PROJECTING THE IMPACT OF AIDS ON HOSPITALS

by Jesse Green, Madeleine Singer, Neil Wintfeld, Kevin Schulman, and Leigh Passman

Prologue: In the context of the acquired immunodeficiency syndrome (AIDS) epidemic, a recent Washington Post editorial stated that "no hospital wants to shrink from the sick, but every hospital wants to protect its staff." Faced with these twin objectives, hospitals—the front line of the battle against AIDS—must meet moral and philosophical questions head on. In “balancing the rights and needs of the sick against [those] of the society-at-large,” the Post editorial continued, hospitals must resist the “panicky and demagogical responses” that the AIDS epidemic has provoked. And they must do so in a climate in which cost estimates and prevalence projections are constantly revised upward. In this article, Jesse Green and his colleagues at the New York University (MU) Medical Center assess hospitals’ reactions to the AIDS crisis. They look at practical ways hospitals have responded to the disease’s impact on staffing and financing patterns. Green, who is currently director of health services research at the NYU Medical Center, holds a doctorate in philosophy from the University of Rochester in New York. He served as a consultant to the Institute of Medicine’s task force that prepared its landmark report, Confronting AIDS. Madeleine Singer, with a master of public health degree from the Yale University School of Medicine, is a research analyst at the NYU Medical Center. Neil Wintfeld holds a doctorate in policy analysis—quantitative methods from the University of Rochester and is a senior research analyst at the NYU Medical Center. Kevin Schulman, a medical student at NYU and a master of business administration candidate from the Wharton School in Philadelphia, was a research associate at the NYU Medical Center at the time the study was completed. Leigh Passman, a trainee in the NYU Medical Scientists’ Training Program at the time of the study, is a resident in internal medicine at the University of California, Los Angeles.
As the number of acquired immunodeficiency syndrome (AIDS) cases climbs relentlessly higher throughout the country, hospitals are making a major commitment of resources to the treatment of AIDS and associated conditions. The first hospitals to be significantly affected are in the areas of highest AIDS prevalence, including New York City; San Francisco; Los Angeles; Houston; Washington, D.C.; and Miami. But as the epidemic spreads to states that currently have few AIDS cases, the demand for resources including beds, medical staff, nurses, and expertise will put increasing strains on acute care hospitals throughout the United States.

AIDS is a disease that manifests itself in a bewildering variety of clinical presentations, many of which result in episodes of inpatient care. On average, once a person is diagnosed with AIDS, the median life expectancy is twelve months. During this time, the person with AIDS is likely to require a wide range of health care services, including several hospitalizations. The most common reason AIDS patients enter the hospital is for treatment of an opportunistic infection. Since AIDS results in death within a short period of time, hospital mortality rates are high, as are the costs of hospitalization.

But it is only when the effect of these hospital admissions is considered in the context of an expected fivefold increase in AIDS prevalence by 1991 that the full measure of the impact of AIDS on U.S. hospitals can be estimated. In states and cities that have several years of experience with AIDS, planners are just now beginning to grasp how AIDS affects bed need assessments, Medicaid budgets, and the organization of health care delivery. The Centers for Disease Control (CDC) project that by 1991, 80 percent of persons with AIDS will reside outside the current high-concentration areas of New York City and San Francisco. Therefore, states that so far have been less affected by AIDS have more time to plan but should not wait.

Methods of projection. The fundamental component of any projection of resource consumption is an estimate of prevalence, that is, the number of disease victims alive during the period under study. The CDC has developed a model for predicting AIDS prevalence: a five-year prevalence projection based on data describing AIDS cases diagnosed from January 1983 through April 1986. The CDC’s projections are for the number of persons with AIDS who will be alive at any time during 1991. Lower and upper bounds for the 1991 prevalence projections were also provided by the CDC. These give an estimate of the range within which the actual prevalence is likely to fall. In addition, the CDC estimated a separate projection of the distribution of AIDS cases by geographic region, patient risk group, and race. The exhibits below use the CDC’s midrange prevalence and distributional projections except where noted. These estimates have been increased by 20 percent to
account for under-reporting and underascertainment on the advice of W. Meade Morgan of the CDC. It should be noted, however, that the estimates apply only to cases that meet the CDC-defined criteria for AIDS. This definition was developed for surveillance purposes, not for resource planning, and does not include all cases that require hospitalization. We discuss the possible impact of AIDS-related complex (ARC) and other human immunodeficiency virus (HIV)-related conditions on hospitals later in the article.

