smoking, but its methodology did not project these reduced smoking rates into adult years. SAMHSA acknowledged the conservative nature of its estimate and noted the likelihood that the majority of the cost savings would accrue over long time spans, "as each cohort of non-smoking youth ages into non-smoking adults." Nevertheless, SAMHSA did not quantify these lifetime benefits, "because there are so many uncertainties as to future outcomes." While agreeing that long term benefit projections are uncertain, FDA is convinced that estimates based on valid assumptions can provide reasonable approximations of future cost savings.

The major beneficiaries of the proposed rule are those individuals who would otherwise become addicted to tobacco early in life, but who are

unlikely to start using tobacco products as an adult. Evidence from SAMHSA suggests that this percentage will be high as most smokers become daily cigarette smokers before the age of 18. The 1994 Surgeon General's Report indicates that 82 percent of persons (aged 30 to 39) who ever smoked daily began to smoke before the age of 18. That report concludes that "if adolescents can be kept tobacco-free, most will never start using tobacco. FDA agrees with that assessment, but notes that the above percentage may not reflect the ultimate demand for tobacco consumption that may occur if adolescent access is effectively limited. Thus, to account for this possibility, FDA conservatively assumed that this proposed regulation would prevent the use of tobacco as an adult for only one half of the estimated 500,000 youngsters

who would be deterred from starting to smoke each year. Accordingly, FDA has calculated the annual benefits of the proposed rule from the lifetime health gains associated with preventing 250,000 adolescents from ever smoking as an adult.

5. Lives Saved

FDA calculated the number of smoking-related deaths that would be averted by the 250,000 lifetime nonsmokers (who in the absence of the proposed regulation would be smokers) from age-specific differences in the probability of survival for smokers and nonsmokers. The probability of survival data for the agency's estimate were derived from the American Cancer Society's Cancer Prevention Study II, as shown in Table 3.

TABLE 3—PROBABILITY OF SURVIVAL BY AGE, SEX, AND SMOKING STATUS [Probabilities of a 17-Year-Old Surviving to Age Shown]

Age	Male	Male	Female	Female
(years)	neversmokers	all smokers	neversmokers	all smokers
35	1	1	1	1
	0.986	0.966	0.988	0.984
	0.951	0.893	0.962	0.939
	0.867	0.733	0.901	0.831
	0.689	0.466	0.760	0.630
	0.336	0.159	0.453	0.289

Source: Thomas Hodgson, "Cigarette Smoking and Lifetime Medical Expenditures," "The Milbank Quarterly," vol. 70, no. 1, 1992, p. 91. Based on data from the American Cancer Society's Cancer Prevention Study II.

FDA initially compared the probability of death for smokers versus nonsmokers within each 10-year period. Differences in the probabilities of death were then multiplied by the number of smokers remaining at the start of each 10-year period. Excess deaths among smokers in all age groups totaled almost 28 percent of the 250,000 cohort. Because these data do not account for potentially confounding variables, such as alcohol consumption, or other lifestyle differences, FDA adjusted the mortality estimate to 24 percent to reflect findings by Manning et al.18 that such nontobacco lifestyle factors may account for 13 percent of excess medical care expenditures. FDA recognizes that this 24 percent mortality estimate may be too low. For example, Peto, et al. found that about half of all adolescents who continue to smoke regularly will eventually die from smoking-related disease. 19 Moreover, CDC projects that up to 1 in 3 adolescent smokers may die prematurely. Nevertheless, for this analysis, FDA relied on the probabilities shown in Table 3, corrected by the 13 percent lifestyle influence adjustment, to project that achieving the "Healthy

People 2000'' performance goal would prevent about 60,200 smoking-related fatalities among each year's cohort of potential new smokers.²⁰

The economic assessment of healthrelated variables requires discounting the value of future events to make them commensurate with the value of present events. For this analysis, a 3 percent discount rate was used to calculate the present value of the projections. (Most health-related cost-effectiveness studies use rates of from 3 to 5 percent. FDA presents summary estimates below for rates of both 3 and 7 percent.) On the assumption that it would be 20 years before each year's cohort of new adults reached the midpoint of the 35 to 45 age bracket and 60 years to reach the 75 to 85 age bracket, these calculations indicate that, on a present value basis, the proposed rule would save 15,863 lives per year.

6. Life-Years Saved

The number of life-years that would be saved by preventing each year's cohort of 250,000 adolescents from acquiring a smoking addiction was calculated from the same age-specific survival differences between smokers and non-smokers. In each 10-year life span, the number of years lived for each cohort of persons who would have been smokers but who were deterred was compared to the number of years that would have been lived by that same cohort if they had been smokers. The difference between these two measures is the life-years saved for that 10-year period.21 Deducting the 13 percent lifestyle adjustment indicates that over the full lifetime of each cohort, the proposed regulation would gain an estimated 905,000 life-years, or about 15 years per life saved. On a discounted basis, the proposed rule would save an estimated 211,391 life-years annually.

7. Monetized Benefits of Reduced Tobacco Use

There is no fully appropriate means of assigning a dollar figure to represent the attendant benefits of averting thousands of tobacco-induced illnesses and fatalities. However, to quantify important components of the expected economic gains, FDA has developed estimates of the value of the reduced medical costs and the increased worker productivity that would result from