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Passive Smoking: A Review of Medical and Legal Issues

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The Surgeon General's 1986 report on the adverse health effects of environmental tobacco smoke (ETS) has sharpened the debate between the anti-smoking forces and the cigarette industry.[1-6] Much of the dispute centers on the validity of studies analyzing the medical effects of passive smoking. The likely success of judicial and legislative attempts to further reduce nonsmokers' exposure to ETS also depends on the data from these studies. This paper summarizes the medical effects of passive smoking and reviews the role of litigation, legislation, and private regulation in the area of ETS.

Medical Issues and Passive Smoking

Passive smoking research has focused on the physicochemical constituents of ETS and the relationship of ETS to common diseases caused by active smoking, principally cardiac and respiratory illnesses and lung cancer. The populations studied have been adults and young children who may be at particular risk for damage from passive smoking because of the potential impairment of their developing organ systems.

Over 3,800 chemicals have been identified in smoke and more than 50 substances in tobacco smoke have been identified as carcinogens in animals or humans.[7] Environmental tobacco smoke consists of mainstream smoke, sidestream smoke, and vapor phase components that diffuse through cigarette paper into the environment. Mainstream smoke is the smoke inhaled and exhaled by the smoker, and sidestream smoke is the smoke which issues from the end of the cigarette between puffs. Approximately 85 per cent of passive smoke exposure is from sidestream and 15 per cent from mainstream smoke. The concentrations of physicochemical constituents in mainstream and sidestream smoke are similar qualitatively but vary widely quantitatively. The concentration of carbon monoxide is 2.5 times higher in sidestream than mainstream smoke.[8] The particles in sidestream smoke have a smaller diameter than those in mainstream smoke and are more likely to deposit in the most distant aveolar portions of the lung.[9] Also, secondary chemical reactions occur before a nonsmoker inhales ETS, including aging, volatilization, and adsorption of radon daughters on particles.[10]

One negative impact of ETS is its odor, which is distinctive and unpleasant for many individuals. The odor is related principally to the vapor phase; resistant to filtration systems, it can be removed by ventilation systems. In order to maintain a nonirritating carbon monoxide level below 2.0 ppm, however, it is estimated that ventilation in a room with smokers must be two to four times greater than a room with nonsmokers.[11] In addition to having a distaste for ETS odor, several studies demonstrate that people have an intolerance to ambient tobacco smoke.[11,12] In one study of 191 allergic nonsmokers and 250 non-allergic nonsmokers, 69 per cent of the nonallergic subjects developed eye irritation when exposed to passive smoke, 29 per cent had nasal symptoms, 32 per cent had headaches, and 25 per cent developed a cough.[12] The percentage of subjects who experienced each of these symptoms was higher among patients who reported allergies to smoke.

Infants and children exposed to passive smoke appear to be at distinct increased risk for pulmonary problems. Three large longitudinal studies have demonstrated an increased incidence of respiratory illnesses and hospitalizations among infants whose parents smoke.[13-15] In an Israeli study of 10,672 infants (birth to one year), there were 9.5 hospitalizations per 100 for bronchitis and pneumonia for infants with nonsmoking mothers compared to 13.1 hospitalizations per 100 for infants with smoking mothers ($p < .001$).[13] As the number of cigarettes smoked by the mothers increased, so did the hospital admission rates. Among infants whose mothers smoked more than one pack per day, there was an admission rate of 31.7 per 100, a three-fold increase over the admission rate for infants with nonsmoking mothers. The relationship between illness and passive smoke exposure was maintained after controlling for birthweight. Other studies from Britain and New Zealand showed similar results.[14,15]

Children in households with adult smokers have more restricted activity and bed disability days than children living with nonsmokers.[16] Several studies have shown a mild impairment in the pulmonary function among children whose parents smoke.[17-20] In a longitudinal study of 7,834 children, increased maternal smoking resulted in a lower forced expiratory volume (FEV_1) at age eight and a measurable growth retardation in FEV_1 per pack year of exposure.[17] Childhood reduction in lung growth may predispose individuals to obstructive lung disease by reducing peak lung growth, or by accelerating the rate of pulmonary function

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decline known to occur among smokers.[21] This problem is potentially compounded by the fact that children of smokers are more likely to become smokers.[22] In addition, cross-sectional surveys have demonstrated increases in frequent cough[23] and persistent middle ear effusions[24] among children and adolescents with passive smoke exposure. Parental smoking also may be a risk factor for the development of childhood asthma.[25,26]