There is no published estimate of hospital days per patient during a year for New York City, but there is evidence that length-of-stay for AIDS in New York City is longer than in other places. AIDS patients at New York University Medical Center had an average length-of-stay of twenty-one days. Belmont, of St. Luke’s-Roosevelt Hospital in New York City, reports an average length-of-stay of twenty-two days. Using data from a survey of 198 public and teaching hospitals accounting for 8,800 AIDS admissions in 1985, Andrulis and colleagues estimated that AIDS patients in the Northeast (based on fifty-three hospitals) averaged thirty-seven days of hospital care that year. Since New York City accounts for 61 percent of the AIDS cases in the Northeast, and since Andrulis and colleagues’ Northeast sample is the only one available that included a large number of cases with a risk factor of intravenous (IV) drug use, we used this estimate in our projections for New York City, where IV drug use accounts for 34 percent of AIDS cases. For San Francisco projections, the best available projections are from Scitovsky and Rice’s study of patients who had all of their care at San Francisco General Hospital. Based on their data, we estimate that these patients were admitted 1.56 times for 11.53 days per stay, or a total of eighteen days per patient in 1984. Our projections for the U.S. outside New York City and San Francisco are based on the study by Andrulis and colleagues—the largest study of hospital costs for AIDS care conducted to date. We used an average of his days-per-patient estimates for 1985 for the South (twenty-seven days) and the Midwest (thirty-one days) to derive an overall estimate of twenty-nine days.

For projecting hospital cost, we sought an estimate of cost per inpatient day. Scitovsky estimated charges per day of $773 for all AIDS patients at San Francisco General Hospital. Studies that use hospital costs rather than charges yield estimates ranging from Berger’s $542 per day in Maryland to Boufford’s $800 per day in New York City. Seage’s data imply a $675 cost per day for Massachusetts, while Andrulis estimated $635 per day for the U.S. as a whole. However, none of these estimates (except Boufford’s) reflects the higher use of nursing services by AIDS patients, which we discuss later. For our projections of cost per day, we used an estimate of $698 that is based on Andrulis’s estimate of $635 with 10 percent added to account for extra nursing requirements. This
assumes that nursing requirements for AIDS patients are 40 percent higher than for other patients, and that nursing accounts for 25 percent of hospital costs.

Our estimates of bed days are the product of days per patient and total cases alive during the year. Beds were calculated by dividing bed days by 365. Hospital costs are the product of bed days and cost per day. The percentages of cost and beds described in the exhibits were calculated using American Hospital Association (AHA) data for 1985 reflecting total medical/surgical beds available and total hospital costs by Primary Metropolitan Statistical Area (PMSA), except for the number of medical/surgical beds available in San Francisco PMSA, which were obtained from the California Hospital Association.15

Impact Of AIDS On Hospital Resources

By 1991, we estimate that 13,854 hospital beds will be occupied by persons with CDC-defined AIDS. This amounts to five million hospital bed days at a cost in excess of $3.5 billion (Exhibits 1 and 3). This is considerably more inpatient care than was devoted to lung cancer (3.36 million bed days) or motor vehicle accidents (3.54 million bed days) in 1980.16 AIDS cases will utilize nearly 2 percent of all US. medical/surgical beds and account for nearly 3 percent of total hospital costs (Exhibits 2 and 3). These proportions will be much higher in areas of the

<p>| Exhibit 1 |</p>
<table>
<thead>
<tr>
<th>Hospital Use By Persons With AIDS, 1986 And 1991</th>
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<tr>
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<tr>
<td>New York</td>
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<td>San Francisco</td>
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<td>Other U.S.</td>
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<p>| Exhibit 2 |</p>
<table>
<thead>
<tr>
<th>Bed Need For AIDS As A Percentage Of Total Medical/Surgical Beds Available</th>
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<tbody>
<tr>
<td>New York</td>
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<td>San Francisco</td>
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<td>Other U.S.</td>
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<tr>
<td>Total U.S.</td>
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**Exhibit 3**
Hospital Inpatient Treatment Costs For AIDS As A Percentage Of Total Hospital Inpatient Costs

