16. PREVENTIVE CARE

Eve A. Kerr, M.D., M.P.H., Lisa Schmidt, M.P.H., Deidre Gifford, M.D.,
and Steven Asch, M.D., M.P.H.

Many observers believe that much of medicine’s contribution to this century’s overall increase in life expectancy is due to office-based preventive services. Clinical preventive services have also contributed to a reduction in the prevalence of many diseases that once devastated adult women. Cervical cancer mortality has declined 73 percent since 1950 in part due to the institution of regular Papanicolaou testing to detect cervical dysplasia (U.S. Preventive Services Task Force [USPSTF], 1989). Similarly, age-adjusted mortality for strokes has declined by more than half in part due to early detection and treatment of hypertension (USPSTF, 1989).

Despite these sound clinical reasons for emphasizing prevention in medicine, studies have shown that physicians often fail to provide recommended clinical preventive services (USPSTF, 1989). Explanations cited include lack of time, no reimbursement, and confusion as to which preventive services are recommended or efficacious in reducing morbidity and mortality (USPSTF, 1989). Although physician visits for preventive care services constitute a large proportion of overall physician visits, data from the 1993 National Health Interview Survey (NHIS) indicate that only 63 percent of individuals 18 to 64 years of age were asked at least one screening question (diet, physical activity, alcohol or drug use, history of sexually transmitted disease and contraceptive use) during their last routine check-up. Moreover, only 60 percent of respondents reported having their cholesterol checked in the last five years, 57 percent reported receiving a tetanus booster in the last ten years, and 78 percent of women reported receiving a Pap test in the last three years (National Center for Health Statistics [NCHS], 1994).

In deciding what constitutes necessary or appropriate preventive care, experts have recommended evaluating three areas: 1) the burden of suffering associated with the condition 2) the accuracy and acceptability of screening tests and 3) the efficacy of treatment at the
preclinical state versus treatment after the disease manifests itself (Hayward et al., 1991). Several organizations have done systematic reviews of certain clinical preventive services for various age groups. The USPSTF (1989) recommends a variety of screening and counseling services for healthy adult women aged 19-50. These include: history of and counseling for tobacco, alcohol and drug use, sexual practices, dietary intake, and physical activity; measurement of blood pressure, blood cholesterol, height and weight; screening for cervical and breast cancer; and, status of tetanus-diphtheria immunizations.

Those preventive services for which there is agreement among the major review bodies are included as quality indicators for this study. Many of these preventive services can, and should be, included as part of a doctor visit for another illness or reason. Each preventive service and indicator is examined in terms of its importance and efficacy/effectiveness.

**IMMUNIZATIONS**

Lisa Schmidt, M.P.H., and Eve A. Kerr, M.D., M.P.H.

The primary references for this review were two *Morbidity and Mortality Weekly Reports* (Centers for Disease Control [CDC], 1991; CDC, 1994b) issued by the Advisory Committee on Immunization Practices (ACIP) and the Guide to Clinical Preventive Services of the USPSTF (1989). In addition, a review article by Gardner and Schaffner (1993), which summarizes the literature on recommended adult immunization practices, was consulted.

**IMPORTANCE**

**Tetanus**

Tetanus, an acute infectious disease of the nervous system, is caused by the bacillus *Clostridium tetani*. It is characterized by spasms of the voluntary muscles and painful convulsions and may eventually lead to death. Death occurs in 26 to 31 percent of all cases
(USPSTF, 1989). The CDC reported 31 cases of tetanus between January and October 1993 (CDC, 1994a).

Serosurveys undertaken since 1977 indicate that many U.S. adults are not protected against tetanus. It is estimated that 6 to 11 percent of adults 18–39 years of age may lack protective levels of circulating tetanus antitoxin (CDC, 1991). The protective percent increases for older adults (CDC, 1991).

**Diphtheria**

Diphtheria is caused by the bacterium *Corynebacterium diphtheriae*. Both toxigenic and nontoxigenic strains of *C. diphtheriae* can cause disease, but only strains that produce toxin cause myocarditis and neuritis. Toxigenic strains are more often associated with severe or fatal illness in noncutaneous (respiratory or other mucosal surface) infections (CDC, 1991). From 1980 to 1989, only 24 cases of respiratory diphtheria were reported; two cases were fatal and 18 (75 percent) occurred in persons 20 years of age or older (CDC, 1991). The CDC reported only 1 case between January and October 1994 (CDC, 1994a).

Limited serosurveys conducted since 1977 indicate that 22 to 62 percent of adults 18–39 years of age may lack protective levels of circulating antitoxin against diphtheria (CDC, 1991). A complete vaccination series substantially reduces the risk of developing diphtheria and vaccinated persons who develop disease have milder illnesses (CDC, 1991).

**Influenza**

Yearly influenza vaccination is recommended for those over age 65 and for persons at high risk of complications from influenza. According to the Centers for Disease Control (CDC) (CDC, 1994b), these include adults under age 65 who:

- are residents of nursing homes and other chronic-care facilities that house persons of any age with chronic medical conditions;
- have chronic disorders of the pulmonary or cardiovascular system (e.g., asthma, chronic obstructive pulmonary disease, congestive heart failure); or
have required regular medical follow-up or hospitalization during the preceding year because of chronic metabolic diseases (including diabetes mellitus), renal dysfunction, hemoglobinopathies, or immunosuppression (including immunosuppression caused by medications).

