

Chapter 61

Patients with HIV Infection and AIDS

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What began as a little-noticed report of five homosexual men from Los Angeles with *Pneumocystis carinii* pneumonia in the June 4, 1981, Centers for Disease Control newsletter became an epidemic spanning the globe, killing millions, and affecting the lives of tens of millions.¹ Cases in homosexual men, intravenous drug users, hemophiliacs, and sexual partners of people in high-risk groups soon were reported across the United States. Newly absent T-helper cells seemed to be the common theme connecting these disparate groups. Lack of normal immune function left affected individuals vulnerable to opportunistic infections.

By 1984, human immunodeficiency virus (HIV) was established as the cause of this progressive T-helper cell destruction. Blood tests became widely available and presented the bad news that for every case of acquired immunodeficiency syndrome (AIDS), there were thousands of asymptomatic HIV-positive individuals who were able to transmit the virus to others. By 1988, 90,000 individuals had been diagnosed with AIDS, of whom about 50,000 had died.² By 1995, 500,000 had been diagnosed with AIDS, of whom more than 50% had died.³

In 1996, newly identified protease inhibitors (PIs) and precisely timed drug cocktails started to reverse symptoms even in seriously ill patients. In 1996 the death rate in the United States fell by 23% compared with that of 1995, and it dropped another 40% in 1997.⁴ In this era of highly active antiretroviral therapy (HAART), PIs in combination with nucleoside reverse transcriptase inhibitors (NRTIs) and nonnucleoside transcriptase inhibitors (NNRTIs) have been able to reduce the amount of HIV in plasma to undetectable levels in many patients and increase life expectancy to 36 years in white men with HIV and 11 years in those with AIDS.⁵ The combinations also seemed to prevent the progression to AIDS. There were 6% fewer AIDS cases in 1996, 15% fewer in 1997, and 25% fewer in 1998, leading many experts to predict a relatively normal life expectancy for those with HIV or AIDS.⁶ What once was a virtual death sentence had become treatable. With new breakthroughs in antiviral therapy and transmission prevention, hopes for a cure with a vaccine are now voiced more frequently.

But to paraphrase Dickens, it has been the best of times and the worst of times in our efforts to treat HIV infection and AIDS. Because of economics (on average HAART costs \$17,000 per year), only Western nations have seen the benefits. Unfortunately, AIDS-related illness is now the fourth leading cause of death worldwide.⁷ An estimated 50 million individuals have been infected, of whom 33 million are still alive.⁸ By November 1999 estimates, 1600 babies are born with HIV or are infected via consumption of breast milk each day.⁹

A total of 19 of 20 new cases of seroconversion and AIDS deaths occur in developing countries, with sub-Saharan Africa (particularly Botswana, Namibia, and Zimbabwe) being responsible for nearly 70% of the world's HIV infections despite representing only 10% of the population.¹⁰ In these regions, seroconversion is almost entirely a result of heterosexual and mother-to-child transmission. In 1998 and 1999, 22 million and 23.3 million, respectively, of those positive for HIV lived in this region, compared with only 500,000 in Western Europe.¹¹ Life expectancy in the sub-Saharan region, which was 59 years in the 1990s, is now expected to drop to 45 years by 2005 to 2010.¹² By 2005, one of five workers in this part of the world will be HIV positive.¹³

The nations of the former Soviet Union had a greater than 30% increase in the number of HIV conversions in 1999 (estimated at 360,000), with the majority resulting from intravenous drug use.¹⁴ In Moscow there were three times the number of cases in the first 9 months of 1999 as in all prior years combined.¹⁵ Other regions also have been hard hit by this epidemic, with Asia now representing the fastest growing seroconversion rate, heralding a potential explosion in numbers.

The biggest problems continue to be poor access to treatment (mostly because of cost), poor understanding of basic sex education concepts, promiscuity among men who are indifferent to potential heterosexual transmission, and transmission to babies. In sub-Saharan Africa, more women than men are now HIV positive, with African girls ages 15 to 19 years five to six times more likely than boys to be seropositive.¹⁶ This problem will cripple countries

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whose economies cannot match the resources of the United States or Western Europe. In 1997, for example, the United States spent \$1 to \$3 billion on HIV/AIDS-related illnesses, whereas sub-Saharan Africa spent only \$165 million despite having almost 70% of the world's cases. For these countries the only viable option is a vaccine to prevent further transmission.

The dramatic improvements in life expectancy resulting from new drug combinations in the United States and Western Europe have created other issues of concern. Although less of a problem than in developing countries, the cost of new combination therapies may reduce access to treatment or encourage noncompliance. Adverse events from multiple drug treatments and comorbidities, such as increased susceptibility to opportunistic infections and some cancers, are greater concerns with increased life expectancy. Increasing the pool of seropositive individuals under treatment increases the potential for transmitting the virus to noninfected individuals. Failure to adhere to strict drug regimens substantially increases the chance for mutation, resistance, and tolerance.¹⁷ Resistant strains can be passed on to others, as has been documented in 80 newly infected individuals who showed a 16.3% prevalence of HIV-1 variants with known resistance-conferring genotypes to any retroviral agent.¹⁸ The presumption is that these cases represent transmission of treatment-resistant strains from previously treated patients.

It has been estimated that an adherence rate of 95% is necessary for optimal results.¹⁹ This level of patient compliance is rarely achieved even in the best of situations. Noncompliance rates may approach 30%, allowing for more resistant HIV strains to emerge. Even if the cost was far less than the current \$1000 to \$2000 per month, other factors encourage incomplete dosing regimens. Multiple drugs must be taken at fixed times, some with food and some without, and side effects, such as malaise, nausea, and vomiting, are common.

TREATMENT

Many hoped that HIV infections could be eradicated if viral replication could be completely suppressed and chronically infected cells could be allowed to die. Using estimates of an infected cell's half-life of 10 to 14 days, it was suggested that eradication might be achievable in 2 to 3 years. These hopes dissipated in the face of newer data indicating that low-level viral replication may occur even with combination therapy at plasma HIV-ribonucleic acid (RNA) levels below detection (<50 copies/ml).²⁰

As of December 1999 the consensus regarding specific antiretroviral therapy as reviewed by the International AIDS Society-U.S.A. Panel is to use initial regimens of two nRTIs and one PI, two nRTIs and one NNRTI, or two PIs and two nRTIs.²¹ No definitive superiority of one regimen over another has been noted. Early treatment is recommended, but perceived benefits must be balanced against long-term adverse events. Plasma HIV-RNA levels and CD4⁺ counts are good predictors of outcome.

Current antivirals approved by the U.S. Food and Drug Administration (FDA) include the following:²²

- nRTIs: Zidovudine (AZT, Retrovir), didanosine (Videx), zalcitabine (Hivid), stavudine (Zerit), lamivudine (Epivir), and abacavir (Ziagen).
- NNRTIs: Nevirapine (Viramune), delavirdine (Rescriptor), and efavirenz (Sustiva).
- PIs: Saquinavir (Fortovase), ritonavir (Norvir), indinavir (Crixivan), nelfinavir (Viracept), and amprenavir (Agenerase).

HAART regimens have reduced HIV to undetectable levels in some patients, raising hopes of eradication, but recent studies have shown a swift resurgence by HIV on discontinuation with or without interleukin-2 (IL-2) added to activate resting memory cells.²³ In one study, 12 patients received HAART for a mean of 20.8 months and 14 patients received HAART for a mean of 20.1 months with IL-2 for a mean of 39 months. CD4⁺ counts fell even before HIV could be detected, demonstrating a continual low-level "whittling away" of CD4⁺ even during HAART.

Despite these disappointments, further research has opened doors for new approaches. Transactivator of transcription (Tat) is a small HIV protein essential for both viral replication and the progression of HIV.²⁴ It increases the transcription rate of viral mRNA by thousands (burst effects), helping to produce full-length transcripts of HIV genes. Tat can be excreted into plasma and enter other cells to trigger immediate transcription of all viral genes. Tat may be immunosuppressive as well by increasing susceptibility of T cells to HIV infection and making them more sensitive to apoptosis (programmed cell death). Individuals with the highest levels of anti-Tat antibodies are among those with the slowest disease progression.

Two other encouraging approaches include HIV-1 fusion inhibitors²⁵ and integrase inhibitors. HIV-1 fusion inhibitors are designed to block infection by preventing HIV fusion with host cells, thereby preventing insertion of viral deoxyribonucleic acid (DNA). Integrase is an enzyme crucial for insertion of HIV genetic material into the host's own DNA. In January 2000, researchers announced that two compounds, both diketo acids, blocked the enzyme's action in laboratory tests.²⁶

VACCINE DEVELOPMENT

Traditional vaccine development typically involves the production of a weakened or attenuated virus that is injected into uninfected hosts to produce an immune response in hopes that, with subsequent exposure, immunological memory will bolster defenses. Unfortunately, traditional approaches have not worked well in HIV prevention. HIV has proved to be a formidable foe to vaccine research. It weakens host antibody responses and makes the cells it inhabits less noticeable to immunological surveillance by constantly changing the structure of peptide antigens (spikes) by which cytotoxic T cells recognize infected cells.²⁷ These spikes also can be shed into circulation, much like countermeasures released by planes or submarines to attract missiles.

The inherent limitations of current antiretroviral therapy underscore the need to develop effective vaccines, the most feasible and economical way of halting the worldwide epidemic. Several different vaccine strategies have been tested, largely in animals. These strategies include subunit vaccines, inactivated virus vaccines, attenuated live-virus vaccines, and DNA vaccines. Unfortunately, none of the vaccines tested has shown a significant effect on patients' conditions, CD4⁺ T cell counts, or HIV burden in the blood.²⁸ Because of the obvious concerns of transmission with some vaccines, the Joint United Nations Programme on HIV/AIDS (UNAIDS) has published recommendations on ethical guidelines for vaccine research.²⁹

A group of prostitutes in Kenya that was thought to be immune to HIV despite numerous exposures (from which an antibody was developed) has now become infected.³⁰ This unfortunate turn of events has raised concerns that immunity may be reliant on continued exposure and any vaccine developed would have to be given repeatedly, certainly not a feasible approach for mass prevention programs. To help coordinate international cooperation on HIV vaccine development, the World Health Organization (WHO) and UNAIDS have created a new initiative (HIV Vaccine Initiative) to provide an independent forum for all researchers on HIV vaccines to collaborate.³¹

DISCRIMINATION

Although all 50 states offer some disability protection, discrimination against persons with HIV continues to be a major issue. Two significant disability discrimination statutes—the Vocational Rehabilitation Act of 1973³² and the Americans with Disabilities Act of 1990 (ADA)³³—continue to be enforced at the federal level. The ADA bars discrimination in employment,³⁴ government-provided services,³⁵ and public accommodations.³⁶ It applies to state and local governments, and employment provisions cover private employers with 15 or more employees.³⁷ Although the ADA does not specifically include HIV seropositivity, the U.S. Supreme Court has determined that it is a disability, even if the patient does not yet exhibit symptoms of AIDS.³⁸

Protection from discrimination in insurance remains a great concern for HIV-positive individuals, for whom access to costly treatment regimens may become a life-or-death issue. Most of the legal developments that concern the financing of AIDS care involve efforts by insurers to limit or escape liability, as well as efforts by persons afflicted by AIDS to obtain coverage to which they feel entitled under their insurance plan. Although the ADA prohibits discrimination in employer-based health insurance,³⁹ it does allow decisions on underwriting to be based on actuarial risk.⁴⁰ Of course, the employer must show that it provides a bona fide insurance plan and demonstrate that the plan is not a “subterfuge” for disability discrimination.⁴¹

TESTING

The first tests for HIV antibody—enzyme immunoassay (EIA) and Western blot (WB)—were developed in 1985.⁴²

With their development, calls for mandatory testing surfaced. But it was clear that, even ignoring the huge cost, mandatory universal testing was not a viable option. As with all diagnostic testing, the sensitivity and specificity of the test (rate of false-negative and false-positive results) must be considered. Without 100% accuracy, the emotional harm to individuals testing falsely positive and the false sense of security given those testing falsely negative outweigh any potential benefits to society. In addition, the period between infection and detectable antibody development (now about 25 days) increases potential for false-negative results.⁴³ Voluntary testing programs designed to encourage testing by preventing discrimination through strict confidentiality provisions and to decrease the spread of disease through awareness of HIV status and education regarding appropriate safety measures continue to be the primary testing emphasis.

Because of recent sales of home HIV tests claiming to be approved by the WHO or FDA, the FDA and Federal Trade Commission (FTC) have sent warning letters to numerous companies.⁴⁴ The WHO does not license or approve HIV test kits, and the FDA has not approved any home-use test kit. Other than the standard tests, a rapid test (5 to 30 minutes) with sensitivity and specificity as good as EIA is the only one licensed by the FDA.⁴⁵ Saliva tests are being developed and may be available soon.

HIV transmission during medical procedures almost exclusively has been from infected patient to health care worker.⁴⁶ Prospective studies of health care workers estimate the average risk of transmission after a percutaneous exposure to HIV-infected blood is about 0.3% and after mucous membrane exposure, 0.9%.⁴⁷ The risk after skin exposure is probably less than that for mucous membrane exposure, but no data are available to better quantify the number. As of June 1997 the Centers for Disease Control and Prevention (CDC) had received 52 reports of health care workers in the United States with documented seroconversion after occupational exposure, and an additional 114 episodes were considered possible occupation transmissions.⁴⁸ Of the 52 documented episodes, 47 were exposed to HIV-infected blood, 1 to bloody body fluids, 1 to an unspecified body fluid, and 3 to concentrated virus in a laboratory setting. A total of 45 exposures were the result of needle punctures (41) or cuts with a broken glass vial (2) or other sharps (3) and 5 were mucocutaneous.

The well-recognized occupational risk has prompted the CDC to issue recommendations for postexposure prophylaxis (PEP) that include a basic 4-week regimen of two drugs (zidovudine and lamivudine) for most exposures and an expanded regimen including a PI (indinavir or nelfinavir) for exposures that pose an increased risk of transmission or where resistance to an nRTI is suspected. PEP's efficacy in reducing seroconversion has support in both animal and human studies, with some studies showing up to an 80% reduction.⁴⁹ Postexposure health care workers need not modify patient care responsibilities to prevent transmission to patients based solely on the exposure.⁵⁰ If seroconversion occurs despite PEP, the health care worker's work status should be evaluated according to published

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recommendations. (The 1991 CDC guidelines suggest that an expert committee could restrict a health care worker from performing "exposure prone" procedures.⁵¹)

Despite the widely acknowledged low risk of transmission to patients from seropositive health care workers, courts have frequently upheld the decision to restrict the practice of seropositive health care workers.⁵² In cases where HIV-infected health care workers have been prevented from continuing their occupations, the courts have held that the risk of harm to others must be "significant."⁵³ To evaluate the significance of the risk, four factors must be considered: (1) the nature of the risk, (2) the duration of the risk, (3) the severity of the risk, and (4) the probability that the disease will be transmitted.⁵⁴

STATISTICS AND PRIVACY ISSUES

New federal guidelines published by the CDC for tracking HIV cases have raised concerns about the privacy of the patient health care records.⁵⁵ Some fear that individuals may become more afraid of being tested or that current patients may fear losing health insurance or employment.⁵⁶ The guidelines instruct states to track the number of cases and to attach the patient's name or some other identifying code to each case.⁵⁷

Confidentiality is important if voluntary testing programs are to succeed. At the federal level, surveillance data are protected by several statutes and by removal of names and encryption of data transmitted to the CDC.⁵⁸ In addition, receipt of federal funding for state surveillance activities requires that states show an ability to guarantee security and confidentiality of reports. All states and many localities have legal safeguards for confidentiality of government-held health data that provide greater protection than laws protecting information held by private health care providers.⁵⁹ However, because the degree of protection varies from state to state, in some cases being somewhat minimal, the Model State Public Health Privacy Act⁶⁰ was developed at Georgetown University and, if enacted by states, would ensure greater confidentiality of surveillance data.

Since 1985, following CDC recommendations,⁶¹ many states have implemented HIV case reporting as part of their comprehensive HIV/AIDS surveillance programs. As of November 1, 1999, 34 states and the Virgin Islands had done so using a confidential system for name-based case reporting for both HIV infection and AIDS.⁶² Four states (Illinois, Maine, Maryland, and Massachusetts), the District of Columbia, and Puerto Rico use a coded identifier rather than the patient's name.⁶³ Washington state reports by patient name to enable public health follow-up and converts the name to codes after services and referrals are offered.⁶⁴ In most other states, HIV case reporting is under consideration, or laws, rules, or regulations enabling HIV surveillance should be implemented soon.

In contrast, the Department of Health and Human Services (DHHS) proposed regulations in late 1999 that aim to protect patients' electronic medical records by imposing federal regulations that would apply in any state with less

protective measures for patients' electronic medical records.⁶⁵ Federal regulation would be a new approach because health care organizations have traditionally dealt primarily, if not exclusively, with the varying regulations of each state.⁶⁶ Under the new regulations, electronic (but not paper) medical records could be obtained only via a search warrant, subpoena, or other legal authorization without the patient's consent.⁶⁷ Similar protection for nonelectronic medical records would require passage of additional legislation.⁶⁸

"SAFE NEEDLE" REGULATIONS

Intravenous drug use can be linked to nearly one of three AIDS cases and approximately half of all hepatitis C cases in the United States.⁶⁹ However, many states restrict the possession and distribution of hypodermic needles to health care workers and those who have a prescription for such devices, often on the grounds that to do otherwise would imply that drug use is acceptable.⁷⁰ Individuals and organizations that want to distribute clean needles to intravenous drug users to combat the spread of HIV often experience legal barriers, including criminal prosecution, that prevent them from doing so.⁷¹ To address these concerns, the American Medical Association, the American Pharmaceutical Association, the Association of State and Territorial Health Officials, the National Association of Boards of Pharmacy, and the National Alliance of State and Territorial AIDS Directors have jointly urged states to coordinate efforts across professional disciplines and reduce regulatory barriers to improve access to sterile syringes and needles.⁷²

In areas that allow some form of needle distribution to drug users, some groups have found innovative ways to operate. One Chicago organization, the Chicago Recovery Alliance, has instituted a paging system in which a drug user can call a pager number to obtain sterile syringes and blood testing.⁷³ Chicago Recovery Alliance is one of only two organizations approved under Illinois law to distribute needles to drug users and is not publicly funded, except for purposes of providing drug counseling.⁷⁴

Approximately 600,000 to 800,000 health care workers suffer accidental needle injuries each year.⁷⁵ Health care workers often handle a patient's blood products without knowing the patient's HIV status. Even if the health care worker knows that the patient is HIV-positive, under a 1998 Supreme Court ruling, the patient cannot legally be denied health services for that reason alone.⁷⁶ To help protect health care workers from the risk of accidental injury and HIV infection by needles used in the treatment of patients, some state legislatures have recently begun implementing or considering legislation requiring the use of retractable needles.⁷⁷ California has already passed such laws, and at least 21 other states and the District of Columbia are considering similar legislation.⁷⁸ The Occupational Safety and Health Administration (OSHA)⁷⁹ and the CDC⁸⁰ also advocate the use of retractable needles by medical employers to reduce the number of needle-related injuries.

AIDS RESEARCH INVOLVING PRISON INMATES

Interest is developing in the medical community to expand AIDS research among prison inmates.⁸¹ Despite more than a 50% drop in the number of AIDS cases in U.S. prisons from 1995 to 1997,⁸² the rate of HIV infection among prisoners is still more than five times higher than that of the general population.⁸³ A study at Canadian correctional facilities involving face-to-face interviews in 439 men and 158 women in 1996 and 1997 points to high-risk behaviors as the reason for the prevalence of seropositivity, especially injection drug use and sexual behavior.⁸⁴ Nearly one third of the inmates had injected drugs in the year preceding their current sentence. Among those sexually active, more than half had two or more sex partners before being incarcerated and the majority rarely used condoms.

A team at the Brown University HIV/Prison Project has developed preliminary guidelines for clinical tests involving prison inmates.⁸⁵ The idea has been met with some strong resistance because of abuses that occurred in inmate research programs during the 1950s and because some states simply outlaw inmate research altogether.⁸⁶ Advocates say the research is needed to help find treatments for AIDS and also to allow inmates access to cutting-edge treatments.⁸⁷ Administratively, such programs may be aided by a January 2000 U.S. Supreme Court decision. The court declined to review, and thus left standing, an Eleventh Circuit Court decision that allows inmates with HIV to be segregated from the rest of the prison population.⁸⁸ However, the primary concern in any research program, whether or not involving prisoners, is that it be conducted in a medically ethical manner.⁸⁹

MEDICAL USE OF MARIJUANA TO TREAT AIDS-RELATED SYMPTOMS

Despite warnings from a recent study that support what many have long suspected, that smoking marijuana increases the risk of cancer almost as much as smoking tobacco,⁹⁰ laws have been approved in at least six states to allow the use of marijuana by seriously ill patients, including AIDS patients, to alleviate pain and other symptoms of disease.⁹¹ Some AIDS patients report significant relief of pain and other AIDS-related symptoms from smoking marijuana—relief that they allegedly cannot obtain from taking dronabinol (Marinol) or other treatments.⁹² Although some states now recognize that marijuana has some legitimate medical use, the federal government shows no signs of changing its position against the widespread use of marijuana for medical purposes.⁹³ The Justice Department is currently challenging the medical marijuana laws in five states,⁹⁴ and possession and distribution of marijuana remain federal crimes, outside of an approved federal trial program. The U.S. Attorney General also is challenging a federal Ninth Circuit Court of Appeals ruling that would allow a defense of “medical necessity”—a criminal act done

to prevent more serious harm—as a defense to violating the federal laws prohibiting the possession of marijuana.⁹⁵ The implication of the court’s decision is that the medical need to treat patient symptoms in certain cases by prescribing marijuana may be a “lesser evil” than the violation of laws against the possession and distribution of marijuana.

CONCLUSION

Medicine has come a long way in the ability to treat AIDS and HIV-related infections. New antiretroviral treatments have erased what was once a virtual death sentence. Unfortunately, the epidemic is rapidly accelerating in non-industrialized nations that do not have the resources to cope with the problem. Vaccine research, although promising, offers only a hope for a future solution.

As more has been learned about HIV/AIDS and the infection has become treatable and is more often the result of intravenous drug use and heterosexual or mother-to-fetus transmission, the fear and hysteria bred by misunderstanding have slowly been replaced by reason and thoughtful concern over how to reduce transmission. Issues of discrimination seem to have shifted more to concerns over privacy of information and maintenance of insurance and medical treatment, but the longer life expectancy resulting from more aggressive treatment regimens provides more opportunities for individuals to suffer discrimination of some type. There is still much to do, but desperation has given way to hope—hope for a cure, hope for a vaccine, and hope for greater understanding of and compassion and respect for individuals coping with HIV infection.

Endnotes

1. Good places for additional reading are the HIV/AIDS What’s New webpage maintained by the CDC at www.cdcnpin.org/hiv/whatsnew.htm, the HIV/AIDS Resources webpage maintained by the National AIDS Clearinghouse/CDC at www.cdcnpin.org/, the UNAIDS (Joint United Nations Programme on HIV/AIDS) webpage at www.unaids.org/, and the HIV and AIDS webpage of links to other sites (including MEDLINE and AIDSline at igm.nlm.nih.gov/) maintained by the FDA at www.fda.gov/oashi/aids/other.html. The CDC’s Morbidity and Mortality Weekly Report (MMWR) is available free of charge in electronic format; send an e-mail message to listserv@listserv.cdc.gov. The body content should read, “SUBscribe mmwr-toc.”
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 12. *Supra* note 7.
 13. *Id.*
 14. *Supra* note 9.
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 18. D. Boden, A. Harley, L. Zhang, et al., *HIV-1 Drug Resistance in Newly Infected Individuals*, 282 J.A.M.A. 1135-1141 (1999).
 19. Panel on Clinical Practices for Treatment of HIV Infection convened by the Department of Health and Human Services, *Guidelines for the Use of Antiretroviral Agents in HIV-Infected Adults and Adolescents*, www.hivatis.org/guidelines/adult/pdf/A&ajani.pdf (posted Jan. 28, 2000).
 20. L. Zhang, B. Ramratnam, K. Tenner-Racz, et al., *Quantifying Residual HIV-1 Replication in Patients Receiving Combination Antiretroviral Therapy*, 340 N. Engl. J. Med. 1605-1613 (1999).
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 22. The FDA maintains an updated list of antivirals at <http://www.fda.gov/oashi/aids/virals.html>. A nice overview by M. Schutz and A. Wendrow covers antivirals, side effects, mutations, resistance, and problems with drug-drug combinations, including antituberculous agents and methadone. This report can be found at <http://hiv.medscape.com/updates/quickguide>. A good coverage of PIs can be found in M.A. Dietrich, J.D. Butts & R.H. Raasch, *HIV-1 Protease Inhibitors: A Review*, 16 Infect. Med. 716-738 (1999).
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 33. See 42 U.S.C.A. §§12101-12213 (West 1999).
 34. See 42 U.S.C.A. §§12111-12117 (West 1999).
 35. See 42 U.S.C.A. §§12131-12165 (West 1999). This prohibition includes employment discrimination. See 35 C.F.R. §35.140 (1992).
 36. See 42 U.S.C.A. §§12181-12189 (West 1999). Examples of public accommodations include hotels, restaurants, theaters, stadiums, convention centers, parks, museums, private schools, malls, hospitals, and health care providers.
 37. See 42 U.S.C.A. §12111 (West 1999).
 38. See *Bragdon v. Abbott*, 524 U.S. 624 (1998).
 39. See 42 U.S.C.A. §12112(a)-(b)(2) (West 1999).
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 42. www.cdc.gov/nchstp/hiv_aids/hivinfo/vfax/260310.htm.
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 52. See, e.g., *Doe v. University of Maryland Medical System Corporation*, 50 F.3d 1261 (4th Cir. 1995) (neurosurgery resident); *Bradley v. University of Texas M.D. Anderson Cancer Center*, 3 F.3d 922 (5th Cir. 1993), cert. denied, 114 S.Ct. 1071 (1994) (surgical technician); *Goetz v. Noble*, 652 So. 2d 1203 (Fla. Dist. Ct. of App., Mar. 29, 1995; rehearing denied, May 2, 1995) (orthopedic surgeon).
 53. *School Bd. of Nassau County, Fla. v. Arline*, 480 U.S. 273, 107 S.Ct. 1123, 94 L.Ed. 2d 307 (1987).
 54. *Id.*
 55. See Russ Bynum, *Guidelines Urge States to Collect HIV Cases with Names*, Associated Press Newswires (Dec. 10, 1999), available in WestLaw AllNewsPlus database.
 56. *Id.*
 57. *Id.*
 58. *Id.* at 11.
 59. L.O. Gostin, Z. Lazzarini, V.S. Neslund & M. Osterholm, *The Public Health Information Infrastructure*, 275 J.A.M.A. 1921-1927 (1996).
 60. L.O. Gostin & J.G. Hodge, *Model State Public Health Privacy Act* (Georgetown University, Washington, D.C. 1999).

61. Centers for Disease Control and Prevention, *supra* note 6 at 1-31.
62. *Id.* at 2-3.
63. *Id.*
64. *Id.*
65. See *The Coming Revolution: Proposed Patient Privacy Rules May Dramatically Change Daily Operations, Add Compliance Demands*, 10(12) *Physician Manager* (Nov. 12, 1999), available in 1999 W.L. 13419985.
66. See *Clinton Unveils Limited Privacy Protection for Electronic Medical Records*, *supra* at 60.
67. *Id.*
68. *Id.*
69. See C.W. Henderson, *Groups Seek Better Access to Sterile Syringes*, Health Letter on CDC (Nov. 15, 1999), available in WestLaw, 1999 W.L. 11593596.
70. See C. Clark, *Needle Exchange Advocates Strive Anew for County Assent*, San Diego Union & Tribune A1, available in WestLaw, 1999 W.L. 29195430 (quoting San Diego health care supervisor Dianne Jacob, responding to efforts to implement a needle exchange program, "No, no, no. A thousand times, no. It's wrong for governments to say it's OK to use illegal drugs as long as you use a clean needle. Clean needle exchanges send the wrong message to our kids.")
71. See *Medical Emergency Declaration to Be Sought for Needle Swaps*, Los Angeles Times, A33 (Dec. 18, 1999); see, e.g., Cal. Bus. & Prof. Code §4326(b) (West 2000), available in WestLaw, 1999 W.L. 26206731 (making the distribution of needles without a prescription a misdemeanor punishable by fine and/or imprisonment.)
72. *Supra* note 69.
73. See M.T. Galo, *Drug Users Have Link to Sterile Needles: Pager System Starts in Northwest*, Chicago Tribune 1 (Dec. 24, 1999), available in WestLaw, 1999 W.L. 31273900.
74. *Id.*
75. See Lauran Neergaard, *CDC Urges Use of Safer Needles to Protect Workers*, Washington Post Z07 (Nov. 30, 1999), available in WestLaw, 1999 W.L. 30305865.
76. See *Bragdon v. Abbott*, 524 U.S. 624 (1998).
77. See *Scott-Levin Announces Sharp Ideas: Preventing Occupational Contamination by Needles*, Business Wire (Dec. 10, 1999), available in WestLaw AllNewsPlus database.
78. *Id.* California is also actively enforcing its regulations in this area by issuing fines for noncompliance. See *Fed and State OSHAs Step up Needlestick Safety Enforcement*, Business Wire (Nov. 3, 1999), available in WestLaw AllNewsPlus database.
79. See M.F. Conlan, *OSHA Wants Safer Needles Used to Protect Workers*, 143(23) *Drug Topics* 1 (1999), available in WestLaw, 1999 W.L. 10022313.
80. *Supra* note 75.
81. See D. Rising, *Medical Tests on Inmates Reassessed*, AP Online (Oct. 14, 1999), available in WestLaw 1999 W.L. 28128332.
82. See *AIDS Death Rate for Inmates Drops*, Los Angeles Times A31 (Nov. 4, 1999), available in WestLaw, 1999 W.L. 26192733.
83. See S. Sternberg, *\$7M to Fight AIDS, Drugs in Minorities Behind Bars*, USA Today 07D (Oct. 5, 1999), available in WestLaw, 1999 W.L. 6858143.
84. L. Calzavara & A. Burchell, *HIV/AIDS in Prisons*, 5 *HIV/AIDS Policy & Law* (1999), posted at www.aidslaw.ca/Newsletter/FallWin99/prisons.htm.
85. See D. Rising, *Medical Tests on Inmates Addressed: Team Suggests Guidelines for AIDS and Hepatitis Trials for Prisoners*, Orange County Register A13 (Oct. 16, 1999), available in WestLaw, 1999 W.L. 30109100.
86. *Id.*
87. *Supra* note 81.
88. See *Onishea v. Hopper*, 171 F.3d 1289 (11th Cir. (Ala.) 1999), cert. denied, *Davis v. Hopper*, No. 98-9663, 2000 W.L. 29361 (U.S., Jan. 18, 2000).
89. *Supra* note 81. Rising references 1950s-era research programs in which "[i]nmates were injected with herpes, hepatitis and syphilis. Some had their testicles radiated; others were inflicted with wounds to see how they healed."
90. See *Marijuana Use Linked to Cancer*, N.Y. Times News Service D6 (Jan. 14, 2000).
91. See H.T. George, *Medicinal Marijuana Users Wary Despite Win in Washington State*, Chicago Tribune 38 (Dec. 10, 1999), available in WestLaw, 1999 W.L. 2940383.
92. See, e.g., *supra* note 90; R. George, *Gay Activist Has One Last Cause: The Right to Smoke Marijuana for Medical Reasons*, Sun-Sentinel (Ft. Lauderdale, Fla.) 1E (Oct. 10, 1999), available in WestLaw, 1999 W.L. 20287971.
93. *Supra* note 91.
94. *Id.*
95. See B. Egelko, *Lockyer Backs "Necessity" Defense, Asks Feds to Drop Opposition*, Associated Press Newswires (Oct. 14, 1999), available in WestLaw AllNewsPlus database; *United States v. Oakland Cannabis Buyers' Cooperative*, 190 F.3d 1109 (9th Cir. 1999).