<table>
<thead>
<tr>
<th>Location</th>
<th>Total costs of all acute hospital inpatient care, thousands of dollars</th>
<th>Hospital costs, thousands of dollars, 1986</th>
<th>Hospital costs, thousands of dollars, 1991</th>
<th>AIDS as percent of total cost, 1986</th>
<th>AIDS as percent of total cost, 1991</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>$63,940</td>
<td>$195,059</td>
<td>$530,259</td>
<td>3.08%</td>
<td>8.37%</td>
</tr>
<tr>
<td>San Francisco</td>
<td>1,080,445</td>
<td>37,873</td>
<td>174,891</td>
<td>3.51%</td>
<td>16.19%</td>
</tr>
<tr>
<td>Other U.S.</td>
<td>111,265,094</td>
<td>415,220</td>
<td>2,824,731</td>
<td>0.37%</td>
<td>2.54%</td>
</tr>
<tr>
<td>Total U.S.</td>
<td>$118,681,479</td>
<td>$648,152</td>
<td>$3,529,881</td>
<td>0.55%</td>
<td>2.97%</td>
</tr>
</tbody>
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Note: Costs are in 1985 constant dollars.

country where AIDS is most prevalent.

Geographic distribution of the epidemic. While New York and San Francisco together account for 4.1 percent of the nation’s population, they accounted for 34 percent of the nation’s live AIDS cases by the end of 1986. This concentration of AIDS cases is already producing localized but very acute health care delivery problems, since local resources are increasingly becoming strained by the disproportionate prevalence of AIDS. However, according to the CDC, the proportion of cases outside of New York City and San Francisco likely will rise to 80.2 percent of all cases by 1991, as the epidemic spreads. What we can expect to see during this period is an enormous strain on health care facilities in the high-prevalence cities, coupled with a large increase in the impact on hospitals where the problem is currently small. Many states that have seen few AIDS cases to date will reach occupancy levels for AIDS similar to those found in New York City in 1986.

Our analysis indicates that by 1991, 12.4 percent of all available medical/surgical beds and more than 16 percent of all hospital treatment costs in San Francisco will be devoted to AIDS treatment (Exhibits 2 and 3). This represents a fivefold increase in bed utilization for AIDS between 1986 and 1991. These figures raise questions about whether San Francisco will continue to have the capacity in its health care system to provide not only the necessary inpatient care but also the excellent outpatient, hospice, and other services to AIDS patients, for which the city has become known.

In the New York metropolitan area, by 1991, AIDS cases will occupy 2,081 beds, more than 8 percent of the medical/surgical beds in the city. This represents an increase of more than two-and-one-half times the 1986 levels of beds and costs devoted to AIDS. This does not include
ARC, which is becoming quite prevalent in New York City. Recently, two surveys of New York City hospitals were conducted by the Greater New York Hospital Association (GNYHA) to determine the average daily census of patients with “confirmed AIDS” and “suspected AIDS.”¹⁸ One survey covered the week of March 8, 1987, while the second covered the week of June 21, 1987. The results for confirmed AIDS cases (741 for March, 685 for June) are consistent with our projections. However, the survey also found a surprisingly high citywide hospital census of 330 “suspected AIDS” cases in March and 580 in June. The June survey implies that 46 percent of the HIV-related cases in hospital beds in New York City do not meet CDC criteria for AIDS. If these estimates of additional bed need for HIV-related conditions (ARC and “rule-out AIDS”) hold up, then our estimate of beds needed should be adjusted up substantially.

While AIDS will remain a growing and serious health care problem in the cities where it is now concentrated, it is outside New York City and San Francisco that the highest growth rates are projected. The number of cases outside those areas is predicted to increase nearly sevenfold, from 20,513 to 139,548 cases (Exhibit 4). These numbers imply that 1.6 percent of all medical/surgical beds and more than 2.5 percent of total health care expenditures will be devoted to AIDS in areas outside New York and San Francisco by 1991 (Exhibits 2 and 3). Already, every state in the nation has reported AIDS cases to the CDC. Even states where projections of cases are relatively small may have difficulty meeting the needs if they have few hospitals and few physicians trained to care for AIDS patients.

