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Stress test cpt

When you exercise, your cardiovascular and respiratory systems work hard to supply oxygen and other essential fuel to your muscles. How these systems function under stress can tell a lot about a person’s overall health. If your doctor wants to assess your heart and lungs, a cardiopulmonary stress test is just the right tool. Who Needs A Cardiopulmonary Stress Test? A cardiopulmonary stress test is also known as a cardiopulmonary exercise test. It is a noninvasive diagnostic procedure that provides information about your cardiopulmonary system at rest and during exercise. This test is recommended for patients whose electrocardiogram, echocardiography, or spirometry results are slightly abnormal. Your doctor can use this test to gather information on your cardiopulmonary structure and suggest possible treatment. What Happens During The Test? You begin the test at rest. It is important that the air you exhale does not mix with the air in the room. A non-breathing valve, which controls the direction of airflow, prevents this from happening. A machine records your blood pressure, baseline heart rate, oxygen saturation, and gas exchange values. Your provider will ask you to exercise on a stationary cycle or motorized treadmill. Pedaling or walking at a constant speed before increasing the intensity is recommended. You will do this while an attached mouthpiece measures respiratory gas exchange per breath. The entire test takes 40 minutes to complete, but the exercise part is relatively short – usually about 10 minutes only. What Does A Cardiopulmonary Stress Test Measure? Data collected during the exam includes your heart rate, EKG, oxygen uptake, and carbon dioxide output. The data helps calculate your minute ventilation and maximal oxygen consumption. Your doctor can then examine how your heart and lungs function at rest and during times of stress A cardiopulmonary stress test measures oxygen input and carbon dioxide output. It also checks your anaerobic threshold. This metric is the point when the metabolic demands of physical activity go beyond the oxygen intake needed to function. In particular, your anaerobic threshold can indicate how much exercise you can feasibly handle. With your physical limit taken into consideration, your pulmonologist can make the most responsive and effective exercise plan for you. Knowing a person’s anaerobic threshold is particularly useful for patients with heart failure, for whom overexertion may be fatal. Stress Test For Diagnosis, Treatment Assessment, And Disability Evaluation On top of generally assessing a person’s exercise capacity, healthcare providers use a cardiopulmonary stress test to determine if patients have other conditions. These may include ischemic heart disease, pulmonary hypertension, and congenital heart defects. Moreover, it can help your doctor study if your current treatment plan is effective. The test can inform the diagnosis of patients for employment disability evaluations, as well. If a person wants to return to a physically demanding job, they may have to take this test to determine if they are fit to do so. Can You Undergo A Cardiopulmonary Stress Test? Even with all the benefits, a cardiopulmonary stress test is not without risk. It is generally not recommended to patients with severe heart and respiratory problems. Consult with your doctor first to see if you’re a good candidate. You should not take the test if you have: Syncope due to physical activity Active myocardial ischemia Decompensated heart failure Uncontrolled arrhythmia Advanced aortic stenosis Endocarditis, myocarditis, pericarditis Aortic dissection Acute respiratory failure Acute pulmonary edema Uncontrolled asthma Resting oxygen saturation of less than 85% Untreated deep vein thrombosis pulmonary embolism Chronic obstructive pulmonary disease (COPD) exacerbation Cardiopulmonary Stress Test In North Texas By assessing how the cardiovascular and pulmonary systems work together under stress, a cardiopulmonary stress test can provide greater insight into a person’s health. If your doctor recommends a cardiopulmonary stress test, visit the Lung & Sleep Specialists of North Texas today. Our very own Dr. Olusegun Oseni is board-certified in pulmonary medicine and uses a multi-faceted approach to pulmonary care and disease management. You will be tested under the close supervision of a physician to ensure maximum comfort and safety. To schedule an appointment with our providers, call (817) 594-9993 or fill out our online appointment request form. We serve patients from Parker County, Tarrant County, and surrounding areas. We look forward to seeing you! Pulse quickening and sweat beading, you’re not running a marathon—you’re navigating the complex world of medical billing for a simple treadmill test. The 93015 CPT code, a seemingly innocuous string of numbers, holds the key to unlocking the intricacies of cardiovascular stress testing and its associated billing procedures. As we delve into this comprehensive guide, we’ll unravel the mysteries surrounding this crucial code and its significance in the healthcare industry. Before we dive into the specifics of the 93015 CPT code, it’s essential to understand what CPT codes are and why they matter. Current Procedural Terminology (CPT) codes are standardized numerical codes developed by the American Medical Association (AMA) to describe medical, surgical, and diagnostic services provided by healthcare professionals. These codes serve as a universal language for medical procedures, ensuring consistency in billing and communication across the healthcare system. Accurate coding is paramount in healthcare for several reasons: 1. Proper reimbursement: Insurance companies and government programs use CPT codes to determine payment amounts for specific procedures. 2. Legal compliance: Correct coding helps healthcare providers avoid fraud allegations and comply with regulatory requirements. 3. Data analysis: CPT codes facilitate the collection and analysis of healthcare data, which is crucial for research and policy-making. 4. Efficient communication: These codes allow healthcare professionals to communicate precisely about procedures and treatments. In the realm of cardiovascular health, stress testing plays a vital role in diagnosing and monitoring heart conditions. Understanding the 3 Types of Stress Tests: A Comprehensive Guide to Cardiac Function Evaluation is crucial for both patients and healthcare providers. The 93015 CPT code specifically relates to cardiovascular stress testing, which is a non-invasive procedure used to evaluate heart function under physical stress. The 93015 CPT code represents a comprehensive cardiovascular stress test, including supervision, interpretation, and report. This code encompasses the entire stress test procedure from start to finish, performed by a single provider or group. It’s important to note that this code is used when one entity (such as a cardiology group) performs all aspects of the test. Components covered by the 93015 code include: 1. Patient preparation and education 2. Supervision of the exercise or pharmacological stress portion 3. Continuous electrocardiogram (ECG) monitoring 4. Blood pressure measurements 5. Interpretation of results 6. Generation of a comprehensive report While 93015 is a global code, there are related codes that represent individual components of the stress test: – 93016: Physician supervision only – 93017: Tracing only, without interpretation and report – 93018: Interpretation and report only The key difference between 93015 and these other codes is that 93015 encompasses all aspects of the stress test, while the others are used when different providers perform specific parts of the test. A cardiovascular stress test, also known as an exercise stress test or treadmill test, is designed to evaluate how well the heart functions during physical activity. Stress Echocardiogram: A Comprehensive Guide to Understanding This Vital Cardiac Test provides detailed information on a specific type of stress test that combines exercise with ultrasound imaging. The typical procedure for a cardiovascular stress test covered by the 93015 CPT code includes the following steps: 1. Patient preparation: – Medical history review and physical examination – Explanation of the procedure and obtaining informed consent – Attachment of ECG electrodes and blood pressure cuff 2. Resting measurements: – Baseline ECG recording – Initial blood pressure measurement 3. Exercise phase: – Patient walks on a treadmill or pedals a stationary bicycle – Speed and incline/resistance gradually increase – Continuous ECG monitoring and periodic blood pressure measurements – Patient communicates any symptoms (e.g., chest pain, shortness of breath) 4. Peak exercise: – Patient reaches target heart rate or maximum tolerated exertion – Final ECG and blood pressure readings taken 5. Recovery phase: – Patient