EFFICACY AND/OR EFFECTIVENESS OF INTERVENTIONS

The ACIP recommends that all adults receive a tetanus booster at least once every ten years and that a complete series of combined tetanus-diphtheria (Td) toxoids should be given to patients who have not received a primary series (CDC, 1994a; ACP, 1994; USPSTF, 1989). In addition, pregnant women, who are not fully immunized, should complete the immunization series (Gardner and Schaffner, 1993). Td is highly effective in producing protective antibody titers; a completed primary series generally induces protective levels of serum antitoxin that persist for 10 or more years (CDC, 1991).

Local reactions (tenderness and erythema) are common after a Td injection, but severe reactions are rare. Because Arthus-type hypersensitivity reactions occur most commonly after multiple boosters, Td boosters should not be given to anyone who, within the previous five years, has either completed a primary series or received a booster dose (Gardner and Schaffner, 1993).

SEXUALLY TRANSMITTED DISEASES AND HIV PREVENTION

Eve A. Kerr, M.D., M.P.H.

Approach

The primary references for this review were the Guide to Clinical Preventive Services of the USPSTF (1989) and the Healthy People 2000 National Health Promotion and Disease Prevention Objectives (USPHS, 1991).
IMPORTANCE

An estimated 1-1.5 million people are infected with the human immunodeficiency (HIV) virus (USPSTF, 1989). Within 10 years of infection with HIV, approximately 50 percent of persons develop AIDS and another 40 percent or more develop other clinical illnesses associated with HIV infection (USPHS, 1991). Persons with AIDS can develop severe opportunistic infections, malignancies, and multiple-system medical complications. In a study performed before the licensure of AZT, the five-year survival rate was only 15 percent (USPSTF, 1989). The economic consequences of AIDS are enormous; it is estimated that the annual cost of treating AIDS is $2.2 billion (USPSTF, 1989).

Almost 12 million cases of sexually transmitted diseases occur annually (USPHS, 1991). Each year there are about 3-4 million cases of chlamydia, 2 million cases of gonorrhea, over 35,000 cases of primary and secondary syphilis, and 270,000 primary episodes of genital herpes (USPSTF, 1989). These diseases are associated with considerable morbidity. Chlamydia and gonorrhea produce mucopurulent cervicitis and pelvic inflammatory disease (PID) in women. PID is an important risk factor for ectopic pregnancy and infertility; approximately 1 million cases of PID are reported annually in the United States (USPSTF, 1989). Syphilis produces ulcers of the genitalia, pharynx, and rectum and can progress to secondary and tertiary syphilis if left untreated (USPSTF, 1989). Genital herpes causes painful vesicular and ulcerative lesions and recurrent infections due to latent infection (USPSTF, 1989). The total societal costs of STDs is estimated to be $3.5 billion annually (USPHS, 1991).

EFFICACY AND/OR EFFECTIVENESS OF INTERVENTIONS

The most efficacious means of reducing the risk of acquiring AIDS and other STDs through sexual contact is either abstinence from sexual relations or maintenance of a mutually monogamous sexual relationship with an uninfected partner (USPSTF, 1989). In addition, the use of latex condoms and spermicides may reduce the risk of infection with HIV or other STDs (USPSTF, 1989). Intravenous drug use and unsterilized needles should be avoided to reduce the risk of HIV infection. The
prevalence of HIV infection in heterosexual partners of persons in high-risk categories may be as high as 11 percent and 60 percent of heterosexual partners of HIV-infected individuals may be seropositive (USPSTF, 1989).

The primary purpose of HIV and STD counseling is to prevent further spread of infection (USPHS, 1991). Physicians can play an important role in preventing infection in asymptomatic persons by reinforcing and clarifying educational messages, providing literature and community resource references for additional information, and dispelling misconceptions about unproven modes of transmission (USPSTF, 1989). Although it has not been proven that physicians can change the sexual behavior of patients, there is evidence that the frequency of high-risk behaviors can be reduced in response to information provided through public education (USPSTF, 1989). A survey of primary care physicians found that only 10 percent asked new patients questions specific enough to identify those at risk of exposure to HIV (USPSTF, 1989).

It is recommended that clinicians take a complete sexual and drug use history on all adult patients to identify risk factors for HIV and AIDS. In addition, clinicians should counsel at-risk patients on measures to prevent STDs and HIV. Risk factors include: not being in a monogamous relationship; having more than two sexual partners in the past six months; having a history of STDs; having a history of intravenous drug abuse; having sexual relations with an infected partner; having a history of blood transfusion between 1978 and 1985; being a hemophiliac; and being born to an infected mother.

Sexually active patients should receive complete information on their risk for acquiring STDs (USPSTF, 1989). The key elements of counseling include: advising sexually active patients that abstaining from sex or maintaining a mutually faithful monogamous sexual relationship with a partner known to be uninfected are the most effective strategies to prevent infection with HIV or other sexually transmitted diseases; advising against sexual activity with individuals whose infection status is uncertain; advising patients that a nonreactive HIV test does not rule out infection if the sexual partner has not been monogamous for at least six months before the test;
advising that a condom at each sexual encounter should be used and anal intercourse should be avoided if the patient chooses to engage in sexual activity with multiple partners; and, advising women of the potential risks of HIV infection during pregnancy (USPSTF, 1989).

OBESITY COUNSELING

Lisa Schmidt, M.P.H., and Eve A. Kerr, M.D., M.P.H.

The primary references for this review were the Guide to Clinical Preventive Services of the USPSTF (1989) and the Healthy People 2000 National Health Promotion and Disease Prevention Objectives (USPHS, 1991).