Factors affecting the estimates. AIDS is a relatively new phenomenon, and the treatment protocols are constantly changing. Outpatient care is being substituted for inpatient care in many cases, even for treatment of *Pneumocystis carinii* pneumonia. Following the lead of San Francisco General Hospital, a number of experimental programs are being funded that try to encourage the use of out-of-hospital services, including grants from The Robert Wood Johnson Foundation and from the Health Resources and Services Administration, New York State’s Designated

### Exhibit 4

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<tbody>
<tr>
<td>New York</td>
<td>7,553</td>
<td>20,532</td>
<td>13,594</td>
<td>24,638</td>
</tr>
<tr>
<td>San Francisco</td>
<td>3,014</td>
<td>13,920</td>
<td>9,216</td>
<td>16,704</td>
</tr>
<tr>
<td>Other U.S.</td>
<td>20,513</td>
<td>139,548</td>
<td>92,390</td>
<td>167,458</td>
</tr>
<tr>
<td>Total U.S.</td>
<td>31,080</td>
<td>174,000</td>
<td>115,200</td>
<td>208,800</td>
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Source: W.M. Morgan, AIDS Program, Center for Infectious Diseases, Centers for Disease Control.
AIDS Care Center Program, and Medicaid’s Home and Community Based Waivers. If successful, these efforts may help reduce the demand for beds.

There also are some discouraging factors. The data do not include ARC cases, which have been estimated at between two and ten times the prevalence of AIDS.\(^{19}\) ARC patients present many clinical problems, some quite severe, which require care in both inpatient and outpatient settings. Also, estimates of the proportion of inpatient beds required by AIDS patients assume that all available beds are actually used, that is, that occupancy rates in hospitals are 100 percent, when in fact they are only 65.7 percent.\(^{20}\) The estimates also do not take into account that the beds suitable for AIDS patients are primarily medical beds, not surgical beds. Thus the impact of AIDS on the medical service of a hospital (and its physicians and nurses) will be much greater than our figures reflect. Finally, the effect of new treatment protocols and drugs, such as Retrovir (AZT), on hospital use are unknown, since they prolong life and decrease the frequency of opportunistic infections but produce some serious side effects that may require hospitalization.\(^{21}\)

**The AIDS Patient From The Hospital’s Viewpoint**

The impact of increasing hospital occupancy by AIDS patients can only be understood by considering the special requirements and challenges these patients bring to the hospital. AIDS patients require more hospital services and treatment-personnel time than non-AIDS patients.\(^{22}\) These requirements are related to the multiple clinical problems associated with the disease as well as to certain treatment precautions that must be followed for AIDS patients. In addition, hospitals are often called upon to assist AIDS patients in finding appropriate care once they are discharged. AIDS treatment requires considerable skill and dedication, constant learning, and the ability to overcome personal anxiety. Projections that focus only on such things as numbers of beds miss the impact that this epidemic is having and will have on increasing numbers of physicians, interns and residents, nurses, and other professionals.

**Infection surveillance and precautions.** Among the first areas of concern is implementing infection control precautions as recommended by the CDC to minimize “the risk of exposure to blood and body fluids in order to prevent transmission of HIV infection in the workplace and during invasive procedures.”\(^{23}\) Hospitals need to train personnel in preventing the transmission of bloodborne infectious diseases and in other standard infectious disease precautions. This training must be provided sensitively so that fear of AIDS does not hinder the provision of routine daily care to AIDS patients, including patient transport, meal delivery, and housekeeping. This could be a particular problem for hospitals that
currently treat only a few AIDS patients. The hospital’s concern about infection control for AIDS patients has a significant impact on the infection surveillance department. One hospital estimated that 1.5 full-time-equivalent infection surveillance nurses are required for a census of thirty AIDS patients.

Infection control precautions for treating an AIDS patient may include use of isolation clothing. A study by the GNYHA estimated that in 1984 twenty people entered an AIDS patient’s room during each day. Each time a person entered the room, he or she used a hospital gown. The concern over the recent cases of HIV transmission to three health care workers through occupational exposure, as reported recently by the CDC, has reinforced the CDC recommendation that “routine precautions must be followed when there is a possibility of exposure to blood or other body fluids. The anticipated exposure may require gloves alone (for example, when placing an intravascular catheter or handling items soiled with blood or other body fluids). Procedures involving more extensive contact with blood or potentially infective body fluids . . . may require gloves, gowns, masks, and eye coverings.”