In adults, there is clear epidemiological data proving that *active* smoking causes lung cancer. Numerous prospective studies and case-control studies have met the criteria for causality including biologic plausibility, strength of association as evidenced by a dose response relationship, appropriate temporal relationship, and consistency of results across studies.[27] Studies of the association between *passive* smoking and lung cancer in adults have fulfilled some but not all of the criteria for causality. It is biologically plausible that passive smoke exposure might cause lung cancer because passive smoke contains carcinogens to which there is no established lower threshold level of exposure for the development of lung cancer. A number of studies have linked passive smoking with the development of lung cancer, but others have shown no association.[28–47] Based on the conclusions from these studies, the Surgeon General determined that ETS is a cause of lung cancer.[1] The Committee on Passive Smoking from the National Research Council (NRC) also reviewed the existing scientific literature regarding ETS and lung cancer, and corroborated the Surgeon General's findings.[48] Because many of the studies are small and inconclusive, the NRC determined 13 studies presented adequate information for comparative analysis and pooling. The overall risk of lung cancer in association with ETS exposure was 1.34 (95 per cent confidence interval 1.18, 1.53); for women the relative risk was 1.32 (1.16, 1.51); for men the RR was 1.62 (0.99, 2.64). The broad confidence interval for men was secondary to fewer studies investigating lung cancer in male nonsmokers (34 male cases, 643 female cases). The NRC investigators concluded that the increased risk represents a direct and causal effect, but confounding factors associated both with lung cancer and living with a spouse who smokes may lower the overall relative risk to 1.25 for nonsmokers exposed to ETS.

Information linking passive smoking to cardiorespiratory illnesses has emerged more slowly than the lung cancer data. In one study, physical parameters were measured in 10 patients with classic stable angina exposed to ETS.[49] Subjects showed a 22 per cent decline (232 seconds to 181 seconds) in exercise duration from baseline when exercised in a ventilated smoke-filled room, and a 38 per cent decrease (234 seconds to 146 seconds) in time to angina when exercised in an unventilated smoke-filled room. Smoke exposed groups showed an increase in resting pulse rate, systolic and diastolic blood pressure, and carboxyhemoglobin.

Two prospective studies have evaluated the association between passive smoking and coronary artery disease.[50–52] The relative risk of death from ischemic heart disease for women married to current or former smokers compared to women married to nonsmokers was 2.7 ($p < 0.10$) in a study of 695 married nonsmoking women followed for 10 years.[50,51] The age-adjusted mortality increased with the number of cigarettes smoked per day by the spouse. In the Multiple Risk Factor Intervention Trial (MRFIT) the smoking histories of the participants' wives, family members, and coworkers were assessed for 1,245 nonsmoking men.[54] Among men who were never smokers there was a statistically significant increase in coronary heart disease deaths when the wives smoked more than 20 cigarettes per day.

The data on the effects of passive smoking on adult pulmonary function and respiratory symptoms are conflicting. One study of asthmatics exposed to ETS revealed an acute decrease in pulmonary function,[26] while another showed no change.[53] In a large study of young asymptomatic adults, pulmonary function tests among nonsmokers exposed to tobacco smoke at work showed a significant decrease in the FEV_1 (5.5 per cent) and the MMEF (13.5 per cent) compared to nonexposed individuals.[54] A French study found a decrease in pulmonary function only after prolonged ETS exposure in older women.[55] The clinical significance of these studies is uncertain. However, it appears that the association of ETS with cardiopulmonary diseases is stronger with increasing exposure, the phenomenon also noted with active smoking.

Legal Issues and Passive Smoking

Adequate information exists for physicians to counsel their patients to avoid the smoke of others. The medical evidence against ETS has also been important in decision-making in the public arena. As studies on the harmful effects of ETS have accumulated, legislation has been implemented, and corporations have adopted nonsmoking policies. In the courts, plaintiffs have argued for a smoke-free workplace on the basis of constitutional claims, public nuisance claims, and safe workplace claims. In addition, greater numbers of employees are suing for worker compensation and disability payments for passive smoking-related medical illnesses.