continues to be monitored as heart rate and blood pressure return to baseline – Additional ECG recordings and blood pressure measurements 6. Data analysis and interpretation: – Physician reviews all collected data – Compares exercise ECG with resting ECG – Evaluates blood pressure response and any reported symptoms 7. Report generation: – Comprehensive report detailing test findings, interpretation, and recommendations The entire procedure typically takes about 15-20 minutes for the exercise portion, with additional time for preparation and recovery. The total appointment time is usually around 60-90 minutes. Equipment involved in the stress test includes: – Treadmill or stationary bicycle – ECG machine – Blood pressure monitoring equipment – Emergency medical equipment (as a precaution) Personnel typically present during the test include: – Supervising physician (often a cardiologist) – Trained technician or nurse – Additional staff for emergency response if needed Patient safety is paramount during a stress test. Precautions include: – Continuous monitoring of vital signs – Immediate access to emergency equipment and medications – Clear communication between the patient and medical staff – Ability to stop the test immediately if any concerning symptoms arise Cardiovascular stress tests are ordered for various reasons, primarily to diagnose or monitor heart conditions. Common indications for ordering a stress test include: 1. Suspected coronary artery disease 2. Evaluation of chest pain or shortness of breath 3. Assessment of heart rhythm abnormalities 4. Monitoring the effectiveness of heart disease treatments 5. Determining safe levels of exercise for cardiac patients 6. Preoperative risk assessment for non-cardiac surgery Conditions that can be diagnosed or monitored using this test include: – Coronary artery disease – Arrhythmias – Heart valve disorders – Congestive heart failure In some cases, stress tests may also help diagnose less common conditions. For instance, Understanding ICD-10 Code for Takotsubo Cardiomyopathy: A Comprehensive Guide discusses a rare form of heart muscle weakness that can sometimes be detected during stress testing. The frequency of testing varies depending on the patient’s condition and risk factors. For individuals with known heart disease, annual stress tests may be recommended. For those at lower risk, tests may be performed every few years or as symptoms warrant. Follow-up procedures after a stress test may include: – Additional diagnostic tests (e.g., coronary angiography) – Medication adjustments – Lifestyle modifications – Referral to a cardiologist for further evaluation Understanding the financial aspects of the 93015 CPT code is crucial for both healthcare providers and patients. The average costs associated with a cardiovascular stress test can vary widely depending on factors such as geographic location, facility type, and insurance coverage. Typical cost ranges for a 93015 stress test: – Without insurance: $1,000 – $5,000 – With insurance: $100 – $500 (patient responsibility after insurance) Insurance coverage for stress tests is generally good when deemed medically necessary. Most private insurance plans, Medicare, and Medicaid cover these tests, but patients may be responsible for copayments, coinsurance, or deductibles. Proper documentation is essential for reimbursement. Required documentation typically includes: – Physician’s order with medical necessity justification – Patient’s medical history and risk factors – Detailed test results and interpretation – Any complications or unusual events during the test – Recommendations for follow-up care Common billing errors to avoid include: 1. Incorrect code selection (e.g., using 93015 when only a component was performed) 2. Lack of medical necessity documentation 3. Unbundling of services included in the global code 4. Duplicate billing for included services 5. Improper use of modifiers To ensure accurate billing and maximize reimbursement, healthcare providers should: – Implement robust coding and documentation training programs – Utilize certified coders familiar with cardiology procedures – Regularly audit billing practices – Stay updated on coding changes and payer policies While 93015 is a comprehensive code for cardiovascular stress testing, there are several related codes that healthcare providers should be familiar with: 1. 93016: Cardiovascular stress test using maximal or submaximal treadmill or bicycle exercise, continuous electrocardiographic monitoring, and/or pharmacological stress; supervision only, without interpretation and report 2. 93017: Cardiovascular stress test using maximal or submaximal treadmill or bicycle exercise, continuous electrocardiographic monitoring, and/or pharmacological stress; tracing only, without interpretation and report 3. 93018: Cardiovascular stress test using maximal or submaximal treadmill or bicycle exercise, continuous electrocardiographic monitoring, and/or pharmacological stress; interpretation and report only These codes are used when different providers perform specific components of the stress test. For example, if a technician performs the test (93017) and a cardiologist interprets the results (93018), these codes would be used instead of 93015. Another related code is CPT Code 93351: A Comprehensive Guide to Stress Echocardiogram Billing, which covers stress echocardiography with continuous ECG monitoring and report. When comparing 93015 with the stress EKG CPT code (93000 series), the main difference is that 93015 includes the stress component, while the 93000 series covers resting ECGs. Choosing the correct code is crucial for proper reimbursement and compliance. Use 93015 when: – A single provider or group performs all aspects of the stress test – The test includes exercise or pharmacological stress – Continuous ECG monitoring is performed – The provider supervises the test, interprets results, and generates a report Use individual component codes (93016, 93017, 93018) when: – Different providers perform separate parts of the test – Billing for a specific component of the test Accurate code selection ensures: 1. Proper reimbursement for services rendered 2. Compliance with billing regulations 3. Clear communication of services provided 4. Accurate medical records and data collection As we’ve explored throughout this comprehensive guide, understanding the 93015 CPT code is crucial for healthcare providers, billing specialists, and patients alike. This code represents a vital diagnostic tool in cardiovascular medicine, and its proper use ensures accurate billing, fair reimbursement, and clear communication among healthcare stakeholders. The future of cardiovascular stress testing and medical coding is likely to see continued evolution. Emerging trends include: 1. Integration of artificial intelligence in ECG interpretation 2. Increased use of pharmacological stress agents for patients unable to exercise 3. Combination of stress testing with advanced imaging techniques 4. Potential development of more specific CPT codes for newer stress test variations As the field advances, it’s essential for healthcare professionals to stay informed about changes in both medical procedures and coding practices. CPT 93016: Understanding Cardiovascular Stress Testing and Its Role in Diagnosing Heart Conditions provides additional insights into the evolving landscape of stress testing and its associated codes. For those seeking further information on CPT codes and stress testing, valuable resources include: 1. American Medical Association (AMA) CPT code books and online resources 2. American College of Cardiology guidelines and educational materials 3. Centers for Medicare & Medicaid Services (CMS) documentation 4. Professional coding organizations such as AAPC and AHIMA 5. Continuing education courses focused on cardiology coding and billing In conclusion, mastering the intricacies of the 93015 CPT code and related stress test billing practices is essential for ensuring optimal patient care, accurate reimbursement, and compliance with healthcare regulations. As the field of cardiology continues to advance, staying informed and adaptable will be key to navigating the ever-changing landscape of medical coding and billing. References: 1. American Medical Association. (2021). CPT 2022 Professional Edition. Chicago, IL: AMA Press. 2. Centers for Medicare & Medicaid Services. (2021). Medicare Claims Processing Manual. Chapter 12 – Physicians/Nonphysician Practitioners. 3. American College of Cardiology. (2020). 