Cost of Inpatient Care of AIDS Patients in Oregon, 1981-1991

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ABSTRACT

Acquired Immune Deficiency Syndrome (AIDS) is a relatively new medical condition whose devastating effects touch individuals, communities, and the world as a whole. In the United States, changes have occurred in the epidemiology of AIDS and in the institutional setting of AIDS-related care over time (i.e., inpatient-based care versus care in outpatient settings). In addition, the medical care system has become increasingly burdened. Our study focused on changes in sites of AIDS-related care and on charges for inpatient hospital care for AIDS patients in Oregon.

Using the Oregon AIDS case and hospital admissions registries, this study retrospectively examined hospital use patterns of Oregon AIDS cases who were reported between 1981 and 1990. We described whether persons were diagnosed with AIDS in outpatient settings or as hospital inpatients (i.e., their site of diagnosis). Then, we described hospital use and charges for AIDS patients. We compared these charges and hospital use on the basis of site of AIDS diagnosis. Next, we described the payors of hospital charges, comparing payors of charges based on the mode of HIV transmission and site of AIDS diagnosis. Finally, we described the length of survival of AIDS patients from their diagnosis to their death. We compared lengths of survival based on mode of HIV transmission and on site of diagnosis of AIDS.

One thousand thirty-three Oregon residents were reported with AIDS between 1981 and 1990. The majority (96%) of these AIDS cases were men, and most (77%) became infected through male-to-male sexual contact. Sixty-nine percent of the cases were between the ages of 30 and 49; most (93%) were white; and most (68%) resided in Multnomah County.

The changes in the site of AIDS-related medical care were dramatic. The diagnosis of AIDS evolved from being an inpatient-diagnosed disease to having a significant portion of cases diagnosed in outpatient settings. Overall, 34% of the AIDS

cases in Oregon were diagnosed in outpatient settings, indicating a change in the locus of AIDS-related care.

Between 1981 and 1991, AIDS patients used 20,677 inpatient days. These patients were admitted a mean of two times per year, with a mean of 7.7 days per admission. Cases diagnosed in inpatient settings spent a total of 16,506 days in the hospital; cases diagnosed in outpatient settings spent a total of 4,171 days in the hospital. The difference in the number of hospitalized days between these two groups of AIDS cases was significantly different ($p<.001$).

Between 1981 and 1991, the charges for AIDS-related care in Oregon were $25,928,958. The charges were $20,698,524 for patients diagnosed as inpatients and $5,230,434 for patients diagnosed as outpatients. Considering hospital use of the two groups of patients, charges for hospital care of AIDS outpatients were significantly lower.

Payors of AIDS-related hospital charges include commercial insurance (34%), Medicaid and Medicare (34%), Kaiser Permanente (16%), self pay (3%), and other (10%). The payors of 2% of hospital charges were not known.

Our findings indicate that in Oregon, the percent of AIDS-related hospital charges being billed to public payors (i.e., Medicaid and Medicare) is increasing at an alarming rate. This rate has increased from 0% in 1981 to 36% in 1991. This sharp increase is one indication for reform in the Medicaid/Medicare system.

The mean survival from AIDS diagnosis to death was 12.3 months. Mean survival time of patients diagnosed as inpatients was 11.5 months, and the mean survival time for patients diagnosed with AIDS in outpatient settings was 14.7 months. The difference in survival times in these two groups was significantly different ($p<.002$).

The results of our study indicated that patients diagnosed with AIDS in outpatient sites spent less time overall in the hospital, had fewer hospital charges, and survived longer. We believe that these findings indicate that early identification and treatment of HIV infection and AIDS benefit both the HIV-infected person and the payors of hospital

charges. Nurses can help encourage early identification and treatment of HIV-infection by educating individuals and society. In addition, nurses must take an active role in health care planning and formulation of AIDS-related policies.

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CHAPTER 1

Introduction

Discovery of HIV and AIDS

In June 1981, the Centers for Disease Control (CDC) received a report from a group of physicians in Los Angeles describing their treatment of five young homosexual men for *Pneumocystis carinii* pneumonia (PCP), a type of pneumonia virtually unheard of before that time in young, otherwise healthy individuals (CDC, 1981a). One month later, CDC reported 26 cases of Kaposi's sarcoma (KS), an uncommonly-reported malignancy in the United States, among homosexual men in New York City and California, ranging in age from 26 to 51 years (CDC, 1981b). Since KS had previously been reported with increased incidence among organ transplant recipients and others receiving immunosuppressive therapy (e.g., patients undergoing chemotherapy), it seemed likely that the reported occurrences of KS and PCP in homosexual men were related to an underlying disturbance in immune function.