IMPORTANCE

Obesity has been defined as being 20 percent or more overweight (USPSTF, 1989) or a body mass index (BMI) greater than 27.3 for women (USPHS, 1991). It is estimated that approximately 32 million American adults aged 25-74 are overweight (USPSTF, 1989). Obesity is prevalent in minority populations, especially among minority women. In 1976-80, approximately 44 percent of black women aged 20 and older, 39 percent of Mexican-American women, 34 percent of Cuban women, and 37 percent of Puerto Rican women were overweight (USPHS, 1991). Poverty level is also related to overweight in women. Between 1976 and 1980, 37 percent of women with incomes below the poverty level were overweight compared with 25 percent of those above the poverty level (USPHS, 1991).

Morbid obesity, defined as being 50 to 100 percent, or 100 pounds, above the desirable weight has been correlated with increased mortality and morbidity. The prevalence of diabetes and hypertension is three times higher in overweight persons than in those of normal weight (USPSTF, 1989). There is a clear association between obesity and hypercholesterolemia and a possible independent relationship between obesity and coronary artery disease. In addition, obesity may influence the risk of cancer of the colon, rectum, gallbladder, biliary tract,
breast, cervix, endometrium, and ovary (USPSTF, 1989). Finally, obesity affects the quality of life by limiting mobility, physical endurance, and other functional measures (USPSTF, 1989).

Efficacy and/or Effectiveness of Interventions

Extremely overweight individuals can be easily identified in the clinical setting by their physical appearance. More precise methods, however, are required to identify mildly or moderately obese persons.

The most common clinical method for detecting obesity is the evaluation of body weight and height based on tables of average weights; however, this method only approximates the extent of obesity (USPSTF, 1989). The criteria for desirable body weight are a matter of controversy among experts and vary considerably in different weight-height tables (USPSTF, 1989). Another method of measuring obesity is the measurement of body fat distribution. This can be measured in the clinical setting by comparing the circumference or skinfold thickness of the trunk and limbs. A waist-hip circumference greater than 0.8 in women may be a reliable predictor of complications from obesity (USPSTF, 1989). Studies have shown that these measurements compare favorably with estimates obtained from hydrostatic weighing (USPSTF, 1989).

The purpose of screening for obesity is to convince the individual to lose weight thereby preventing the complications of obesity. Although there is little evidence from prospective studies that losing weight improves longevity, there is evidence that obesity increases mortality and that weight loss reduces important risk factors such as hypertension, elevated serum cholesterol, and impaired glucose tolerance (USPSTF, 1989).

Periodic height and weight measurements, although not proven to be effective in motivating patients to lose weight, are inexpensive, rapid and acceptable to patients. They may also be useful for the detection of medical conditions causing unintended weight loss and weight gain, such as cancer or thyroid disorders (USPSTF, 1989). The reliability of other methods of detecting obesity, such as the measurement of skinfold thickness and limb circumference, requires further study before these techniques are deemed suitable for widespread implementation in the
clinical setting (USPSTF, 1989). There are inadequate data to determine the optimal frequency of obesity screening (USPSTF, 1989). The Institute of Medicine recommends height and weight measurements at five age intervals during adulthood: 18-24, 25-39, 40-59, 60-74, and over 75 (USPSTF, 1989). The American Heart Association recommends body weight measurements every five years (USPSTF, 1989). The USPHS recommends reducing the prevalence of obesity to no more that 20 percent among people age 20 and older. Special population targets include reducing obesity to 25 percent in low-income women aged 20 and older, 30 percent for Black women aged 20 and older, and 25 percent for Hispanic women aged 20 and older (USPHS, 1991).

SEAT BELT USE COUNSELING

Lisa Schmidt, M.P.H., and Eve A. Kerr, M.D., M.P.H.

The primary references for this review were the Guide to Clinical Preventive Services of the USPSTF (1989) and the Healthy People 2000 National Health Promotion and Disease Prevention Objectives (USPHS, 1991).

IMPORTANCE

Injuries are the fourth leading cause of death in the United States and the leading cause of death in persons under age 45. Motor vehicle injuries account for about one-half of these deaths (USPSTF, 1989). In 1986, nearly 48,000 Americans died in motor vehicle crashes, and each year several million suffer nonfatal injuries (USPSTF, 1989). Although males and persons aged 15-24 account for one-third of all deaths from motor vehicle accidents (MVA), a significant number of women and children are killed or injured in MVAs each year. Many of these deaths and injuries are preventable with use of a safety restraint. However, only 46 percent of Americans used seat belts in 1988, up from 13 percent in 1978 (USPSTF, 1989).
EFFICACY AND/OR EFFECTIVENESS OF INTERVENTIONS

The effectiveness of safety belts has been demonstrated in a variety of study designs that include laboratory experiments (using human volunteers, cadavers, and anthropomorphic crash dummies), postcrash comparisons of injuries sustained by restrained and unrestrained occupants, and postcrash judgments by crash analysts regarding the probable effects of restraints had they been used (USPSTF, 1989). It has been estimated on the basis of such evidence that the proper use of lap and shoulder belts can decrease the risk of moderate to serious injury to front seat occupants by 45 to 55 percent and can reduce crash mortality by 40 to 50 percent (USPSTF, 1989). When brought to the hospital, crash victims who are wearing safety belts at the time of the crash have less severe injuries, are less likely to require admission, and have lower hospital charges (USPSTF, 1989).

The USPSTF recommends that clinicians regularly urge their patients to use safety belts whenever driving or riding in an automobile. In addition, they should be counseled regarding the dangers of operating a motor vehicle while under the influence of alcohol or other drugs, as well as on the risks of riding in a vehicle operated by someone who is under the influence of these substances (USPSTF, 1989). A number of other organizations have issued recommendations on physician counseling of patients on seat belt use, including the American Medical Association, the American College of Physicians, the American Academy of Family Physicians and the National Highway Traffic Safety Administration (USPSTF, 1989). In addition, the American College of Obstetricians and Gynecologists has issued recommendations for the use of passenger restraints by pregnant women (USPSTF, 1989). Lastly, the Healthy People 2000 objectives includes a risk reduction objective to increase the use of occupant protection systems to at least 85 percent of motor vehicle occupants (USPHS, 1991).