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Despite advances in disease prevention, coronary artery disease remains a major cause of illness and death in the United States.1,2 The costs of treating this disease and the indirect costs resulting from lost work and wages are substantial.3 The exercise stress test is a useful tool for detecting coronary artery disease and for evaluating medical therapy and cardiac rehabilitation following myocardial infarction.4,5 In addition to the standard exercise stress test, other methods of cardiovascular stress testing include scintigraphy and echocardiography (Table 1).4–9 Exercise stress scintigraphy uses a radioactive tracer to enhance abnormal areas of myocardial blood flow. Stress scintigraphy can be performed with pharmacologic agents instead of exercise if the patient's condition does not allow sufficient physical activity for performing the study. Echocardiography has recently been used in combination with exercise or pharmacologic stress testing as yet another form of noninvasive cardiac evaluation. Competence and Equipment Requirements The clinical competence to perform exercise stress testing is usually granted by staff privileges in health care institutions. The Joint Commission on Accreditation of Healthcare Organizations requires that institutions assess competence on the basis of criteria established in the medical staff bylaws. A combined specialty task force, composed of members from the American College of Cardiology (ACC), the American College of Physicians and the American Heart Association (AHA), in 1996 issued a statement on clinical competence in exercise testing.10 Equipment requirements for exercise stress testing include a bicycle ergometer or treadmill, a monitor system, a medical crash cart and a defibrillator. Equipment costs can range from $15,000 to $40,000. Personnel requirements include the examiner and one other person trained in basic cardiac life support, although someone with advanced cardiac life support skills is preferred.4,11 Sensitivity and Specificity Exercise stress testing provides a controlled environment for observing the effects of increases in the myocardial demand for oxygen; significant fixed stenoses from coronary artery disease result in electrocardiographic (ECG) evidence of ischemia.5 Particularly difficult to detect is evidence of fixed stenoses with collateral blood flow, as well as low-grade (less than 50 percent) stenoses. These abnormalities may not produce sufficient impairment of blood flow to affect the ECG. Some studies indicate that low-grade stenoses are often the source of spontaneous thrombosis, leading to the sudden development of significant stenosis, infarction and sudden death because such lesions do not have the benefit of collateral blood flow.12 An exercise stress test would not be helpful in detecting this type of lesion.13 The estimation of the pretest probability of a significant fixed stenosis should be based on the patient's age, gender, symptoms, concurrent medical conditions, medications and physical examination, as well as on the clinician's diagnostic experience with symptoms of myocardial ischemia.5 This information is helpful for determining the potential utility of an exercise stress test for a given patient.5,14 The sensitivity of exercise stress testing ranges from 23 to 100 percent, and the specificity ranges from 17 to 100 percent.5,7,10 For example, in an abnormal exercise stress test in which a man reaches a heart rate of 85 percent of the predicted maximum for his age, the sensitivity and specificity for the diagnosis of significant coronary artery disease is 65 percent and 85 percent, respectively.10,11 A more detailed discussion of sensitivity, specificity, population effect and probability analysis is available in the ACC/AHA Task Force Report on Exercise Stress Testing.7,10 Indications for the Standard Exercise Stress Test Table 27 summarizes the currently accepted indications for exercise stress testing. Consideration may be given to obtaining this test when patients present with symptoms of coronary artery disease, including the classic anginal symptoms of chest pressure or pain that occurs with or without exertion. Atypical presentations or anginal equivalents, such as shortness of breath or dyspnea on exertion, are also appropriate indications for this study.4,5,7,13 The rightsholder did not grant rights to reproduce this item in electronic media. For the missing item, see the original print version of this publication. Patients with coronary artery disease who have undergone surgical intervention or are receiving medical therapy can perform an exercise stress test when they are medically stable and symptom-free. The study can be used to assess the effectiveness of treatment. After myocardial infarction, patients may be candidates for exercise stress testing at a low level of exercise to determine functional capacity and identify any ECG changes or symptoms during exercise.15 With this information, the clinician is often able to prescribe an exercise regimen or more aggressive therapy, or to select the appropriate tests for further evaluation.16,17 Asymptomatic healthy persons may be considered as candidates for exercise stress testing if they are in high-risk occupations (e.g., pilots, firefighters, law enforcement officers, mass transit operators).7 In addition, the American College of Sports Medicine (ACSM) recommends an exercise stress test for all women 50 years of age and older and all men 40 years of age and older who plan to engage in vigorous exercise. The ACSM does not recommend exercise stress testing for asymptomatic healthy persons who are not planning vigorous exercise, regardless of the person's age.18 An exercise stress test may also be considered in asymptomatic patients who have two or more risk factors for coronary artery disease or a concurrent chronic disease, such as diabetes, that carries a high risk of coronary disease. Patients with valvular disorders (except those with hemodynamically significant aortic stenosis) may undergo an exercise stress test to evaluate their functional capacity, the effectiveness of treatment, their symptom complex or the need for surgical intervention. The history, physical examination and laboratory studies necessary to evaluate the patient's suitability for performing an exercise stress test are summarized in Table 3. In addition, the patient should receive the proper preparatory instructions for the exercise stress test as required by the hospital or the testing laboratory. Instructions usually include no food intake for six to 12 hours before the study. Patients should be told to wear loose-fitting, comfortable clothing and comfortable walking shoes. In addition, instructions about modifying the doses of any medications should be given. In addition to the presence and character of chest pain, concurrent medical conditions such as claudication, severe physical disabilities and pulmonary disease should be considered in view of their effects on the patient's ability to exercise. Such conditions may render the patient unable to perform the test. Exercise usually worsens uncontrolled hypertension, and the pretest evaluation may be terminated because of this finding.15 The patient's general activity level and pulmonary reserve and the presence of arthritic disease may influence the type of exercise test protocol selected and the duration and level of activity achieved. Many exercise protocols exist to accommodate patients who need to walk at a slower pace or advance through exercise stages at a slower rate. The patient's current medications are important. Nitrates may mask the occurrence of chest pain; beta-adrenergic blockers may blunt the heart rate response to exercise, and digoxin (Lanoxin) may produce abnormal ST-segment depression. A general physical examination with special attention to the systems listed in Table 3 usually is adequate for the pretest evaluation. Cardiac examination should include an assessment for the presence of murmurs and valvular disease. Severe valvular dysfunction, especially aortic stenosis, is an absolute contraindication to exercise stress testing.4,7 Gallop rhythms are noteworthy because the presence of an S3 may indicate significant congestive heart failure, a contraindication if it is clinically severe. While the development of an S4 during exercise may indicate significant cardiac ischemia, detection of it during a physical examination does not signify ischemia and is not grounds for not performing an exercise stress test.7 A thorough pulmonary examination is helpful in detecting signs of severe pulmonary disease or congestive heart failure disorders that may not be obvious from the patient's history. Pulmonary pathology may render the patient unable to walk on a treadmill or use the exercise equipment. An assessment of the vascular system should include palpation of the carotid and peripheral pulses, as well as evaluation for the presence of bruits over the abdominal aorta and other larger vessels. Because claudication of the lower extremities or transient ischemic attack–type symptoms can occur during exercise, another type of stress testing that does not require exercise should be considered if the physical examination suggests that these problems are clinically significant.7 Assessment of the musculoskeletal system