Constitutional claims under the 1st, 5th, 9th, and 14th Amendments have been used unsuccessfully by nonsmoking plaintiffs in an effort to restrict smoking. In refusing to recognize a fundamental right to breathe clean air under the 9th Amendment,[56] courts have explained that the right to breathe clean air is not on a constitutional par with other more appropriately defined 9th Amendment rights.[57] Nonsmokers' 5th and 14th Amendment due process claims to a right to be free from toxins which endanger life[58] have been received as follows:

> If this Court were to recognize that the Fifth and Fourteenth Amendments provided the judicial means to prohibit smoking, it would be creating a legal avenue, heretofore unavailable, through which an individual could attempt to regulate the social habits of his neighbor. This court is not prepared to accept the proposition that life-tenured members of the federal judiciary should engage in such basic adjustments of individual behavior and liberties . . . For the Constitution to be read to protect nonsmokers from inhaling tobacco smoke would be to broaden the rights of the Constitution to limits heretofore unheard of, and to engage in that type of adjustment of individual liberties better left to the people acting through legislative processes.[59]

The 1st Amendment, which has been interpreted to protect the right to receive information and ideas freely,[60] has also failed to protect nonsmokers from smoking. In *Gasper v. Louisiana Stadium and Exposition District,* plaintiffs claimed that their right to exposure to events was impaired since smoking was allowed at the stadium.[61] The plaintiffs in *Federal Employees for Nonsmokers' Rights v. United States* made a similar claim.[59] Both courts, however, rejected the 1st Amendment argument.

There seem to be two principal reasons for failure of nonsmokers' constitutional claims. The first hurdle, in con-

stitutional claims, is the requirement of "state action." Outside the area of racial discrimination, the United States Supreme Court has required that state action be affirmative; state *inaction* is not sufficient to constitute a constitutional violation.[62] Yet, nonsmokers have generally sought relief from state or local government's *failure* to regulate or prohibit smoking,[63] and thus the necessary state action has been missing. In addition, the Supreme Court is reluctant to recognize rights alleged to be "fundamental" unless such rights are "explicitly or implicitly guaranteed by the Constitution."[68] Nonsmokers' claims under the 1st, 5th, 9th, and 14th Amendments have not been based directly upon the explicit language of those amendments, but rather upon reading the amendments together to construct "penumbral" claims, which the courts have found implausible. The Supreme Court's holding in *Rodriquez*[64] indicates that a nonsmoker's claim of a constitutional right to clean air is destined to failure unless the Supreme Court's constitutional analysis changes radically.

A more successful approach taken by nonsmokers in court is the argument that smoking should be restricted because it is a "public nuisance." Several state statutes specifically designate smoking in public as a public nuisance.[65] Others describe smoking as a health hazard, and plaintiffs in those states could use the public nuisance theory if they could show that tobacco smoke is a health hazard sufficiently unreasonable to constitute a public nuisance. In *Stockler v. City of Pontiac*, for example, a nonsmoking plaintiff successfully claimed that smoking at the Detroit Lions games was a public nuisance.[66]

Nonsmokers' safe workplace claims also have enjoyed greater success than has the nonsmoker's constitutional approach. In *Shimp v. New Jersey Bell Telephone Co.*,[67] a New Jersey court held that smoking was a health hazard, to the allergic, nonsmoking employee, and that her right to a safe workplace made it imperative for smoking to be forbidden in work areas. In *Smith v. Western Electric Co*,[68] and *Gordon v. Raven Systems & Research Inc*,[69] which involved similar claims, the courts concluded that the employers had no obligation to accommodate nonsmoking workers who were particularly sensitive to smoke and wanted a smokefree environment. The rationale for those holdings is suspect, however, in light of mounting medical data on passive smoking dangers. The courts in *Smith* and *Gordon* emphasized that they had no evidence that smoke is hazardous to all workers, and that "the common law does not impose upon the employer the burden to conform his workplace to the particular needs or sensitivities of an individual employee." Evidence of passive smoking's dangers to the health of all individuals will further empower the common law safe workplace claim, though it may weaken allergic nonsmokers' claims to "handicapped" protection.[70]

