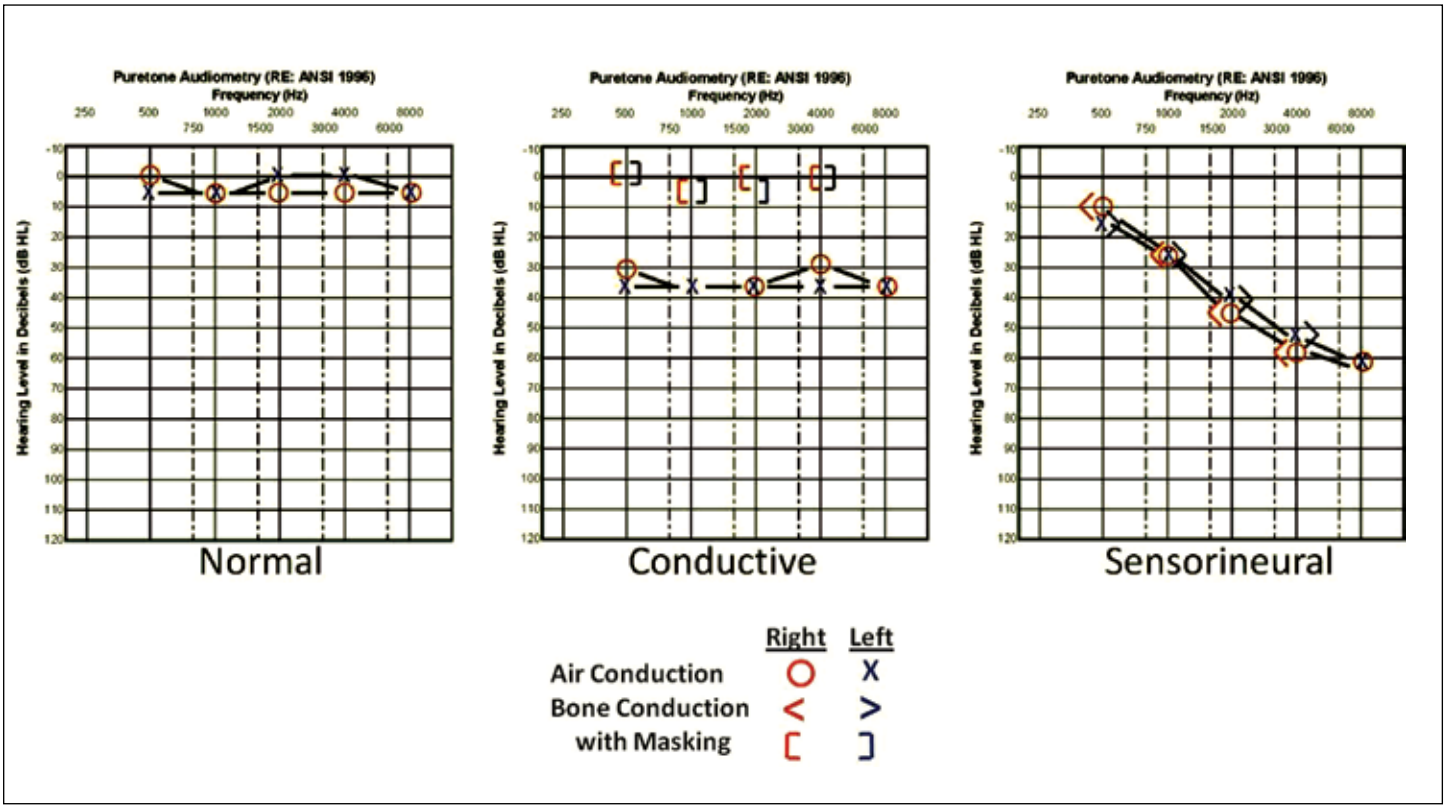
The right panel of Figure 2 illustrates an ABR threshold series obtained from a child with sensorineural hearing loss using click stimuli. Threshold is estimated at 50 dBnHL, as indicated by the highlighted text.[16]

Screening for Hearing Loss in Toddlers and Young Children

Although studies have shown that only 50% of children with hearing loss are identified by the comprehensive use of risk assessment questionnaires, the National Institute on Deafness and Other Communication Disorders has published screening questions for children (>7 years) and adults, which are used in Bright Futures for risk assessment.

- Risk assessment questions (used for nonuniversal screening ages)
  - Do you have a problem hearing over the telephone?
  - Do you have trouble following the conversation when two or more people are talking at the same time?
  - Do people complain that you turn the TV volume up too high?
  - Do you have to strain to understand conversation?
  - Do you have trouble hearing in a noisy background?
  - Do you find yourself asking people to repeat themselves?
  - Do many people you talk to seem to mumble (or not speak clearly)?
  - Do you misunderstand what others are saying and respond inappropriately?
  - Do you have trouble understanding the speech of women and children?
  - Do people get annoyed because you misunderstand what they say?

Figure 3.



Source: Ann Clock Eddins, PhD, CCC-A

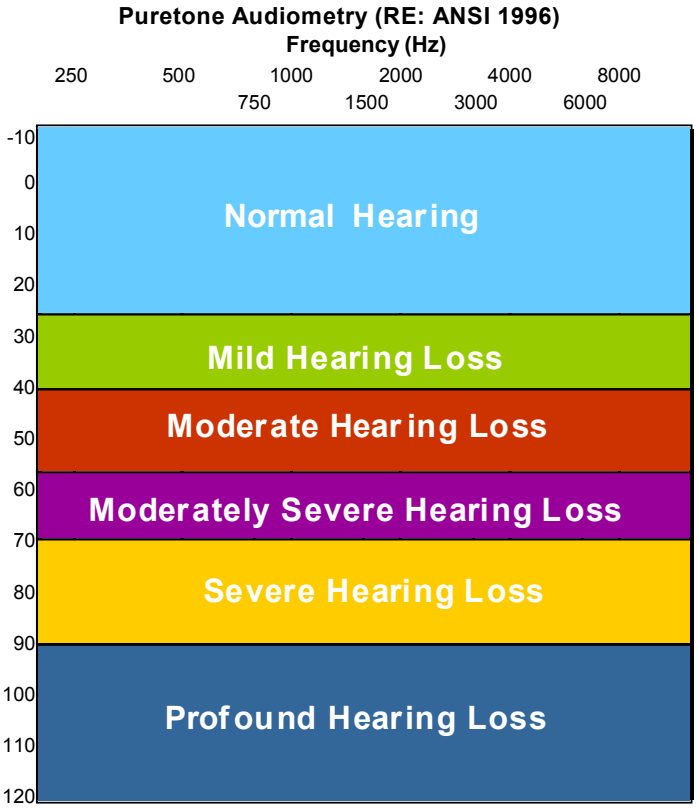
If there is a positive on the risk assessment questions, objective measures that can be used to screen for hearing loss and possible causes in toddlers and young children include OAE and ABR, as described previously, as well as behavioral pure tone audiometry and tympanometry.

- Behavioral pure tone audiometry is the standard for hearing evaluations. Different techniques are used depending on the age of the infant or child and his or her ability to follow directions or cooperate with the examination.
  - Children 4 years or older often can be tested in a quiet room in a physician's office. Children younger than about 4 years generally can be tested more reliably by an audiologist in a sound-treated test booth rather than the physician's office.
  - Each ear should be tested at 500, 1000, 2000, and 4000 Hz.
  - Screening is typically done by presenting sounds at a fixed level of 20 or 25 dB HL across the frequency range, depending on the sound level in the room. If the child responds to sounds at that level, it is interpreted as a pass.
  - If the child does not respond at any frequency, refer for a formal audiologic evaluation. If there is suspicion or concern about hearing loss, refer for further evaluation. Even a mild loss (25–40 dB HL) or a loss in one ear can result in delayed speech and language and academic development.

Figure 3 shows a series of audiograms illustrating normal hearing thresholds (left), conductive hearing loss (center), and sensorineural hearing loss (right).[17]

The degree of hearing loss is determined by measuring the dB HL required to just detect a tonal or noise signal 50% of the time. The scale in Figure 4 is used to define the degree of hearing loss.

Figure 4.



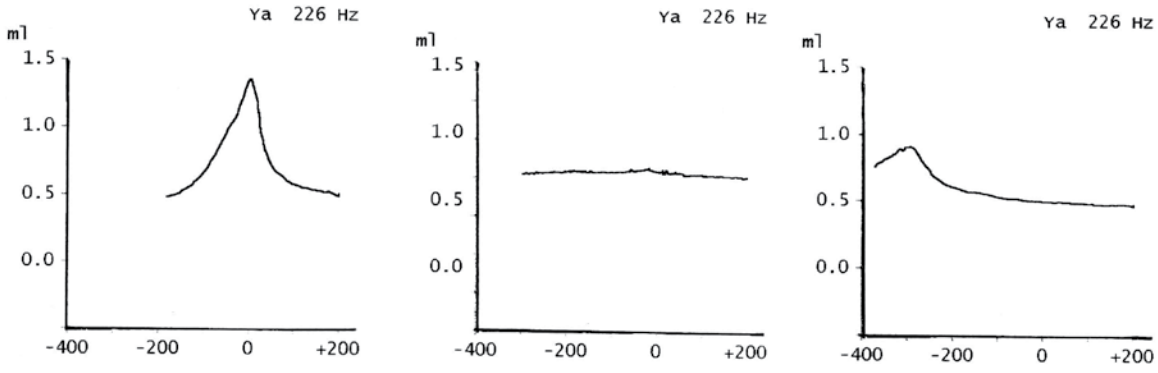
Source: Ann Clock Eddins, PhD, CCC-A

- Tympanometry is used to evaluate the function of the middle ear system. A small probe placed in the ear canal generates a low tone that changes with the air pressure in the ear canal. The resulting movement of the tympanic membrane and middle ear system is recorded. This test can be performed without any participation on the part of the child. The step-by-step protocol follows.

