

HEALTH EFFECTS OF SMOKING ON CHILDREN

AMERICAN THORACIC SOCIETY, MEDICAL SECTION OF AMERICAN LUNG ASSOCIATION
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Introduction

Tobacco smoking is the number 1 avoidable cause of mortality in the United States (1). The possible harmful effects of tobacco smoke on the health of children in this country have become of great concern to health professionals and lay public alike. The Scientific Assembly on Pediatrics of the American Thoracic Society, composed primarily of pediatricians who are specialists in the area of lung disease in childhood, has prepared this statement in order to (1) summarize the health effects of cigarette smoke on infants and children, and (2) recommend specific actions to minimize or eliminate this unnecessary health hazard.

Scope of the Problem and the Known Health Effects

Currently there are about 53 million active cigarette smokers in the United States, an absolute number that has remained virtually unchanged over the past 20 yr (2). About 30% of all adults smoke; male smokers outnumber females but the difference is progressively diminishing (3). In 1979, it was estimated that the total health costs associated with smoking exceeded \$25 billion per year, a figure that may be an underestimate as the health effects of passive smoking are difficult to document (1).

The majority of smokers start smoking in adolescence; the current average age of smoking onset for both sexes is about 16 yr. Teenage smoking has shown a slight decline in recent years, especially in girls (4). Nonetheless, by 17 to 19 yr of age about one fifth of all teenagers smoke regularly (1). The total number of children who are exposed each year to tobacco smoke by placental transfer of by-products, passive inhalation, or active smoking is difficult to estimate.

Tobacco smoke can harm children via: (1) the effects of smoking during pregnancy on fetal and child outcome, (2) the effects of passively inhaled smoke on respiratory symptoms and lung function in childhood, and (3) the effects of active smoking on the respiratory system. The current state of knowledge concerning each of these three areas is summarized below.

Maternal smoking decreases birth weight and increases perinatal mortality (4-7). The dose-dependent reduction in birth weight averages about 200 grams and has been shown to be independent of possible confounding factors such as socioeconomic status and maternal age. Cessation of smoking early in pregnancy can result in normal birth weight. Mothers who smoke have an increased rate of placenta previa, abruptio placenta, antepartum hemorrhage, and premature delivery. These complications of pregnancy lead to an increased number of stillbirths and neo-

natal deaths from respiratory distress syndrome, asphyxia, pneumonia, and immaturity. Perinatal mortality among the offspring of heavy smokers is increased by about 35% and is dose dependent (6). It has been estimated that maternal smoking may lead to about 5,000 extra perinatal deaths each year in the United States (8).

These adverse health effects of maternal smoking on fetal well-being probably result from maternal systemic absorption of toxins such as carbon monoxide and nicotine. Carbon monoxide readily crosses the placental barrier, and the resulting tissue hypoxemia may be one of the causes of the observed decrease in birth weight. Nicotine is a potent placental vasoconstrictor; recurrent episodes of placental vasoconstriction may lead to undernourishment of the fetus and a decrease in birth weight (5, 7).

Several adverse health effects resulting from passive smoking during childhood have been demonstrated. Children who receive a heavy passive exposure to cigarette smoke have more upper and lower respiratory tract infections than other children (9-11). Passive smoking appears to be a risk factor for recurrent otitis media, recurrent tonsillopharyngitis, and the need for tonsillectomy and adenoidectomy (12). The incidence of severe lower respiratory tract infections is increased in infants who are passive smokers and is to some extent dose related. A significantly increased risk for hospital admission for a lower respiratory tract infection in passive smoking infants under 1 yr of age has been demonstrated (13). Passive smoking has been shown to be one of many risk factors for Sudden Infant Death Syndrome that is independent of other confounding factors (14). The mechanism of this association is not yet known.

Small decreases in pulmonary function have been found in some studies of passive smoking in childhood while others have found no such trend (15-18). A decrease in lung function in passive smokers may be the result of their increased frequency of lower respiratory infections or a direct effect on airway function.

Cigarette smoke may have an adverse effect on the health of children with preexisting lung disease, especially asthma. Tobacco smoke can precipitate bronchospasm as a nonspecific irritant or via an IgE-mediated pathway. Cessation of parental smoking leads to decreased respiratory symptoms in childhood asthmatics (19).

Active smoking in adolescents is not a major cause of respiratory morbidity, but both clinical symptoms and pathologic changes have been demonstrated in teenage smokers. Autopsy studies performed on teenage victims of sudden death have shown that pathologic changes begin within the first few years of active smoking (20). The changes are those

of early small airways disease and include inflammatory bronchiolitis, epithelial hyperplasia, loss of bronchial epithelium, and bronchial wall inflammation. Teenage smokers have increases in respiratory symptoms and decreases in lung function when compared to control subjects (21-23).

Probably the most important aspect of smoking in children is that about two thirds of adult smokers begin the habit during adolescence. The majority of smokers have begun by 16 yr of age (1). At present, approximately one fifth of all high school seniors are regular smokers. If cigarette smoking is considered an epidemic, as well it should be because it causes up to 325,000 premature deaths per year, then the answer, as in any epidemic, will be found in prevention, not cure (1).

Many factors are associated with a teenager's decision to start smoking. Among these are family dynamics, socioeconomic status, health habits and knowledge, number of smokers in the household, siblings who smoke, peer pressure, and an adolescent's natural urge to become autonomous and rebel. Behavioral and social scientists have advanced a number of theories to explain the adoption of smoking (1, 2). A common thread to these theories is that as children mature into adults there are many influences on them to begin smoking that may overpower their knowledge of the adverse health effects. Numerous efforts have been made to educate adolescents about the harmful effects of tobacco smoke with the hope that education would lead to avoidance. Virtually all such studies have come to the same conclusion: You can educate teenagers about the health effects of smoking, but that alone will not prevent them from smoking. For education to lead to prevention, efforts will have to be directed towards children of grammar school age or even younger.

Summary and Suggestions for Action

Cigarette smoke has adverse effects on the health of children from conception through adolescence, and most adult smokers start during childhood. For these reasons smoking prevention must become a major focus for all who are interested in child health. As pediatricians and physicians whose expertise is in the area of lung disease in children, the Scientific Assembly on Pediatrics of the American Thoracic Society has drafted the following set of guidelines and recommendations for its membership, the membership of the American Thoracic Society and the American Lung Association, and other health professionals: