RAND REVIEW

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Privileged Treatment

Inequities in HIV Care Demand Remedies for U.S. Health Care

By Martin Shapiro and Samuel Bozzette

SMALL CLASSES TEACH UNINTENDED LESSONS ■ QUALITY DEFICIENCIES PERVADE U.S. HEALTH CARE ■ COSTS AND BENEFITS OF DRUG PREVENTION

Message from the Editor

Quantitative research is not known for its excitement. Gathering data, crunching numbers, and conducting cost-benefit analyses often rank in people's minds right up there with the thrills of reconciling bank accounts and filing tax returns—only worse.

But the two leading feature articles in this issue exhibit the urgency of good data and their ability to help improve the quality of our lives and build a more just society.

The AIDS epidemic has always been much more than a medical problem. It has been a social justice issue ever since the very first cases of the illness in this country were diagnosed in Los Angeles in 1981 as "gay-related immune deficiency syndrome" (GRIDS). The epidemic has also been an enduring challenge to our public health system, which was never designed to care for large numbers of young people with a protracted illness but without private health insurance. The political, cultural, and financial battles over research and treatment have raged for nearly two decades.

Yet only today can we point to data documenting the uneven quality of care throughout the United States and the wildly fragmented and wholly inefficient approach to financing the costs of that care. Only with this type of information can we craft reforms that might inject more fairness into the health care system and, in the process, save more lives. As Martin Shapiro and Sam Bozzette explain in their cover story, such reforms would benefit not just people with AIDS but people with all kinds of chronic and terminal illnesses.

The second case in point involves the continuing evaluation of California's massive effort to reduce the size of primary-grade classes. One of the most politically popular and generously funded educational reforms in U.S. history, this class-size reduction program might end up a victim of its own success, unless state officials can heed the warnings from the early data.

In the rush to reduce class sizes in California, there have not been enough classrooms and teachers to go around. As a result, the most overcrowded schools have benefited the least, placing the most disadvantaged children at an even greater disadvantage and almost defeating one of the purposes of this monumental investment. But all is not lost, at least not yet, because midcourse corrections can get the program back on track. Thanks to the data-gathering and number-crunching efforts of Brian Stecher and a statewide research consortium, there is more reason to hope that smaller class sizes will boost the prospects of millions of children, especially of those children who need help the most.

And that's pretty exciting.

—John Godges

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On the Cover

Capsules of Norvir, one of the first three protease inhibitors approved for treatment of the human immunodeficiency virus (HIV), roll off the manufacturing line at Abbot Laboratories in Chicago, Ill., in February 1996. Protease inhibitors are members of the new class of antiretroviral medications that have made HIV infection a highly treatable disease for those receiving appropriate care.

AP/WIDE WORLD PHOTOS/CALVIN WOODS, JR.

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News

Debate on Patients' Rights Emits More Heat Than Light

In the recent congressional debate over one of the most controversial aspects of the patients' bill of rights—whether to allow lawsuits against managed care organizations for delay or denial of benefits—both sides of the argument have relied on assumptions for which there is little hard evidence, according to a new RAND study.

Proponents have argued that the threat of litigation would significantly deter wrongful behavior and induce health plans to improve quality of care. However, a substantial body of evidence indicates that lawsuits are, at best, an imperfect deterrence to wrongful behavior. And increased liability might also induce health plans to approve unnecessary care. The net effect is uncertain.

Opponents have argued that expanded liability would produce a flood of costly lawsuits, generating higher costs to consumers. However, no one can predict the magnitude and cost of such litigation, because the data are not available, leaving researchers to estimate that new lawsuits could range from as few as 1,000 to more than 150,000 a year.

"We don't know enough about how health care consumers and lawyers may respond to a new liability environment to project litigation rates with any degree of confidence," concluded the team of researchers, led by Carole Roan Gresenz. Details of the study are explained further in *A Flood of Litigation?* (RAND/IP-184).

Insuring Children Can Help Mend Frayed Safety Nets

The Children's Health Insurance Program (CHIP), a federal-state partnership established in 1997, promises to boost the number of low-income children with insurance nationwide and double their frequency of doctor visits. But the effects will vary greatly from state to state, with the biggest improvements in states that have traditionally provided the flimsiest health safety nets.

These are among the findings of a RAND study reported in the June 2 issue of the *Journal of the American Medical Association* (also available as RAND/RP-798). Economists Stephen H. Long and M. Susan Marquis collected family insurance data and health safety net information for Colorado, Florida, Minnesota, New Mexico, New York, North Dakota, Oklahoma, Oregon, Vermont, and Washington.

The results showed that CHIP could increase the average frequency of physician visits by low-income, formerly uninsured children from 2.3 to 4.6 visits per year—or a 105 percent increase on average. However, the increase would range from 41 percent in Minnesota to 189 percent in Oregon, which currently provides relatively few health safety net resources.

"These are encouraging results," said the researchers. "They show the promise of CHIP to significantly increase insurance coverage of low-income children and improve their access to physician services throughout the nation."

Care for Chronic Illnesses: Is There a Better Way?

Over the next four years, RAND and the University of California at Berkeley will conduct an $8.4-million study designed to improve health care for people with chronic conditions, such as diabetes and congestive heart failure.

The study will examine how health care organizations could change the way they deliver care for chronic illnesses, what organizational and personnel adjustments might be required, and whether these new methods to deliver care improve patient health at a reasonable cost. The study will compare the progress of patients receiving new methods of care with the progress of patients in a control group, whose care will not be affected initially.

The Institute for Healthcare Improvement, based in Boston, and the W. A. (Sandy) MacColl Institute for Health Care Innovation, based in Seattle, are cooperating on the study, which is being directed by Emmett Keeler of RAND. The Robert Wood Johnson Foundation is funding the research, which will conclude in May 2003.

If Wealth Is the Chicken, Health Is the Egg

Although a large body of research shows that wealth affects health, that low economic status leads to poor health, and that people at higher socioeconomic levels live longer, the opposite direction of influence—from health to wealth—has received far less scrutiny.

Few would argue that health has no effect on wealth. In fact, health shocks can deplete savings and drain resources long after the onset of illness, even if someone has health insurance, according to a RAND study that appeared in the Spring 1999 issue of the *Journal of Economic Perspectives*. The study, also available as RAND/RP-802, investigates the relationship between childhood health and subsequent health—and wealth—throughout life.

In "Healthy Bodies and Thick Wallets: The Dual Relation Between Health and Economic Status," RAND economist James P. Smith quantifies the effect of poor health on wealth. Matching the wealth of U.S. households from 1984–1994 to the health status of the heads of those households, Smith shows that—across all age groups—those who reported excellent health in 1984 had 74 percent more wealth than those who reported poor health (see figure).

Those whose health improved or remained at high levels over the ensuing 10 years continued to accumulate wealth. Those whose health slipped or failed saw their resources dwindle. "These differentials rival in size the wealth and income differences by schooling," says Smith.

Household wealth includes net home equity, business equity, real estate, cars, and a wide variety of financial assets, such as checking and savings accounts, individual retirement accounts, Keogh accounts, stocks, and bonds.

For Americans aged 51 to 61, a severe illness reduces household wealth by an average of about $17,000, or 7 percent. Some of the loss stems from the inability to work and from out-of-pocket medical expenses, with health insurance not insuring against these losses. For Americans aged 70 and over, a mild or severe illness reduces wealth by an average of about $10,000.

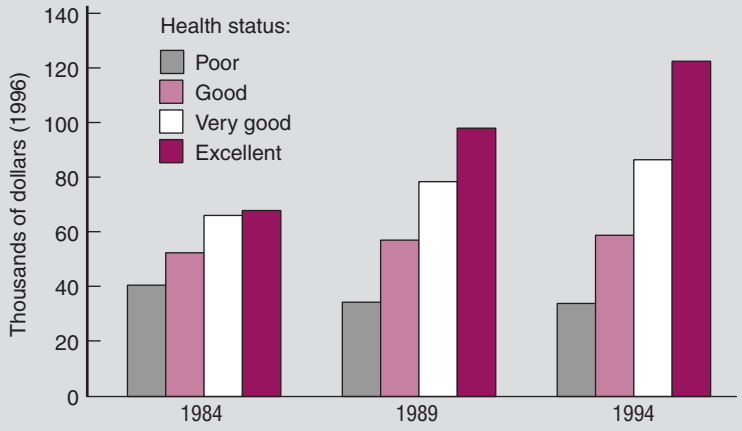
"When the health condition is severe, financial wealth is unable to absorb the full brunt," notes Smith. "Families dip into some of their other assets, including taking new loans on their homes."

Smith also examines newer theories of why lower economic status leads to poor health. The old standbys—that poor people have bad health habits and less access to quality medical care—offer only a partial explanation, he argues. Rather, there appear to be long-term health effects of early childhood—and even intrauterine—environmental factors and of prolonged exposure to stressful events.

"A growing number of impressive studies demonstrate that health at middle and older ages reflects health at earlier life," he points out. "This research also suggests that either direct provision of health care early in life or improvements in household living standards for families with younger children may have a long-run return on lifetime health."

This return, Smith says, may be especially high compared with that of current major public investments in Medicare and Social Security, which are not provided until the post-retirement years.

Median Household Wealth by Health Status



SOURCE: James P. Smith, "Healthy Bodies and Thick Wallets: The Dual Relation Between Health and Economic Status," *Journal of Economic Perspectives*, Vol. 13, No. 2, Spring 1999.

Russia at Risk of Becoming "a Failed State with Nukes"?

The future of Russia—even its existence as an undivided state—depends largely on its parliamentary elections in December and its presidential election in June 2000, according to Jeremy Azrael, director of RAND's Center for Russia and Eurasia.

