Their conclusion: smoking was very likely a cause of lung cancer, but much less likely a cause of other kinds of cancer. The results were declared to be of the "highest" statistical significance, though the authors did not attempt to quantify that significance (as they certainly could have, using the chi-square statistical techniques already available at that time). A 1994 reevaluation of Schairer and Schöniger's study showed that the probability of the results' having come about by chance was less than one in ten million.[143]

Schairer and Schöniger's study provided the most conclusive epidemiological evidence up to that time, anywhere in the world, that smoking posed a major lung cancer hazard. The paper is also notable for its discussion of possible biasing factors. Attention was drawn to the fact that in both this study and Müller's there was a surprisingly high fraction of nonsmokers among the men (15–16 percent—compared with Lickint's estimate of 5 to 10 percent for the general population)—which the authors suggested might be due to a reluctance of smokers to respond to the survey. The authors speculated that the sample they investigated—with an average age of 54—may have included more nonsmokers than one would have found in a younger population; they also entertained the alternative hypothesis that smokers may not have been "entirely candid" in their responses. The low response rate of the 700 noncancer controls (only 270 men responded in a satisfactory manner) might have something to do with "war conditions," they suggested, but they also noted that one would not have expected such a bias to yield a difference between the reported smoking behavior of lung and stomach cancer sufferers—which was, after all, the major finding of the study. By contrast with the lung cancer cases, stomach cancer victims were no more likely than the general population to have smoked.[144]

Schairer and Schöniger's paper was not the last tobacco research of the Reich (a 1944 study showed that lung cancer was now the number one cause of cancer death among soldiers—a result not inconsistent, in this military man's view, with a tobacco etiology),[145] but the more interesting fact is the fate of the paper after the war. Müller's prewar paper is occasionally cited, but Schairer and Schöniger's is little known.[146] A 1953 German bibliography on



the smoking-cancer link does not even mention Schairer and Schöniger's paper; nor does an otherwise admirable 1990 historical review of lung cancer–tobacco epidemiology.[147] The 1964 U.S. surgeon general's report, *Smoking and Health*, cites both articles,[148] but the equally famous report by Britain's Royal College of Physicians—issued in 1962—cites neither Müller nor the Jena paper.[149] There is nothing to suggest that either paper was ever widely read. Sir Richard Doll, the man most often credited with documenting the link, told me in February of 1997 that he had never seen the Schöniger and Schairer piece.[150] (I sent him a copy.) Science can be a forgetful enterprise.

## Gesundheit über Alles

How are we to understand the Nazi-era campaign against tobacco? The emphasis on preventive medicine was one source, but pressure also came from the insurance bureaucracy, whose administrators worried that tobaccogenic illnesses could lead to financial drains on the health insurance system. (Life insurers by this time had already begun to consider nicotine addiction a statistically significant cause of death.)[151] Cancer treatments cost the Reich an estimated fifteen million marks in 1933, and Nazi authorities worried that this would only grow with the aging of the population.[152] Pressures also came from industrial hygienists worried about a tobacco-instigated loss of German manpower. By the end of the 1930s, people missing more than four weeks of work due to "cigarette stomach" (especially gastritis or ulcers) were required to report to a hospital for examination; repeat offenders—people who failed to quit smoking and kept missing work—could be remanded to a nicotine-withdrawal clinic.[153] A 1942 essay argued that cancer should be fought more aggressively because it was killing Germans in the prime of their working years. The author noted that three-quarters of the people succumbing to cancer were skilled or professional workers (*Facharbeiter*), whereas children, pensioners, and invalids made up only 24 percent. He also endorsed the idea that people wanting to get married should consult