Mounting medical evidence on the health hazards of passive smoking will not only enhance the nonsmoker's safe workplace claim, but also will enhance claims involving disability and unemployment, and product liability. Increasingly, employees exposed to workplace smoking and suffering from associated medical ailments are suing for workers' compensation, disability payments, or unemployment benefits. For example, in *Parodi v. Merit Systems Production Board,* the 9th Circuit Court of Appeals ruled that a smoke-sensitive federal worker who suffered from asthmatic bronchitis and hyper-irritable airways was entitled to a disability retirement annuity if the government could not provide a suitable work environment.[71] In addition, at least four states have granted unemployment compensation benefits to nonsmokers, due to inability to work in a smoke-filled environment. In *Alexander v. Unemployment Insurance Appeals Board,* for example, the court affirmed a decision requiring the state unemployment insurance appeals board to pay benefits to an x-ray technician who quit her job because she was allergic to smoke.[72] Other state courts have reached similar conclusions.[73] It is conceivable that in the future, with increasing passive smoking health hazard data, nonallergic employees will be successful in such claims as well.

Nonsmokers also may be able to use a products liability theory in court actions against smoking. During the late 1950s and early 1960s, when the link between cigarette smoking and cancer was suspected but not proven, several cancer victim smokers brought product liability actions against cigarette companies. All of the suits failed. When a second wave of product liability claims was initiated in the 1980s, for the first time a federal jury held a tobacco company partially responsible for the lung cancer death of a smoker in *Cippolone v. Liggett Group, Inc.*[74] The verdict was based on the company's violation of express warranties contained in its ads, and the company's failure to adequately warn the public about the dangers of cigarettes. While the case established that the tobacco companies are no longer invincible to product liability suits, the verdict was limited in terms of the financial damages and the continued recognition that the plaintiff partially assumed the risks of her smoking. Unlike smokers, however, innocent bystanders do not "assume the risk." If a nonsmoking plaintiff can convince the court that tobacco products are legally defective and that they were a substantial factor in the cause of his/her injury, it is conceivable that the products liability theory would be successfully invoked by the passive smoking plaintiff.

Judicial action to curb smoking has had some success, and certain claims look even more promising with future substantiation of the health hazards of passive smoking; litigation places the burden of proof on the nonsmoker nonetheless, and it entails piece-meal, case-by-case resolution.[75] Legislation and regulation, on the other hand, reach everyone within the jurisdiction. Most legislation restricting smoking has been enacted at the state level, and the rate of enactment of state legislation has increased dramatically over the last decade.[76] As of 1986, 41 states and the District of Columbia had legislation aimed at reducing involuntary smoke inhalation by restricting smoking in various places[77] (Table 1). Eighty per cent of the United States population currently resides in states with some smoking restriction, compared with 8 per cent in 1971.[78] Most of the nine states without smoking legislation are concentrated in the Southeastern portion of the country and include North Carolina, Virginia, and Tennessee—three of the six major tobacco-producing states. For the most part, courts have upheld smoking regulations and statutes when they have been challenged in court, finding that they are a legitimate exercise of state government's police power.[79] The US Supreme Court has said that as long as a regulation reasonably advances some legitimate goal of the legislature (e.g., protecting nonsmokers' health), it will be sustained.[80]

Courts have rejected smokers' contentions that restrictive laws violate equal protection and/or their constitutional rights of privacy and liberty. In *Rossie v. State of Wisconsin Department of Revenue,* the court upheld a Wisconsin statute that prohibits smoking in state-controlled buildings except for certain designated areas.[81] In holding that the statutory distinctions have a reasonable basis and do not deny equal

TABLE 1—Limitations on Smoking in Public Places

States	Public Transit	Health Care Offices/ Facilities	Elevators	Indoor Recreation Facilities	Open Air Cultural/ Recreation Facilities	Cultural/ Schools	Retail Outlets	Restaurants
AL								
AK	X	X	X	X		X	X	X
AZ	X	X	X	X		X		
AR		X				X		
CA	X	X		X		X	X	X
CO	X	X	X	X		X		
CT	X	X	X			X	X	X
DE	X							
DC	X	X	X			X	X	
FL	X	X	X	X		X	X	X
GA	X		X					
HI			X	X				
ID	X	X	X	X		X	X	X
IL								
IN								
LA	X	X	X	X				
KS	X	X	X	X				
KY						X		
LA								
ME	X	X					X	
MD		X	X					
MA	X	X	X	X			X	
MI		X	X				X	X
MN	X	X	X	X		X	X	X
MS	X							
MO								
MT	X	X	X	X		X	X	X
NE	X	X	X	X		X	X	X
NV	X	X	X	X		X		
NH	X	X	X	X		X	X	
NJ	X	X	X			X	X	X
NM	X	X	X	X		X	X	X
NY	X			X				
NC								
ND	X	X	X	X		X		X
OH	X	X	X	X		X		
OK	X		X	X				
OR		X	X	X		X	X	X
PA		X		X			X	
RI	X	X	X	X		X	X	X
SC								
SD	X	X	X	X		X		
TN								
TX	X	X	X	X		X		
UT	X	X	X	X		X	X	X
VT								
VA								
WA	X	X	X	X		X	X	X
WV	X					X		
WI	X	X	X	X		X	X	X
WY								