Speaking at a June 1999 seminar, Azrael recounted a litany of woes plaguing the world's largest country: economic "meltdown," with rising unemployment, growing inflation, a largely collapsed banking system, a wipeout of small businesses, and the obliteration of the middle class; political paralysis, with an elite "utterly lacking in coherence" or consensus about what to do; military disarray; and pandemic corruption across all strata of society.

"I don't see any hope for the midterm unless Russia is allowed to elect a new president who can capitalize on an initial credibility" and undertake "crisis management," said Azrael. The parliamentary elections in December most likely will produce no major change of direction, but the presidential election next June could be far more significant. In the meantime, Azrael said, there is not much the United States can do.

"It all depends on good leadership. If there is none, decline will continue, discontent will grow, and Russia is likely to become a 'failed state'—with nukes," warned Azrael, although he added that even Russia's nuclear weapons may no longer work.

According to Azrael, the United States needs to become prepared for even worse times ahead in Russia. Without legitimate leadership, Russia will become increasingly threatened by fragmentation of military command and control, proliferation of all sorts of weapons of mass destruction, and "lots of Kosovos in Muslim areas."

If there is a silver lining, Azrael said, "there is no Hitler or Lenin" emerging on the horizon to exploit Russian discontent. "I see no mass movement. The people are too cynical, too apathetic, and too focused on basic needs."

Burden of Indonesian Crisis Weighs Most Heavily on Poor

Recent economic and political upheavals in Indonesia have made life more difficult for all Indonesians, but the most damaging blow to the country's future may be the dramatic decline in the ability of the poor to give their children an education and health care, according to a new RAND study.

Before the collapse of the Indonesian rupiah in January 1998, the country had achieved nearly universal primary education and made substantial progress in health care. But the collapsing currency caused food prices to soar, putting a squeeze on education and health expenditures, especially among the poor.

Just prior to the crisis, the poorest children aged 7–12 were just as likely to be in school as their peers from the wealthiest households. In the wake of the crisis, 11.7 percent of poor children were not in school, compared with 2.5 percent of the better-off children.

DIANE BALDWIN

Jeremy Azrael, director of RAND's Center for Russia and Eurasia, remains anxious about upcoming elections in Russia.

Between 1997 and 1998, the proportion of all children who visited community health centers on a monthly basis for preventive services dropped from nearly 50 percent to just 25 percent. And prices of antibiotics and bandages rose faster at public facilities, which largely serve the poor, than at private facilities.

"If policies are to alleviate the impact of the crisis, they must reach the most vulnerable and those most likely to suffer grave consequences in the longer term. Policies that are not well-targeted will waste resources," concluded the research team of Elizabeth Frankenberg, Duncan Thomas, and Kathleen Beegle. To monitor the medium- and long-term effects of the Indonesian crisis, the researchers will return to the field for another round of their survey in 2000.

The analysis is described more fully in *The Real Costs of Indonesia's Economic Crisis* (RAND/DRU-2064-NIA/NICHD).

Checking for Vital Signs of Cultural Life in America

In a unique appraisal of the art of the state, RAND researchers will analyze trends in American arts over the last 30 years and assess the vitality of the arts today, as indicated by the composition of audiences, the financial health of performers, and the economic well-being of arts organizations.

The research will gather data on the performing arts—including theater, opera, music, dance, and film—as well as the visual and literary arts at a time when commercial arts appear to be flourishing, nonprofit arts appear to be suffering, and amateur arts appear to be holding their own.

"It is difficult to tell if the arts are prospering or in decline," said Kevin McCarthy, director of the new $1.25-million research project, funded by The Pew Charitable Trusts. Beyond assessing the state of the arts, the information collected should help artists and arts organizations develop strategies to survive and prosper in a changing cultural environment.

By creating a centralized database of information on the arts in America, the project will also inform policymakers about the condition of various arts sectors and how they might be strengthened. The project will continue through February 2001.

Combined with a $710,000 grant from the Lila Wallace–Reader's Digest Fund to evaluate efforts to expand arts participation and a $75,000 grant from the City of Los Angeles for a pilot study on the effect of arts participation on at-risk youth, RAND in the past year has developed a $2-million arts research program.

Looming Korean Upheaval Requires Army Flexibility

Dire economic and political conditions in North Korea could provoke an array of unpredictable outcomes for which the armies of the United States and South Korea need to prepare, according to a new RAND study.

For nearly five decades, the United States and South Korea have trained their armies to fend off an invasion from the north. Today, however, the spectrum of potential army duties could include everything from deflecting weapons of mass destruction to providing humanitarian assistance, explain Jonathan Pollack and Chung Min Lee in their new book, *Preparing for Korean Unification* (RAND/MR-1040-A).

The authors outline four alternative scenarios that could lead to Korean unification, each entailing very different implications for the U.S. Army: (1) peaceful integration and unification, (2) collapse and unification through absorption, (3) unification through conflict, and (4) sustained disequilibrium with potential external intervention.

"The U.S. Army needs to prepare for a much wider range of roles and missions," say the authors.

The army also "needs to enhance its intelligence-collection and analysis capabilities," especially given the possibility of an abrupt collapse of the North Korean regime and potential Chinese intervention. If the current regime of Kim Jong Il is replaced by a military junta, for example, the army would need to immediately analyze the military capabilities of the new regime and the extent of central control over the military.

The armies of both the United States and South Korea also need a new set of "operational requirements" to outline respective responsibilities under various scenarios.

Finally, establishing closer communication linkages with China could emerge as a pressing priority.

"It seems crucial that these linkages be in place before any full-scale crisis erupts on the peninsula. Absent such means of communication, there would be incentives for unilateral action on all sides that could trigger highly adverse responses. If the risks of a larger conflict on the peninsula are to be managed, this cannot be achieved without effective ties with China, including its military leadership," the authors conclude.

Government and Industry Strive for Higher Mandates

Three recent RAND reports describe how leading manufacturers now view environmental challenges as profit-making opportunities rather than as just annoying mandates, how business and industry leaders view the role of government in technology more positively than in the past (see

sidebar), and how a pathbreaking public-private venture to produce an environmentally friendly automobile could become a model for technological collaboration in the public interest.

The first report, *Technology Forces at Work* (RAND/MR-1068-OSTP), explains that innovative, research-intensive companies now invest in environmental technologies as part of their bottom-line business strategies rather than just to comply with regulations. The companies are interested most in technologies that increase efficiency, create environmentally preferred products, reduce emissions, and meet customer demands.

Author Susan Resetar interviewed senior environmental managers and senior research and development managers at four manufacturers recognized as among the leaders in their fields: DuPont (chemicals), Monsanto (biotechnology), Intel, and Xerox (both electronics).

DuPont is working on products and delivery systems that limit customer exposure to hazardous materials; more efficient delivery would reduce customer inventories, and new protective components would allow customers to avoid hazardous materials altogether. Monsanto seeks to develop multipurpose products—such as plants that bear fruit and also provide material for plastics—to increase market value without necessarily using more resources.

Intel invests in pollution-prevention technologies to reduce emissions below the point at which permits are required, thus eliminating permit delays and accelerating the introduction of profitable new products. Xerox saves hundreds of millions of dollars a year by reusing and recycling copiers and components; environmental costs now get factored into the company's accounting system.

Meanwhile, these companies look to the government for leadership on national environmental priorities, for more federal spending on university-based environmental research, and for help in developing markets for new environmental products.

A second report, *The Machine That Could* (RAND/MR-1011-DOC), discusses the Partnership for a New Generation of Vehicles, a joint effort by the U.S. government and U.S. auto industry to build an affordable, environmentally friendly, and safe family sedan that can get 80 miles per gallon of gas.

Launched in 1993 amid fears that U.S. auto manufacturers were losing ground to Japanese competitors, the effort brought the government together with the Big Three automakers—Ford, Chrysler, and General Motors—to develop a "super car" prototype by 2004.

Although the effort is just halfway toward its goal, the partnership "has already succeeded, if success can be measured by the imitation among foreign competitors, some of whom are now also striving to introduce new technology to motor vehicles," concluded author Robert Chapman. ■

U.S. Regains Technological Edge, Say Business and Industry Leaders

American business and industry leaders believe the United States has restored its technological leadership in the past decade and consider government a positive contributor to that process, signaling important shifts in the attitudes of U.S. business leaders toward government.

As recently as 1990, many executives fretted about lagging U.S. competitiveness in the world and about the government's meddling in business concerns. Today, the executives point to recent changes within industry itself as one reason for renewed technological leadership and look to government to play a distinct role in developing new technologies. There is widespread agreement that the government should provide leadership, support research and higher education, and ensure an economic, legal, and regulatory environment conducive to economic activity.

For many executives, government leadership means the government should act as a convenor of industry leaders and other stakeholders in the early stages of technological development. In this way, contentious issues can be ironed out and standards established *before* competition begins.

These findings appear in *New Forces at Work* (RAND/MR-1008-OSTP). Authors Steven Popper, Caroline Wagner, and Eric Larson interviewed top executives at 39 firms representing the electronics and automotive industries, banking and financial services, construction, and other industrial sectors. The executives identified five technologies as critical to the future health of all sectors and of the entire U.S. economy: software, microelectronics and telecommunications, advanced manufacturing, materials, and sensors and imaging.

Given these technological priorities, the executives frequently cited three common worries as leading the list of their concerns: (1) the shortage of software engineers might become a bottleneck to progress; (2) American manufacturing skills, particularly machine-building, have not kept pace with technological skills; and (3) the nation's K–12 education system is not preparing enough skilled workers.