includes evaluation of the patient's ability to walk at a moderate to fast pace without significant gait disturbances. The hips, shoulders, arms and legs should allow relatively full mobility and support during exercise. Screening laboratory studies are obtained to diagnose subclinical disease that may be present. Exercise stress testing should not be performed in patients with symptoms of anemia or severe hepatic, renal or metabolic disorders. A resting ECG is an essential part of the pretest evaluation. The patient should have a resting ECG that is free of the abnormalities listed in Table 4. While the presence of any of these ECG changes is not an absolute contraindication to exercise stress testing, they may interfere with the validity of the test by altering the ECG changes that are consistent with ischemia during exercise. Most authorities suggest an imaging study in addition to exercise stress testing as a part of the cardiac evaluation in most patients with these changes on the baseline ECG.19 It should be noted, however, that in these persons, an exercise stress test could potentially be used to evaluate functional capacity, blood pressure response or other clinically determined parameters. Potential Contraindications to Exercise Stress Testing ABSOLUTE CONTRAINDICATIONS Table 5 lists the absolute contraindications to exercise stress testing. Exercise stress testing may worsen the patient's condition or place the patient at increased risk of cardiac instability or injury in the setting of acute myocardial infarction, unstable angina, acute cardiac inflammation, severe congestive heart failure, uncontrolled sustained ventricular arrhythmias, symptomatic supraventricular arrhythmia, high-grade block, hemodynamically significant aortic stenosis or severe hypertension. Patients with such conditions usually require immediate medical or surgical intervention as clinically indicated but may be reassessed as candidates for exercise stress testing when the acute problems are resolved. The remaining contraindications listed in Table 5 render the patient physically unable to perform an exercise stress test.4,7,13 RELATIVE CONTRAINDICATIONS Relative contraindications to exercise stress testing are listed in Table 6. While patients with these conditions may undergo a standard exercise stress test, they require special consideration because the presence of these conditions may invalidate the test results. In most cases, medications should not be withheld in preparation for an exercise stress test.4,7,11 Patients can be instructed to take their medications before an exercise stress test, with the exception of insulin and oral hypoglycemic agents. Depending on how stable the patient's diabetic condition is, all of the dose of insulin or the hypoglycemic agent or one half of the dose should be withheld before the test. Digoxin may depress the ST-segments. If ST-segment depression of 1 mm or more is present on the baseline ECG, use of ECG criteria for exercise-induced ischemia during exercise will be difficult. Type I antiarrhythmic agents and tricyclic antidepressants are proarrhythmogenic. For example, if at baseline a patient receiving any one of these medications has significant ectopy, the patient is at increased risk of hemodynamically significant arrhythmias with exercise and should not undergo exercise stress testing.7 The antihypertensive effect of beta blockers, alpha blockers and nitroglycerin may cause significant hypotension during exercise. In general, orthostatic blood pressure assessment and a careful history will identify most patients susceptible to such a response. Beta blockers may also blunt the heart rate during exercise. While patients receiving beta blockers may perform the exercise required for the test, the usual age-adjusted target heart rate may not be a realistic end point for them. Most electrolyte and endocrinologic abnormalities can affect the heart rate and ST-segment and T-wave changes on a resting ECG, and they may affect the patient's ability to exercise as well.20 Vasoregulatory problems from central and peripheral autonomic neuropathy associated with disorders such as diabetes, Parkinson's disease and Shy-Drager's syndrome may cause profound vasodilation and hypotension during exercise. The pretest evaluation should alert the clinician to the presence of this tendency, and exercise stress testing should not be performed if such a response to exercise seems significant.4 Patients who have a history of tachyarrhythmias may be considered candidates for exercise stress testing, but those with easily reproduced tachycardia during exercise or other heavy physical activity are not candidates for exercise stress testing. Such a problem may be found in patients with mitral valve prolapse syndrome, Wolff-Parkinson-White syndrome and episodic or periodic supraventricular tachycardia. The occurrence of a tachyarrhythmia during exercise stress testing could cause syncope or, at a minimum, produce an inconclusive result. Understanding the Results Most exercise stress tests are interpreted in a standard format that includes an interpretation (or comment) section and a conclusion section.21 Table 7 summarizes the currently accepted interpretation and conclusion categories and their subsections. Each section may not be described in every report because some of them may not be relevant or particularly useful in every clinical circumstance. An interpretation of the baseline ECG is included in the report, noting any abnormalities and changes that occurred with changes in position (standing, lying or sitting). Symptoms occurring during the exercise stress test are usually reported as well. Most commonly, these comments are described as “fatigue,” “legs tired,” “chest pain/pressure,” “shortness of breath,” etc. If these symptoms were severe, they may have been the reason for discontinuing the test. Other reasons cited for stopping the test may be “target heart rate achieved,” “exercise stopped per patient's request,”“equipment malfunction” or “ECG findings or criteria were met.” Also usually described are the duration of the exercise period and the workload in METS (metabolic equivalents, or resting oxygen consumption of about 3.5 mL per kg per minute).22 The interpreter may also add subjective comments about the patient's exercise capacity; for example, the report may state “poor exercise tolerance (3 to 4 METS)” or “good exercise tolerance (10 to 11 METS).” The cardiorespiratory fitness levels established by the ACSM can serve as general guidelines.18 Increases or decreases in blood pressure during exercise and rest are also noted. Hypotension, defined as a drop of more than 10 mm Hg in the systolic blood pressure during exercise, may signify severe cardiac ischemia.15 Opinions vary as to the definition of a hypertensive response to exercise, but most authorities accept as a maximal limit a systolic pressure of 230 mm Hg. The diastolic blood pressure during exercise usually varies 10 mm Hg in either direction. A 10 mm Hg decrease in the diastolic blood pressure during the postexercise period is not unusual and is considered physiologic.21,22 While the presence of arrhythmias may or may not carry clinical significance, their frequency, type and appearance or disappearance with exercise and rest are also noted. The final category of information provided in the report is the ECG response during exercise and recovery. Findings usually include the presence and location of ST-segment changes, P-wave, T-wave and U-wave changes, and the appearance of conduction abnormalities during the exercise and recovery periods.15,23 Positive Results. Figure 1 shows the ECG findings suggestive of myocardial ischemia; Table 8 lists the clinical findings suggestive of a positive test. An exercise stress test positive for myocardial ischemia may be further qualified with the terms “probably” and “strongly.” For example, hypotension (a drop of more than 10 mm Hg in systolic pressure) or large (more than 2 to 3 mm) ST-segment depressions, either alone or in combination, are strongly positive test results. The presence of these abnormalities leaves little clinical doubt that significant coronary artery disease exists.4 The appearance during exercise of an S3, S4 or murmur indicates cardiac muscle dysfunction and therefore ischemia.4 The interpreter may also comment on the recovery or return to baseline of these findings as well as any interventions needed to bring about this change. Negative Results. A negative test result is simply the lack of any of the above-mentioned findings. Some normal physiologic and ECG changes may occur during exercise (Table 9). Equivocal, or Inconclusive, Findings. Equivocal exercise stress test results are summarized in Table 10. These ECG changes are not diagnostic of ischemia.21 Alterations in the P-wave and T-wave morphology and changes in atrioventricular conduction with exercise are considered nondiagnostic if the changes revert to