“I have a feeling more may be better, but we really don’t know yet,” she said. “Doing some activity may be better than nothing, but it may not be enough to go and walk for 10 minutes. It may need to be longer, more sustained activity.”

Exercise trials have also clarified how physical activity can lower colon cancer risk. A study in the September 2006 *Cancer Epidemiology, Biomarkers, and Prevention* found that men who did at least 1 hour of aerobic activity 6 days per week for a year saw a substantial decrease in the amount of cellular proliferation in the colonic crypts—tiny tubelike indentations in the lining of the colon that help regulate absorption of water and nutrients. Although a certain amount of cellular proliferation in the bottom part of the crypt is normal, too much can lead to polyps. However, the same effect did not occur in women, according to McTiernan, lead investigator for the study.

“For colon cancer, sex hormones are protective. It could have been that the women exercised a lot, that lowered their estrogen levels, which means they lost some of their protection from colon cancer,” she said.

Recent observational work has also highlighted the connection between cancer and exercise. A meta-analysis of 20 studies published in the March 2011 *British Journal of Cancer* revealed that regular physical exercise was associated with a 16% decrease in the risk of developing colon polyps and with a 30% decrease in the risk of developing polyps that were large or advanced and thus more likely to become cancerous. Several factors could account for these findings, wrote the researchers, including enhanced immune function, decreased inflammation, reduced insulin levels and insulin resistance, and higher vitamin D levels, all of which influence formation of colon polyps.

Bernstein cowrote a paper published last October in *Cancer Epidemiology* that suggested normal and underweight women, as measured by body mass index, who exercised at least 5.5 hours weekly had a slight reduction in their risk of developing papillary thyroid cancer. “Although the results were suggestive, they require confirmation in future studies,” she said. She hopes that other researchers can build on this work.

**Next Steps**

Many questions need to be answered to better understand the role of exercise in cancer prevention. For example, researchers are trying to determine how much exercise people need to see the most benefit. General guidelines suggest 150 minutes per week (30 minutes, five times per week) of moderate activity. But the American Cancer Society believes that this number should be increased to 225 minutes per week (45 minutes per day, 5 days per week).

“What we are seeing for cancer prevention is that it may require a higher level of activity to get a benefit, but there is not a lot of precision or clarity around the recommendation,” said Alpa Patel, Ph.D., an epidemiologist with the American Cancer Society.

Also, studies define and measure physical activity differently. One study may look at number of overall minutes, whereas others may classify exercise as moderate or vigorous. Adding to thismessiness in measurement is that the population groups in studies are different. All these factors make generalizing study results difficult.

Moreover, different kinds of exercise may need to be examined. For instance, weight training reduces insulin resistance in diabetics. Insulin resistance, in which the body produces insulin but does not use it effectively, has been linked to the development of some cancers, including pancreatic cancer. Could weight training lower cancer risk by improving the body’s use of insulin?

And some researchers say that to draw firm conclusions about exercise and cancer risk reduction, many people would need to be put into randomized groups that exercised and groups that didn’t and then followed up for several years to see who actually developed cancer.

“There just isn’t enough money to do those kinds of studies very often,” McTiernan said.

Still, most experts agree that exercise at any amount is good for overall health, including lowering risk for cancer. A study published last November in *PLoS Medicine* found that people older than 40 years who exercised at an intensity level equivalent of brisk walking for 75 minutes per week gained 1.8 years of life expectancy. That gain was greater at higher levels of exercise and if people were not overweight or obese.

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**Good and Bad News about Latest Outcomes for Smoking**

**By Mike Fillon**

In 1964, U.S. Surgeon General Luther Terry released *Smoking and Health: Report of the Advisory Committee to the Surgeon General of the United States*. Before this, health suspicions about smoking existed, but not much more than common parental homilies to adolescents that smoking cigarettes would “stunt their growth.”

The report presented the first clear evidence that cigarette smoking could be linked to lung cancer, bronchitis, and other chronic and life-threatening diseases. Many people got the message, and U.S. smoking rates have fallen, from 42% of adults in 1965 to 19% in 2010. Even
so, two new studies show mixed results of good and bad news.