The executives also agreed that the technological priorities of the government, acting on behalf of the entire society, are broader than those of private industry. For example, energy and environmental technologies assume greater importance for government and society as a whole.

Crowding Out

Small Classes Teach a Lesson in Unintended Consequences

California's massive effort to reduce the size of primary-grade classes—one of the largest educational reforms in U.S. history, costing up to $1.5 billion a year and involving 1.6 million students in the first two years alone—requires major adjustments to make sure the huge investment pays off, according to an early evaluation of the program.

On the positive side, California third graders in classes of 20 or fewer students have achieved slightly higher test scores than students in larger classes. The gains have been made equally by students of all ethnic, racial, economic, and linguistic backgrounds. Teachers report less time disciplining students and more time helping poor readers one-on-one and addressing students' personal concerns. Principals and superintendents report greater teacher enthusiasm for all reforms. And parents report more contact with teachers and greater satisfaction with their children's education.

On the negative side, the rapid implementation of the program, begun in 1996, has worsened the inequities among schools. The push to reduce class sizes has exacerbated space shortages at already overcrowded, inner-city schools, placing them at a triple disadvantage. First, it is tougher for overcrowded, land-restricted schools to add classrooms. Second, as a result, these schools earn fewer of the state dollars awarded for reducing class sizes. Third, to add classrooms and earn dollars, overcrowded schools are more likely than affluent schools to usurp space from libraries, computer labs, arts and music programs, child care, and special education.

Class-size reduction has also created 23,500 new teaching jobs—a 38 percent increase in the number of kindergarten through third-grade teachers in California. But many of the new teachers are minimally qualified, allowing the most qualified to pick and choose from the "most desirable" schools. Consequently, the better-qualified teachers often get "crowded out" of the inner-city, low-income, heavily minority, heavily immigrant schools where they are needed most.

"Overall, we're looking at class-size reduction with cautious optimism," says Brian Stecher, senior social scientist at RAND and director of the evaluation team, which includes staff from five research organizations. "We are finding some positive effects but also some troubling aspects that need to be addressed." To make the program work more equitably, as intended, the researchers propose several midcourse corrections:

- Construct more classrooms.
- Revise the formula by which the state reimburses school districts for reducing class sizes.
- Allow schools greater flexibility in how they use these funds.
- Improve teacher recruitment, preparation, and professional development.
- Create incentives for good teachers to work at schools where their expertise is needed most.

California's experience has important implications for the nation as a whole. At least 19 states already have some kind of class-size reduction policy in place, and a proposed national program would face similar constraints as in California, according to a separate RAND study. Another related RAND study has concluded that the single most promising strategy to recruit and retain high-quality teachers in low-income, heavily minority areas is, simply, higher pay.

Bricks and Teachers

California schools have responded remarkably quickly to the incentives to reduce class sizes from an average of about 30 students to 20 or fewer students in kindergarten through third grade. The state legislature agreed to reimburse schools a flat rate of $650 for each child in a smaller class in 1996–97 and $800 per child in 1997–98. In just these two years, almost all first- and second-grade students and almost two-thirds of kindergarten and third-grade students moved into smaller classes.

Even so, the reimbursements have not covered the costs in more than 40 percent of the school districts, especially in districts with larger proportions of students who are poor, Latino, black, or still learning English. These districts have either absorbed the extra costs themselves—often by taking money from other programs—or delayed implementation. With funding linked to implementation, proportionately more money has flowed to wealthier districts.

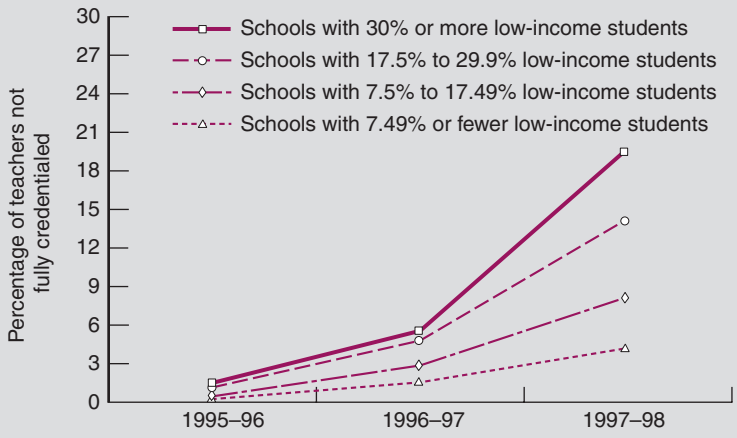
The single greatest factor in the uneven implementation of class-size reduction has been the shortage of facilities for new classes. Despite state reimbursements and despite a state bond measure providing $700 million for construction and renovation for smaller class sizes, the shortfalls remain. Yet the need for space is not uniformly distributed. Not only did the districts start out with different space needs, but several districts have succeeded in getting their own local school construction bonds approved by voters. State officials need to get a better understanding of these variable space needs and target more money to add classroom space in overcrowded schools, according to the researchers. Otherwise, the students who are most in need academically will continue to be the least likely to attend smaller classes.

Moreover, California should consider changing the flat-rate funding formula that now favors wealthier schools. Because the cost of reducing class sizes varies from school to school, state reimbursements could, for example, match the actual costs of implementation rather than meet just a flat rate. Alternatively, the state could shift to a formula that gives a disproportionate share of the money to districts with a disproportionate share of at-risk students. The existing formula has widened the resource gap between rich and poor districts. Reversing these unintended consequences, say the researchers, "may help ensure that the persistent achievement gap for many of the state's low-income and minority students will, as hoped, be narrowed rather than widened by this reform."

Schools could also be given greater flexibility in how they use state funds to deal with classroom and teacher shortages. The state Legislative Analyst's Office has suggested that individual classes could be permitted to have as many as 22 students so long as the *average* class size in a district does not exceed 20.

Another key factor in the uneven implementation of the program has been the quality of teaching. Traditionally, teachers working in low-income, inner-city areas have had somewhat lower qualifications than teachers in wealthier areas, but the gap widened tremendously between 1995 and 1998. Figure 1 shows that, prior to class-size reduction, schools with higher percentages of low-income students had slightly higher percentages of teachers without full credentials. But with class-size reduction, the gap increased almost tenfold, as schools with the highest percentages of low-income students hired much larger numbers of teachers without full credentials.

Figure 1
Percentage of Teachers Not Fully Credentialed in Schools with Different Proportions of Low-Income Students



SOURCE: California Class-Size Reduction Consortium analysis of California Department of Education, CBEDS-PAIF data.

By 1998, nearly 20 percent of teachers in the poorest areas lacked full credentials, compared with 4 percent of teachers in the wealthiest areas. Of the 23,500 new teachers hired in California between 1996 and 1998, about 10,100 of them—or nearly 43 percent—lacked full credentials. Some districts could reduce class sizes only if they hired teachers on emergency permits.

To improve the quality of teaching, Governor Gray Davis has proposed a mentor teacher program and pressed for more slots for teacher preparation at California State University and the University of California. These efforts may be insufficient, say the researchers. It may be necessary to bolster local school-based training programs and to financially entice qualified teachers to the schools in greatest need. Experienced teachers probably gravitate toward schools that appear safer, serve students with fewer challenges, provide supportive parent involvement, and offer higher salaries. Thus, offering higher salaries and other benefits might be the only realistic way to lure teachers to cities and school districts with teacher shortages.

Offering higher salaries and other benefits might be the only realistic way to lure teachers to cities and school districts with teacher shortages.

Related RAND research reinforces this conclusion. Sheila Kirby, Scott Naftel, and Mark Berends examined teacher demand and supply in Texas in high-poverty districts that tend to have more students at risk of educational failure. The researchers found that teachers in these districts tend to display an overall greater sensitivity to pay and working conditions. "Raising teacher pay holds the most promise for reducing attrition," the researchers concluded. Raising salaries "would not only increase teacher supply in general, but may increase the supply of high-quality teachers," who are even more highly sensitive to pay and working conditions, given their competitive opportunities elsewhere.

Dividends from Equity

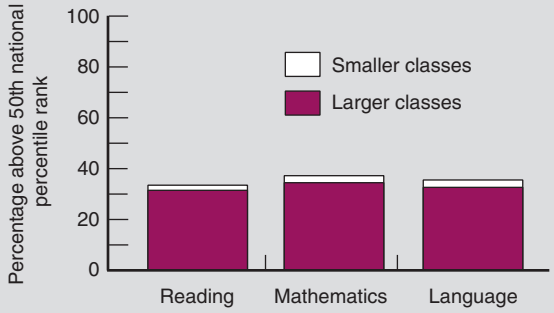
California's class-size reduction effort arose from several motivating factors, including financial opportunity, academic deficiency, and social equity. First, the state economy had gone from recession to boom by 1996, and a fixed percentage of the new surplus had to be spent on education, thanks to the voter-approved Proposition 98. Second, a decade-long decline in student achievement had reached the point of alarm in 1994, when the average reading scores of California fourth-graders tied for last place out of 39 states. Third, particular concern had been mounting over a persistent achievement gap: Black and Latino students in inner cities were performing at considerably lower levels than the rest of California students.

Research had shown that smaller classes could help disadvantaged students the most. California officials pinned their hopes on the results of a class-size reduction experiment conducted in Tennessee from 1985 to 1990. That experiment produced relatively large achievement gains for all students based on standardized test scores. Even more impressive, low-income and black students posted gains almost twice as large as those of other students. These results made the Tennessee model especially attractive for California.

But the programs in Tennessee and California have been vastly different. The Tennessee program was a small, strictly controlled experiment of fewer than 10,000 students, whereas the California program, with few guidelines, has involved 1.6 million. In Tennessee, schools could participate *only* if they had enough classrooms available. The project had no effect on teacher supply. Classes had only 15 students on average. And the diversity of students in Tennessee allows no comparison with the diversity of students in California.

Nevertheless, California students in classes of reduced size have posted modest gains. Figure 2 shows that third graders in smaller classes scored somewhat higher in reading, mathematics, and language than third graders in larger classes. For example, 34 percent of students in smaller classes scored above the national median in reading last year, compared with 32 percent in larger classes. In mathematics, 38 percent in smaller classes exceeded the national average, compared with 35 percent in larger classes. And in language, 36 percent in smaller classes met the mark, compared with 33 percent in larger classes.

Figure 2
Percentage of Third-Grade Students Scoring Above 50th National Percentile Rank (Median) on Stanford Achievement Test, Version 9



SOURCE: California Class-Size Reduction Consortium analysis of California Department of Education, Standardized Testing and Reporting (STAR) data.

Although these differences are small, they translate into an additional 6,000 students who now score above the national median in reading and 9,000 now above the national median in math, according to the research team. Furthermore, the achievement gains were made regardless of race, ethnicity, family income level, or English-language fluency. If anything, it is striking that the gains have been equally distributed across socioeconomic groups despite the unequal implementation across the state. Students in smaller classes in low-income areas have kept pace regardless of their relatively less-qualified teachers and larger cutbacks in other programs. If the inequities in funding and teacher quality can be eliminated, perhaps the achievement gains will ultimately prove to be the greatest among the most disadvantaged students, as in Tennessee.

National Implications

The California experience contains lessons for the nation as a whole. President Clinton has proposed reducing class sizes nationwide to 18 students in grades 1–3. Such a venture would require 100,000 new teachers and cost $5–6 billion a year, even without salary hikes or new classroom facilities, according to a RAND study led by Dominic Brewer. As in California, the rapid increase in the demand for teachers nationwide would reduce the average quality of teachers, thus reducing the overall benefits of the program.

Rather than spending $5–6 billion a year for more teachers, the same amount of money could be used for many alternative purposes. The money would be enough, for example, to raise the salary of every existing teacher in grades 1–3, in every public school in America, by $10,000. Although the authors do *not* suggest such an across-the-board approach, they do argue that some combination of targeted salary hikes and improved professional development would most likely improve teaching in the nation's K–3 classrooms. Therefore, the researchers send a note of caution: "Policymakers may well wish to consider whether schoolchildren learn better in small classes with less-qualified teachers, or in larger classes with more-qualified teachers."

Nonetheless, the California experiment with smaller classes has scored some clear successes, including modest improvements in student achievement despite widespread problems finding space and qualified teachers. The evaluators of the California program—at RAND, the American Institutes for Research, EdSource, Policy Analysis for California Education, and WestEd—will continue their evaluation for three more years. Meanwhile, there is no reason to hesitate fixing the problems already identified. The sooner that California can correct the flaws in the current program, the more likely that it will prove to be a source of celebration rather than consternation. ■

Related Reading

Class Size Reduction in California: Early Evaluation Findings, 1996–1998, George W. Bohrnstedt and Brian M. Stecher (eds.), Palo Alto, Calif.: American Institutes for Research, 1999. Also available as RAND/RP-803, no charge.

"Supply and Demand of Minority Teachers in Texas: Problems and Prospects," *Educational Evaluation and Policy Analysis,* Vol. 21, No. 1, Spring 1999, pp. 47–66, Sheila Nataraj Kirby, Mark Berends, Scott Naftel.

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"Estimating the Cost of National Class Size Reductions Under Different Policy Alternatives," *Educational Evaluation and Policy Analysis*, Vol. 21, No. 2, Summer 1999, pp. 179–192, Dominic J. Brewer, Cathy Krop, Brian P. Gill, Robert Reichardt.

Privileged Treatment

Inequities in HIV Care Demand Remedies for U.S. Health Care

By Martin Shapiro and Samuel Bozzette

Martin Shapiro is professor of medicine at the University of California, Los Angeles. Samuel Bozzette is professor of medicine at the University of California, San Diego, and senior research associate for the Veterans Affairs San Diego Healthcare System. Both are also senior natural scientists at RAND, where they codirect the HIV (human immunodeficiency virus) Cost and Services Utilization Study.

NOT ALL PEOPLE WITH HIV ARE TREATED EQUALLY. AMONG ADULTS WITH HIV IN the United States, women receive inferior patterns of care compared to men, as do blacks and Latinos compared to whites, the uninsured and Medicaid-insured compared to the privately insured, and heterosexuals and injection drug users compared to gay and bisexual men.

Those are some of the results from the first nationally representative study of Americans with HIV. The study, conducted by RAND and a consortium of public and private research institutions, has demonstrated systemic disparities in HIV care across all regions of America. This evidence shines the spotlight on a socioeconomic chasm in the U.S. health care system—a chasm that probably undermines the care for those with other chronic illnesses as well.

The variations in HIV care are especially disturbing given recent clinical advances that have made HIV infection a highly treatable disease. Appropriate medical care can now offer patients the hope of long-term survival and can prevent costly, unnecessary complications. But to receive these benefits, patients need to be in continuous contact with providers who can monitor their health and modify their treatments, particularly as newer medications become available. Even a brief interruption in treatment or a lag in receiving new therapies can place a patient at risk of serious complications—and even death.

Disparities in HIV care can be associated with insurance status, gender, race, ethnicity, exposure group, income, education, age, and even geographical region. The challenge now is to eliminate these disparities. We propose comprehensive national efforts to improve access to HIV care for all Americans. We also must ensure that lags in distributing new treatments to disadvantaged groups are not repeated with each improvement in treatment.

National Data for National Solutions

Until now, research on HIV care has failed to answer the most basic policy questions about the people in care: how much care they receive, where they get it, what it costs, and who pays for it. Although earlier research did suggest that there were inequities in HIV

care, the research dealt with populations that were not nationally representative; thus, it was possible to discount those findings and their implications. Only representative national data can answer questions for the nation as a whole, help to interpret local studies, and point to strategies that might bring equitable treatment to all Americans.

With the HIV Cost and Services Utilization Study (HCSUS), we have begun to sketch the first national portrait of the people in treatment, the costs of treatment, and the care delivered. In early 1996, the HCSUS team interviewed nearly 3,000 HIV patients in 28 urban and 25 rural areas across the continental United States—a representative sample of the national HIV caseload. Since then, we have monitored the treatment of the survivors and detailed the disparities in care across socioeconomic groups and types of insurance coverage.

We are currently examining many other issues as well: the extent of mental health and substance abuse disorders among HIV patients, the extent to which HIV is becoming resistant to antiretroviral drug therapies, the attitudes of patients toward these therapies, the use of alternative therapies, patterns of oral health care, and HIV care in rural areas. We are also studying how insurance plans affect costs, how provider knowledge and specialization affect care, and how health outcomes might be predicted. All told, there are 13 HCSUS research teams working on more than 50 manuscripts to document the results.

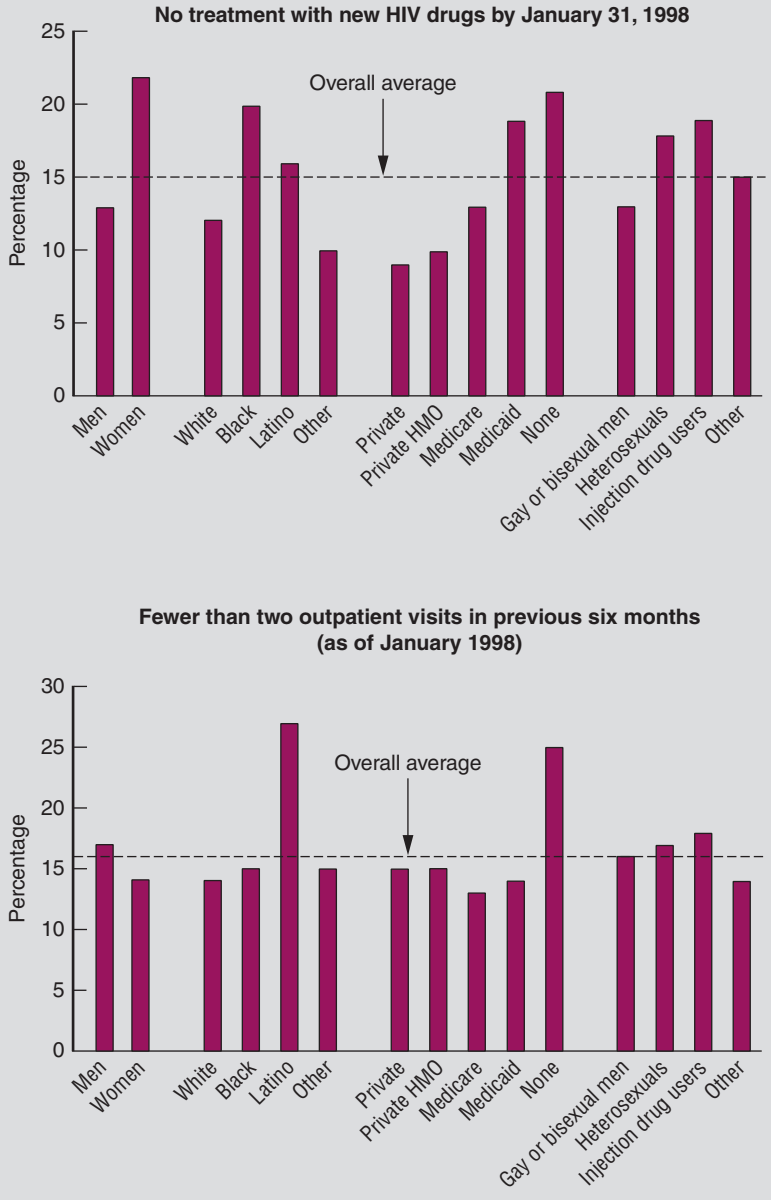
Researchers at RAND, UCLA, and UC San Diego have led the national effort. Sandra Berry and the RAND Survey Group have managed a complex field operation, with most of the fieldwork being conducted by the National Opinion Research Center. Sally Morton and the RAND Statistics Group have collected the data, applied weights to them to represent the national population, and guided the analyses of investigators scattered across a multitude of institutions.

To date, the study has produced good news and bad news. The good news is that the cost of HIV treatment is not inordinate. In fact, the annual cost of caring for people with HIV accounts for less than 1 percent of national health care expenditures. The bad news is twofold: First, many people with HIV still go untreated, even though we can afford to treat everyone; and second, many people who do receive treatment do not receive the quality of treatment that should be made available to everyone.

Divergent Populations Under Care

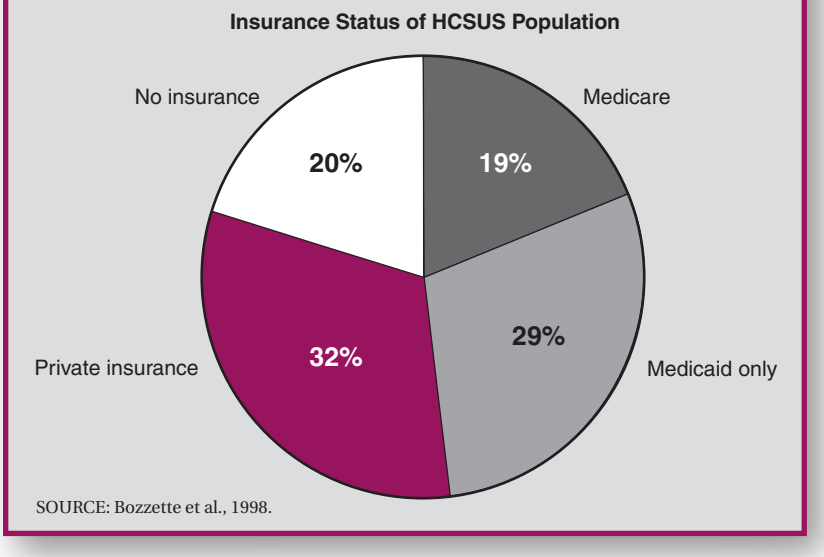
Our study sample represents the 231,400 HIV-infected adults who received care during early 1996 in the continental United States at facilities other than emergency rooms, military hospitals, or prisons. Among these patients, an unexpectedly high 59 percent met

Some Disparities in HIV Care Persist Based on Gender, Race/Ethnicity, Insurance Status, or Exposure Group



SOURCE: Shapiro et al., 1999.

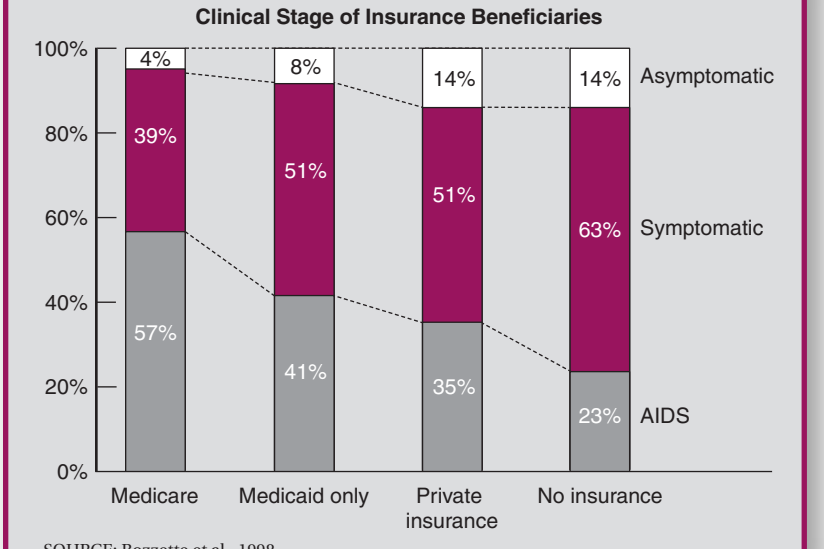
Public Programs Support Much of the HIV-Positive Population . . .



SOURCE: Bozzette et al., 1998.

the Centers for Disease Control case definition for acquired immune deficiency syndrome (AIDS), even though natural history studies indicate that only about a third of those with HIV have full-blown AIDS. In addition, over 90 percent of those in our sample had conditions indicating a need for antiretroviral medications. Clearly, the vast majority in treatment had advanced disease, and it appears that many Americans with early or unrecognized HIV infection are not receiving regular care.

. . . and the Beneficiaries of Public Programs Are in More Advanced Stages of Disease



SOURCE: Bozzette et al., 1998.

The patients in our study were strikingly different from the general U.S. population. They were disproportionately male, black, and poor: 77 percent were men, about half were whites, a third were blacks, and almost a sixth were Latinos. Almost half had annual household incomes of less than $10,000 per year, placing them in the bottom quintile of the U.S. population. Nearly half were gay or bisexual men who reported no injection drug use. Nearly a quarter reported injection drug use, with or without other risk behaviors. Another 18 percent reported only heterosexual sex, and 9 percent reported no known risk factors.

There were striking differences across the HIV-infected groups as well. Compared with men, the women were more likely to be young, black, unemployed, impoverished, underinsured, and less educated. Compared with those in other exposure groups, gay and bisexual men were more highly educated, more likely to be employed, had higher incomes, and were more likely to have private health insurance (see figure on page 17). Gay and bisexual men were also more likely to live in the West, the only region where a majority of the patients had private insurance.

Nationwide, just 32 percent of the patients had private insurance, 48 percent had public insurance, and 20 percent had no insurance at all. Of those with public insurance, 29 percent had only Medicaid (the federal and state program for the poor) and 19 percent had Medicare (the federal program for the elderly and disabled) usually in conjunction with Medicaid. As expected, those with advanced disease relied more heavily on public insurance (see figures at left).

Insurance coverage varied substantially by region. While 51 percent of the patients in the West had private insurance, only 19 percent in the Northeast had private insurance. In the Northeast, 50 percent had Medicaid alone. In the Midwest, 41 percent had private insurance, and 47 percent had either Medicaid or Medicare. In the South, 30 percent had no insurance at all, and there were more uninsured patients in the South—nearly 25,000—than in all other regions combined, which together had roughly 21,000.

This variable and fragmented financing of care will pose an increasingly serious problem as the prevalence of HIV infection grows among groups that are less likely to have private insurance. One of the most daunting health care policy challenges of the next decade will be

to find ways to expand access to HIV care while simultaneously implementing new and fiscally sustainable approaches to underwrite the cost of that care.

Unequal Access to Medications and Services

Access to HIV care improved dramatically from 1996 to 1998. And many disparities in care that were glaring in 1996 narrowed considerably by 1998. Even so, women continued to receive inferior care compared to men, blacks and Latinos compared to whites, the uninsured and Medicaid-insured compared to the privately insured, and heterosexuals and injection drug users compared to gay and bisexual men.

The most conspicuous example involves the newer, potentially lifesaving medications known as protease inhibitors and nonnucleoside reverse transcriptase inhibitors. In 1996, when the HCSUS team began measuring the quality of care received, 41 percent of all eligible patients were not receiving these new therapies, and the disparities were pronounced. Among those not receiving the therapies were 51 percent of women (but only 39 percent of men); 56 percent of blacks (but only 32 percent of whites); 54 percent of the uninsured, and 47 percent of the Medicaid-insured (but only 28 percent of the privately insured); and 51 percent of heterosexuals (but only 37 percent of gay and bisexual men).

In less than two years, the overall proportion of eligible patients failing to receive these new therapies dropped precipitously: from 41 percent in 1996 to 15 percent in early 1998. Yet those still lacking the medications in 1998, as shown on page 13, included 22 percent of women (versus 13 percent of men); 20 percent of blacks (versus 12 percent of whites); 21 percent of the uninsured, and 19 percent with Medicaid (versus 9 percent with private insurance); and 19 percent of injection drug users (versus 13 percent of gay and bisexual men).

Lags in distribution to traditionally disadvantaged groups also meant they waited much longer to receive these treatments. From the beginning of 1996, women waited, on average, 13.5 months, while men waited 11.2 months. Blacks waited 13.5 months, while whites waited 10.6 months. The uninsured waited 13.9 months and Medicaid beneficiaries waited 12.4 months, while the privately insured waited 9.4 months.

