and alcohol use. At the molecular level, HPV-related cancers are not only positive for HPV DNA but also express the human p16 gene, induced by the virus’s oncoproteins. Most HPV-positive patients also have detectable antibodies against HPV.

**HPV Vaccine Reaching Broader Population**

Current HPV vaccination rates will at least partly influence the cancer statistics that will emerge in 20–30 years as a result of current HPV infection rates. Over time, “prevention is the key, and prevention is either abstinence or vaccination,” said Vokes.

The HPV vaccine can reduce the risk of HPV-related cancers that in 10–30 years could affect people who are now teenagers. The vaccine, a series of three shots, is recommended for girls aged 11 or 12 years (with catch-up until age 26 years) and boys aged 11 or 12 years (with catch-up until age 21 years), to protect against HPV infection and HPV-related diseases, including cancer. Researchers initially developed the vaccine to protect against cervical cancer and genital warts, and the U.S. Food and Drug Administration has now approved it to protect against anal, vaginal, and vulvar cancers. In principle, the vaccine should also protect against HPV-positive oropharyngeal cancer because as many as 90% of cases are attributed to the two HPV strains that the vaccine targets.

“A critical aspect of the HPV vaccine is that it should reduce the risk of all cancers caused by the HPV types targeted by the vaccine, not just cervical cancer, for which we don’t have another public-health intervention,” said Lowy.

Yet uptake of the vaccine in the U.S. remains low: Only 35% of girls aged 13–17 years were fully vaccinated as of 2011, compared with 18% in 2008—considerably short of the 80% goal of the Healthy People 2020 program.

Studies indicate that physician recommendation is a main determinant of whether a teen will receive the vaccine. Susan T. Vadaparampil, Ph.D., associate member of the Health Outcomes and Behavior Program at the Moffitt Cancer Center in Tampa, Fla., who studies trends in HPV vaccination, said that pediatricians are more likely than family physicians to offer the vaccine (Cancer 2013;119:621–8). Her study also showed that physicians who care primarily for minority groups are more likely to administer the vaccine to these patients. Cost is not necessarily a deterrent because children from families who cannot pay can receive the vaccine free through Medicaid or the Vaccines for Children program.

These findings are consistent with results of a national survey that Vadaparampil conducted to compare rates of physicians’ HPV vaccine recommendations for girls aged 11–12 years from 2010 and 2011. Recommendation rates increased little, and another study focusing on low-income families showed that despite free programs and recommendations, vaccination rates for girls remained low.

“There has been very poor and slow uptake compared with the meningococcal and Tdap [combined tetanus–diphtheria–pertussis] vaccines given to teens,” said Robert M. Jacobson, M.D., a pediatrician at the Mayo Clinic. Jacobson recently found that the number of parents who opt out of vaccinating their teens against HPV is increasing nationally despite recommendations (Pediatrics 2013;131:645–51). “The most alarming finding, frankly more disturbing than the poor uptake, is the increasing concern of parents regarding safety issues and the decreasing number of parents who say they will vaccinate their daughters,” said Jacobson.

To better understand how to improve physician–parent communication, Jacobson and colleagues will, as part of a large national study, go directly to physicians’ offices to analyze the conversations physicians are having with parents and teens. “We need to find out what is being said and, perhaps more important, what is not being said.”

CDC and other organizations are leading campaigns to increase HPV vaccination rates. According to Simard, the campaigns underscore the vaccine’s anticancer function. As for the scientifically unfounded safety concerns, “we need to continue to communicate the scientific rationale for HPV vaccines to the public and underscore that all of the data support the conclusions that the vaccines are safe and efficacious,” said Simard. “We are confident in that, but we do need additional ways to combat people’s misperceptions about the HPV vaccine.”

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**Shaking Tobacco’s Residual Grip: Endgame Strategies Emerge**

**By Susan Jenks**

In 1984, humorist and radio personality Garrison Keillor penned a satire about the last smokers in America for the New Yorker, describing them as a beleaguered group of three women and two men, puffing their “little smoke puffs.”

The group had lost contact with “the only other band of smokers they knew of—five writers holed up in an Oakland apartment,” Keillor wrote, as law enforcement closed in on them inside a box canyon south of California’s Donner Pass. Ultimately, handcuffed and returned to their families, the hapless smokers were tried and convicted of violating the “28th Amendment” and sentenced to write 20,000 words on personal integrity.

Keillor’s portrait of the country’s final smokers in “The End of the Trail” seemed
at best premature at the time, but nearly three decades later the idea of an endgame strategy for tobacco use is gaining surprising traction, at least among a small group of tobacco-control experts. Smoking remains the number-one preventable cause of death globally, and in the U.S. alone it accounts for some 400,000 tobacco-related deaths each year, according to the Centers for Disease Control and Prevention.

Endgame strategies first took hold several years ago because of frustration over flat levels of smoking prevalence (around 19%) since 2004, said Kenneth Warner, Ph.D., Avedis Donabedian Distinguished University Professor of Public Health at the University of Michigan School of Public Health. “We realized we needed something radical” beyond the usual tactics for tobacco control—higher excise taxes, educational campaigns, and smoke-free workplace laws—to push smoking-cessation rates lower, Warner said.