Epidemiologic analysis of these and other reports revealed that patients afflicted by this immune dysfunction tended to fall into distinct, identifiable risk groups. These groups included homosexual or bisexual men,[1] injection drug users (IDUs), hemophiliacs, and Haitians. Except for Haitians, these groups share one commonality: they are all regularly exposed to the blood or body fluids of another person. (Haitians were later found to represent people who became infected by heterosexual conduct; Haiti and Central Africa are two areas where heterosexual

[1] After World War II, large geographic concentrations of homosexual and bisexual men developed in a number of major cities, including New York, San Francisco, and Los Angeles. By the late 1960s and early 1970s, sexual promiscuity became a prominent feature of these communities. This promiscuity brought about epidemics of sexually-transmitted diseases, including syphilis, gonorrhea, and "gay bowel syndrome" (parasitic infections of the colon). These communities were clearly vulnerable to the introduction of new sexually-transmitted diseases (Shilts, 1987).

contact is the primary mechanism of transmission.) These findings supported the theory that the disease was infectious and that it was transmitted by blood and body fluids.

The disease was named Acquired Immune Deficiency Syndrome (AIDS). The virus that causes AIDS was discovered in 1983 (Barre-Sinoussi, et al., 1983; Gallo, 1984) and is now known as human immunodeficiency virus (HIV).

Since the early reports of isolated cases of AIDS in 1981, the incidence of AIDS has continued to escalate throughout the world. Today, over 200,000 cases of AIDS in the United States and 1,301 cases in Oregon have been reported to the CDC (Oregon Health Division, *HIV/AIDS Surveillance Report*, December 1991).

The tremendous increase in incidence of AIDS and HIV infection has resulted in numerous social, political, and economic problems. The focus of this study is on the medical care cost consequences of HIV infection and AIDS. Specifically, this study deals with the epidemiology of AIDS in Oregon and with total charges for hospital care of AIDS patients in the state.

Economic issues related to the medical care of AIDS patients are important because the cost of this care is very high. Medical care costs associated with AIDS have been studied by other researchers, but these costs are worth continued evaluation because AIDS has evolved from a relatively short, acute, fatal infection to a chronic (albeit still fatal) disease, and the treatment modalities have changed accordingly. Moreover, the epidemiology of AIDS is changing, with concomitant implications for health care planning and spending.

Evolution of HIV Disease and its Associated Costs

The cost of medical care of patients with HIV disease is strongly related to the treatment modalities used. These modalities, which include pharmaceuticals as well as monitoring and treatment schedules and techniques, have changed over time

because medical knowledge about AIDS and HIV infection has improved. In the early years of the epidemic, patients frequently presented to hospitals with acute PCP or another life-threatening infection (which represents the latest stages of HIV infection). Consequently, many of these patients died during their initial (diagnostic) admission or shortly thereafter. The median survival time after diagnosis of AIDS during the early phase of the epidemic was less than one year (Chaisson, 1990). Now, the two-year survival rate after AIDS diagnosis has increased significantly (Harris, 1990; Lemp, et al., 1990). Both Harris (1990) and Chaisson (1990) believe that the increase in survival time is a result of a combination of earlier treatment of opportunistic infections and the availability and use of zidovudine, aerosolized pentamidine, and oral trimethoprim-sulfamethoxazole (Bactrim). In an article published by the *Journal of the American Medical Association*, Cotton (1989) summarized the common interpretation of these changes:

> The perception of acquired immunodeficiency syndrome (AIDS) as a medical disease is changing. Previously considered fatal in the short term and amenable only to palliative measures, AIDS now is viewed increasingly as a long-term disease, human immunodeficiency virus (HIV) infection, in which therapy might significantly prolong life and some complications might be totally preventable.

New pharmaceutical regimens are used both to treat common acute opportunistic infections (such as PCP) as well as to prevent the occurrence of these infections. These pharmaceuticals differ markedly from ones available in the early years of the epidemic. These drugs include ditiocarb sodium, zidovudine, 2', 3'-dideoxyinosine (ddI), gangcyclovir, and aerosolized pentamidine. The cost of these drugs is very high (e.g., an estimated $9,637 per person per year for treatment with zidovudine and aerosolized pentamidine, or $10,440 for patients surviving 13 months [Arno, et al., 1989]). These expenses have significantly increased the overall cost of medical care for AIDS.

A second significant change in treatment of HIV infection and AIDS is the locus of care. Current treatment of HIV-infected patients often begins when patients

are asymptomatic, and patients are thus seen more frequently on an outpatient basis. Consequently, since 1987, diagnosis of AIDS in outpatient settings is becoming increasingly common. In Oregon, 26% of AIDS cases were diagnosed on an outpatient basis in the period 1981-86; this rose to 36% for the period 1987-90 (Table 1).

Table 1. Oregon AIDS cases by site and year of diagnosis.