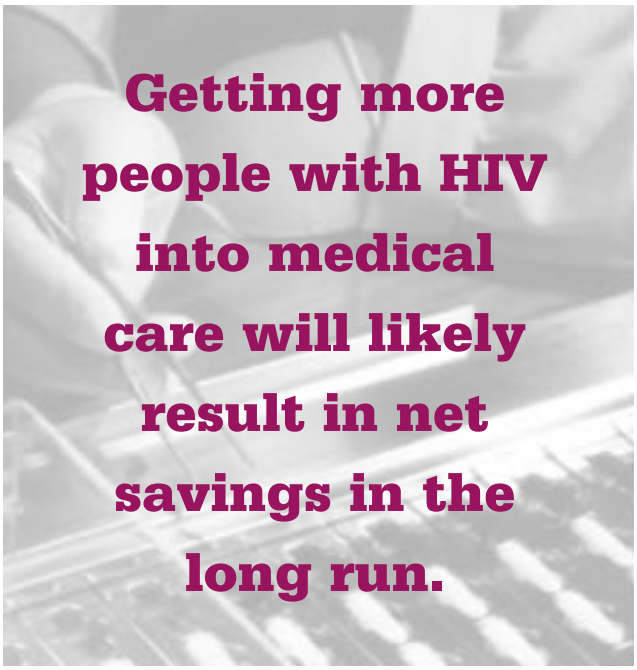
The HCSUS team found other signs of mixed progress. For example, many people with HIV need to take preventive medication against *Pneumocystis carinii* pneumonia (PCP), a common opportunistic infection. From 1996 to 1998, there was a modest overall decline in the proportion of those not receiving necessary PCP treatments. Most important, some gaping disparities in 1996—based on gender, race, and insurance status—had been almost eliminated by 1998. However, with respect to PCP treatments, heterosexuals continued to fare worse than gay and bisexual men, and Southerners and Northeasterners continued to lag Westerners and Midwesterners.

It is also important for HIV patients to make at least one doctor visit every three months. As of 1998, Latinos and the uninsured were least likely to make doctor visits this frequently: 27 percent of Latinos and 25 percent of the uninsured failed to make regular visits, compared with just 16 percent of patients overall (see figure on page 13).

In theory, patients who make regular doctor visits should not need to use emergency rooms for nonemergencies or need to be hospitalized much at all. It is interesting, however, that Latino HIV patients used neither emergency rooms nor hospitals disproportionately. Those who did use both types of facilities disproportionately were women, injection drug users, the uninsured, and the publicly insured. In addition, blacks used hospitals disproportionately.

Members of health maintenance organizations (HMOs) enjoyed a pattern of care very similar to others with private insurance, except that HMO members were even more likely to have received appropriate PCP medications. Patients with the most education and higher incomes also had more desirable patterns of care.

Several conclusions emerge from these findings. First, being uninsured and HIV-infected places an individual at serious risk. We found that insurance status partially explained many of the disparities among racial, ethnic, income, and education groups and at least some of the disparities for women. Second, Medicaid does not provide the quality of care provided by private health insurance. In fact, those with Medicaid were not much better off than those with no insurance at all. Third, the disparities endured by blacks and Latinos cannot be fully explained by insurance status or other characteristics. Fourth, disparities can also depend on gender, exposure group, income, education, age, and region.



Because of the overlapping groups in our study, some might be tempted to simplify the story of HIV in America. One might claim, for example, that black drug abusers receive the worst care, whereas gay white men receive the best care. But even if such a dubious claim were true, it completely ignores the majority of Americans with HIV. Among the 231,400 people represented in our sample, there are roughly 53,000 blacks who are not injection drug abusers, 25,000 white men who are not gay or bisexual, and 42,000 Latinos and other ethnic minorities who span all risk categories. Comprehensive strategies to improve HIV care in America must take into account all patterns of deficient treatment and recognize that no single characteristic of disenfranchised populations is responsible for all deficiencies.

Limited—Yet Shifting—Costs

Fortunately, HIV care has not been unduly expensive. Our sample represented those patients who sought care during January and February of 1996. To estimate the costs of all patients who visited a doctor at least once every *six* months, we extrapolated from our two-month sample of 231,400 adults. We estimated that about 335,000 adults received HIV care during a typical six-month period in 1996. For this larger population, we calculated annual expenditures of $6.7 billion, or about $20,000 per patient per year, with about 85 percent allotted for hospital care and pharmaceuticals.

This $6.7 billion accounted for less than one percent of the $700 billion in U.S. health care expenditures in 1996. This proportion is not excessive, considering that HIV infection, at its peak, accounted for about seven percent of the total potential years of life lost in the United States—which is more than pneumonia, influenza, chronic obstructive pulmonary disease, diabetes mellitus, and chronic liver disease combined. Therefore, the crisis in expenditures for patients with HIV disease appears to be one of financing, not cost.

Nonetheless, any financing reforms must account for two foreseeable *shifts* in costs. First, hospital care was the biggest expenditure in 1996, followed closely by pharmaceuticals. Most likely, hospital expenditures will decline and pharmaceutical costs will rise with the increasing use of highly effective antiretroviral therapies.

Second, many Americans with HIV do not receive medical care even once every six months—a situation that underestimates the national costs of appropriate care for all HIV-infected adults. Although roughly 335,000 patients saw a doctor during the first six months of 1996, there were between 650,000 and 900,000 people with known or unknown HIV infection

in this country at that time, according to the Centers for Disease Control. Quite possibly, the numbers in care have increased somewhat since 1996. Getting more people into medical care obviously will increase costs in the short run, but in the long run it will likely result in net savings by avoiding hospitalizations and emergency room visits, preventing complications, and reducing the costs of lost productivity due to HIV infection.

Prescription for U.S. Health Care: A Comprehensive National Strategy

The initial HCSUS findings lead to a number of recommendations for improving HIV care and the U.S. health care system more broadly.

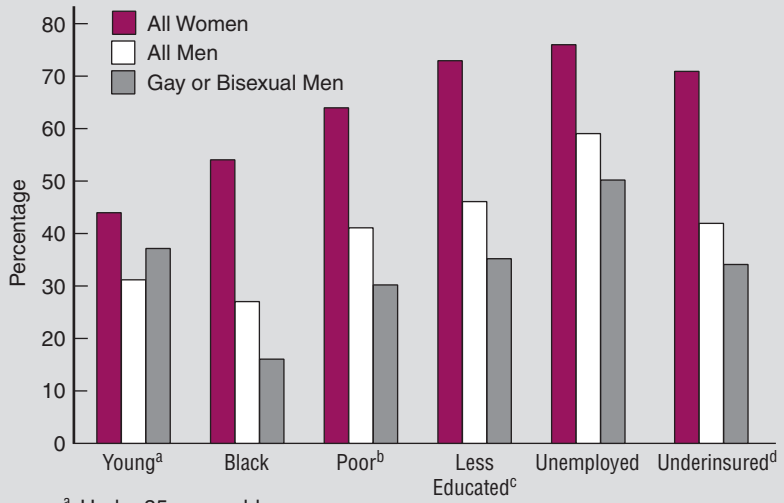
First, the public sector is already paying for the lion's share of HIV care, yet deficiencies remain because of the lack of a comprehensive funding mechanism and the attendant variability in the care provided by different funding sources. Therefore, we need to establish national goals and approaches. A common financing strategy would remove the incentive of some state programs, for example, to cut corners on costs. And if the evidence shows that providing more care actually decreases national costs in the long run, then eliminating disparities in care would be quite straightforward, because everyone would stand to gain.

Second, there is an urgent need to identify those not yet in treatment and to provide them with care for HIV disease. The costs to both the individual and society could be enormous if those currently not in treatment remain outside the health care system until their disease is very advanced and they are very ill.

Third, HIV care will continue to evolve. New treatments will be needed to sustain the lives of those for whom existing therapies do not work. We need to do a much better job to prevent the kinds of lags in access to newer therapies that occurred with the protease inhibitors.

Fourth, the disparities in care that we have seen across categories of insurance, race, gender, and other characteristics are unacceptable. We need to set very specific targets to eliminate these variations, and we need to collect data to monitor the extent to which they occur.

Women with HIV Are Strikingly Different Than Men with HIV



SOURCE: Bozzette et al., 1998.

Finally, HIV disease is far from unique. There should be studies, on a scale similar to HCSUS, of a number of other chronic diseases to provide nationally representative data on the care that people are receiving. Diabetes mellitus, coronary artery disease, epilepsy, chronic obstructive pulmonary disease, and some of the common cancers typify the kinds of diseases that should be studied in this way. If we are to safeguard the health of all the American people, we should allow zero tolerance for disparities in the care rendered for HIV and for other chronic diseases as well. ■

Related Reading

"Variations in the Care of HIV-Infected Adults in the United States: Results from the HIV Cost and Services Utilization Study," *Journal of the American Medical Association*, Vol. 281, No. 24, June 23, 1999, pp. 2305–2315, Martin F. Shapiro, Sally C. Morton, Daniel F. McCaffrey, J. Walton Senterfitt, John A. Fleishman, Judith F. Perlman, Leslie A. Athey, Joan W. Keesey, Dana P. Goldman, Sandra H. Berry, and Samuel A. Bozzette, for the HCSUS Consortium.

"The Care of HIV-Infected Adults in the United States," *New England Journal of Medicine*, Vol. 339, No. 26, December 24, 1998, pp. 1897–1904, Samuel A. Bozzette, Sandra H. Berry, Naihua Duan, Martin R. Frankel, Arleen A. Leibowitz, Doris Lefkowitz, Carol-Ann Emmons, J. Walton Senterfitt, Mark L. Berk, Sally C. Morton, and Martin F. Shapiro, for the HCSUS Consortium.

Chronic Condition

Quality Deficiencies Pervade U.S. Health Care System

Large gaps exist between the quality of health care that people in the United States should receive and the quality of care that people do receive. These gaps appear across different types of health care facilities, health conditions, health insurance, geographical locations, and age groups.

Those are the dominant findings of a team of RAND researchers who reviewed 48 studies published over the last decade on quality of care. In the absence of a national quality tracking system, researchers Mark Schuster, Elizabeth McGlynn, and Robert Brook conducted their literature review to summarize the quality of care in the United States.