baseline in the rest period. The appearance of unifocal, premature atrial contractions or premature ventricular contractions (fewer than five per minute) is not a specific indicator for coronary artery disease.23 The development of intraventricular blocks, such as right bundle branch block, left bundle branch block and hemiblocks, is a nondiagnostic finding. An intraventricular block may also obscure ischemic changes and hinder further interpretation of the ECG. As with all inconclusive results, additional testing is needed. In most cases, an imaging study, exercise scintigraphy or echocardiography is needed to document ischemia. Uninterpretable Results. In addition to equipment failure, other causes of uninterpretable test results include the patient's or operator's inability to complete the test before any goals are met. Further diagnostic studies should be planned, and any information that could have contributed to this result should be included in the report. For example, the patient may have appeared on physical examination to be a good exercise candidate but was unable or unwilling to comply with the requirements of the exercise stress test. In this case, the reason for noncompliance can help the clinician choose another examination that would be more appropriate for the patient. Maximal and Submaximal Exercise Stress Test. A maximal exercise stress test is one that achieves the target heart rate, exercise level or time limit established for the patient. In most cases, the goal is the target heart rate, as calculated with the following formula: (220 − patient's age) × 0.85 beats per minute. An exercise stress test that does not meet the expected goal is called a submaximal study.6,18 If the stress test is submaximal because of decreased exercise capacity or noncardiac symptoms, consideration should be given to obtaining radionuclide scintigraphy or echocardiographic studies that do not include exercise as a component of the evaluation.5,20,24 Page 2 Adverse reactions to foods may be toxic or nontoxic.1 Toxic reactions are not related to individual sensitivity but occur in anyone who ingests a sufficient quantity of tainted food. Examples of toxic reactions include reactions to histamine in scombroid fish poisoning or to bacterial toxins in food poisoning. In contrast, non-toxic adverse reactions to food depend on individual susceptibility and are either non–immune-mediated—i.e., food intolerance (Table 1), or immune-mediated—i.e., food allergy. This article focuses on the clinical manifestations of food allergy. Allergic reactions to food are either IgE-mediated or non–IgE-mediated (Table 2). The role of IgE-mediated reactions in food allergy is well established. Persons who are genetically predisposed to atopy produce specific IgE antibodies to certain proteins to which they are exposed.2 These antibodies bind to mast cells and other cells in body tissues and to basophils circulating in the blood stream. When a food protein is ingested, the IgE recognizes it on the surface of these cells; mediators (e.g., histamine) are released, and symptoms occur. The symptoms of IgE-mediated reactions typically involve the skin, respiratory system and gastrointestinal tract.3 The pathogenesis of non–IgE-mediated reactions in food allergy is not as clearly defined, but T cells and macrophages most likely play a role. Illnesses caused by these non–IgE-mediated immunologic responses to food affect the same organ systems that the IgE-mediated forms affect. The skin is a common target organ for allergic responses to food. Acute urticaria is characterized by pruritic, transient, erythematous raised lesions, sometimes accompanied by localized swelling (angioedema). Food allergy accounts for up to 20 percent of cases of acute urticaria4 and is mediated by IgE specific to food protein. Lesions usually occur within one hour after ingestion of or contact with the causal food. Because only 1.4 percent of cases of chronic or persistent urticaria (i.e., lasting more than six weeks) are caused by food allergy,5 a search for a causative food in the initial evaluation of this condition is not generally warranted. Atopic dermatitis usually begins in early infancy and is characterized by a typical distribution (face, scalp and extremities), extreme pruritus and a chronic and relapsing course. This inflammatory skin condition is frequently associated with allergic disorders (e.g., asthma and allergic rhinitis) and with a family history of allergy.6 Evidence suggests that IgE-mediated food allergy plays a pathogenic role in atopic dermatitis, particularly in children,6 although non–IgE-mediated food allergy has also been implicated.7 Clinical studies using double-blind, placebo-controlled food challenges have shown that 37 percent of children with moderate atopic dermatitis have food allergy.8 By contrast, 6 to 8 percent of infants and children in the general population are allergic to some type of food.9 Dermatitis herpetiformis is a chronic papulovesicular skin disorder in which lesions are distributed over the extensor surfaces of the elbows, knees and buttocks.10 The disorder is associated with a specific non–IgE-mediated immune sensitivity to gluten (a protein found in wheat, barley, oat and rye). Although dermatitis herpetiformis is related to celiac disease, patients often appear to have no associated gastrointestinal problems. The rash abates with the elimination of gluten from the diet. The gastrointestinal tract is another common target organ for IgE-mediated reactions to foods. Symptoms of gastrointestinal “anaphylaxis” occur shortly after the ingestion of an implicated food and include nausea, vomiting, abdominal pain and diarrhea. The oral allergy syndrome is characterized by pruritus and edema of the oral mucosa occurring after the ingestion of certain fresh fruits and vegetables.11 The symptoms rarely progress beyond the mouth. The reaction occurs primarily in patients with allergic sensitivity to pollens and is caused by IgE antibodies directed toward cross-reacting proteins found in pollens, fruits and vegetables.11 Patients with birch-pollen hay fever may have symptoms of oral allergy syndrome after ingesting hazelnut, apple, carrot and celery, whereas patients with IgE sensitivity to ragweed pollen may react to melons (e.g., water-melon or cantaloupe) and banana. Interestingly, patients are usually able to ingest cooked forms of the foods without symptoms because the responsible allergens are destroyed in the heating process. It is crucial to differentiate the symptoms of oral allergy syndrome from the early symptoms of a systemic reaction to food. A number of immunologic reactions to food proteins are not mediated by IgE. Celiac disease presents over a period of months with steatorrhea, flatulence and weight loss. Hypersensitivity to gluten causes the disease, and the characteristic diagnostic feature is extensive flattening of villi in a biopsy specimen taken from the jejunal mucosa. ALLERGIC EOSINOPHILIC GASTROENTERITIS Although allergic eosinophilic gastroenteritis is an IgE-mediated disease in some patients, about one half of patients do not exhibit specific IgE antibody to foods. Patients with allergic eosinophilic gastroenteritis have severe reflux, postprandial abdominal pain, vomiting, early satiety and diarrhea. The diagnosis is suggested by the presence of inflammation and significant eosinophilic infiltration of the esophagus, stomach or small intestine. Treatment with a strict avoidance diet using an elemental formula is efficacious in some patients.12 The symptoms of infantile proctocolitis are limited to the lower gastrointestinal tract and are of short duration. The ingestion of the responsible food (usually cow's-milk protein or breast milk from mothers who are consuming cow's milk) provokes diarrhea with blood in the stool, but anemia rarely occurs. FOOD PROTEIN–INDUCED ENTEROCOLITIS AND ENTEROPATHY Patients with enterocolitis induced by food protein are often diagnosed in infancy and present with profuse vomiting and diarrhea. When severe, these symptoms may lead to lethargy, dehydration and hypotension (often mimicking bacterial sepsis). The symptoms may be complicated by acidosis. The enterocolitis resolves with elimination of the responsible protein, most often cow's milk or soy.13,14 Patients may also have more indolent food protein–induced gastrointestinal symptoms that are induced by milk, soy, egg, wheat, rice, chicken or fish. These patients, classified as having food protein–induced enteropathy, do not typically experience colitis, and they have a lower incidence of emesis (30 percent) than patients with enterocolitis (90 percent).15 The role of IgE-mediated or non–IgE-mediated food protein sensitivity in cases of infantile colic16 and inflammatory bowel disease17 remains controversial. Although failure to thrive in infants may be associated with malabsorption resulting from food allergy, a restrictive diet imposed by the family