It is not known, however, how effectively clinicians can alter behaviors regarding seat belt use. In one survey, patients claimed to have increased their use of safety belts as a result of a brief statement by their physician during a routine office visit, but the study lacked controls and the patients were carefully selected (USPSTF,
1989). Other measures that have proven successful in motivating people to use safety belts, such as community educational programs and intensive psychological strategies, may not be generalizable to the clinical practice setting (USPSTF, 1989).

BREAST EXAMINATION

Lisa Schmidt, M.P.H., and Eve A. Kerr, M.D., M.P.H.

The general approach to clinical breast examination was obtained from a review of the U.S. Preventive Services Task Force recommendations on breast cancer screening (USPSTF, 1989) and review articles obtained from a MEDLINE search which identified all English language review articles related to breast cancer screening between the years of 1985 and 1995.

IMPORTANCE

Breast cancer is the most commonly diagnosed cancer and the second leading cause of cancer deaths among women (CDC, 1992b). Breast cancer accounts for 32 percent of all cancers in women and 18 percent of female cancer deaths (American College of Obstetricians and Gynecologists [ACOG], 1991). In 1987, approximately 41,000 women died from breast cancer; the mortality rate was 27.1 deaths/100,000 women (CDC, 1992a). The probability that an average-risk woman will be diagnosed with breast cancer in the coming 10 years is about 130 in 10,000 for a 40 year old woman and the chance of dying from breast cancer diagnosed in the coming 10 years is about 90 in 10,000 for a 40 year old woman; these rates increase with age (Eddy, 1989).

EFFECTIVITY AND/OR EFFECTIVENESS OF INTERVENTIONS

Three screening tests are usually considered for breast cancer: clinical breast examination (CBE); mammography; and, breast-self examination. Currently, there is controversy about the role of routine mammography in women under the age of 50. Many of the professional societies, such as the American Cancer Society, ACOG, and the National
Cancer Institute differ in their recommendations for routine mammography for women in this age group. Moreover, a meta-analysis by Kerlikowske et al. (1995) showed that screening mammography did not significantly reduce breast cancer mortality in women 40-49 years of age. The other screening technique, routine breast self-examination, has also not been shown to be an effective method of screening for breast cancer (Austoker, 1994). Therefore, only CBE will be included as a quality indicator for breast cancer screening for women under age 50.

Based on data from the 1992 National Health Interview Survey, Makuc reported that only 62 percent of women aged 40-49 received a CBE in 1992 (NCHS, 1994). Of women in this age category, only 56 percent with less than 12 years of education received a CBE, while 68 percent of women with 13 or more years education received a CBE.

Results on the effectiveness of CBE in detecting breast masses vary in the literature. According to Hindle (1990) and the USPSTF (1989), new techniques for CBE have increased clinician’s sensitivity to smaller breast lesions, however the sensitivity and specificity varies with the skill and experience of the clinician and with the characteristics of the individual breast being examined. Over the five years of the Breast Cancer Detection Demonstration Project (BCDDP), the estimated sensitivity of clinical examination alone was 45 percent (USPSTF, 1989). Data from studies using manufactured breast models showed that for breast lumps 1.0 cm in diameter mean sensitivity was 65 percent among registered nurses and 87 percent among physicians; this compared to only 55 percent sensitivity for untrained women (USPSTF, 1989). Rosner and Blaird (1985) found that physical examination correctly identified only 58 percent of 66 palpable cysts. The sensitivity of CBE in the Health Insurance Plan of Greater New York (HIP) and the BCDDP was about 50 percent (Eddy, 1989).

Evidence in the literature about the effectiveness of CBE alone in reducing mortality from breast cancer indicate that CBE was responsible for approximately two-thirds of the effect of the combined strategy of mammography and clinical breast examination (Eddy, 1989). In addition, although no formal analyses on the independent contributions of CBE and mammography have been presented in the BCDDP, Eddy reports that it is
likely that any increased effectiveness seen in the BCDDP is a result of improvements in the mammography technology and that CBE alone would have had only half the estimated effectiveness. Using a computer model, CAN*TROL, and data from the HIP and BCDDP, Eddy shows that, in asymptomatic women aged 40 to 50, annual CBE for ten years decreases the probability of death from breast cancer by 15 to 29 per 10,000 and increases life expectancy by 13 to 27 days. Adding mammography to the CBE decreases the probability of death by an additional 8 to 29 per 10,000 and adds an additional 7 to 29 days of life expectancy. Eddy also estimates that if 25 percent of asymptomatic women in the U.S. between ages 40 and 50 were screened annually with CBE between 1989 and the year 2000, the number of breast cancer deaths in that age group would decrease by 300 to 760. Thus, although there appears to be some benefit associated with CBE alone, these benefits must be weighed against the costs associated with the screening, including the costs of doing a work up of every breast mass detected, some of which will be false positives.

For asymptomatic women, the American Cancer Society recommends a CBE every three years for women between the ages of 20 and 40 and annual CBEs for women 40 and older (Mettlin and Smart, 1994). The USPSTF (1989) and the American College of Physicians (McGuire, 1989) also recommend annual CBEs for women aged 40 and older. The National Cancer Institute recommends regular breast examinations for all women (USPSTF, 1989). However, because the effectiveness of yearly CBE is not well documented, we recommend that the quality indicator for breast cancer screening should be at least one CBE every three years, during a routine visit for a pelvic exam. This indicator is designed to coincide with the indicator for regular cervical cancer screening which recommends a Pap smear every three years for asymptomatic women less than 50 years of age.
HYPERLIPIDEMIA SCREENING

Steven Asch, M.D., M.P.H.