- Examine the ear otoscopically for evidence of external ear canal pathology, a perforated tympanic membrane, or pressure equalization or ventilation tube. Also examine for general size and shape.
- Instruct the patient about what you are about to do and ask her to sit quietly without responding to any sounds she might hear. Tell her to inform you if she feels any pain.
- Select a probe tip that is appropriate for the patient's ear canal and, gently pulling up and back on the pinna, insert the probe tip into the external ear canal with a slight twisting motion. Verify that the probe tip is well within the ear canal and filling the meatus.
- If you can't build up positive pressure, select another probe tip as appropriate and insert it into the ear canal.
- For automated tympanometers, simply press the start button to begin tympanometry.
- For manual equipment, increase pressure until you have reached +200 mmH20 (daPa).
- Plot the tympanogram or save it to a computer.
- Note important tympanogram findings, including ear canal volume, peak amplitude of the tympanogram, and pressure point of the peak.

Figure 5 provides examples of tympanograms used to evaluate the outer and middle ear systems. They are often classified based on their shape using the Jerger classification system. Type A shows a normal response. Type B shows a flat response, which is typically indicative

Figure 5.



Source: Ann Clock Eddins, PhD, CCC-A

of OME. Type C shows a response with negative peak pressure, which is typically indicative of eustachian tube dysfunction.

What Should You Do With an Abnormal Result?

Conductive Hearing Loss

- Refer children with persistent conductive hearing loss to an otolaryngologist.

Sensorineural Hearing Loss

- Refer children with sensorineural hearing loss to an otolaryngologist to determine whether medical treatment is warranted and to an audiologist to determine appropriate rehabilitation. Audiologists will then work with other professionals (eg, early intervention caseworkers, speech-language pathologists, educators) to coordinate the necessary support services that the child may need.
- Children with sensorineural hearing loss can usually be helped with amplifying devices such as hearing aids and frequency modulated systems.
- For children with more severe to profound hearing loss, a cochlear implant may provide more benefit than hearing aids, as this device bypasses the inner ear and directly stimulates the auditory nerve.

CPT and *CD-9-CM* Codes	
92551	Screening test, pure tone, air only
92552	Pure tone audiometry (threshold); air only
92567	Tympanometry (impedance testing)
398.8	Other specified forms of hearing loss

The American Academy of Pediatrics publishes a complete line of coding publications, including an annual edition of *Coding for Pediatrics*. For more information on these excellent resources, visit the American Academy of Pediatrics Online Bookstore at **www.aap.org/bookstore/.**

Mixed Hearing Loss

- Refer children with a mixed loss to an otolaryngologist for medical evaluation and to an audiologist for rehabilitation.

Central Hearing Loss

- The recommended assessments for infants with auditory neuropathy spectrum disorder include a pediatric and developmental evaluation and history, referrals for an otologic evaluation (imaging of the cochlea and auditory nerve), medical genetics, an ophthalmologic assessment, a neurologic evaluation (assessment of peripheral and cranial nerve function), a communications assessment, and a referral to an audiologist to determine appropriate rehabilitation.
- Refer children with a central hearing loss to an otolaryngologist and an audiologist as well as a neurosurgeon and oncologist.

What Results Should You Document?

Document the results of a hearing screening in the infant or child's medical chart.

Resources

Articles

Bachmann KR, Arvedson JC. Early identification and intervention for children who are hearing impaired. *Pediatr Rev.* 1998;19:155–165

National Institute on Deafness and Other Communication Disorders. *Ten Ways to Recognize Hearing Loss*. Bethesda, MD: National Institutes of Health; 2006. NIH Publication No. 01-4913. http://www.nidcd.nih.gov/health/hearing/10ways.asp

Web Sites

American Speech-Language-Hearing Association: http://www.asha.org/

Boys Town National Research Hospital: http://babyhearing.org

Early Hearing Detection & Intervention (EHDI) Program Centers for Disease Control and Prevention: http://www.cdc.gov/ncbddd/ehdi

National Center for Hearing Assessment & Management

National Institute on Deafness and Other Communication Disorders:

National Institutes of Health: http://www.nidcd.nih.gov/

National Newborn Screening & Genetics Resource Center: http://genes-r-us.uthscsa.edu/resources/newborn/HearingScreening.htm

Utah State University: http://www.infanthearing.org/index.html

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15. Hall JW. *Handbook of Auditory Evoked Responses.* Boston, MA: Allyn & Bacon; 1992
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IMMUNIZATIONS, NEWBORN SCREENING, AND CAPILLARY BLOOD TESTS

This chapter includes basic information on the most common procedures in pediatrics, including injections and capillary blood testing. The chapter covers immunizations (by subcutaneous or intramuscular injection), newborn metabolic screening (by heel stick), anemia and lead screening (by finger stick), and tuberculosis exposure screening (by intradermal injection). Immunizations may also be administered by oral or nasal routes. Also discussed are newborn screening results and follow-up.

Why Are Immunizations and Screening Blood Tests Important?

Immunizations. Childhood immunizations protect children from dangerous childhood diseases. Immunizations are required by states based on recommendations by the Centers for Disease Control and Prevention (CDC), the Advisory Committee on Immunization Practices, and the American Academy of Pediatrics (AAP). For review of the immunization schedule visit http://www.cdc.gov/vaccines/recs/schedules/child-schedule.htm.

Newborn screening. Newborn screening is a system involving the actual testing, follow-up, diagnostic testing, and disease management within the medical home. Screening is done to identify unrecognized disease or defect before clinical presentation, and in most states is performed in the hospital of birth prior to discharge. Newborn screenings are done using spots of blood on filter paper that undergo tandem mass spectrometry, isoelectric focusing, and high-performance liquid chromatography. There are specific circumstances that require additional testing within the pediatric office, including repeat testing at 1 to 2 weeks of age that is required by 9 states (AZ, CO, DE, NV, NM, OR, TX, UT, WY) and recommended by several other states. Office-based systems should be developed to ensure that all infants have been screened, taking into account home births and, in some instances, parental refusal, and results managed appropriately. Prompt identification and follow-up of out-of-range results are required to prevent significant morbidity, mortality, and disability from disease. As the medical home practitioner and most often the first provider to obtain abnormal results from the newborn screening program, pediatricians must be familiar with the meaning of positive screens, subsequent diagnostic testing, and referrals. In addition, the pediatrician must recognize the possibility of false-negative results and subsequent disease later in life.

Guidelines for newborn screening are decided at the state level, based on federal suggestions distributed by the Secretary's Advisory Committee on Heritable Disorders in Newborns and Children. Pediatricians must be familiar with their individual state's policies and often adjoining states, as infant screening is dependent on the hospital of birth and not the state of residence. Most states screen for congenital hypothyroidism, congenital adrenal hyperplasia (CAH), phenylketonuria (PKU), galactosemia, maple syrup urine disease (MSUD), biotinidase deficiency, and hemoglobinopathies, as well as several other amino

acidopathies and many organic and fatty acid defects. The National Newborn Screening Status Report for state-by-state screening can be found at http://genes-r-us.uthscsa.edu/nbsdisorders.pdf. Newborn screening fact sheets published in *Pediatrics* (2006;118;934–963) can also be found online at www.pediatrics.org/cgi/content/full/118/3/1304) for many of the more common inborn errors.

Anemia screening. Anemia screening by finger stick blood samples is recommended by the AAP universally at the 12-month health supervision visit and as determined by risk at the 4-, 18-month and annual visits from age 2 to 21.

Lead screening. Lead screening is also performed by finger stick blood sample and is recommended at the 12- and 24-month health supervision visit either by risk assessment or screening as appropriate, based on the universal screening requirement for patients with Medicaid or locale in high-prevalence areas. Risk assessment (questions provided below) for lead screening is also recommended multiple times during infancy, middle childhood, and adolescence. Refer to the AAP "Recommendations for Preventive Pediatric Health Care" available at: brightfutures.aap.org/clinicalpractice.html.

Tuberculosis exposure screening. The tuberculin test is done if a child is determined to be high risk by risk assessment questions as outlined in Bright Futures.

How Should You Perform These Procedures?

Immunizations

All subcutaneous and intramuscular injections should be to the appropriate depth in order to maximize immune response and minimize discomfort and side effects. The recommended depths of injection and needle length are demonstrated in Figures 1 and 2.

Subcutaneous Injection

- Sites include upper outer arm or outer aspect of upper thigh.
- Clean the area to be injected with alcohol.
- Insert the needle into subcutaneous tissue at a 45-degree angle then inject vaccine.

Figure 1.