Some ideas under discussion and featured in a recent tobacco-control issue of the British Medical Journal (May 2013, vol. 22, suppl. 1), titled “The End,” include the following:

- Reducing nicotine in cigarettes to non-addictive levels
- A “sinking lid” strategy on sales and imports of tobacco products to strangle supply and drive up prices
- Creating a tobacco-free generation by prohibiting the sale of tobacco products to those born after a certain year
- Outright abolition

How realistic such measures might be, with the powerful tobacco lobby, Warner conceded, means that “it’s going to be tough.” But, he and others now believe, a change in attitude among public-health officials and the public could lead to ending, or substantially limiting, tobacco’s residual grip. One feasible change in the foreseeable future, Warner said, might be restrictions on the amount of nicotine cigarettes contain, with the U.S. Food and Drug Administration’s new regulatory authority as of 2009.

Such ideas are definitely catching on, suggested Warner, who has been working in tobacco control since 1975. “If you had told me in 2003 that 10 years later, some 30 U.S. states and 30 countries would ban smoking in all workplaces and bars, I would have thought you were out of your mind.”

Tim McAfee, M.D., M.P.H., director of CDC’s Office on Smoking and Health, agreed. Like Warner, he said, “it’s important that, as folks in public health, we alter our paradigm and move beyond the classic idea of tobacco control,” despite its notable successes in reducing tobacco consumption over the past half-century.

“The idea of an endgame,” he said, “is less a question of whether it’s realistic than whether it’s fair to ourselves or our children not to do this.”

“It’s important that, as folks in public health, we alter our paradigm and move beyond the classic idea of tobacco control.”

**E-Cigarettes and Other Alternatives**

This coming January marks the 50th anniversary of the U.S. Surgeon General’s report first linking tobacco use to lung cancer in men. Since then, researchers have learned that smoking combustible tobacco products robs both men and women of 11–12 years of life, said McAfee, although people can regain nearly 10 of those years by quitting before age 40 years.

What’s different today from the past, he said, is not only the public’s attitude toward tobacco use but also the industry’s tacit recognition of the need to develop what he calls a less defective product. Although e-cigarettes are a marketed alternative to the “burn cigarette,” pulmonary oxygen inhalers are also under development, which industry claims will function like cigarettes, without causing harm. There are “big ifs around that for us,” McAfee emphasized, but there is “some reason to be optimistic. And, to the extent we’re entering that universe, it’s endgame time.”

Meanwhile, however, 15 years into the Master Settlement between tobacco companies and the states, only a miniscule portion of tobacco funds actually goes to tobacco control and prevention programs, according to the annual reports of both the American Lung Association and the Campaign for Tobacco-Free Kids. Despite receiving an estimated $25.7 billion in fiscal year 2013 in tobacco money, most states spend less than two cents of every dollar on these programs, the two groups estimate.

“It is a weakness [in the settlement] not to require states to set aside a set amount for tobacco control,” said Vince Willmore, a spokesman for the Campaign for Tobacco-Free Kids. Achieving CDC-recommended levels of funding for this effort, he said, “is very much an annual battle by state” through the legislative process. Only Alaska and North Dakota currently meet the federal agency’s standards, which are tied to a state’s infrastructure, smoking prevalence, population, and other measures and would cost only 15% of annual tobacco revenues, suggests Broken Promises to Our Children, the campaign’s 2012 report.

Increasingly, evidence-based studies show that preventing tobacco use or getting smokers to quit saves money by reducing health care costs, said Willmore. For example, he cites a study in the American Journal of Public Health (Julia A. Dillay et al., published Dec. 15, 2011), which found that for every dollar Washington state spent on tobacco prevention and control, more than $5 was saved on hospitalizations caused by smoking-related illnesses.

“We think the evidence is very clear: These programs save lives,” he said.

**Tips to Quit**

Although the states’ failure to use more tobacco revenues to battle tobacco use
disappoints advocacy groups, a federally funded advertising campaign called “Tips to Quit” is already garnering high praise for its impact. CDC spent $54 million last year and will spend $49 million this year on the emotionally charged, often gruesome educational effort to alter smoking behavior. Using real people whose cigarette habits led to amputated limbs, early cancer diagnoses, and other frightening consequences, the campaign increased calls to the federal agency’s “quit line” by 132% in 2012 alone during a 3-month period—some 365,194 calls.

Similarly, this year during its brief run from the end of March through June, the campaign and the response has been “quite bullish,” according to CDC’s McAfee. Not only are phone calls up, but visits to CDC’s website have grown dramatically, he said.

Before the campaign’s launch, the agency talked to thousands of smokers about potential messages and what might motivate them to quit. “What they told us is they know smoking is bad, but they don’t understand the magnitude of what smoking can do to them,” McAfee said. The campaign spells out those health risks in graphic detail, recently adding diabetes and respiratory illnesses to the mix, coupled with strategies on how to quit.

But “this is only one of the levers we need to pull” in tobacco control, McAfee warned. The next phase of the campaign, launched in May, will encourage smokers to talk to their doctor about quitting. Because of changes in the Affordable Care Act, some insurers, including Medicare and Medicaid, may pay for smoking-cessation medications or programs, McAfee said—a historic hurdle for smokers in lower socioeconomic groups and a major target audience.

Ultimately, no matter how you define an endgame, McAfee said, ordinary bread-and-butter initiatives, such as the Tips campaign, have not yet played out: Only half of states have smoke-free laws, and tax levies on combustible tobacco products vary widely.

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