The researchers divided their review into preventive, acute, and chronic care, because some people value information about preventive check-ups or cancer screenings, for example, more than information about acute care for sore throats or ear infections or about chronic care for diabetes or depression. The 48 studies cover services delivered to half a million people for a broad range of conditions.

On average, only 50 percent of people received the recommended preventive care, 70 percent received the recommended acute care, and 60 percent received the recommended chronic care. The problem is compounded by "contraindicated" care, or care delivered that never should have been delivered. About 30 percent of acute patients and 20 percent of chronic patients received contraindicated care.

The gap between care recommended and care received is a matter of life and death.

The gap between care recommended and care received is a matter of life and death. One national study showed that patients at the worst hospitals, ranked by quality of care, were more likely to die of heart failure, heart attack, and pneumonia than patients at the best hospitals. The quality differences translated into 5–8 extra deaths per 100 patients at the worst hospitals.

Mediocrity Is Nothing New

National interest in quality of care has grown dramatically in response to the dramatic transformation of the health care system in recent years. A presidential commission is seeking to define, measure, and promote quality of care amid fears that quality will be sacrificed to control costs under new managed care regimes.

The RAND literature review, however, shows no overall deterioration or improvement in quality as a result of the shift toward managed care. Some studies find that managed care organizations provide better care than fee-for-service, some find that fee-for-service provides better care, and others find that the care is about the same. Results vary depending on the setting, type of care, and methodology.

Unfortunately, research has generally lumped together managed care organizations without distinguishing between health maintenance organizations, independent practice associations, preferred provider organizations, and point-of-service plans. Distinguishing features have not been considered, either, such as the comprehensiveness of benefits packages or nonprofit versus for-profit status.

In the future, it would be more useful to look at the effects of specific characteristics of managed care organizations, the RAND team suggests. For example, inclusion of immunizations in a benefits package may have a larger effect on immunization rates than whether the care is offered by a managed care organization or a fee-for-service provider.

At any rate, problems with quality of care predate managed care. The current findings are consistent with quality assessments under fee-for-service arrangements analyzed as part of RAND's Health Insurance Experiment as long ago as the 1970s, before the term *managed care* entered the popular vocabulary.

Thus, a disturbing and enduring national picture emerges from these studies. The quality of health care in the United States varies across hospitals, cities, and states. Whether the care is preventive, acute, or chronic, it frequently does not meet professional standards. The table quantifies how frequently several recommended health care services *do* meet the standards.

Just spending more money on health care will not solve the problem. On the one hand, a major part of the problem is overuse, which is both wasteful and potentially harmful to health. Eliminating such care might save money while possibly even promoting health. On the other hand, many people receive either too little care or the wrong care, such as misdiagnosis and mistreatment. Fixing these problems may improve health but also increase expenditures.

The Remedy: a National Strategy

Essential to improving quality of care is a coordinated national system to measure quality routinely and to communicate the results in a way that is useful for clinicians, consumers, health plan managers, and policymakers. At present, there is only a patchwork of quality measurement systems, with little uniformity, breadth, or ability to produce rapid results. These systems do not yet assess most health care providers in the country, and changes in health care are occurring faster than these changes can be evaluated.

The United States urgently needs a strategy for routine monitoring and reporting on quality, both to preserve the best of the American health care system and to improve the efficiency of service delivery. This strategy could be organized by the federal government, the private sector, or a public-private partnership.

Over the past decade, RAND has developed (a) more than 1,000 criteria to measure the quality of care delivered to men, women, and children; (b) mechanisms to obtain this information from patient surveys and medical records; and (c) measures of health status and patient satisfaction that can gauge the effects of changes in health care policy.

"The United States is capable of setting up a quality measurement system that can provide the multiple participants in the health care system the information they need to ensure delivery of high-quality care," say the researchers. "A strategy . . . is needed now." ■

Care Recommended Versus Care Received

Health Care Recommended	*Quality of Care Received*
Preventive Care	
Routine vaccines for all children	74% received all recommended vaccines
Annual influenza vaccine for all people over 65	52% received annual vaccine
Pap smear every 1–3 years for women over 18	67% had Pap smear in prior three years
Acute Care	
Antimicrobial drugs *not* appropriate for viral upper-respiratory-tract infection	16% of all antimicrobial drug prescriptions in 1992 were written for upper-respiratory-tract infections
Care for hip fracture	67%–94% of patients with hip fracture received appropriate components of care
Routine prenatal screening tests	Across six health maintenance organizations, women received 64%–95% of seven recommended tests
Chronic Care	
Dilated-eye examination to screen for diabetic retinopathy	Less than two-thirds of patients at high risk had eye exam in past year
Beta-blocker therapy to reduce post–heart attack mortality	45% of heart attack patients received beta blockers before or at discharge
Adequate doses of antidepressants for persons receiving them	33% of depressed patients discharged from a hospital with antidepressants had doses below recommended level

Related Reading

"How Good Is the Quality of Health Care in the United States?" *The Milbank Quarterly,* Vol. 76, No. 4, 1998, pp. 517–563, Mark A. Schuster, Elizabeth A. McGlynn, Robert H. Brook. Also available as RAND/RP-751.

"Managed Care Is Not the Problem, Quality Is," *Journal of the American Medical Association,* Vol. 278, No. 19, 1997, pp. 1612–1614, Robert H. Brook. Also available as RAND/RP-672.

Math over Myth

Is Drug Prevention Worth the Price?

For nearly a decade, federal dollars have supported drug prevention programs throughout the United States. Community groups have hailed prevention—or "demand reduction"—as more effective than law enforcement efforts to shrink the drug supply. "An ounce of prevention," the cultural myth asserts, "is worth a pound of cure," and prevention advocates have argued for shifting money away from enforcement and toward prevention.

But prevention is an elusive target. How can a prevention program for adolescents today really receive blame or credit for drug use or abstention in the future, when so many other social and psychological variables intervene in the interim? The benefits of prevention (or of *not* doing something) also seem incalculable. Even if success can be pinpointed, how *much* success is necessary to make a program worth its cost? And for policymakers, how might the benefits of prevention compete with the benefits of other drug control strategies?

These questions are pertinent today. One primary goal of the 1999 national drug control strategy is "to educate and enable our youth to reject substance abuse." The federal government has begun spending $195 million a year on a new drug prevention media campaign. The national strategy also seeks, however, to balance demand and supply reduction efforts, and White House drug policy director Barry McCaffrey has called for greater accountability for all antidrug programs, which could mean boosts in funding for programs that work and cutbacks for those that don't.

To measure how well prevention can work, a RAND research team led by Jonathan Caulkins estimated the cost-effectiveness of exemplary school-based drug prevention programs and compared the estimates with those of other drug control programs. The bottom line: School-based prevention programs can be just as cost-effective as some law enforcement programs, primarily because prevention is so inexpensive. However, the real benefits of prevention are so limited that prevention could only complement—not substitute for—other antidrug strategies. Intriguingly, one strategy stands out as likely to be much more cost-effective than either prevention or enforcement, and that strategy is drug treatment.

These results apply to school-based prevention programs only. There are insufficient data available from community-based and media-based prevention programs to assess their cost-effectiveness. Furthermore, the results apply to only the best school-based programs—those few that have been proven effective by formal evaluations. The RAND research compares the *best* school-based prevention programs with *average* enforcement and treatment programs.

The Mathematics of Prevention

The researchers developed a fairly straightforward mathematical formula to calculate, dollar for dollar, how much an exemplary school-based program could reduce cocaine consumption. To give prevention its best shot, the researchers based their calculations on two successful school-based programs: Project ALERT and Life Skills Training. Both seek to inculcate in adolescents the skills to resist social pressure to use drugs.

Building on earlier evaluations of these programs, the researchers used proven reductions in *marijuana* use to project future reductions in *cocaine* use. The study focused on cocaine for two reasons: It is the country's most problematic illicit drug, and previous studies of other drug control strategies provide comparative benchmarks of cost-effectiveness for control-

ling cocaine. Thus, the findings of all studies can be compared with one another.

The mathematical formula contains eight factors that are multiplied together. Because of uncertainty regarding each factor, each is given a low value, a high value, and a "best-estimate" value. The table at right shows the factors, the best-estimate values, the rationales behind each best estimate, and the result. Using this formula, researchers can substitute improved estimates as more information becomes available.

The tentative result shows that a model school-based prevention program will reduce future cocaine consumption by the average participating adolescent by a net present value of about 3.8 grams. Of course, most people never use cocaine, and the reduction for some could be dramatic. But the average lifetime reduction of only 3.8 grams is equivalent to what a light user would consume over three months or a heavy user would consume in about 12 days.

To determine cost-effectiveness, the reduction in use is divided by the program cost. The cost of a full program of 30 class sessions is estimated at $146.50 per student, including materials, teacher training, and the opportunity cost of using class time for nonacademic subjects. Therefore, we divide 3.8 grams by $146.50 and multiply the result by a thousand to convert grams per dollar to kilograms per million dollars. The answer: $1 million spent on prevention can reduce nationwide consumption of cocaine by 26 kilograms.

The figure on the next page illustrates how the cost-effectiveness of model prevention programs compares with that of enforcement and treatment programs previously studied. The best estimate suggests that model school-based prevention programs can reduce cocaine consumption as much per dollar spent as some enforcement programs. The uncertainty is so great, however, that the low estimate implies that prevention is not as cost-effective as any enforcement approach, whereas the high estimate implies prevention is more cost-effective than almost all of them.