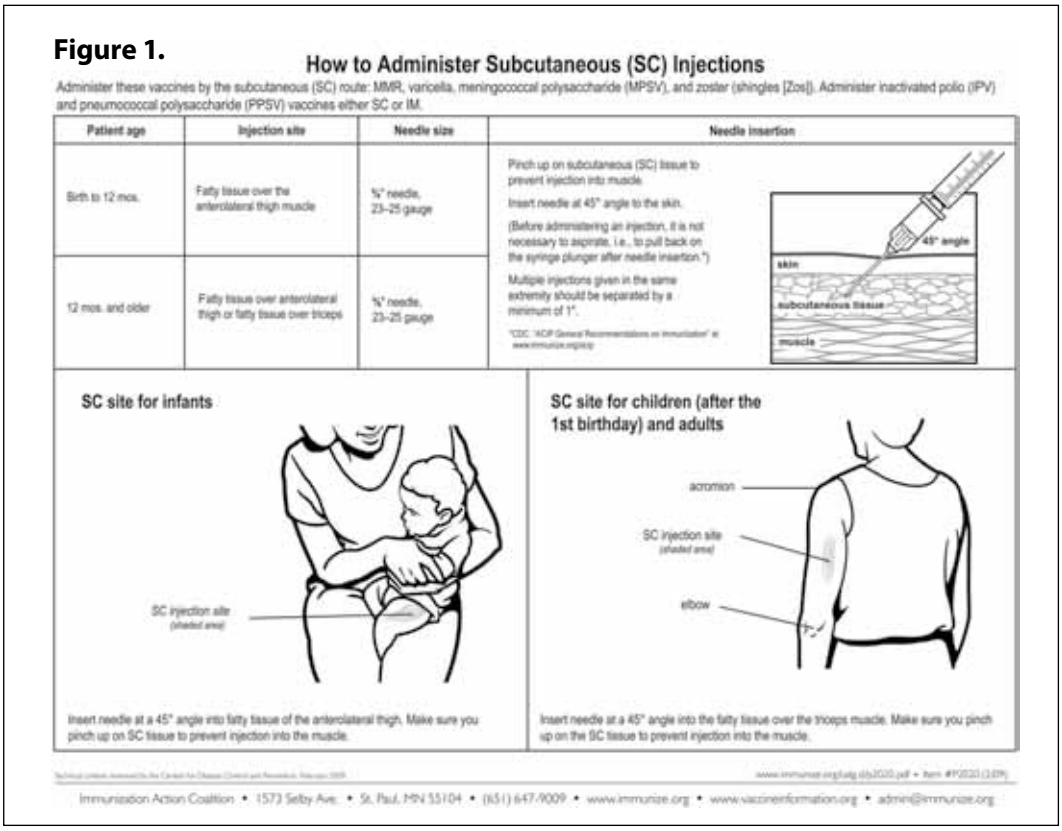


Figure 2.

How to Administer Intramuscular (IM) Injections

Administer these vaccines by the intramuscular (IM) route: Diphtheria-tetanus (DT, Td) with pertussis (DTaP, Tdap); *Haemophilus influenzae* type b (Hib); hepatitis A (HepA); hepatitis B (HepB); human papillomavirus (HPV); inactivated influenza (TIV); meningococcal conjugate (MCV); and pneumococcal conjugate (PCV). Administer inactivated polio (IPV) and pneumococcal polysaccharide (PPSV) either IM or SC.

Patient age	Injection site	Needle size
Newborn (0–28 days)	Anterolateral thigh muscle	⅝"* (22–25 gauge)
Infant (1–12 months)	Anterolateral thigh muscle	1" (22–25 gauge)
Toddler (1–2 years)	Anterolateral thigh muscle	1–1¼" (22–25 gauge)
	Alternate site: Deltoid muscle of arm if muscle mass is adequate	⅝–1"† (22–25 gauge)
Children (3–18 years)	Deltoid muscle	⅝–1"† (22–25 gauge)
	Alternate site: Anterolateral thigh muscle	1–1¼" (22–25 gauge)
Adults 19 years and older	Deltoid muscle of arm	1–1½"†‡ (22–25 gauge)
	Alternate site: Anterolateral thigh muscle	1–1¼" (22–25 gauge)

*A ⅝" needle may be used only if the skin is stretched tight, the subcutaneous tissue is not bunched, and injection is made at a 90° angle.
†A ⅝" needle is sufficient in adults weighing <130 lbs (<60 kg); a 1" needle is sufficient in adults weighing 130–152 lbs (60–70 kg); a 1–1½" needle is recommended in women weighing 152–200 lbs (70–90 kg) and men weighing 152–260 lbs (70–118 kg); a 1½" needle is recommended in women weighing >200 lbs (>90 kg) or men weighing >260 lbs (>118 kg).

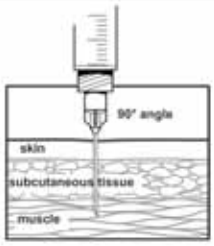
Needle insertion

Use a needle long enough to reach deep into the muscle.

Insert needle at a 90° angle to the skin with a quick thrust.

(Before administering an injection, it is not necessary to aspirate, i.e., to pull back on the syringe plunger after needle insertion.†)

Multiple injections given in the same extremity should be separated by a minimum of 1", if possible.

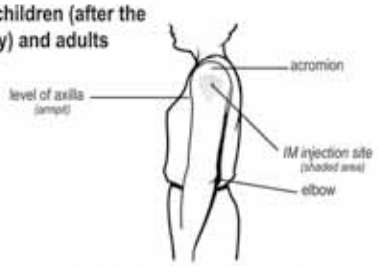


†CDC. "ACIP General Recommendations on Immunization" at www.immunize.org/acip

IM site for infants and toddlers

Insert needle at a 90° angle into the anterolateral thigh muscle.

IM site for children (after the 3rd birthday) and adults



Insert needle at a 90° angle into thickest portion of deltoid muscle — above the level of the axilla and below the acromion.

Technical content reviewed by the Centers for Disease Control and Prevention, February 2009. www.immunize.org/catg.d/p3020.pdf • Item #P3020 (3/09)

Immunization Action Coalition • 1573 Selby Ave. • St. Paul, MN 55104 • (651) 647-9009 • www.immunize.org • www.vaccineinformation.org • admin@immunize.org

Intramuscular (IM) Injection

- Sites include the deltoid muscle of the upper arm for older children/adolescents or the vastus lateralis muscle in the anterolateral upper thigh for small children.
- Volumes for each IM injection are limited by age of child
  - 0.5 mL for small infants
  - 1 mL for larger infants
  - 2 mL for school-aged children
  - 3 mL for adolescents
- Clean the area to be injected with alcohol.
- Insert the needle to the appropriate depth, then inject vaccine.

As immunization recommendations are updated annually, current schedules may be obtained at the Web sites for the CDC (www.cdc.gov) or the AAP (www.aap.org).

Newborn Screening

Use a heel stick procedure for this test.

- Warm the heel with a warm compress for several minutes before sampling.
- Clean the area with alcohol.
- Using a sterile medical lancet, puncture the heel on the lateral aspect, avoiding the posterior area. Or, puncture the finger on the ventral lateral surface near the tip.
- Wipe away the first drop of blood with dry gauze, then collect blood on absorbent filter paper.

Anemia and Lead Screening

Anemia Risk

Infancy

- Prematurity
- Low birth weight

- Use of low-iron formula or infants not receiving iron-fortified formula
- Early introduction of cow's milk as a major source of nutrition. If infants are not yet consuming a sufficient alternate source of iron-rich foods, replacement of breast milk or formula may lead to insufficient iron intake.

Early and Middle Childhood (ages 18 month–5 years)

- At risk of iron deficiency because of special health needs
- Low-iron diet (eg, nonmeat diet)
- Environmental factors (eg, poverty, limited access to food)

Middle Childhood (6–10 years)

- Strict vegetarian diet and not receiving an iron supplement

Adolescence (11–21 years)

- Extensive menstrual or other blood loss
- Low iron intake
- Previously diagnosed with iron-deficiency anemia

Lead Risk

Lead Exposure Risk Assessment Questions

- For children ages 9 months to 6 years, ask screening questions for lead exposure[4]:
  - Does your child live in or regularly visit a house or child care facility built before 1950?
  - Does your child live in or regularly visit a house or child care facility built before 1978 that is being or has recently been renovated or remodeled (within the last 6 months)?
  - Does your child have a sibling or playmate who has or did have lead poisoning?
- Perform finger stick/heel stick procedure.
  - Warm the heel or finger with a warm compress for several minutes before sampling.
  - Clean the area with alcohol.
  - Using a sterile medical lancet, puncture the heel on the lateral aspect avoiding the posterior area. Or, puncture the finger on the ventral lateral surface near the tip.
  - Wipe away the first drop of blood with a dry gauze, then collect blood with capillary tube/container. Avoid "milking" capillary stick site, as this increases tissue fluid in the sample and may falsely lower the result.

Tuberculosis Screening

- Every 6 months until age 2 years, then annually, ask the following screening questions for tuberculosis exposure[5]:
  - Has a family member or contact had tuberculosis disease?
  - Has a family member had a positive tuberculin skin test?
  - Was your child born in a high-risk country (countries other than the United States, Canada, Australia, New Zealand, or Western European countries)?
  - Has your child traveled to, and had contact with resident populations of, a high-risk country for more than 1 week?
- For those at high risk of disease, perform tuberculosis screening by intradermal injection of 0.5 mL of purified protein derivative (PPD).
  - Clean volar surface of left or right forearm with alcohol. Let it dry.
  - Wipe stopper of PPD vial with another alcohol pad. Let it dry.
  - Draw 0.1 cc of PPD (5TU) into syringe, and with needle bevel up, inject full 0.1 cc into volar aspect of mid-forearm intradermally (just beneath the surface of the skin) so that a 5- to 10-mm wheal is created.
- Obtain results between 48 and 72 hours after injection.
  - With arm flexed, feel for induration at the site of injection.
  - To aid in measurement, using a ballpoint pen, mark the arm by moving the pen toward the induration, stopping at the point of induration/resistance.