can also result in poor growth. This factitious food allergy was diagnosed in 5 percent of children with failure to thrive who were referred to an academic allergy program.18 The upper respiratory tract can be a target of IgE-mediated food allergy. Symptoms may include nasal congestion, rhinorrhea, sneezing and pruritus. The prevalence of food-induced allergic rhinitis, even among patients referred to allergy clinics, appears to be less than 1 percent, although 25 to 80 percent of patients with documented IgE-mediated food allergy have nasal symptoms during oral food challenges.19 Gustatory rhinitis is rhinorrhea caused by spicy foods. This is not an immunologic reaction; it is mediated by neurologic mechanisms.20 Food-induced asthma is an IgE-mediated illness that may result from the ingestion of a causative food or from the inhalation of vapors released during cooking or in occupational settings. The prevalence of food-related asthma in the general population is unknown, but this illness has been found to occur in 5.7 percent of children with asthma, 11 percent of children with atopic dermatitis and 24 percent of children with a history of food-induced wheezing.21 The prevalence of food-induced wheezing in adults with asthma is less than 2 percent.22 An example of a non–IgE-mediated adverse pulmonary response to food is Heiner syndrome. This uncommon syndrome of infancy is characterized by an immune reaction to cow's-milk proteins with precipitating antibody (IgG) to cow's-milk protein resulting in pulmonary infiltrates, pulmonary hemosiderosis, anemia, recurrent pneumonia and failure to thrive. Anaphylaxis refers to a dramatic multiorgan reaction associated with IgE-mediated hypersensitivity. Fatal food-related anaphylaxis appears to be more common in patients with underlying asthma.23 Patients who experienced fatal or nearly fatal food-induced anaphylaxis were unaware that they had ingested the incriminated food, had almost immediate symptoms and experienced a delay in receiving adrenaline therapy. In about one half of the patients, a period of quiescence preceded the respiratory decompensation. The foods most often responsible for food-induced anaphylaxis are peanuts, tree nuts (walnut, almond, pecan, cashew, hazel nut, Brazil nut, etc.) and shellfish.23 Food-associated, exercise-induced anaphylaxis occurs in two forms.24 Anaphylaxis may occur when exercise follows the ingestion of a particular food to which IgE-mediated sensitivity is usually demonstrable (e.g., celery) or, less commonly, may occur after the ingestion of any food. Ingestion of the incriminated food with exercise or exercise without ingestion of the food does not result in symptoms. Controversies and Food Allergies The relationship of food allergy to a number of clinical entities remains controversial. Food allergy may play a role in a minority of patients with migraine headaches,25 although the pharmacologic activity of chemicals found in some foods (i.e., tyramine in cheeses) is more often responsible. The role of food allergy in childhood behavior disorders is also controversial. A small subset of children with behavior disorders may be affected by food dyes, but no convincing evidence shows that food allergy plays a direct role in these disorders.26 Unfortunately, unreliable information in the lay press and the use of unconventional and unproven methods, such as “provocation-neutralization,”27 for diagnosing and treating behavior disorders can divert the patient's family from more useful treatments. On the other hand, in children with behavior disorder who also have bona fide allergies, treatment to relieve the symptoms of asthma, atopic dermatitis and hay fever should be pursued. An evaluation is warranted in patients who have the common clinical manifestations of food allergy. The initial evaluation, beginning with a thorough history and physical examination, must consider a broad differential diagnosis, including metabolic disorders, anatomic abnormalities, malignancy, pancreatic insufficiency, nonimmunologic adverse reactions to foods and many other disorders that could lead to similar symptoms. Allergic reactions to substances other than foods (e.g., animal dander, molds, dust) must also be considered. Once food allergy is identified as a likely cause of symptoms, confirmation of the diagnosis and identification of the implicated food(s) can proceed. In patients with acute reactions such as acute urticaria or anaphylaxis, the history may clearly implicate a particular food. In patients with chronic disorders such as atopic dermatitis or asthma, it is more difficult to pinpoint causal food(s). Virtually any food protein can cause a reaction; however, only a small number of foods account for more than 90 percent of adverse food reactions, and most patients are sensitive to fewer than three foods.3,28 In children, the most common foods causing reactions are egg, milk, peanuts, soy, wheat, tree nuts and fish.3,28 Adults most often react to peanuts, tree nuts, fish and shellfish.29 PRICK-PUNCTURE SKIN TESTING In the evaluation of IgE-mediated food allergy, specific tests can help to identify or exclude responsible foods. One method of determining the presence of specific IgE antibody is prick-puncture skin testing. While the patient is not taking antihistamines, a device such as a bifurcated needle or a lancet is used to puncture the skin through glycerinated extract of a food and also through appropriate positive (histamine) and negative (saline-glycerin) control substances. A local wheal-and-flare response indicates the presence of food-specific IgE antibody, with a wheal diameter of more than 3 mm indicating a positive response. Prick skin tests are most valuable when they are negative because the negative predictive value of these tests is very high (over 95 percent).30,31 Unfortunately, the positive predictive value is on the order of only 50 percent.30,31 Thus, a positive skin test in isolation cannot be considered proof of clinically relevant hypersensitivity, whereas a negative test virtually rules out IgE-mediated food allergy to the food in question. Intradermal allergy skin tests with food extracts give an unacceptably high false-positive rate and therefore should not be used.31 The protein in commercial extracts of some fruits and vegetables is prone to degradation, so fresh extracts of these foods are more reliable.32 In vitro tests for specific IgE (radioaller-gosorbent tests [RAST]) are more practical than prick skin tests for food allergy screening in the primary care office setting. As with skin tests, a negative result on RAST testing is very reliable in ruling out an IgE-mediated reaction to a particular food, but a positive result has a low positive predictive value. In vitro tests for IgE are generally less sensitive than skin tests; however, when highly sensitive assays are used, the levels of food-specific IgE antibody correlate with clinical reactivity to certain foods (e.g., milk, egg, peanuts, fish).33 Because most patients with food allergy are sensitive to only a few foods3,28 and a small number of foods are responsible for most reactions,3,28 it is usually inappropriate to test for allergies to an extensive number of foods. In the context of a detailed history, selective testing is more likely to reveal causal foods. Measurement of immunoglobulin G4 (IgG4) antibody, provocation-neutralization, cytotoxicity, applied kinesiology and other unproved methods are not useful.34 When patients have a history suggestive of food-related illness and tests for IgE antibody to the food are positive, the first course of action is to eliminate the food from the diet. Further testing is usually not needed in patients with severe, acute reactions. However, if symptoms are chronic (atopic dermatitis, asthma) and/or many foods are implicated, diagnostic oral food challenges may be necessary. Double-blind, placebo-controlled food challenges are considered the gold standard for diagnosing food allergy.3,30,35 The procedure is labor intensive but can be modified for an office setting.35 Patients avoid the suspected food(s) for at least two weeks, antihistamine therapy is discontinued according to the elimination half-life of the specific medication, and doses of asthma medications are reduced as much as possible. After intravenous access is obtained, graded doses of either a challenge food or a placebo food are administered. The food is hidden either in another food or in opaque capsules. Medical supervision and immediate access to emergency medications, including epinephrine, antihistamines, steroids and inhaled beta agonists, and equipment for cardiopulmonary resuscitation are required because reactions can be severe. During the challenge, patients are assessed frequently for changes in the skin, gastrointestinal tract and respiratory system. Challenges are terminated when a reaction becomes apparent, and emergency medications are given as needed. Patients are