The relatively frequent use of gowns and gloves is a significant incremental cost for the hospital. To prevent transmission of HIV infection to health care personnel, the AHA has now recommended that “all patients’ body fluids be considered hazardous and that all patients be subject to infection-control guidelines originally established for hepatitis and AIDS patients.”

Additional costs for treating AIDS patients also include the disposal of contaminated articles and infectious waste. Hospitals must dispose of waste in more expensive puncture-resistant containers to prevent contamination. The GNYHA study estimated that six bags of waste per day were removed from each AIDS patient’s room. Nondisposable articles contaminated with blood and body fluids also need to be placed in isolation bags before they are sent to be cleaned and used again. This includes double bagging and marking of linens to prevent laundry employees from contacting contaminated material. According to CDC guidelines, instruments, including lensed instruments, and equipment used on AIDS patients should be sterilized or disinfected before being used again.

Isolation. Hospitals can admit AIDS patients to both private and semi-private rooms. San Francisco General Hospital and others have been admitting AIDS patients only to private rooms as a precaution. The Hospital Council of Southern California recommends that, “although patients with AIDS do not require a private room, unless the patient’s hygiene is poor or the patient is coughing or has another infection, it still may be prudent to admit AIDS patients to private rooms.”

Given the expected increase in AIDS admissions and bed days between now and
1991, many hospitals will find it impossible to continue to admit AIDS patients strictly to private rooms. This could cause even more concern about infection precautions. For those patients who require private rooms, the hospital incurs extra costs usually not covered by insurance.

**Staff utilization.** As the number of AIDS patients increases, so will the need for additional staff. AIDS patients are cared for not only by a primary physician but also by physician consultants from pulmonary medicine, neurology, psychiatry, and oncology, among other specialties. A study done at St. Luke’s-Roosevelt Hospital Center estimated an average of 10.3 consult visits were conducted for each AIDS admission.  

AIDS patients also require more intensive nursing care than non-AIDS patients do. The GNYHA study estimated that the average AIDS patient on a medical/surgical-unit required up to 28 percent more nursing hours per patient day than a non-AIDS patient. The number of nursing care hours rendered to AIDS patients also had the greatest impact on incremental costs for treating these patients. A study of nursing care hours conducted at New York City Health and Hospitals Corporation facilities, using a Patient classification system, reported that AIDS patients on the medical/surgical unit required about 40 percent more direct nursing care than an average medical/surgical patient required. Pediatric AIDS patients required more than twice the nursing care hours than the average pediatric patient required. The St. Luke’s-Roosevelt Hospital Center study reported that an average of 8.9 hours per day was given to 229 AIDS admissions on the general units. A study done at one Chicago hospital reported an average of 7.84 nursing care hours per day for forty-one AIDS patients. These figures compare with an average for the United States of 3.5 hours of nursing per patient day. Nursing requirements at these high levels mean that by 1991, requirements for nursing staff in the hospital could exceed 13,000 full-time equivalents, at a time when the U.S. faces a serious shortage of nurses.

AIDS patients tend to have more social service needs than non-AIDS patients have, because of the physical disabilities associated with AIDS and the possibility of neuropsychological impairment. The social service department of Memorial Sloan-Kettering Cancer Center in New York estimated that an AIDS patient needs an average of five hours of social service consultations per week, compared with three hours for a leukemia patient.

**Outpatient care.** Providing comprehensive care to the AIDS patient has become an integral part of the treatment of the patient during the course of the disease. Hospitals are developing comprehensive ambulatory care programs for AIDS patients, which provide a range of services from various hospital disciplines. The AIDS clinics also provide psychosocial services and serologic testing and counseling. AIDS patients can be effectively treated as outpatients when they are considered stable, do not
require drug therapy as an inpatient, and have adequate support at home. A coordinated inpatient and outpatient treatment program for AIDS patients provides the continuum of care necessary during each stage of the disease.

The development of AIDS outpatient clinics requires financing a staff of physicians and nurses, finding a location within the hospital, and other start-up costs. Outpatient care and costs will also include an increasing number of patients who will need serological testing for antibodies to HIV. The CDC recommends that “counseling and voluntary serologic testing for HIV be routinely offered to all persons at increased risk when they present to health care settings.” The CDC also recommends that counseling be available at locations that women at increased risk will use to prevent perinatal transmission.