- Draw lines from both directions (vertically and horizontally).
- Measure the induration with a millimeter ruler transversely to the long axis of the arm.
- Do not measure or record erythema without any induration (ie, erythema without any induration = 0 mm of induration).

What Should You Do With an Abnormal Result?

Newborn Metabolic and Hemoglobinopathy Screen

Manage abnormalities based on the specific abnormality. Newborn screening results are, in general, considered "in range," "out of range," or "invalid." States vary in screening guidelines and recommendations (see above). The AAP has endorsed the work of the American College of Medical Genetics (ACMG) and in 2006 published a technical report "Introduction to the Newborn Screening Fact Sheets" by Celia I. Kaye, MD, PhD, and the AAP Committee on Genetics (*Pediatrics,* 2006;118[3];1304–1312). The newborn screening information includes not only a description of the newborn test, but importantly the follow-up of abnormal screening results. Systematic follow-up is required to facilitate timely diagnostic testing and management, as well as the diagnostic tests and disease management (including coordination of care and genetic counseling). The following disorders are reviewed in the newborn screening fact sheets (which are available at www.pediatrics.org/cgi/content/full/118/3/e934): biotinidase deficiency, CAH, congenital hypothyroidism, cystic fibrosis, galactosemia, homocystinuria, MSUD, medium-chain acyl-coenzyme A dehydrogenase deficiency, PKU, sickle cell disease and other hemoglobinopathies, and tyrosinemia. While not a metabolic disease, information on congenital hearing loss is also available from the ACMG.

You must know what is screened for in your state. Many states have centrally located referral centers for medical care for specific abnormalities, which can also be accessed on the ACMG site.

- Pediatric endocrinology for abnormal CAH and thyroid screen
- Pediatric genetics for the range of inborn errors of metabolism, including PKU, MSUD, galactosidase, and other amino acid defects as well as biotinidase deficiency and fatty acid and organic acid abnormalities
- Pediatric pulmonology for cystic fibrosis
- Pediatric hematology for abnormal hemoglobin electrophoretic patterns

In many cases of abnormal screening, further confirmatory testing is necessary before a diagnosis is reached. The pediatrician may choose to do these tests or have them done by the referral center. The ACMG provides a free service for many of the common newborn screening tests. Included is a description of condition, a brief reference for differential diagnosis, actions to be taken, diagnostic evaluation, clinical considerations, reporting requirements, and links to additional resources, all easily accessed http://www.acmg.net/AM/Template.cfm?Section=NBS_ACT_Sheets_and_Algorithms_Table&Template=/CM/HTMLDisplay.cfm&ContentID=5072.

Lead or Anemia Screening

Abnormal lead results will need further workup and treatment, such as lead avoidance, possibly abatement, and potentially chelation.

For abnormal anemia results see Table 1, iron replenishment and supplementation may be the first and only step. However, it is important to determine whether abnormalities continue or whether other etiologies exist that warrant further investigation and treatment.

Tuberculosis Exposure Screening

Clinical factors will determine which size PPD (≥5 mm, ≥10 mm, or ≥15 mm) is positive (see AAP 2009 *Redbook,* page 681, Table 3.79 Definitions of Positive Tuberculin Skin Test Results in Infants, Children, and Adolescents). Those with positive PPDs need to have a chest x-ray. In most districts, public health authorities will need to be informed, and follow-up with pediatric pulmonology or infectious disease specialists may be warranted if chest x-ray is abnormal.

Changes in therapeutic recommendations may occur, thus the most recent AAP *Red Book* should be consulted or a referral made to a consulting tuberculosis specialist. The 2009 AAP *Red Book* recommends the following treatments:

Table 1. Fifth Percentile Cutoffs for Various Measures of Iron Deficiency in Childhood

Age, y	Hgb, g/dL	Hct, %	MCV, fL	ZnPP µg/dL	RDW, %	%TIBC saturation	Ferritin, µg/L
Newborn	<14.0	<42	NA	NA	NA	NA	<40
0.5–2.0	<11.0	<32.9	<77	>80	>14	<16	<15
2.0–4.9	<11.1	<33.0	<79	>70	>14	<16	<15
5.0–7.9	<11.5	<34.5	<80	>70	>14	<16	<15
8.0–11.9	<11.9	<35.4	<80	>70	>14	<16	<15
12.0–15.0 (male)	<12.5	<37.3	<82	>70	>14	<16	<15
12.0–15.0 (female)	<11.8	<35.7	<82	>70	>14	<16	<15
>15.0 (male)	<13.3	<39.7	<85	>70	>14	<16	<15
>15.0 (female)	<12.0	<35.7	<85	>70	>14	<16	<15

Abbreviations: Hct, hematocrit concentration; Hgb; hemoglobin concentration; MCV, mean corpuscular volume; NA, not applicable (no standards available); RDW, red blood cell distribution width; %TIBC, percent total iron-binding capacity; ZnPP, zinc protoporphyrin concentration.
Source: Reproduced from Kleinman, RE (2009) Pediatric Nutrition Handbook, 6th Edition, Elk Grove Village, IL

Latent tuberculosis (positive skin test, no disease)

- Isoniazid (INH)-susceptible: 9 months of INH, daily. If daily is not possible, direct observation of therapy (DOT) 2 times/week for 9 months.
- INH-resistant: 6 months rifampin, once daily. If daily is not possible, DOT 2 times/week for 6 months.
- INH-rifampin resistant: Consult tuberculosis specialist.

Pulmonary and extrapulmonary

- 2 months INH, rifampin and pyrazinamide daily, followed by 4 months INH and rifampin by direct observation of therapy for drug-susceptible *Mycobacterium tuberculosis*. Ideally, treatment is daily for first 2 weeks to 2 months, then 2 to 3 times per week by DOT.
- Extend duration to 9 months if initial chest x-ray shows cavitary lesions and sputum after 2 months of treatment is positive. If hilar adenopathy, only 6 months duration probably sufficient. Meds given 2 or 3 times/week under DOT in initial phase if nonadherence likely.
- 9 to 12 months of INH and rifampin for drug susceptible *Mycobacterium bovis*.

Meningitis

- 2 months INH, rifampin, pyrazinamide, and an aminoglycoside or ethionamide daily; followed by 7 to 10 months of isoniazid and rifampin daily or 2times/week (9–12 months total) for drug-susceptible M.TB
- At least 12 months without pyrazinamide for drug-susceptible *M Bovis*.
- Give a fourth drug—aminoglycoside—with initial treatment until susceptibility is known.

What Results Should We Document?

Immunizations

Document the immunization procedure (injection type, site, manufacturer, lot number and expiration of vaccine, provision of Vaccine Information Statement). Record all immunizations in the medical record. In some states, immunizations must also be recorded in a state registry.

Newborn Metabolic Screen

Make results of the newborn metabolic screen available in the patient chart. Note documentation of discussion of normal and abnormal results. Document parental refusal.

Include referral to appropriate center (or documentation of plan), or repeat or further lab testing, for those infants who have abnormal, questionable, or invalid results.

Lead and Anemia Screening

Document results of lead levels and hematocrit in the patient chart. In some practices this is noted in the specific visit record. Many medical records have an easily accessible section, chart, or graph for recording all screening test results and immunizations.

Tuberculosis Exposure Screen

Document the PPD procedure (injection type, site, lot number, and expiration of PPD). Record result of testing (including measurement of area of induration) in the medical record.

ICD-9-CM and *CPT* Codes

Immunizations

There are separate billing codes for the vaccine product, administration of the vaccine, and for patient evaluation and management services. Advice on *CPT* coding should be obtained as needed, as codes and rules for coding do change regularly.

The *ICD-9-CM* codes for vaccine administration: "Inoculations and vaccinations: Categories V03–V06 are for encounters for inoculations and vaccinations. They indicate that a patient is being seen to receive a prophylactic inoculation against a disease. The injection itself must be represented by the appropriate procedure code. A code from V03–V06 may be used as a secondary code if the inoculation is given as a routine part of preventive health care, such as a well-baby visit."[3]

The *CPT* codes are classified by vaccination and available at http://www.aap.org/immunization/pediatricians/pdf/VaccineCodingTable.pdf.

Codes 99381–99385 are evaluation and management (E/M) codes for an office or outpatient visit for the initial comprehensive preventive E/M of a patient. Codes 99391–99395 are E/M codes for established patients for periodic comprehensive preventive visit.

Code 90471 is for immunization administration (includes percutaneous, intradermal, subcutaneous, IM and jet injections), one vaccine (single or combination vaccine/toxoid). Code 90473 is for immunization by intranasal or oral route (single vaccine).

Code 90472 is for each additional vaccine (single or combination vaccine). (List separately in addition to the code for primary procedure.) Code 90474 is for each additional intranasal or oral vaccine.

When counseling for immunization administration that does not include a visit, well-child care, or an illness, but the physician provides face-to-face counseling to the family, the following codes are used for children younger than 8: 90465—percutaneous, intradermal, subcutaneous, IM, and jet injections, one vaccine (single or combination vaccine/toxoid)); 90466—each additional vaccine; 90467—initial intranasal or oral vaccine; 90468 for each additional intranasal or oral immunization.