IMPORTANCE

Identifying high blood cholesterol in asymptomatic patients allows modifications of an important risk factor for coronary artery disease, the leading cause of death in the United States (Reed, 1987). The MRFIT trial found that patients with a cholesterol in the highest quintile (>246 mg/dl) were 3.4 times as likely to die from coronary heart disease as those in the lowest quartile (<181) (Martin et al., 1986). Several other major observational cohorts including Framingham and Whitehall have demonstrated the same risk relationship between cholesterol (particularly low density lipoprotein subcomponent and cardiovascular mortality) and most have found a synergistic relationship between cholesterol and other cardiovascular risk factors like hypertension and smoking (Littenberg et al., 1991, in Eddy, 1991; Rose and Shipley, 1986; and Kannel et al., 1971). Though recently disputed, the relationship between serum cholesterol and total mortality appears to be J-shaped; most experts believe that the higher mortality rates in patients with very low cholesterol derive from occult malignancies or other serious illnesses rather than low cholesterol inducing those conditions (Littenberg et al., 1991, in Eddy, 1991). The relationship between hypertriglyceridemia and coronary artery disease is less certain, but several clinical studies have shown that an unusually large number of people with coronary artery disease have high levels of triglycerides in the blood (American Heart Association [AHA], 1993). The AHA estimates that cardiovascular disease costs the U.S. about $80 billion each year (AHA, 1993).

EFFICACY AND/OR EFFECTIVENESS OF INTERVENTIONS

Screening

The tests for total cholesterol, HDL cholesterol and LDL cholesterol, and triglycerides are inexpensive and safe. The accuracy
of the tests varies somewhat by laboratory. The American College of Pathology found a range of 197 to 379 mg/dl in 5000 samples with a known concentration of 262 mg/dl mailed to labs throughout the country (Laboratory Standardization Panel of the National Cholesterol Education Program, 1988). The same study found similar problems with the measurement of triglycerides, HDL and LDL. Serum cholesterol varies somewhat with recent dietary fat intake; serum triglycerides also vary greatly with a number of other noncardiac conditions including liver disease, pancreatitis and hyperthyroidism. Despite this, there is no strong evidence that fasting lipids are more predictive of coronary artery disease than nonfasting lipids. Perhaps more importantly for the current study of predominantly young women, cholesterol measurements in younger patients are highly predictive of elevations later in life (Gillum et al., 1982). Like in hypertension, while the screening test itself poses little risk to the patient’s health, incorrectly labeling a patient as having high cholesterol may impose some risk of unnecessary side effects from pharmacologic therapy.

Efficacy of Early Treatment

No clinical studies have directly assessed whether early detection of hyperlipidemia prevents heart disease, though there is widespread agreement that early treatment should be more efficacious than treatment after the development of atherosclerosis (Littenberg et al., 1991, in Eddy, 1991). However, several randomized controlled trials of lipid lowering treatment in hypercholesterolemic patients have shown modest reductions in mortality, though the study populations have in general been middle aged men. The WHO Cooperative Trial (Report from the Committee of Principal Investigators, 1978, 1980, 1984) divided 15,000 men into two groups, those taking clofibrate and a control group receiving placebo capsules. Those receiving medication experienced a 20 percent reduction in fatal myocardial infarction and a 25 percent reduction in nonfatal myocardial infarction. The Helsinki Heart Study, a trial of over 4000 asymptomatic men, found the incidence of cardiac events to be 34 percent lower among those receiving gemfibrozil (Frick et al., 1987). The Lipid Research Clinic’s (LRC) Coronary Primary
Prevention Trial compared cholestyramine and placebo in almost 4000 men and found a 19 percent reduction in cardiovascular events (LRC, 1979; LRC, 1983a; LRC, 1983b; LRC, 1984a; LRC, 1984b). There was no difference in overall mortality in this study due to an excess of cancer and trauma deaths in the control group. Two of three studies testing dietary and other nonpharmacologic interventions, MRFIT, Oslo, and Wadsworth, found decreased cardiovascular mortality in the intervention group (Report from the Committee of Principal Investigators, 1984; Dayton, 1969; Hjermann et al., 1981). More recently, the Scandinavian Simvastatin Survival Study (SSSS) found that, among patients age 35 to 69 of both genders with known coronary artery disease and mild to moderate hypercholesterolemia, Simvastatin (a cholesterol-lowering drug) significantly reduced the overall risk of death when compared to placebo (RR=0.70; 95 percent CI 0.58–0.85, p=0.0003). The study demonstrated benefits among women as well as men (SSSS, 1994).

The cost effectiveness of screening for and treating hyperlipidemia has been the subject of some controversy. Estimates have varied from $11,000 to $56,000 per year of life saved, but most authors have concluded that screening younger patients is more cost effective than screening older patients (Littenberg et al., 1991, in Eddy, 1991; and Taylor et al., 1987).

**RECOMMENDATIONS**

The USPSTF recommends that all adults undergo blood cholesterol measurement every five years and more often for patients with known cardiac risk factors. The American College of Physicians recommends that cholesterol be measured once in early adulthood to identify those with severe or familial hypercholesterolemia. The Canadian Task Force (CTF) on Periodic Health Examination concluded that insufficient evidence existed for screening all asymptomatic patients. It is recommended that physicians use their clinical judgment in deciding whether to screen and suggested that men aged 30–59 would benefit most (USPSTF, 1989; Littenberg et al., 1991, in Eddy, 1991; CTF, 1993).
HYPERTENSION SCREENING

See Chapter 12 for discussion of hypertension screening.