Long-term care. As AIDS patients enter the end stage of the disease, they may require hospice and long-term care. According to the director of the AIDS Home Care and Hospice Program of San Francisco, approximately 15 percent of AIDS patients in a home care program receive twenty-four-hour attendant care because of severe neurological and physical status changes. If such care is not available in other cities, then placement in long-term care facilities may be necessary. Long-term or hospice care is more cost-effective for such patients than is alternative hospital care. The San Francisco AIDS Home Care and Hospice Program estimates that costs of long-term care in skilled nursing, intermediate care, and ambulatory care settings for an AIDS patient range from $120 to $300 per day; for a patient in the AIDS Home Care and Hospice Program, the cost is approximately $94 per day. We estimate the average daily cost in an acute care setting to be $698 per day.

There is some question of how well prepared US. skilled nursing facilities are to handle AIDS patients. Occupancy rates in these facilities are greater than 85 percent. Seventy-two percent of nursing homes report having a waiting list. Also, AIDS patients may require more direct nursing care than is available in a skilled nursing facility, where there are just over three registered nurses and four licensed practical nurses for every 100 patients on average. Attendants provide most of the direct care in nursing homes. In addition, the typical thirty- to forty-year-old AIDS patient would be out of place in most nursing homes, where the average age is over eighty. We also can expect serious problems with elderly residents and some staff because of fear of AIDS.

### Alternative Care Facilities

The high costs of treating AIDS patients have led to a search for alternatives to traditional inpatient care. San Francisco General Hospital (SFGH) has led in developing experimental programs to provide services...
to AIDS patients. The SFGH model program, introduced in 1983, includes an inpatient unit integrated with outpatient clinics. SFGH also works closely with a network of community agencies that provide home care, hospice care, counseling, housing, and other services.

The program at SFGH has led the way for New York State to develop a Designated AIDS Care Center Program. This program will allow hospitals to receive supplemental reimbursement for a comprehensive, multidisciplinary AIDS program including an inpatient AIDS treatment unit, outpatient clinic, home care, psychological and legal services, and housing assistance, coordinated by a case manager.

If these and similar experiments succeed in providing systems of care that allow patients to be treated in outpatient settings whenever possible, they may lessen the impact of AIDS on hospitals. Nevertheless, at a time of increased belt tightening in the health care delivery sector, the special needs of AIDS patients for more intensive nursing care, social services, infectious disease precautions, and other services, together with the high expected utilization rates cited earlier, will strain hospitals and other facilities significantly. It is not clear that we currently have the facilities that we will need by the early 1990s.

In addition to the effect of the AIDS epidemic on hospital resource needs, there are also intangible effects. The U.S. Public Health Service predicts that by 1991, 54,000 people will die from AIDS each year. It is difficult to quantify the effect of an incurable, and invariably fatal, illness—which most often takes its toll upon relatively young patients—on the morale and “culture” of the hospital. In addition, fear of AIDS among hospital personnel, including some physicians, is likely to be a persistent problem as the epidemic reaches areas of the country not previously exposed. The Institute of Medicine has said, “If the spread of the virus is not checked, the present epidemic could become a catastrophe.” There is a great need for thoughtful planning and preparation now to assure that the physical human resources to cope with the AIDS epidemic will be ready to meet the anticipated need.

The authors wish to express their appreciation to Gail Flay, who prepared the manuscript and assisted with the research for this article.
NOTES

2. Ibid.
3. Ibid.
4. Projections for New York City are for the NYC Primary Metropolitan Statistical Area (PMSA) and Bergen County, New Jersey. Projections for San Francisco are for the SF PMSA and Contra Costa County, California.
5. Midrange, upper-bound, and lower-bound annual prevalence projections obtained from W.M. Morgan, AIDS Program, Center for Infectious Diseases, Centers for Disease Control, personal communication, July 1986.
10. Andrulis et al., “Care for AIDS Patients in U.S. Public and Private Teaching Hospitals.”
20. AHA, Hospital Statistics.
23. Centers for Disease Control, “Update: Human Immunodeficiency Virus Infections in


25. CDC, “Update: HIV Infections in Health Care Workers.”


32. GNYHA, *Study of Routine Costs of Treating Hospitalized AIDS Patients.*

33. Boufford, “AIDS and the Public Hospital System in New York City.”

34. Belmont, St. Luke’s-Roosevelt Hospital Center Study.


37. Monahan, personal communication


43. Ibid.