Newborn Screening

The *CPT* code for newborn screen retesting is 84030, and the diagnosis code is 270.10.

Screening Procedures

- Heel stick blood draw CPT 36416—Collection of capillary blood specimen (finger, ear, heel stick)
- Finger stick blood draw *CPT* 36416—Collection of capillary blood specimen (finger, ear, heel stick)
- PPD—intradermal *CPT* 86580 (skin test; tuberculosis, intradermal)

Resources

Newborn screen disease descriptions for parents and physicians (also has multiple language translations).

Save Babies Through Screening Foundation Inc.: http://www.savebabies.org/disease_descriptions.html

Articles

1. Groswasser J, Kahn A, Bouche B, Hanquinet S, Perlmuter N, Hessel L. Experience and reason: needle length and injection technique for efficient intramuscular vaccine delivery in infants and children evaluated through an ultrasonographic determination of subcutaneous and muscle layer thickness. *Pediatrics*. 1997;100(3):400–403

2. Cook IF, Murtagh J. The consultation research: optimal technique for intramuscular injection of infants and toddlers: a randomised trial. *Med J Aust.* 2005;183(2):60–63

3. American Medical Association. *CPT: Current Procedural Terminology.* Chicago, IL: American Medical Association; 2009

4. American Academy of Pediatrics Committee on Environmental Health. Screening for elevated blood lead levels. *Pediatrics.* 1998;101:1072–1078

5. American Academy of Pediatrics. Tuberculosis. In: Pickering LK, Baker CJ, Kimberlin DW, Long SS, eds. *Red Book: 2009 Report of the Committee on Infectious Diseases.* 28th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2009:680–681

6. National Newborn Screening Status Report. National Newborn Screening and Genetics Resource Center Web Site. 2009. http://genes-r-us.uthscsa.edu/nbsdisorders.pdf

7. Kaye CI; American Academy of Pediatrics Committee on Genetics. Introduction to the newborn screening fact sheets. *Pediatrics.* 2006;118(3):1304–1312. http://www.pediatrics.org/cgi/content/full/118/3/e934

8. Newborn Screening Authoring Committee. Newborn screening expands: recommendations for pediatricians and medical homes: implications for the system. *Pediatrics.* 2008;121;192–217. http://www.pediatrics.org/cgi/doi/10.1542/peds.2007-3021

Web Sites

American College of Medical Genetics Newborn screening ACT and confirmatory algorithms: http://www.acmg.net/AM/Template.cfm?Section=NBS_ACT_Sheets_and_Algorithms_Table&Template=/CM/HTMLDisplay.cfm&ContentID=5072

Centers for Disease Control and Prevention: http://www.cdc.gov/vaccines/recs/schedules/child-schedule.htm
Vaccine schedules.

Medline Plus: http://www.nlm.nih.gov/medlineplus/newbornscreening.html
Newborn screen disease descriptions for parents and physicians.

National Newborn Screening & Genetics Resource Center: http://genes-r-us.uthscsa.edu
Newborn screening recommendations by state.

Newborn Screening Authoring Committee: www.pediatrics.org/cgi/doi/10.1542/peds.2007-3021
Newborn screening clinical report.

Administering Vaccines: Dose, Route, Site, and Needle Size

Vaccines	Dose	Route
Diphtheria, Tetanus, Pertussis (DTaP, DT, Tdap, Td)	0.5 mL	IM
Haemophilus influenzae type b (Hib)	0.5 mL	IM
Hepatitis A (HepA)	≤18 yrs: 0.5 mL ≥19 yrs: 1.0 mL	IM
Hepatitis B (HepB) *Persons 11–15 yrs may be given Recombivax HB® (Merck) 1.0 mL adult formulation on a 2-dose schedule.	≤19 yrs: 0.5 mL* ≥20 yrs: 1.0 mL	IM
Human papillomavirus (HPV)	0.5 mL	IM
Influenza, live attenuated (LAIV)	0.5 mL	Intranasal spray
Influenza, trivalent inactivated (TIV)	6–35 mos: 0.25 mL ≥3 yrs: 0.5 mL	IM
Measles, mumps, rubella (MMR)	0.5 mL	SC
Meningococcal – conjugate (MCV)	0.5 mL	IM
Meningococcal – polysaccharide (MPSV)	0.5 mL	SC
Pneumococcal conjugate (PCV)	0.5 mL	IM
Pneumococcal polysaccharide (PPSV)	0.5 mL	IM or SC
Polio, inactivated (IPV)	0.5 mL	IM or SC
Rotavirus (RV)	2.0 mL	Oral
Varicella (Var)	0.5 mL	SC
Zoster (Zos)	0.65 mL	SC
Combination Vaccines		
DTaP+HepB+IPV (Pediarix®) DTaP+Hib+IPV (Pentacel®) DTaP+Hib (Trihibit®) DTaP+IPV (Kinrix®) Hib+HepB (Comvax®)	0.5 mL	IM
MMR+Var (ProQuad®)	≤12 yrs: 0.5 mL	SC
HepA+HepB (Twinrix®)	≥18 yrs: 1.0 mL	IM

Injection Site and Needle Size

Subcutaneous (SC) injection Use a 23–25 gauge needle. Choose the injection site that is appropriate to the person's age and body mass.

Age	Needle Length	Injection Site
Infants (1–12 mos)	5/8"	Fatty tissue over anterolateral thigh muscle muscle
Children 12 mos or older, adolescents, & adults	5/8"	Fatty tissue over anterolateral thigh muscle or fatty tissue over triceps

Intramuscular (IM) injection Use a 22–25 gauge needle. Choose the injection site and needle length appropriate to the person's age and body mass.

Age	Needle Length	Injection Site
Newborn (1st 28 days)	5/8"	Anterolateral thigh muscle
Infants (1–12 mos)	1"	Anterolateral thigh muscle
Toddlers (1–2 yrs)	1"–1¼" 5/8–1"	Anterolateral thigh muscle or deltoid muscle of arm
Children & teens (3–18 years)	5/8–1"* 1"–1¼"	Deltoid muscle of arm or Anterolateral thigh muscle
Adults 19 yrs or older		
Male or Female less than 130 lbs	5/8–1"*	Deltoid muscle of arm
Female 130–200 lbs Male 130–260 lbs	1–1½"	Deltoid muscle of arm
Female 200+ lbs Male 260+ lbs	1½"	Deltoid muscle of arm

**A 5/8" needle may be used only if the skin is stretched tight, subcutaneous tissue is not bunched, and injection is made at a 90-degree angle.*

Please note: Always refer to the package insert included with each biologic for complete vaccine administration information. CDC's Advisory Committee on Immunization Practices (ACIP) recommendations for the particular vaccine should be reviewed as well.

Technical content reviewed by the Centers for Disease Control and Prevention, Nov. 2006. www.immunize.org/catg.d/p3085.pdf • Item #P3085 (11/15/06)

Source: Immunization Action Coalition • 1573 Selby Ave. • St. Paul, MN 55104 • (651) 647-9009 • www.immunize.org • www.vaccineinformation.org

SUSAN M. YUSSMAN, MD, MPH

SEXUALLY TRANSMITTED INFECTIONS

Why Is It Important to Screen for Sexually Transmitted Infections?

Sexually transmitted infections (STIs) are common. Every year, 19 million STIs occur. Almost half occur in youth aged 15 to 24. One in 4 sexually active adolescents will be infected with an STI by age 21. The prevalence of chlamydia in women aged 14 to 19 years is nearly 5%, the highest proportion of any age group.

Adolescents are at high risk. There are now more than 20 STIs. Adolescents are at high risk of STIs due to cervical ectopy (columnar epithelium present on the cervix), immature immune system, multiple partners, inconsistent condom use, and barriers to health care.

Sexually transmitted infections have high costs. Sexually transmitted infections in youth pose an economic burden of $15.5 billion a year.

Sexually transmitted infections often have no symptoms and therefore go undiagnosed, leading to disease. In women, a spectrum of diseases exist, including vulvovaginitis, vaginitis, cervicitis, endometritis, salpingitis, tubo-ovarian abscess, and peritonitis. In men, the spectrum of disease includes urethritis, epididymitis, and prostatitis. If left untreated, STIs can cause severe health consequences, including pelvic inflammatory disease, epididymitis, ectopic pregnancy, infertility, cervical cancer, and death.

Sexually transmitted infection screening is recommended. The Centers for Disease Control and Prevention recommends annual chlamydia screening for all sexually active women younger than 25.

Bright Futures recommends screening all sexually active youth for gonorrhea and chlamydia annually. For high-risk teens, also screen for syphilis and HIV at least once a year. For high-risk teens, STI testing, especially for chlamydia, may be done as often as every 3 to 6 months. High-risk teens include, but are not limited to, STI clinic patients, youth in detention centers, men who have sex with men, and injection drug users. Other STIs should be screened for only if a patient is symptomatic. For instance, if a patient has a genital ulcer, then add a herpes culture to the evaluation. If a patient has cervicitis, then conduct additional testing for trichomoniasis.

How Should You Perform STI Screening?