CERVICAL CANCER SCREENING

Deidre Gifford, M.D.

The following guidelines are based primarily on the U.S. Preventive Services Task Force's review of "Screening for Cervical Cancer" (U.S. Preventive Services Task Force [USPSTF], 1989). In addition, we performed a review of the English language literature between 1990 and 1995. Articles were obtained using a MEDLINE search with the search terms cervix dysplasia, cervix neoplasms, and vaginal smears. This document addresses the questions of which populations should be screened and at what interval, as well as management of women with abnormal tests. This review does not address treatment of confirmed cervical cancer.

IMPORTANCE

There are approximately 13,000 new cases of cervical cancer diagnosed each year in the United States, and about 7,000 deaths annually from the disease. The annual incidence of invasive cervical cancer is estimated to be 20 per 100,000, and the lifetime probability of developing cervical cancer was estimated in 1985 to be 0.7 percent (Eddy, 1990). Five-year survival for women with advanced disease is about 40 percent, whereas it is about 90 percent for women with localized cancer (USPSTF, 1989). Cervical cancer is a good candidate for screening programs because it has a long preinvasive stage during which the disease can be detected and cured.
EFFECTIVENESS OF INTERVENTIONS

Screening

The Pap smear is the primary method of screening for cervical cancer. Pap smears can detect early cell changes which are precursors to invasive disease. Women in whom such abnormalities are detected can then have further diagnostic testing and treatment with interventions such as colposcopy and biopsy, cervical conization, and local excision, which can prevent further progression of the disease.

Evidence of the effectiveness of screening programs comes from observational studies showing decreases in cervical cancer mortality following the introduction of population screening programs. Such decreases have been observed in the United States and Canada, as well as in several European countries (USPSTF, 1989). For example, data from Iceland demonstrated a rising cervical cancer mortality rate during the 1960s. Screening was introduced in 1964, and by 1970 the annual mortality rate began to decline. By 1974, it had fallen significantly, decreasing from 23 per 100,000 in 1965-1969 to about 15 per 100,000 in 1970-74 (Johannesson et al., 1978). Further evidence comes from Canada, where the reduction in cervical cancer mortality has been noted to correlate with the proportion of the population screened with Pap tests (Eddy, 1990). In addition to this evidence, several case control studies have noted a marked decrease in risk of developing cervical cancer in women screened with pap smears when compared to unscreened women. Such studies indicate that screening for cervical cancer with Pap smears is highly effective, decreasing the occurrence of invasive cancer by 60-90 percent (Eddy, 1990).

The effectiveness of cervical cancer screening appears to increase with decreasing screening intervals. This evidence also comes from case control studies, which demonstrated decreased relative risks of invasive disease in women with shorter screening intervals (Eddy, 1990). However, there is also evidence that annual screening may produce only a minimally lower risk of invasive disease than screening every two to three years (USPSTF, 1989; Eddy, 1990). According to one study of eight cervical cancer screening programs in Europe and Canada, the incidence
of cervical cancer can be reduced by 64.1 percent with a screening interval of ten years, by 83.6 percent with a five-year interval, and by 90.8 percent, 92.5 percent and 93.5 percent with intervals of three, two and one years, respectively (IARC Working Group, 1986).

Several important risk factors have been identified for cervical cancer (Eddy, 1990). These include:

1) race/ethnicity, with blacks and Hispanics having a two-fold increased risk;
2) early age at first sexual intercourse;
3) number of sexual partners;
4) smoking;
5) human immunodeficiency virus (HIV) infection; and
6) human papillomavirus (HPV) infection.

There is also some evidence that long-term use of oral contraceptives may predispose a woman to cervical neoplasia. There has been debate in the literature about whether or not women with such risk factors should be screened more frequently than the general population of women. Published recommendations leave room for physician discretion in screening such women. Consensus has been reached by the American Cancer Society, the National Cancer Institute, the American College of Obstetricians and Gynecologists (ACOG), the American Medical Association, the American Nurses Association, the American Academy of Family Physicians and the American Medical Women’s Association (Fink, 1988) on a guideline that recommends annual Pap smears for all women who are or have been sexually active, or who are at least 18 years of age. After three normal annual smears, and if recommended by the physician, less frequent testing is permitted.

The USPSTF (1989) makes similar recommendations about the onset of testing and about annual testing until three normal tests have been obtained. They add that “...pap tests are appropriately performed at an interval of one to three years, to be recommended by the physician on the basis of risk factors (e.g., early onset of sexual intercourse, history of multiple sexual partners, low socioeconomic status). Women who have never been sexually active or who have had a total hysterectomy
for benign indications with previously normal screening do not need regular Pap smears because they are not at risk for cervical cancer.

Management of Women with Abnormal Pap Smears

Although there is generally less consensus about appropriate treatment and follow-up of abnormal pap smears than there is about their effectiveness as a screening technique, reductions in cervical cancer mortality are dependent on follow-up and treatment of women who have positive screening exams.

The classification of abnormal smears is variable, with different systems for reporting abnormalities (Table 16.1).