also observed for delayed reactions. If allergy to only a few foods is suspected, single-blind or open challenges may be used to screen for reactivity. Negative challenges are always confirmed with open feeding of a larger, meal-sized portion of the food. Oral challenges should usually not be performed in patients with a clear history of reactivity or a severe reaction. A general approach to the diagnosis of food allergy is shown in Table 3. CHALLENGES IN NON–IGE-MEDIATED ALLERGY It is more difficult to diagnose non–IgE-mediated reactions (e.g., allergic eosinophilic gastroenteritis, enterocolitis) and to pinpoint specific causative foods because no specific laboratory tests are used to identify these illnesses. In some situations (e.g., allergic eosinophilic gastroenteritis), a biopsy may be required to establish the diagnosis. Elimination diets with gradual reintroduction of foods and supervised oral food challenges are often necessary to identify the causal foods. Care must be taken because symptoms from, for example, enterocolitis syndrome, can be severe and even shock can ensue.13 Another diagnostic difficulty occurs when food additives (coloring and flavoring agents and preservatives) are implicated in reactions. Certain additives have been documented to cause the same types of reactions as those caused by IgE-mediated responses (i.e., asthma, urticaria, atopic dermatitis) but with a much lower prevalence.36,37 Because these reactions generally are not mediated by IgE, diagnosis requires trials of food elimination and oral challenge tests. In addition to medical management of the manifestations of food allergy (e.g., topical therapy for atopic dermatitis, inhaled medication for asthma), food allergy is treated by dietary elimination of the offending food(s). Immunotherapy (“allergy shots”) has not proved practical,38 except when pollens are responsible for the symptoms of oral allergy syndrome.39 The elimination of food proteins is a difficult task. In a milk-free diet, for example, patients must be instructed not only to avoid all obvious milk products but also to read food product ingredient labels for key words that may indicate the presence of cow's-milk protein, including “casein,” “whey,” “lactalbumin,” “caramel color” and “nougat.” When vague terms such as “high protein flavor” or “natural flavorings” are used, it may be necessary to call the manufacturer to determine if the offending protein, such as milk protein, is an ingredient. Patients and parents must also be made aware that the food protein, as opposed to sugar or fat, is the ingredient being eliminated. For example, lactose-free milk contains cow's milk-protein, and many egg substitutes contain chicken-egg proteins. Conversely, peanut oil and soy oil generally do not contain the food protein unless the processing method is one in which the protein is not completely eliminated (as with cold-pressed or “extruded” oil). Elimination of a particular food can be tricky. For example, a spatula used to serve cookies both with and without peanut butter can contaminate the peanut-free cookie with enough protein to cause a reaction. Similarly, contamination can occur when chocolate candies without peanuts are processed on the same equipment used for making peanut-containing candy. Hidden ingredients can also cause a problem. For example, egg white may be used to glaze pretzels, or peanut butter may be used to seal the ends of egg rolls. The Food Allergy Network (telephone: 1-800-929-4040) is a lay organization that provides educational materials to assist families, physicians and schools in the difficult task of eliminating allergenic foods and in approaching the treatment of accidental ingestions. When multiple foods are eliminated from the diet, it is prudent to enlist the aid of a dietitian in formulating a nutritionally balanced diet. In addition to eliminating the offending food, an emergency plan must be in place for the treatment of reactions caused by accidental ingestion (Figure 1). Injectable epinephrine and an oral antihistamine should always be readily available to treat patients at risk for severe reactions. Prompt administration of epinephrine at the first signs of a severe reaction must be emphasized because delayed administration has reportedly been associated with fatal and near-fatal food allergic reactions.23 Caregivers must be taught the indications for the use and administration of epinephrine and antihistamine medications. Fortunately, young children often lose their sensitivity to most of the common allergenic foods (egg, milk, wheat, soy) in a few years, particularly with avoidance of the foods.40 However, positive skin tests may persist despite the development of clinical tolerance. Serial diagnostic food challenges over time are often helpful in managing these food-allergic children. Unfortunately, sensitivity to certain foods, such as peanuts, tree nuts, fish and shellfish, is rarely lost, and sensitivity persists into adulthood. Page 3 Many of the things we think we know about food allergy are really just myths—stories that are commonly known but aren't based on science. This handout will help you learn the facts about food allergies. Myth Number 1: Food allergy is very common Fact: Although 25 percent of people think they're allergic to certain foods, studies show that about only 6 percent of children and 1 to 2 percent of adults have a food allergy. Myth Number 2: Most people with food allergies are allergic to strawberries and tomatoes Fact: Babies and young children are most often allergic to milk, eggs, wheat, soybean products and peanuts. Older children and adults are most often allergic to peanuts, tree nuts (like walnuts, almonds and cashews), fish and shellfish. Myth Number 3: Some people are allergic to sugar Fact: A condition is called a food allergy when the immune system (the part of the body that fights infections) thinks a certain protein in a food is a “foreign” agent and fights against it. This doesn't happen with sugars and fats. Myth Number 4: Milk allergy is very common and causes diarrhea in adults Fact: Many adults have trouble digesting the sugar in milk. This is called “lactose intolerance.” It isn't a true allergy. Myth Number 5: People with food allergies are allergic to many foods Fact: Most people with food allergies are allergic to less than four foods. Myth Number 6: Food allergy makes people hyperactive Fact: The most common “sudden” symptoms of food allergy are hives (large “bumps” on the skin), swelling, itchy skin, itchiness or tingling in the mouth, or a metallic taste, coughing, trouble breathing or wheezing, throat tightness, diarrhea and vomiting. There may also be a feeling of “impending doom”—a feeling that something bad is going to happen, pale skin because of low blood pressure, or loss of consciousness (fainting). The most common chronic illnesses associated with food allergies are eczema and asthma. Myth Number 7: Allergy to food dye is common Fact: Bad reactions to food dyes are rare. They may occur in less than one of 100 children and in less than one of 500 adults. Myth Number 8: Food allergy is lifelong—or is always outgrown Fact: Allergies to milk, eggs, soybean products and wheat are usually “outgrown.” However, allergies to

peanuts, tree nuts, fish and shellfish are rarely outgrown. Once a true food allergy is diagnosed, it may be very hard to avoid the food causing it. If you have an allergy, you must read the labels on all the prepared foods you eat. Your doctor can help you learn how to avoid eating the wrong foods. Myth Number 9: Food allergy is not dangerous Fact: Food allergy can be fatal if it causes a reaction called “anaphylaxis” (say: anna-phil-ax-iss). This reaction makes it hard for a person to breathe. Fast treatment with a medicine called epinephrine (say: epp-in-eff-rin) can save your life. If you have an allergy, your doctor might give you a prescription for epinephrine in small, pre-filled syringes. Your doctor can show you how to use them and tell you when to use them. If your doctor thinks you might need to use this medicine, you'll need to carry a syringe with you at all times. A person having an allergic reaction should be taken by ambulance to a hospital emergency room, because the symptoms might start again even after epinephrine is given. They might start again hours later. If your child has food allergies, you can give the school and other caretakers instructions that list the foods to be avoided and tell what to do if the food is eaten accidentally. The Food Allergy Network can send you a newsletter, information on food allergies for families and schools, updates on commercial foods that might be contaminated with unwanted food proteins, and other information about food allergy. Telephone: 1-800-929-4040Web site: Page 4 Frenotomy Can Be Performed Safely in Outpatient Settings (50th Annual Scientific Assembly of the American Academy of Family Physicians) A case report of an infant born