Take a Detailed Sexual History

Ask about

- Age at first intercourse
- Number of sex partners
- Sex with males, females, or both
- Types of sex (oral, vaginal, anal)
- Sexual orientation
- Use of barrier and hormonal contraception
- Prior STI testing and results
- History of sexual abuse

Perform Screening

In all states and the District of Columbia, adolescents are able to consent to diagnosis and treatment of STIs. Most states also allow adolescents to consent for confidential HIV counseling and testing.

Chlamydia and Gonorrhea

- Nucleic acid amplification tests
  - Amplify and detect organism-specific genomic or plasmid DNA or rRNA
  - Polymerase chain reaction
  - Transcription-mediated amplification
  - Strand displacement amplification

Trichomoniasis

- Nucleic acid amplification tests testing-urine sample or vaginal/endocervical swab sample
- Wet prep-vaginal swab sample
- Motile trichomonads seen on saline wet mount
- Vaginal pH >4.5 and positive amine whiff test help confirm the diagnosis, but are also seen with bacterial vaginosis
- Other point-of-care testing-vaginal swab sample
- Antigen detection test
- Nucleic acid probe-hybridization test
- Culture

Genital Warts (Human Papillomavirus [HPV])

- Visual inspection with bright light.
- Can be confirmed by biopsy
- Use of type-specific HPV DNA tests for routine diagnosis and management of genital warts is not recommended.

Herpes

- Viral culture of fluid from an unroofed pustule is best because sensitivity of culture declines rapidly as lesions begin to heal.
- Herpes simplex virus-2 serologic tests are not indicated for screening in the general population, but can be used to confirm a clinical diagnosis or to diagnose persons with unrecognized infection.

Syphilis

- Darkfield examination and direct fluorescent antibody tests of lesion exudates are definitive.
- Serologic tests
  - Nontreponemal tests
    - Venereal Disease Research Laboratory
    - Rapid plasma reagin
    - Most reactive tests become nonreactive after treatment
  - Treponemal tests
    - Fluorescent treponemal antibody absorbed
    - *Treponema* pallidum particle agglutination
    - Most reactive tests always remain positive

HIV

- Serologic antibody testing with enzyme immunoassay
- Rapid oral or blood test which gives a result within 30 minutes is also acceptable for screening.
- All reactive screening tests must be confirmed by Western blot or immunofluorescence assay
- The HIV antibody is detectable in 95% of patients within 3 months after infection

What Should We Do With an Abnormal Result?

All sexual partners from the past 60 days of patients positive for chlamydia, gonorrhea, and trichomoniasis should be tested and treated, regardless of their test results. Sexual partners from the past 90 days of patients positive for primary syphilis should be tested and treated even if seronegative. Partners of those positive for HIV should be tested immediately, in one month, in 3 months, and in 6 months.

Treatments

Chlamydia cervicitis or urethritis

- Azithromycin 1 g orally in a single dose, OR
- Doxycycline 100 mg orally twice daily for 7 days

Gonorrhea cervicitis or urethritis

- Ceftriaxone 125 mg IM in a single dose, OR
- Cefixime 400 mg orally in a single dose
- Fluoroquinolones are no longer recommended due to resistance.

Pelvic Inflammatory Disease (cervical motion tenderness or adnexal tenderness)

- Ceftriaxone 250 mg IM in a single dose PLUS doxycycline 100 mg orally twice a day for 14 days WITH OR WITHOUT metronidazole 500 mg orally twice a day for 14 days OR
- Cefoxitin 2 g IM in a single dose and probenecid, 1 g orally administered concurrently in a single dose PLUS doxycycline 100 mg orally twice a day for 14 days WITH OR WITHOUT metronidazole 500 mg orally twice a day for 14 days

Trichomoniasis

- Metronidazole 2 g orally in a single dose OR
- Tinidazole 2 g orally single dose (non-pregnant patients only)
- Metronidazole 500 mg twice a day for 7 days OR

External Genital Warts

- Patient-Applied Treatments

  Choose **one** of the following treatment options:

  - Podofilox 0.5% solution or gel to visible warts twice a day for 3 days, followed by 4 days of no therapy up to 4 cycles
  - Imiquimod 5% cream once daily at bedtime, 3 times a week for up to 16 weeks (wash off 6–10 hours after application)
- Provider-Applied Treatments

  Choose **one** of the following treatment options:

  - Cryotherapy with liquid nitrogen or cryoprobe every 1 to 2 weeks
  - Podophyllin resin 10% to 25% in compound tincture of benzoin to each wart and air-dry, up to weekly if needed
  - Trichloroacetic acid or bichlproacetic acid 80% to 90% to warts and air dry up to weekly

Genital Herpes

- First Clinical Episode

  Choose **one** of the following treatment options:

  - Acyclovir 400 mg orally 3 times a day for 7 to 10 days
  - Acyclovir 200 mg orally 5 times a day for 7 to 10 days
  - Famciclovir 250 mg orally 3 times a day for 7 to 10 days
  - Valacyclovir 1 g orally twice a day for 7 to 10 days
- Recurrent Episodes

  Choose **one** of the following treatment options:

  - Acyclovir 400mg orally three times a day for 5 days
  - Acyclovir 800mg orally twice a day for 5 days
  - Acyclovir 800mg orally three times a day for 2 days
  - Famciclovir 125mg orally twice daily for 5 days
  - Famciclovir 10000mg orally twice daily for 1 day
  - Valacyclovir 500mg orally twice a day for 3 days
  - Valacyclovir 1000mg orally once a day for 5 days
- Daily Suppressive Therapy for Recurrent Herpes

  Choose **one** of the following treatment options:

  - Acyclovir 400 mg orally twice a day
  - Famciclovir 250 mg orally twice a day
  - Valacyclovir 500 mg or 1 g orally once daily

Syphilis

- Primary and Secondary Syphilis
  - Benzathine penicillin G 50,000 units/kg IM, up to the adult dose of 2.4 million units in a single dose
- Early latent syphilis (seroactivity conversion within prior year without other evidence of disease)
  - Benzathine penicillin G 50,000 units/kg IM, up to the adult dose of 2.4 million units, administered as 3 doses at 1-week intervals (total 150,000units/kg up to the adult total dose of 7.2 million units)

- Late latent syphilis (seroactivity conversion more than 1 year prior or of unknown duration without other evidence of disease)
  - Benzathine penicillin G 7.2 million units IM total, administered as 3 doses of 2.4 million units IM each at 1-week intervals
- Tertiary syphilis (gumma and cardiovascular syphilis)
  - Benzathine penicillin G 7.2 million units IM total, administered as 3 doses of 2.4 million units IM each at 1-week intervals

What Results Should You Document?

As of 2010, all states mandate reporting of gonorrhea, chlamydia, syphilis, and HIV to local health departments.

Check with your local health department to determine if other STIs are reportable.

Resources

Books

Emans SJ, Laufer MR, Goldstein DP, eds. *Pediatric and Adolescent Gynecology*. 4th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 1998

Fortenberry JD. Sexually transmitted infections: screening and diagnosis guidelines for primary care pediatricians. *Pediatr Ann*. 2005;34:803–810

Articles

Burstein GR, Murray PJ. Diagnosis and management of sexually transmitted disease pathogens among adolescents. *Pediatr Rev*. 2003;24:75–82

Burstein GR, Murray PJ. Diagnosis and management of sexually transmitted diseases among adolescents. *Pediatr Rev*. 2003;24:119–127

Centers for Disease Control and Prevention, Workowski KA, Berman SM. Sexually transmitted diseases treatment guidelines, 2006. *MMWR Recomm Rep*. 2006;55(RR-11):1–94

***ICD-9-CM* Codes**	
131.00	Urogenital trichomoniasis unspecified site
131.01	Trichomoniasis vulvovaginitis
131.02	Trichomoniasis urethritis
131.03	Trichomoniasis prostatitis
098.0	Gonococcal urethritis
098.15	Gonococcal cervicitis
616.0	Cervictis
616.11	Vaginitis and vulvovaginitis
099.41	*Chlamydia trachomatis* urethritis
614.0	Pelvic inflammatory disease
054.10	Genital herpes
078.11	Genital warts
132.2	Pediculus pubis (pubic lice)
091.0	Genital syphilis
099.9	Venereal disease, unspecified
042	Human immunodeficiency virus disease
054.11	Herpetic vulvovaginitis
054.12	Herpetic ulceration of vulva
054.13	Herpetic ulceration of penis
054.2	Herpetic ginivostomatitis
099.40	Other non-gonococcal urethritis unspecified
099.50	Chlamydia unspecified site
099.51	Chlamydia pharyngitis
099.52	Chlamydia anus and rectum
091.0	Primary genital syphilis
091.1	Primary anal syphilis
091.2	Other primary syphilis
091.3	Secondary syphilis of skin or mucous membranes
091.4	Adenopathy due to secondary syphilis
614.9	Pelvic inflammatory disease not otherwise specified

The American Academy of Pediatrics publishes a complete line of coding publications, including an annual edition of *Coding for Pediatrics*. For more information on these excellent resources, visit the American Academy of Pediatrics Online Bookstore at **www.aap.org/bookstore/.**

Centers for Disease Control and Prevention, Division of STD Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD and TB Prevention. Updated recommended treatment regimens for gonococcal infections and associated conditions—United States, April 2007. Centers for Disease Control and Prevention Web Site. 2007. http://www.cdc.gov/STD/treatment. Accessed August 21, 2007

Centers for Disease Control and Prevention. New data show heavy impact of Chlamydia on US men and women, particularly young people. Centers for Disease Control and Prevention Web Site. 2005. http://www.cdc.gov/media/pressrel/r050712.htm. Accessed June 4, 2010