<table>
<thead>
<tr>
<th>Class</th>
<th>World Health Organization System</th>
<th>Cervical Intraepithelial Neoplasia System</th>
<th>Bethesda System</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Normal</td>
<td>Normal</td>
<td>Within normal limits</td>
</tr>
<tr>
<td>II</td>
<td>Inflammation</td>
<td>Other</td>
<td>Reactive and reparative</td>
</tr>
<tr>
<td>III</td>
<td>Dysplasia</td>
<td>Squamous intraepithelial lesions</td>
<td>Low grade</td>
</tr>
<tr>
<td></td>
<td>Mild</td>
<td>CIN-1</td>
<td>High grade</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>CIN-2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Severe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>Carcinoma in situ</td>
<td>CIN-3</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>Invasive squamous cell carcinoma</td>
<td>Invasive squamous cell carcinoma</td>
<td>Squamous cell carcinoma</td>
</tr>
<tr>
<td></td>
<td>Adenocarcinoma</td>
<td>Adenocarcinoma</td>
<td>Adenocarcinoma</td>
</tr>
</tbody>
</table>

Source: Miller et al., 1992

The Bethesda system was introduced to replace the previous Pap classifications and to facilitate precise communication between cytopathologists and clinicians. There is not universal agreement that
it is superior to the CIN designations (Kurman et al., 1991), nor is there any evidence that it has been widely adopted.

Recommendations for follow-up of abnormal smears have been summarized by the report of a Canadian National workshop on screening for cancer of the cervix (Miller et al., 1991). First, they stress that screening recommendations (as summarized above) apply only to women with normal screening exams, and that women with abnormal smears should be screened and treated differently. This group recommends that women with so-called “benign atypia,” mild dysplasia (CIN I, low grade SIL) or HPV infection without dysplasia should be rescreened at intervals of 6-12 months, and referred for colposcopy if the abnormality persists at 24 months past the original smear. This is based on the finding that many of these lesions will regress spontaneously without intervention (Montz et al., 1992); however, some have argued that the inconvenience, distress, and possibly the cost of this strategy are excessive, and that all women with abnormal smears should be referred immediately for colposcopic evaluation (Soutter, 1992; Wright et al., 1995). ACOG suggests that women with these low grade lesions may either be followed at six-month intervals or referred for colposcopy. They recommend colposcopic evaluation eventually for all women with “persistent” lesions.

There is agreement about management of women with more dysplastic lesions on pap smear. Women with Pap smears read as “moderate dysplasia,” “severe dysplasia,” “carcinoma in-situ,” CIN II or greater, high grade squamous intraepithelial lesions, squamous cell carcinoma or adenocarcinoma should be referred for colposcopic evaluation. Further, the presence of a visible cervical lesion, even with a normal Pap smear, requires colposcopy because of the possibility of a false negative screening test (Miller et al., 1991; ACOG Technical Bulletin, 1993).
RECOMMENDED QUALITY INDICATORS FOR ROUTINE PREVENTIVE CARE

The following criteria apply to nonpregnant, healthy, adult women under 50 years of age.

Screening

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Quality of evidence</th>
<th>Literature</th>
<th>Benefits</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Immunizations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Notation of date that a patient received a tetanus/diphtheria booster within the last ten years should be included in the medical record.</td>
<td>III</td>
<td>USPSTF, 1989; ACIP, 1994</td>
<td>Prevention of tetanus and diphtheria infection, which can lead to respiratory compromise and death.</td>
<td>A completed primary immunization series generally induces protective serum antitoxin levels that lasts for approximately 10 years. Td boosters are necessary to maintain immunized status in adults.</td>
</tr>
<tr>
<td>2. Women with any of the following conditions should receive a yearly influenza vaccine: a. asthma, b. chronic obstructive pulmonary disease, c. chronic cardiovascular disorders, d. diabetes mellitus, e. renal failure, f. hemoglobinopathies (e.g., sickle cell disease), or g. immunosuppression.</td>
<td>I-III</td>
<td>CDC, 1994c</td>
<td>Prevent pneumonia. Prevent mortality from influenza.</td>
<td>The influenza vaccine has been shown to prevent influenza. Patients at risk for developing complications from influenza should be vaccinated.</td>
</tr>
</tbody>
</table>

**Sexually Transmitted Diseases and HIV Prevention**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Quality of evidence</th>
<th>Literature</th>
<th>Benefits</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Patients should be asked if they have ever been sexually active.</td>
<td>III</td>
<td>USPSTF, 1989</td>
<td>Prevent HIV; Prevent STDs.**</td>
<td>Patients who have ever been sexually active may be at risk of HIV or STD infections.</td>
</tr>
<tr>
<td>4. Patients who have ever been sexually active should be asked the following questions: if they currently have a single sexual partner; if they have had more than 2 sexual partners in the past 6 months; and if they have had a history of any STDs.</td>
<td>III</td>
<td>USPSTF, 1989</td>
<td>Prevent HIV; Prevent STDs.**</td>
<td>Non-monogamous relationships, more than 2 sexual partners in the past 6 months and past history of STDs are risk factors for HIV and/or other STDs.</td>
</tr>
<tr>
<td>5. Patients should be asked about current or past use of intravenous drugs at least once.</td>
<td>III</td>
<td>USPSTF, 1989</td>
<td>Prevent HIV; Prevent STDs.**</td>
<td>Intravenous drug use is a risk factor for HIV infection.</td>
</tr>
<tr>
<td>6. Patients who are sexually active and not in a monogamous relationship, have had more than 2 sexual partners in the past six months, have a history of STDs, or have used intravenous drugs, should be counseled regarding the prevention and transmission of HIV and other STDs.</td>
<td>III</td>
<td>USPSTF, 1989</td>
<td>Prevent HIV; Prevent STDs.**</td>
<td>Persons with risk factors for HIV or other STDs should receive appropriate counseling</td>
</tr>
</tbody>
</table>