SOURCE: Adapted from reference 77.

protection of law in violation of the 14th Amendment, the court pointed out that the ban applies only in buildings and areas that the nonsmoking public may not easily avoid (e.g. hospitals) and not in private offices. In *Grusendorf v. Oklahoma City*[82] the 10th Circuit Court of Appeals ruled that a city fire department regulation requiring trainees to refrain from smoking—even off the job—does not violate the trainees' constitutional rights of liberty and privacy. In *Gusendorf*, a trainee was discharged after taking three puffs from a cigarette while on an unpaid lunch break. In upholding the discharge, the court reasoned that the state government as an employer has a heightened interest in regulating firefighters; and that the nonsmoking regulation has a rational connection with promotion of health and safety of the trainees.

The only reported state constitutional law challenge to nonsmoking regulations which has been won by smokers to date came in New York in November 1987 and involved separation of powers, not impermissible violation of smokers' rights. In *Boreali v. Axelrod,* the New York State Court of Appeals ruled that the state's public restrictions on workplace smoking were unconstitutional because, in promulgating them, the Public Health Council (an appointed administrative body) exceeded its statutory authority.[83] Establishing such a state policy, the court held, was within the prerogative of the legislature. The court stressed that the issue in the case was not whether smoke presented a public health threat but whether the Public Health Council had the power to issue the regulations.

As is true of legislative and regulatory smoking restric-

tions, private sector initiatives to restrict smoking are more effective and efficient than is nonsmokers' litigation. Private sector initiatives to restrict smoking, especially in the workplace, have gained great momentum in the 1980s, although in a nonuniform fashion.[84,85] Four factors may explain the growth of workplace smoking policies in the 1980s. The first factor is public support.[86] In 1985, 79 per cent of the US adults (including 76 per cent of smokers) favored restricting smoking at work to designated areas.[87] In two worksite surveys conducted by one of the authors (JCB), over three-fourths of the respondents felt ETS was unhealthy for nonsmokers. However, the desire for further smoking restrictions was not based on concerns about major health problems. Instead, people were simply tired of the annoyance and irritation of ambient smoke. Only half of the people irritated by ETS were willing to ask smokers to extinguish their cigarettes. Thus, a worksite policy may obviate the need to ask someone to stop smoking or, when necessary, the policy legitimizes the request. The second factor which may explain the growth of workplace smoking policies is recently enacted state and local workplace smoking legislation. The prevalence of private sector smoking policies is higher in regions with statutes in place. A third factor is cost associated with smokers in the workplace. Lost productivity factors and higher health costs associated with smoking employees were estimated at $300–$800 per worker annually in a 1985 Office of Technology Assessment study; others place the average cost to employers per smoking worker at $4,611 per year, a figure reflecting costs due to work absences, medical costs, increased insurance costs, worker unproductivity and maintenance fees.[88] A final factor explaining the growth of workplace smoking policies is growing scientific evidence supporting the view that smoking increases the risk of adverse health consequences for all employees.

These factors which have propelled the growth of workplace smoking policies are not likely to abate, and the likelihood that such policies will withstand legal challenge is high. Although it is conceivable that in some situations involving collecting bargaining agreements, employers may be prevented from adopting no-smoking policies,[89] in most instances this will not be the case. In addition to growing numbers of workplace smoking restrictions, it is probable that greater numbers of employers will refuse to hire smokers in the first place; this exclusion is also likely to withstand challenge. Smokers are not a "protected group," against which employers may not discriminate. In selecting employees it is unlikely that their decision not to hire a smoker who insisted on smoking on the job would be considered illegal discrimination since employers have a duty to provide a safe working environment by protecting their employees from exposure to agents that can cause disease.