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Centers for Disease Control and Prevention, Division of STD Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD and TB Prevention. Trends in reportable sexually transmitted diseases in the United States, 2003—national data on chlamydia, gonorrhea and syphilis. Centers for Disease Control and Prevention Web Site. 2004. http://www.cdc.gov/STD/stats03/trends2003.htm

Centers for Disease Control and Prevention, Division of STD Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD and TB Prevention. Updated recommended treatment regimens for gonococcal infections and associated conditions—United States, April 2007. Centers for Disease Control and Prevention Web Site. 2007. http://www.cdc.gov/STD/treatment. Accessed August 21, 2007

Chesson HW, Blandford JM, Gift TL, Tao G, Irwin KL. The estimated direct medical cost of sexually transmitted diseases among American youth, 2000. *Perspect Sex Reprod Health.* 2004;36(1):11–19

Neinstein LS, ed. *Adolescent Health Care: A Practical Guide.* 4th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2002

Knight JR, Sherritt L, Shrier LA, Harris SK, Chang H. Validity of the CRAFFT Substance Abuse Screening Test among adolescent clinic patients. *Arch Pediatr Adolesc Med.* 2002;156:607–614

Weinstock H, Berman S, Cates W Jr. Sexually transmitted diseases among American youth: incidence and prevalence estimates, 2000. *Perspect Sex Reprod Health.* 2004;36:6–10

Web Sites for Health Professionals

CDC STI Treatment Guidelines: www.cdc.gov/std/treatment

Center for Young Women's Health at Boston Children's Hospital: www.youngwomenshealth.org

Web Sites for Adolescents and Parents

American Social Health Association: www.ashastd.org

Center for Young Women's Health at Boston Children's Hospital: www.youngwomenshealth.org

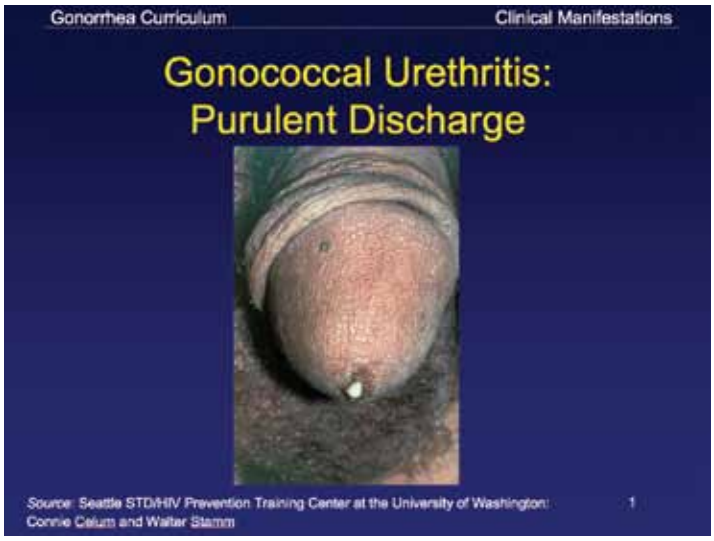
Nemours Foundation: www.kidshealth.org

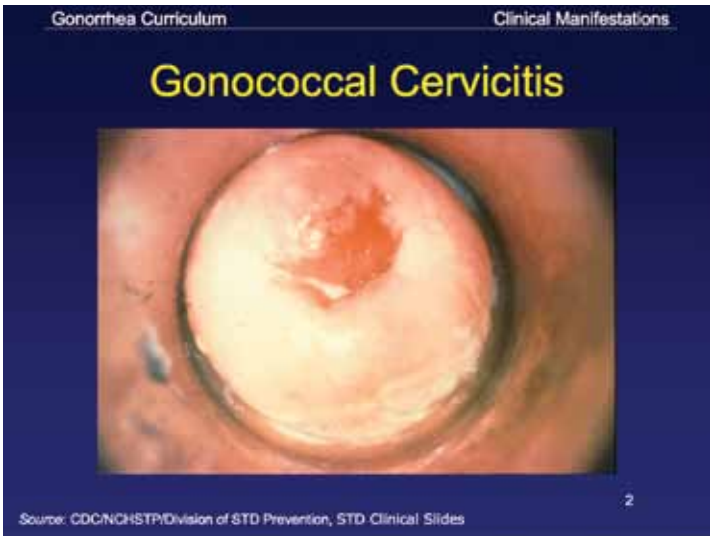
Planned Parenthood: www.plannedparenthood.org

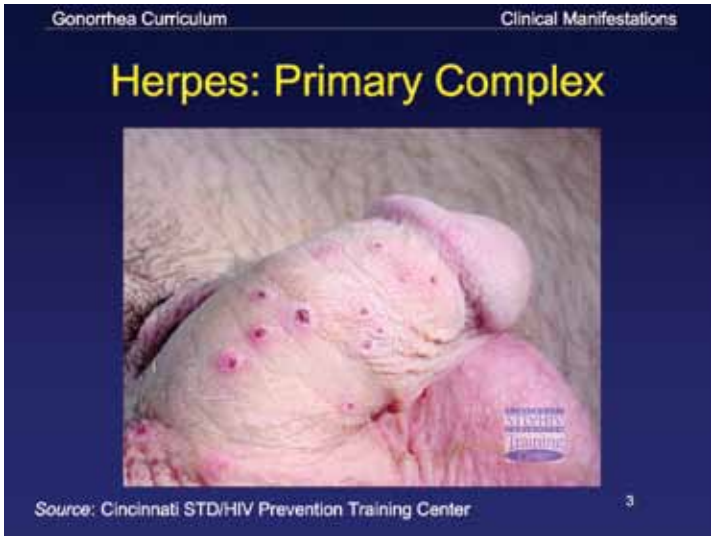
US Department of Health and Human Services: www.4women.gov

Reference

1. Guttmacher Institute. "State Policies in Brief: An overview of minors' Consent Law as of June 1, 2010. Available at: http://www.guttmacher.org/statecenter/spibs/sprb-omel.pdf

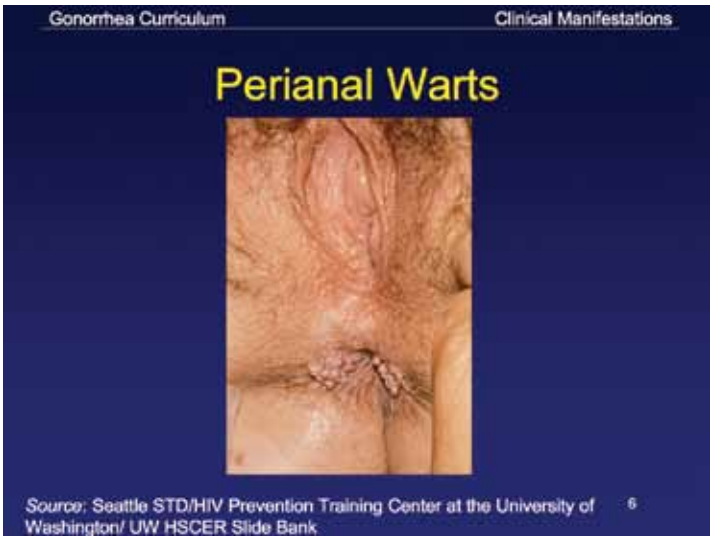

Gonorrhea Curriculum
Clinical Manifestations
Gonococcal Urethritis: Purulent Discharge
Source: Seattle STD/HIV Prevention Training Center at the University of Washington: Connie Celum and Walter Stamm
1

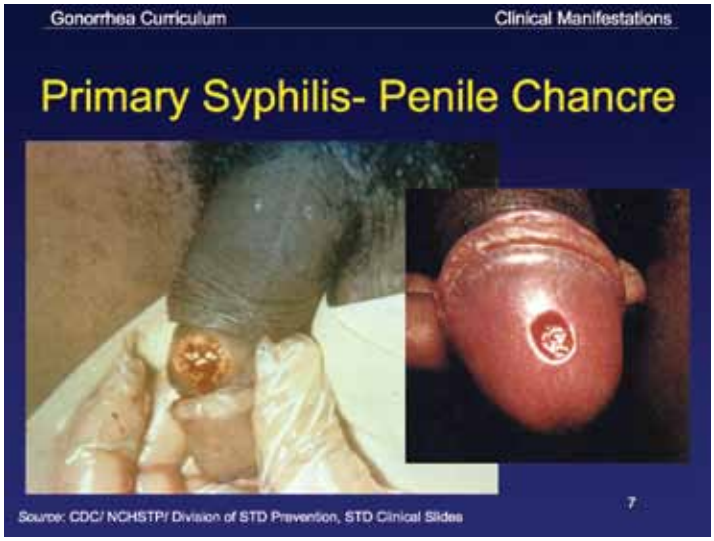

Gonorrhea Curriculum
Clinical Manifestations
Gonococcal Cervicitis
Source: CDC/NCHSTP/Division of STD Prevention, STD Clinical Slides
2

