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EDITORIAL

The Science of Substance Abuse

What common thread links these events of the summer of 1997: the British handover of Hong Kong to China, the tragic auto accident that killed Princess Diana in Paris, and the failure of the U.S. president's appointment for ambassador to Mexico? Each reflects the pervasive tentacles of substance abuse in our society. Hong Kong and its territories came under Western control as a direct result of the 19th-century Opium Wars, waged by Britain to force China to allow importation of opium. Fatal car accidents involving drivers under the influence of alcohol are an all-too-frequent occurrence, despite much public awareness of the dangers of drunk driving. Perceptions of a too-soft philosophical position on marijuana use at least momentarily diverted the U.S. ship of state. These three examples of the daily misfortunes and calamities associated with recreational use and abuse of and dependence on legal and illegal drugs reveal a problem with global dimensions and highly complex legal, moral, economic and health ramifications, both public and personal.

Despite growing investments of federal and state funds in controlling the supply of illegal drugs (amounting to at least twice the total annual U.S. expenditure on biomedical research), all price indicators suggest that supplies have not been constrained. Estimates of illicit drug use suggest undiminished numbers of hard-core users and growing numbers of inexperienced youthful abusers, for whom even the tobacco and alcohol products used by adults are illegal. According to a 1994 report from the Robert Wood Johnson Foundation, the annual cost to society of alcohol abuse is nearly $100 billion; Dupont and Voth* have estimated the annual social costs of tobacco use at $65 billion, with more than half a million deaths annually attributable to alcohol and tobacco use. Substance abuse is unquestionably a major societal problem, which has so far resisted any single approach to reducing drug use, drug supplies, or the multiple adverse consequences of drug use. Lest that conclusion be interpreted as an indication that efforts to control supply have failed, one can only wonder what the costs in carnage and dollars would be without those efforts.

Science is not alone in recognizing the enormity and complexity of this problem. The extensive coverage in the public and scientific presses† reflects the great variety of opinions about what should be done and the factual bases for those opinions. This special issue, coordinated with the help of Senior Editor Katrina Kelner, presents a series of articles designed to inform a broader scientific examination of substance abuse and its problems, as well as the scientific opportunities it presents. Nestler and Aghajanian (p. 58) consider the molecular and cellular changes occurring in the brains of experimental animals made dependent on opiates or cocaine; in those animals, lasting changes in specific signal transduction systems led to altered behavioral consequences of the affected circuits. Koob and Le Moal (p. 52) examine these behavioral consequences in terms of their biochemical substrates as being both adaptive and potentially maladaptive, in an escalating spiral of progressive obsession with drug-seeking and -taking, sensitized by interactions between vulnerability factors such as stress and genetics. O'Brien (p. 66) examines treatments presently available for different drugs of abuse after user detoxification, in order to compare successful long-term treatment options and investigate what is needed to reduce harmful consequences to drug users and those close to them. Nesse and Berridge (p. 63) reflect on the evolutionary implications of mechanisms rooted in the fundamental design of the human nervous system that can hold the brain hostage to drugs of abuse. Their analysis suggests possible strategies for prevention, treatment, and future public policy. MacCoun and Reuter (p. 47) examine the policies used to confront substance abuse in other countries and the degree to which the lessons learned may or may not inform the United States' problems; their in-depth analysis of the Dutch policy of de facto legalization of cannabis suggests the difficulties of predicting the consequences of significant drug policy actions, including their effects on drug use. Lastly, Leshner (p. 45) considers the intersection of the behavioral, social, and pharmacological aspects of the chronic relapsing disease of the nervous system called "addiction," and seeks health and social policy strategies to help diminish the costs to society of substance abuse. We look forward to your reactions.

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†*Am. J. Public Health* (January 1995); *Natl. Rev.* (12 February 1996); *Arch. Gen. Psychiatry* (August 1997).