Conclusion

Many of the health hazards of passive smoking need further investigation but there is definitive information linking ETS to respiratory illnesses in children and lung cancer in adults. The magnitude of the danger posed by these links must be recognized. Since the chemical exposure from passive smoking is an order of magnitude less than the chemical exposure from active smoking, proportionately less disease is likely to be found among nonsmokers exposed to ETS. Yet, active smoking is responsible for over 300,000 deaths annually in the United States,[90] and if the attributable risk for death secondary to passive smoking proves to be only 1 to 5 per cent of that from active smoking, there will be 3,000–15,000 premature deaths per year among exposed nonsmokers. Furthermore, even though passive smoking poses a lower risk than active smoking, it yields a high death rate because of the enormous number of exposed individuals.

Historically the major exposure to ETS has occurred in the home. Studies that have noted adverse health outcomes have been based on passive smoke exposure from a spouse or parent. Ongoing studies are more carefully quantifying all ETS exposures and assessing the presence and level of toxic and carcinogenic components of ETS in all enclosed environments. These ongoing studies are likely to prompt more lawsuits by employees claiming injury due to unsafe working conditions, as well as more antismoking legislation and private initiatives. The case likely to set precedent will involve an individual who never smoked but developed a smoking-related illness and who can prove that his or her only exposure to tobacco smoke was in the workplace. The case will be strengthened if the plaintiff can show that worksite air samples and individual tissue samples reveal high levels of tobacco smoke pollutants. Such a verdict against an employer would likely lead to dramatic legislative and private sector action.

Until such a case comes forward, continued elimination or restriction of smoking through steady legislation and private initiatives will not only result in reduced concentration of ETS in restricted areas, but also will have a direct influence on smoking initiation and cessation. Such restriction will help to reinforce nonsmoking as the normative behavior in society and will increase public awareness of the health risks of tobacco smoke.

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Properly Designed Landfills May Be Safe Disposal Sites for Some Hazardous Wastes

Thousands of communities in the United States operate sanitary landfills to dispose of municipal and industrial waste. These landfills, however, have come under criticism in recent years for polluting groundwater, leaking hazardous wastes, and harming the environment. According to a researcher/civil engineering professor at Georgia Institute of Technology, properly designed and operated landfills still offer most communities the best option for solid waste disposal, and perhaps even for small quantities of hazardous or radioactive wastes.

Using tall metal lysimeter columns to simulate landfill conditions, Professor Fred Pohland and colleagues have demonstrated that normal biological decomposition activity breaks down certain toxic organic compounds. Their results have shown that some of the detrimental features of a variety of toxic organic materials are eliminated by the ongoing biological processes which occur in a landfill, he explained. Normal chemical activity can also convert heavy metal waste—and radioactive heavy metals—to stable componds that can be safely dispersed within the landfill. The team is now attempting to determine the quantities of such materials that can be safely accommodated by a landfill. The key to safe disposal, Pohland cautions, is a well-designed and properly operated landfill which holds the materials on the site; an impermeable liner (clay or synthetic) prevents migration and possible contamination of surface and groundwater.

Professor Pohland foresees future landfills being operated intensively as controlled biological treatment systems, much the same as modern sewage treatment plants actively promote biological and chemical action to break down liquid wastes. His experimental landfills recirculate the liquid runoff (leachate) which collects at the bottom of the decomposing refuse. This recycling speeds up the microbial conversion process, creating more uniform activity.

Decomposition of refuse goes through several stages over a period of years, producing methane and carbon dioxide gases, along with acidic compounds that can leach out heavy metals if not controlled. The Georgia Tech team found that the same conditions which produce the acid also tend to chemically reduce sulfate compounds to sulfides which, in turn, precipitate the metals. By recirculating the leachate, heavy metal precipitates can be dispersed and bound up in the bulk of inactive landfill material. Radioactive heavy meatls can be handled in the same way, dispersed and tied up as their radioactivity decays.

Pohland's work holds important implications for hospitals, physician's offices, and other small generators of low-level radioactive wastes—particularly if the federal regulations which now exempt many of these small operations from hazardous waste regulations become more stringent in the future. If their wastes can safely be handled by landfills, Pohland said, both the businesses and the environment would be protected.