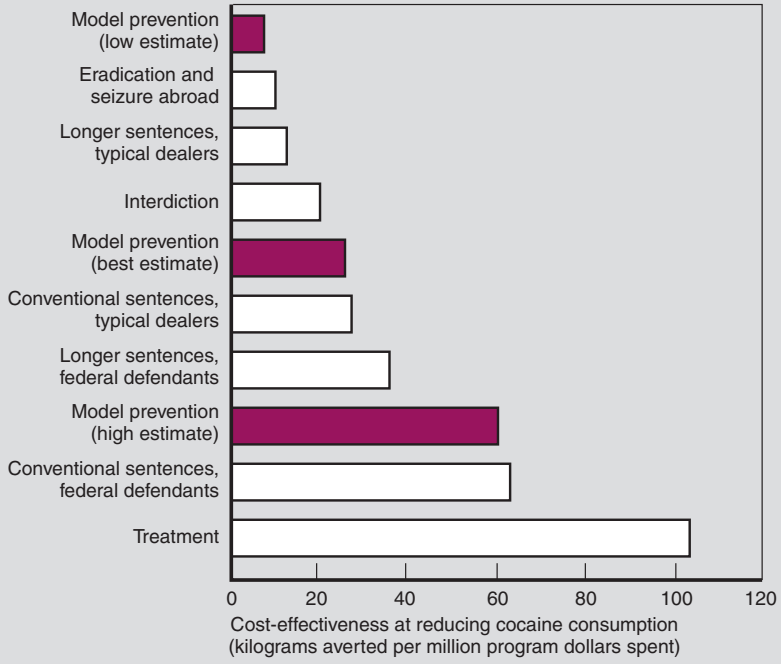
Prevention is generally competitive with enforcement despite generating small reductions in future cocaine use. As it turns out, prevention is cost-effective not because it is so effective but because it is so inexpensive. Neither prevention nor enforcement, however,

Factors Determining the Effectiveness of Prevention at Reducing Cocaine Consumption

Factor	Best Estimate	Explanation
1. Proportion of people who use cocaine	0.20	Without prevention, about 20 percent of people use cocaine
2. Total consumption per user (grams)	350	Without prevention, the average user consumes 350 grams of cocaine over a lifetime
3. Percentage reduction due to prevention	0.076	With prevention, the average youth reduces cocaine use by 7.6 percent over a lifetime, assuming that actual reductions in marijuana initiation represent future reductions in cocaine consumption
4. Discount factor	0.507	Future benefits are less valuable today and need to be discounted, as in economic forecasts, by 4 percent a year, yielding a discount factor of 0.507
5. Social multiplier	2.0	If one person is prevented from using cocaine, he or she exerts a "social multiplier" of peer pressure, preventing one additional person from using cocaine
6. Market multiplier	1.3	If one person is prevented from using cocaine, he or she triggers a "market multiplier" of decreased demand, which makes law enforcement easier, which forces dealers to raise prices, which lowers consumption among remaining users, generating an extra 30 percent decrease in consumption overall
7. Correction for unproven correlation	0.9	The direct correlation between marijuana initiation and cocaine use (postulated in factor 3) is probably overstated and should be reduced slightly
8. Reduction for scale-up effects	0.6	Exemplary programs will not work as well on a large scale; this factor accounts for the degrading effects of expansion
Overall effectiveness (grams per participant)	**3.8**	**Multiplying together all eight factors produces this final result: The best prevention program will reduce average cocaine consumption by a net present value of 3.8 grams per person over the course of a lifetime**

SOURCE: Caulkins et al., 1999.

Comparison of Prevention with Other Cocaine Control Programs



SOURCE: Caulkins et al., 1999.

appears as cost-effective as treating heavy users. Per million dollars spent, treatment can reduce cocaine consumption nationwide by a net present value of more than 100 kilograms.

The other drug control strategies represented in the figure, in order of increasing cost-effectiveness, are

- eradication of coca leaf and seizures of coca base, cocaine paste, and cocaine in foreign countries
- longer prison sentences (mandatory minimums) for typical cocaine dealers
- interdiction of cocaine en route from source countries
- conventional sentences (no mandatory minimums) for typical dealers
- mandatory minimum sentences for high-level dealers prosecuted at the federal level
- conventional sentences for high-level dealers prosecuted at the federal level
- treatment programs effective enough to keep most heavy users off cocaine during treatment and also a small minority off heavy use after leaving treatment.

Benefits Can Easily Outweigh Costs

It is easy to demonstrate the affordability of nationwide implementation of cutting-edge school-based drug prevention programs. Putting all 3.75 million seventh graders in the United States through a program like those discussed here would cost about $550 million a year—less than 1.5 percent of current national drug control spending of $40 billion a year.

Even limited reductions in cocaine use appear to justify the costs of prevention. The researchers estimate that each dollar spent today on a model prevention program averts $2.40 in the social costs of health care, lost productivity, and crime related to cocaine abuse. Again, however, this estimate is subject to substantial uncertainty: Using the lowest and highest estimates of cost-effectiveness, the cost averted per dollar could be as low as 60 cents or as high as $5.60.

But reduced cocaine use isn't the only payoff. The researchers find that the savings from reduced cigarette-related and alcohol-related social costs, though smaller, are enough to virtually guarantee that the overall benefits exceed the overall costs. And there may be still other benefits: Strengthening the resistance skills and perceived self-efficacy of adolescents may dissuade them from associating with gangs, getting pregnant, dropping out of school, and other behaviors potentially injurious to their health or economic prospects. The researchers do not estimate the magnitude of any of these benefits.

There is another reason to fund prevention now. Drug epidemics have recurred periodically in the past, are difficult to predict, and are not always even recognized until too late—after the peak years of adolescent initiation have already passed. Because of this time lag, it would be difficult for a reactive prevention strategy to mitigate the early growth stages of an epidemic. Taking recognition and reaction lags into account, prevention programs are most effective when run about 15 years before it is even clear there is an epidemic to be prevented. How might this be done? One way might be to invest in improving the early warning signs of an epidemic. A more prudent alternative might be to run prevention programs continuously as insurance against future epidemics.

Great Uncertainties Remain

The benefits of prevention, however, are much less certain than those of enforcement or treatment. Research on enforcement and treatment programs also used low, medium, and high values to estimate cost-effectiveness. But the range of estimates for prevention ended up being two to five times as large as the ranges for enforcement and treatment.

A large part of the uncertainty about prevention stems from factors rarely considered pertinent to cost-effectiveness. For example, one might think the main benefit of prevention programs is preventing participants from initiating drug use. Decomposing the mathematical formula reveals that only 38 percent of the reduced cocaine consumption comes from these participants. Forty-four percent comes from positive spillover to friends and associates, and 17 percent comes about because reduced use by all these people shrinks the cocaine market, making enforcement against the remaining users all the more effective.

In addition, not all the reduction in quantity consumed by people in the program is the result of never initiating drug use. Some reduction is associated with reduced overall quantity consumed by those who do start using cocaine at some point. Thus, a prevention program that merely delays initiation can still decrease total consumption.

Another source of uncertainty is that drug epidemics vary over time. Had prevention programs been in place in the 1960s, about a decade before the peak in cocaine initiation, the programs might have been much more effective than in the 1990s. In the early years of an epidemic, initiation rates are higher, and so there is more potential for reduction.

Because of such uncertainties, people can reach dramatically different conclusions about the cost-effectiveness of prevention based on the same evaluations of prevention programs. There is abundant room for disagreement over the following: the indirect effects of prevention programs on nonparticipants and on enforcement, the significance of the correlation between marijuana initiation and cocaine consumption later in life, and the degree to which effectiveness declines with scale-up over the years.

Prevention as Part of the Solution

Although nationwide implementation of school-based drug prevention programs is clearly affordable, it is also clear that full-scale implementation would not eliminate or even greatly reduce the cocaine problem in the United States. Although the most exemplary prevention programs might reduce lifetime cocaine consumption by a net present value of 3.8 grams per participant, depending on the time frame considered, that figure is but a small fraction of the average lifetime consumption per capita. Clearly, most cocaine consumption will not be prevented, and the jobs of law enforcement and treatment will not be supplanted.

Furthermore, it would be years before the country could reap the benefits of prevention. Using the best estimate of effectiveness, it would take a nationwide model program 10 years to reduce the number of cocaine users by 2.5 percent. It would take 20 years to reduce the number of users by 5 percent and 40 years to achieve a 7.5 percent reduction.

Prevention cannot by itself solve the drug problem, but this is not an overly negative finding. Prior research has found that other interventions, such as treatment and interdiction, cannot individually solve America's cocaine problem, either. Even if prevention is not a "silver bullet" solution, it can play a role in managing the problem. ■

Related Reading

An Ounce of Prevention, a Pound of Uncertainty: The Cost-Effectiveness of School-Based Drug Prevention Programs, Jonathan P. Caulkins, C. Peter Rydell, Susan S. Everingham, James Chiesa, Shawn Bushway, RAND/MR-923-RWJ, 1999, 194 pp., ISBN 0-8330-2560-0, $15.00.

Mandatory Minimum Drug Sentences: Throwing Away the Key or the Taxpayers' Money? Jonathan P. Caulkins, C. Peter Rydell, William L. Schwabe, James Chiesa, RAND/MR-827-DPRC, 1997, 193 pp., ISBN 0-8330-2453-1, $15.00.

Controlling Cocaine: Supply Versus Demand Programs, C. Peter Rydell, Susan S. Everingham, RAND/MR-331-ONDCP/A/DPRC, 1994, 120 pp., ISBN 0-8330-1552-4, $15.00.

Modeling the Demand for Cocaine, Susan S. Everingham, C. Peter Rydell, RAND/MR-332-ONDCP/A/DPRC, 1994, 60 pp., ISBN 0-8330-1553-2, $15.00.

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