

## Turning Quitters Into Winners: The Nicotine Patch Success Story

University of California, Los Angeles (UCLA)



A casual conversation between two brothers in the early 1980s leads to the research and development of the Habitrol® nicotine patch, which has helped thousands kick the smoking habit each year.

When Jed Rose, Ph.D., gave his brother a ride to their family reunion back in 1981, the topic of work came up in their conversation. Little did Jed know that their discussion would lead to a major medical discovery that would save thousands of lives.

At the time, Jed Rose was a faculty member of the University of California, Los Angeles School of Medicine and founder of UCLA's Nicotine Research Program, and his brother Dr. Daniel Rose was a physician with a successful private practice in Healdsburg, Calif.

"I remember talking to Dan about my research on separating nicotine from sensory factors like taste or inhaling tobacco smoke into your lungs," Jed Rose says. "In discussing the issue of satisfying nicotine cravings, Dan wondered whether some sort of skin patch could be developed — similar to the transdermal scopolamine patch used for the

prevention and treatment of motion sickness.”

This nicotine patch could potentially be used to reduce people’s cravings for cigarettes, cigars and other tobacco products containing nicotine. “So we hatched a plan to develop the patch,” Rose says. And the rest, as they say, is history.

### **Getting the Nicotine Patch to People Who Want to Kick the Habit**

Working together with his brother and Murray Jarvik, Ph.D., then head of UCLA’s Psychopharmacology Laboratory, Jed Rose initiated the research and development of the nicotine patch. Using himself as the first research subject, Jed Rose determined that nicotine could indeed reach the bloodstream when applied to his skin using a polyethylene patch. The team’s first published study on the subject in 1984 demonstrated that the transdermal transfer of nicotine into the bloodstream had the desired effect of reducing nicotine cravings.

After years of experimentation on hundreds of test subjects, the team, with assistance from the Swiss pharmaceutical company Ciba-Geigy, developed a skin patch that would transmit low doses of nicotine into the bloodstream through a subject’s skin at a rate corresponding to that of smoking. The patch could also be used in combination with a nicotine aerosol spray in development at the time that would mimic some of the sensations associated with inhaling tobacco smoke. The trio of researchers obtained the first of three patents on the technology in May 1990.

Ciba-Geigy licensed the new nicotine patch technology from the University of California Office of Technology Transfer and after gaining approval from the U.S. Food and Drug Administration, the company launched the patch as a prescription drug in 1991. It wasn’t long before other prescription-based Habitrol® transdermal nicotine patches entered the marketplace as well. In 1991 and 1992 other pharmaceutical companies began marketing their own nicotine patch products based on technologies licensed from other research institutions.

But it was the FDA’s approval of over-the-counter nicotine replacement therapies in the mid-1990s that marked another significant step in the nicotine patch success story. Through much wider over-the-counter accessibility, use of nicotine patches increased by as much as 92 percent compared with prior prescription use. By 1999, an over-the-counter version of Habitrol® was introduced to the marketplace by Novartis, a pharmaceutical giant formed from the 1996 merger of Ciba-Geigy and Sandoz.

“*Because 70 percent of all smokers express a desire to quit smoking, the widespread over-the-counter availability of these and other nicotine replacement therapies has presented even greater opportunities to kick the tobacco habit.*”

### **Tremendous Benefits to Society**

To say that nicotine patches have benefited society is like saying breathing oxygen is good for your health. Ample scientific and medical data show that nicotine patches have helped reduce the toll of smoking on society. And it has been a heavy toll indeed. In the U.S. alone, one out of five adults — 44.5 million people — were smokers in 2004. Nearly one out of every five deaths is related to tobacco use, killing 438,000 Americans annually. Cigarette smoking is the primary cause of death and disease in the U.S., taking more lives than alcohol, car accidents, suicide, AIDS, homicide and illegal drugs combined.

The Centers for Disease Control estimate that adult male smokers lose an average of 13.2 years of life, while female smokers lose an average of 14.5 years of life because of smoking. According to one estimate, smoking annually costs Americans 1.1 million years of potential life lost before they reach 65.

Besides these tremendous human costs, the economic costs of smoking are staggering as well. In 1993, an estimated \$50 billion in the U.S. was spent on smoking-related medical care. Lost productivity and earnings from smoking related disabilities were estimated to cost an additional \$47 billion.

Yet nicotine replacement therapies and the nicotine patch in particular have gone far in reversing these devastating trends. Numerous studies indicate that nicotine patches roughly double the rate of successful quit attempts. Successful quit rates for those using nicotine patches range from 9 percent to as much as 20 percent. According to one estimate, the annual number of successful quits achieved using over-the-counter patches alone in the U.S. was 13,566.

By helping thousands of smokers quit every year, nicotine patches generate significant annual net social benefits — an estimated \$1.17 billion to \$1.39 billion. What's more, the nicotine patch is considered highly cost-effective. Use of the patch produces a lifetime quitter at an estimated cost of \$7,332, a tremendous bargain in light of the tremendous cost to society posed by tobacco use, which amounts to \$3,391 per smoker per year. It comes as no surprise that nicotine patches and other nicotine replacement therapies are more cost-effective than other common disease prevention approaches, such as the treatment of hypertension or high blood cholesterol.

Today Jed Rose continues to lead nicotine research as Director of the Duke Center for Nicotine and Smoking Cessation Research at Duke University in Durham, N.C., working alongside his wife, Frederique Behm, who was involved in his initial nicotine patch experiments years ago. Looking back, he notes a humble feeling of satisfaction when reflecting on the groundbreaking research that he, his brother and Murray Jarvik initiated.

“It is very exciting and gratifying to know that our work has made a difference in people’s lives,” he says. “This shows the potential impact that clinical research can have on society.”

**To see available technologies from research institutions, [click here](#) to visit the **AUTM Innovation Marketplace**.**

Share your story at [autm.net/betterworldproject](https://autm.net/betterworldproject)

#betterworldproject