with ankyloglossia indicates that a frenotomy can be performed safely and effectively in an outpatient setting with excellent results in infants born with ankyloglossia characterized by poor feeding and an inability to extend the tongue. In the illustrative case, a newborn male infant weighing 3,465 gm (7 lb 10 oz) was having difficulty with feeding. At discharge, the infant had lost 9 percent of his birth weight. The parents and a lactation nurse identified the infant as a “noisy” feeder with poor breast- and bottle-latch ability and a tight lingual frenulum. By day four, the infant had lost more weight. Physical examination showed an indentation of the tip of the tongue and a tight lingual frenulum. A frenotomy was performed in an outpatient clinic, and the procedure improved tongue movement. At two weeks of age, the infant was feeding normally and weighed 3,978 gm (8 lb 12 oz). The investigator believes that the clinical presentation of the illustrative case will alert family physicians to examine newborns for tight lingual frenulums that may result in poor feeding or failure-to-thrive. The most common clinical presentations of an infant with ankyloglossia include a history of failure to regain birth weight by the two-week check-up, a noisy eater, damage to the mother's nipples and poor latching ability. Physical findings include notching of the tongue tip, inability to see the tongue touching the top of the maxillary ridge, restriction of lateral movement or inability to protrude the tongue past the lower gum.—richard w. emerine, m.d., m.p.h., Family Practice Residency, Naval Hospital, Camp Pendleton, Calif. Time for Newborn's Withdrawal from Methadone Can Be Decreased (American Academy of Family Physicians) Infants with neonatal abstinence syndrome secondary to maternal methadone treatment during pregnancy for opiate addiction must have withdrawal treatment which often results in a lengthy hospital stay. Results of a retrospective case study to determine if there are modifiable factors that influence the length of hospital stay of such infants indicate that receiving doses of neonatal opiate solution every three to four hours instead of every six hours may shorten hospital stays for the infants. Forty-one infants born between January 1991 and December 1996 to mothers who were receiving methadone treatment for opiate addiction at time of delivery were included in the study. The factors that were analyzed to see if they were associated with a longer hospital stay were maternal methadone dose, Finnegan score at initiation of therapy, number of Finnegan scores over 8 prior to initiation of therapy, day of life when therapy was initiated, initial dose of neonatal opiate solution and peak dose of neonatal opiate solution. Peak dose of neonatal opiate solution and dosing interval were found to be significantly related to length of hospital stay. The investigator believes that more frequent dosing of neonatal opiate solution may shorten hospital stays for these infants.—heidi chumley, m.d., San Antonio, Texas. Use of Budesonide Nebulizing Suspension in Children Is Effective (American Academy of Family Physicians) Budesonide nebulizing suspension administered in any one of four different dosing regimens (0.25 mg once daily, 0.25 mg twice daily, 0.5 mg twice daily and 1.0 mg once daily) is an effective and well-tolerated treatment for young children ages six months to eight years who have persistent asthma, according to results of a multicenter, randomized double-blind, placebo controlled trial. The study included 481 children who had a diagnosis of persistent asthma. The children were randomized to receive one of the four treatment regimens or a placebo. A total of 471 children were evaluated for efficacy of budesonide. The primary efficacy variables that were evaluated were mean changes from baseline in nighttime and daytime asthma symptom scores over a 12-week treatment period. A total of 480 children were evaluated for safety of budesonide. The safety variables that were assessed included reported adverse events; morning basal and post-adrenocorticotropic hormone-stimulation effects on plasma cortisol levels in a subset of patients; and changes in physical examinations, vital signs and clinical laboratory results. All four groups of subjects receiving budesonide treatment showed improvements in nighttime and daytime symptoms and morning peek expiratory flow, compared with the children who received placebo. The subjects in all four treatment groups showed statistically significant reductions from baseline in the number of days a breakthrough medication was needed. There were no clinically significant differences noted in the evaluation of safety variables in the children who received treatment, compared with the children who received placebo.—martha v. white, m.d., et al., Institute for Asthma and Allergy at Washington Hospital Center, Washington, D.C. Simulator Training Improves Performance of Flexible Sigmoidoscopy (American Academy of Family Physicians) Training on a virtual reality simulator for flexible sigmoidoscopy improves the performance of family physician residents on subsequent flexible sigmoidoscopies in patients, according to a prospective randomized study in which 10 residents who had no experience in performing flexible sigmoidoscopies were randomized to either a control or experimental group. The residents in the experimental group were trained on a virtual reality sigmoidoscopy simulator prior to the performance of sigmoidoscopy on a patient. The residents in the control group received no training. After both groups of residents performed their first patient sigmoidoscopies, the control group and the experimental group both received training on the simulator to evaluate pre- and post-simulator training effects on performance and for comparison between the groups at different levels of simulator training. After six to 10 hours of training on the simulator, the experimental group had faster insertion times to 30 cm, to 40 cm and a shorter mean length of examination, compared with the control group prior to any simulator training for the control group. A significant improvement was also noted in hand-eye skill measures of the residents in the experimental group in directional errors, percent of colon visualized and viewing quality of examination, compared with the initial performance of the control group on patients. Residents in the control group also had significant improvement in performance times after training on the simulator following their first real patient examinations.—michael tuggy, m.d., Seattle, Washington. Page 5 Standard treatment for seasonal allergic rhinitis consists of either an inhaled corticosteroid or a second-generation nonsedating antihistamine. Ratner and colleagues conducted a double-blind, placebo-controlled trial to evaluate whether concurrent administration of these medications provides any added benefit compared with monotherapy. Patients who were at least 12 years old were included in the study if they had a positive skin-test reaction to mountain cedar, had the nasal mucosal appearance typical of seasonal allergic rhinitis and had a history of moderate to severe symptoms. Patients who had recently received antihistamines, corticosteroids or nasal decongestants were excluded from participation. Study subjects began a one-week to one-month run-in period and recorded their symptoms daily for the duration of the study. Patients were randomly assigned to receive one of four regimens: (1) two daily 50-µg sprays per nostril of fluticasone propionate aqueous nasal spray plus a placebo capsule; (2) a 10-mg loratadine capsule plus placebo nasal spray; (3) both treatment medications; or (4) a placebo spray and a placebo capsule. Use of other medications that could affect rhinitis symptoms was not permitted. Nasal symptoms and adverse events were recorded throughout the study, and each patient was examined for the development of nasal or oropharyngeal candidiasis. The patients also completed a disease-specific quality-of-life questionnaire. A total of 569 patients completed the study. By the seventh day, the physicians rated nasal symptoms in the fluticasone nasal spray groups as significantly better than symptoms in the other groups. At 14 days, the treatment groups continued to have fewer symptoms than the placebo group. Symptoms were most improved in the groups taking fluticasone. The patients in the combination therapy group rated their nasal symptoms (specifically, nasal blockage, nasal discharge and sneezing) most improved. The fluticasone and fluticasone-loratadine treatment regimens were more effective than the loratadine monotherapy regimen. Adverse effects were rare. The authors conclude that patients with seasonal allergic rhinitis may be treated effectively with a 200-µg daily dosage of fluticasone propionate aqueous nasal spray. The addition of loratadine does not significantly benefit these patients.