**Obesity Counseling**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Quality of evidence</th>
<th>Literature</th>
<th>Benefits</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>7.</td>
<td>The medical record should include measurements of height and weight at least once.</td>
<td>III</td>
<td>USPSTF, 1989; USDHHS, 1991</td>
<td>Prevention of complications of obesity, including hypertension, high serum cholesterol and impaired glucose tolerance. This will serve to identify individuals who are obese. However, it is debatable whether physician counseling for obesity is effective in adults.</td>
</tr>
<tr>
<td>8.</td>
<td>Patients should receive counseling regarding the use of seat belts on at least one occasion.</td>
<td>III</td>
<td>USPSTF, 1989</td>
<td>Prevention of motor vehicle injuries and fatalities. Clinician suggestion may affect this behavior.</td>
</tr>
<tr>
<td>9.</td>
<td>A clinical breast exam should be performed on women aged 40 to 50 at least once every three years during a routine visit for a pelvic exam.</td>
<td>III</td>
<td>USPSTF, 1989; McGuire, 1990; Mettlin and Smart, 1994</td>
<td>Prevent late-stage breast cancer; Decrease mortality from breast cancer. This coincides with the recommended screening interval for cervical cancer for women aged 40 to 50.</td>
</tr>
<tr>
<td>10.</td>
<td>As a screen for familial hypercholesterolemia, the medical record should indicate that adult women have undergone a cholesterol measurement at sometime in their lives.</td>
<td>USPSTF, 1989</td>
<td>Prevent morbidity and mortality of coronary artery disease. Early identification may enhance treatment of outcomes.</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>In women with known cardiac risk factors including hypertension, smoking, diabetes, family history of myocardial infarction or familial hypercholesterolemia in a first degree relative, the medical record should indicate a serum cholesterol and triglycerides level in the last 5 years.</td>
<td>USPSTF, 1989; SSSS, 1994</td>
<td>Prevent morbidity and mortality of coronary artery disease. These patients are not at increased risk of serious complications. Cholesterol-lowering drugs can reduce morbidity and mortality.</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>The medical record should contain the date and result of the last Pap smear.</td>
<td>II-2</td>
<td>USPSTF, 1989</td>
<td>Prevent cervical cancer morbidity and mortality. Prevent cervical cancer. The appropriate timing of the next Pap smear is determined by the time elapsed since the last smear, and the result of the last smear.</td>
</tr>
<tr>
<td>13.</td>
<td>Women who have not had a Pap smear within the last 3 years should have one performed (unless never sexually active or have had a hysterectomy).</td>
<td>II-2</td>
<td>USPSTF, 1989</td>
<td>Prevent cervical cancer morbidity and mortality. Prevent cervical cancer. The maximum interval for women with intact uteri is every three years. The incidence of cervical cancer is increased when screening intervals exceed 3 years.</td>
</tr>
<tr>
<td>14.</td>
<td>Women who have not had 3 consecutive normal smears and who have not had a Pap smear within the last year should have one performed.</td>
<td>III</td>
<td>ACOG, 1993</td>
<td>Prevent cervical cancer morbidity and mortality. A normal Pap smear is defined as one without atypia, dysplasia, CIS or invasive carcinoma. If there is no documentation of the actual pathology/cytology reports (i.e., because previous Pap smears were done at another facility) but there is documentation that all previous Paps were normal in the history, then the appropriate screening interval may be regarded as three years.</td>
</tr>
<tr>
<td>15.</td>
<td>Women with a history of cervical dysplasia or carcinoma-in-situ who have not had a Pap smear within the last year should have one performed.</td>
<td>III</td>
<td>Miller et al., 1991; ACOG, 1993</td>
<td>Prevent cervical cancer morbidity and mortality. Prevent cervical cancer. These women are at increased risk for cervical disease, and should not be returned to the usual screening intervals.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>16. <strong>Women with severely abnormal Pap smear should have colposcopy performed.</strong>*</td>
<td>III</td>
<td>Miller et al., 1991</td>
<td>Prevent cervical cancer morbidity and mortality.*</td>
<td></td>
</tr>
<tr>
<td>17. <strong>If a woman has a Pap smear that is not normal but is not severely abnormal,</strong>* then one of the following should occur within 1 year of the initial Pap: 1) repeat Pap smear; or 2) colposcopy.</td>
<td>III</td>
<td>Miller et al., 1991</td>
<td>Prevent cervical cancer morbidity and mortality.*</td>
<td></td>
</tr>
<tr>
<td>18. <strong>Women with a Pap smear that is not “normal” but is not severely abnormal</strong>* and who have had the abnormality documented on at least 2 Pap smears in a 2-year period should have colposcopy performed.</td>
<td>III</td>
<td>Miller et al., 1991</td>
<td>Prevent cervical cancer morbidity and mortality.*</td>
<td></td>
</tr>
</tbody>
</table>

*Morbidity of cervical cancer includes postsurgical and chemotherapeutic complications, infertility, incontinence, and pain from metastases.

**HIV causes fatigue, diarrhea, neuropathic symptoms, fevers, and opportunistic infections (OIs). OIs cause a wide variety of symptoms, including cough, shortness of breath, and vomiting. Average life expectancy after HIV infection is less than 10 years. Other STDs include gonorrhea, syphilis, and chlamydia. They cause a wide variety of symptoms, including dysuria, genital ulcers, infertility, rashes, neurologic and cardiac problems and rarely contribute to mortality. Preventing HIV and STDs has the added benefit of interrupting the spread of disease and preventing morbidity and mortality in those who thus avoid infection.


**Quality of Evidence Codes:**

I: RCT
II-1: Nonrandomized controlled trials
II-2: Cohort or case analysis
II-3: Multiple time series
III: Opinions or descriptive studies
REFERENCES - ROUTINE PREVENTIVE CARE