The good: Quitting smoking before age 40 years reduces the risk of death by continuing to smoke by about 90%. Led by Prabhat Jha, M.D., Ph.D., from the Dalla Lana School of Public Health at the University of Toronto and head of the Centre for Global Health Research at St. Michael’s Hospital, the study analyzed smoking and smoking-cessation histories of 113,752 women and 88,496 men aged 25 years and older, linking histories to causes of deaths in these groups through 2006. Those who quit smoking by age 34 years lived 10 years longer, on average, than those who continued to smoke, with life expectancies comparable to those of never smokers. Smokers aged 35–44 years who quit lived 9 years longer, and those aged 45–54 years lived 6 years longer. Even quitting smoking between ages 55 and 64 years improved life expectancy by 4 years compared with those who continued to smoke.

However, the researchers say, the numbers do not mean that smoking until age 40 years and then stopping is safe. Former smokers who quit by age 40 years still experienced a 20% greater risk of death than that of nonsmokers. About one in six former smokers who died before age 80 years would not have lived longer if they had never smoked.

Now the bad news: According to a study led by Michael J. Thun, M.D., from the Department of Epidemiology at the American Cancer Society in Atlanta, current and ever regular smokers lose at least one decade of life expectancy compared with never smokers. The researchers also found that both men and women who smoked have a 25 times greater risk of death from lung cancer than do nonsmokers. Another new finding: In 1964, death from lung cancer among men who smoked was five times higher than that among female smokers. Risk of death from lung cancer among male smokers appears to have stabilized since the 1980s, whereas it continues to increase among female smokers. The reasons for the increased risk for women is unclear, although the study does state that “Women have more difficulty quitting than men; thus, for both current and former female smokers, the number of years of smoking has increased.” According to Thun, today’s female smokers are even more likely than male smokers to die of lung cancer and have lost the huge advantage over men they formerly held in risk of dying from smoking-related illnesses. “This confirms the prediction that, in relative terms, women who smoke like men die like men.”

Jha’s study also has bad news for female smokers. Women in his study cohort represent the first generation of U.S. women who began smoking early in life and smoked for decades. Risks of death for these women from lung cancer are about 50% greater than risks reported in the 1980s studies. Specifically, female smokers face a 17.8 times greater risk of dying of lung cancer than nonsmoking women, and men who smoke have a 14.6 times greater risk of death from lung cancer than men who don’t.

So why have women “caught up to men”? According to Thun’s study, smoking patterns changed. Women who began smoking in the 1950s and after began smoking “more like men” than they did in previous generations. They started younger and smoked more heavily largely due to targeted cigarette advertising, brand identification, and styles—filters, sleek appearances, and less irritating tobacco blends—and changing social mores.


Smoking continues to exert an enormous toll on health in the U.S., and much more can be done to persuade, and help, smokers to quit—and more important, not to start in the first place.

Brian A. Primack, M.D., Ph.D., associate professor of medicine and pediatrics at the University of Pittsburgh, said that many current antismoking educational programs are not effective. “In fact, some of it may actually be counterproductive specifically among the sensation-seeking, rebellious youths who are more likely to smoke.” Primack, who also directs the university’s Program for Research on Media and Health, also said that certain media campaigns, such as the Florida truth campaign, did lower smoking rates among youth.

“These campaigns were particularly targeted—via their style, content, and/or dissemination—to influence the types of youth who were particularly at risk for smoking. Unfortunately, these types of messages are expensive to make and propagate.”

Stanton A. Glantz, Ph.D., professor of medicine and director of the University of California, San Francisco, Center for Tobacco Control Research and Education, said tobacco taxes are too low and not indexed to inflation. “It would be nice if NCI and NIH gave smoking and tobacco funding priorities that at least approximated the cancer and other disease burden they account for,” said Glantz. “NCI could pressure Cancer Centers to pay more attention to the issues and integrate tobacco use into clinical trials.”

A recent study that Glantz cowrote in the Feb. 13, 2013, issue of PLOS ONE found that over nearly 20 years (1989 to 2008), California’s tobacco-control program reduced health care costs by $134 billion while costing $2.4 billion. “Our research shows that large-scale aggressive tobacco-control programs not only save lives but also make an important contribution to health care cost containment,” said Glantz.