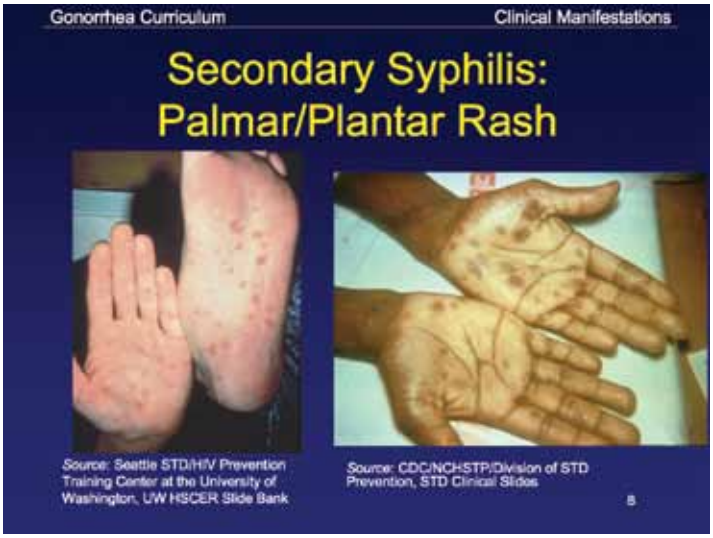

Gonorrhea Curriculum
Clinical Manifestations
Herpes: Primary Complex
Source: Cincinnati STD/HIV Prevention Training Center
3


Gonorrhea Curriculum
Clinical Manifestations
Herpes: Genitalis Multiple Ulcer
Source: Cincinnati STD/HIV Prevention Training Center
4


Gonorrhea Curriculum
Clinical Manifestations
Penile Warts
Source: Cincinnati STD/HIV Prevention Training Center
5


Gonorrhea Curriculum
Clinical Manifestations
Perianal Warts
Source: Seattle STD/HIV Prevention Training Center at the University of Washington/ UW HSCER Slide Bank
6


Gonorrhea Curriculum
Clinical Manifestations
Primary Syphilis- Penile Chancre
Source: CDC/ NCHSTP/ Division of STD Prevention, STD Clinical Slides
7


Gonorrhea Curriculum
Clinical Manifestations
Secondary Syphilis:
Palmar/Plantar Rash
Source: Seattle STD/HIV Prevention Training Center at the University of Washington, UW HSCER Slide Bank
Source: CDC/NCHSTP/Division of STD Prevention, STD Clinical Slides
8

ALEX KEMPER, MD, MPH, MS
MONTE A. DELMONTE, MD

VISION

The goals of vision screening vary by the age of the child. For infants, the goals are to detect retinoblastoma, congenital glaucoma, and conditions that could lead to amblyopia if not detected early, such as congenital cataracts, ptosis, or significant strabismus. For preschool-aged children, the goals are to detect amblyopia and conditions that could lead to amblyopia (eg, strabismus and unequal refractive error between each eye and refractive error). For school-aged children, the goal is to detect refractive error.

Why Is It Important to Screen for Vision Problems?

Vision problems are common. Among preschool-aged children, 5% to 10% have vision problems, including 2% to 5% with strabismus or amblyopia. Among school-aged children and adolescent children, more than 10% have refractive errors, such as myopia or hyperopia.

Rare conditions present in infancy and early childhood. These conditions, which include congenital cataracts, congenital glaucoma, congenital ptosis, and retinoblastoma, can lead to blindness. Retinoblastoma can be fatal, and cataracts may be associated with other systemic disorders.

Early treatment leads to improved outcomes. The difficulty of treatment for amblyopia increases and the likelihood of cure decreases with increasing age of the child. Undetected congenital cataracts, glaucoma, or ptosis can lead to blindness in early infancy. Untreated refractive errors may affect learning.

Some children are at high risk of vision problems. Risk factors for vision problems include prematurity and family history of congenital cataracts or retinoblastoma. Special attention should be paid to children with special health care needs who may be difficult to screen, such as children with cerebral palsy or down syndrome.

When Should You Perform Vision Screening?

Assessing risk for ocular problems and vision impairment should begin in the newborn nursery and occur at all health supervision visits. Bright Futures recommends that all children have formal vision screening as part of their health supervision visit annually from 3 through 6 years of age, at 8 years of age, at 10 years of age, at 12 years of age, at 15 years of age, and at 18 years of age. Vision screening should be conducted at other health supervision visits based on risk assessment or any concern on the part of families or the child.

The American Academy of Pediatrics (AAP) recommends age-appropriate screening tests, which vary based on the goals across the age spectrum. Little is known about the accuracy of vision screening tests in the primary care practice setting, however.

Some children with vision problems appear to be uncooperative on testing. Follow-up testing in 1 to 6 months or referral is recommended if testing is equivocal or if the child is not cooperative.

How Should You Perform Vision Screening?

New vision screening technology (eg, photoscreening, autorefraction) has been developed and is increasingly used in pediatric practice. Reccomendations for the use of such technology will be made as evidence regarding their comparative effectiveness becomes available.

Birth to 3 Years

Assess for parent concern and ask for parent observations. Risk assessment must be adapted to the developmental status of the child. Examples of questions include:

- Does your child seem to see well?
- Does your child hold objects close to his or her face when trying to focus?
- Do your child's eyes appear unusual or do they seem to cross or drift or seem lazy?
- Do your child's eyelids droop or does one eyelid tend to close?
- Have your child's eyes ever been injured?

Take a family history. Explore relevant family histories about eye disorders, such as amblyopia, strabismus, congenital cataracts, retinoblastoma, or preschool or early childhood use of glasses in parents or siblings.

Conduct a physical examination. Assess ability to fix and follow.

- Inspect the eyes and lids.
- Evaluate ocular motility and alignment with the corneal light reflex test (Hirschberg test) and the cover/uncover and cross-cover tests. These tests can help identify strabisumus. Careful examination can also exclude psuedostrabismus. However, if there is doubt, refer to an eye care specialist.
- Examine the reaction of the pupils.
- Assess the red reflex for cataracts or leukocoria.

3 Years and Older

Assess for parent or child concern and ask for parent observations. Ask questions, such as

- Do you (or does your child) have trouble seeing the blackboard in the classroom?
- Do you (or does your child) hold toys or books close to the eyes?
- Do you (or does your child) have trouble recognizing faces at a distance?
- Do you (or does your child) tend to squint?
- Have you (or has your child) failed a school vision screening test?

Perform vision screening tests. This should include tests of distance visual acuity and tests of ocular alignment and stereovision.

- Distance visual acuity measurement for preschool-aged children (3–5 years)
  - Recommended charts include the HOTV chart and the Lea chart (heart, house, circle, square). Some children may be able to use the Snellen Chart.
  - All charts should be tested at 10 feet. If possible, consider testing within a quiet room and not in a heavily trafficked hallway.
- Test each eye individually. Make sure that the other eye is completely occluded.
  - Refer if less than 20/40 in either eye or a 2-line or more difference between each eye, even if in passing range (eg, 20/25 and 20/40).
- Distance visual acuity measurement for older children
  - Test with Snellen letters at 10 feet.
  - Refer if less than 20/30 or a 2-line or more difference between each eye even if in passing range.
- Optic nerve health and retinal vessels
  - Use direct ophthalmoscopy for cooperative children.
- Color vision deficiencies
  - Consider the Ishihara Test to assess color vision.
  - Color vision deficiencies are common in boys (5%–8%) but the value of screening is debated.

If possible, consider testing within a quiet room and not in a heavily trafficked hallway.

What Should You Do With an Abnormal Result?

Refer all children with an abnormal screening result to a pediatric ophthalmologist or an eye care specialist appropriately trained to treat pediatric patients. Some optometrists offer vision therapy, based on eye exercises, for a number of different vision problems, including strabismus. The benefit of vision therapy is unclear. Insurance often does not cover vision therapy.

Refer children at high risk regardless of screening results.

Some children who have vision problems will appear to be uncooperative with testing. When in doubt, refer.

Some children will not receive follow-up care because some parents do not understand the benefits of early detection. Explain these benefits to all families at the time of referral.

Some children do not have coverage for the treatment of refractive errors. Become aware of local available resources (eg, Lions Club). Medicaid provides vision coverage, including corrective lenses.

What Results Should You Document?

Document vision in the medical record and refer as appropriate.

These *CPT* codes were specifically developed to report vision screening tests. Most health plans provide benefit coverage for vision screening; however, payment for vision screening may be inappropriately bundled with the health supervision visit.

Resources

Article

American Academy of Pediatrics Committee on Practice and Ambulatory Medicine, Section on Ophthalmology; American Association of Certified Orthoptists; American Association for Pediatric Ophthalmology and Strabismus; American Academy of Ophthalmology. Eye examination in infants, children, and young adults by pediatricians. *Pediatrics*. 2003;111:902–907

CPT and *ICD-9-CM* Codes

360.44	Leukocoria
366.0	Infantile, juvenile, and presenile cataract
743.2	Congenital glaucoma
743.61	Congenital ptosis
743.3	Congenital cataract and lens anomalies
368.0	Amblyopia
378	Strabismus and other disorders of binocular eye movements
367.0	Hyperopia
367.1	Myopia
368.5	Color vision deficiencies
99173	Screening tests of visual acuity, quantitative, bilateral
99174	Ocular photoscreening with interpretation and report, bilateral

The American Academy of Pediatrics publishes a complete line of coding publications, including an annual edition of *Coding for Pediatrics*. For more information on these excellent resources, visit the American Academy of Pediatrics Online Bookstore at **www.aap.org/bookstore/.**

Tool

- HOTV chart
- Lea chart (heart, house, circle, square)
- Snellen numbers
- Random Dot E stereotest