Site of AIDS Diagnosis	1981-86		1987-90	
	No.	(%)	No.	(%)
Outpatient	44	(26)	320	(36)
Inpatient	127	(74)	560	(64)
Total	**171**	**(100)**	**880**	**(100)**

Source: Oregon Health Division, 1991 (unpublished).

The nature of the medical care given to an HIV-infected patient in outpatient settings differs from that which is given while a patient is hospitalized with an acute condition. This type of care is similar to prophylactic care and monitoring given to stable diabetic patients. The provision of medical care of HIV-infected patients and stable diabetic patients is given primarily in outpatient settings. The goal of preventing complications (of AIDS and of diabetes) is the same for both groups of patients. Much of the care given to AIDS patients in outpatient settings involves nursing case management, education, and counseling. Nurses triage patients, schedule medical appointments in a timely manner when indicated by the patient's symptomology (in order to have opportunistic infections treated promptly), and provide psychosocial counseling. Nurses also assist patients in finding and using appropriate community resources (e.g., Meals-On-Wheels). Finally, nurses help to orchestrate the many appointments that are often a part of the AIDS patient's life (e.g., appointments with social service agencies, counselors, and specialty physicians).

Care of HIV-infected patients in outpatient settings provides long-term management of this chronic condition and prevents acute opportunistic infections--or at least assures that they are treated before they become severe enough to require hospitalization of the patient. This change in the setting of care of HIV-infected patients could significantly affect the amount of time a patient spends hospitalized over his or her remaining lifetime. Preventive therapy, counseling, and overall case management of HIV-infected patients in outpatient settings may cause these patients to have fewer complications and fewer "sick days" overall than those who do not utilize outpatient settings.

Patients who are diagnosed with AIDS on an outpatient basis are expected to show a different pattern of care than those diagnosed on an inpatient basis. Because the nature of HIV-related outpatient care is largely preventive, AIDS patients receiving care in outpatient settings may not experience as many of the opportunistic infections that otherwise might occur, and thus they may spend less time hospitalized.

For the purposes of this study, we are using the designation of "AIDS outpatients", or patients diagnosed with AIDS in outpatient settings, as a marker for AIDS patients who receive care in outpatient settings.[1] Hospital care of AIDS outpatients, thus, would likely be less expensive both per year and over a lifetime. The reasons are twofold: "AIDS outpatients" are expected to spend fewer days in the hospital and to have fewer complicated, multiple infections--complications that generally require intensive nursing and/or increased use of costly procedures, laboratory tests, and medications. Prevention of lengthy, complicated admissions will affect health care costs: if treatment in outpatient settings shortens the amount of time spent in a hospital over a lifetime (from AIDS diagnosis to death), hospital care costs are decreased. Previous cost-of-care studies do not include consideration of

[1] While some HIV-infected patients diagnosed as inpatients likely receive some of their HIV-related medical care in outpatient settings, the only absolute assurance that a patient received outpatient care under the current AIDS surveillance system in Oregon is an AIDS diagnosis made in an outpatient setting.

recent changes in sites of care and treatment modalities. This study will generate cost estimates that include these considerations.

Changing Epidemiology

Evidence has clearly shown that HIV is spread in four distinct ways: through sexual contact with an infected partner; through transfusion of contaminated blood or blood products; through using an HIV-contaminated needle (as when sharing needles, syringes, or "works" with other IDUs); and through perinatal transmission (Berkelman and Curran, 1989; Cates, 1990; CDC [*MMWR*], 1989). HIV is concentrated in blood, semen, and vaginal secretions (with much lesser concentrations found in various other body fluids). In the United States, AIDS has been primarily found in homosexual or bisexual men and IDUs. Other groups who are "at risk" for HIV infection include hemophiliacs, blood transfusion recipients, infants of infected mothers, and sexual partners of persons in these groups.

The number of reported AIDS cases in the United States with risk behaviors other than having male-to-male sexual contact is changing. Tables 2 and 3 summarize the breakdown of AIDS cases by risk behavior in both Oregon and the United States. In general, the proportion of homosexual cases is decreasing over time, while the proportions of cases who are IDUs and heterosexuals are increasing.

The number of reported AIDS cases in each risk group varies depending on the region of the country reporting cases (i.e., the Eastern region has more cases who are IDUs than the Western region). Although the number of cases having injection drug use or heterosexual contact as a risk behavior has increased over time, the percentages of overall cases having these risk behaviors have remained relatively stable. This is deceiving, however, and the changing epidemiology of the epidemic in Oregon is perhaps more clearly presented when one considers the percentages of increases in cases in each risk group.

According to the Oregon Health Division (OHD, *HIV/AIDS Surveillance Report*, 12/31/91),

> In Oregon, risk behaviors of persons with AIDS have been changing over time. Although most cases in Oregon still occur in gay or bisexual men (75%), the incidence of AIDS in other risk groups is increasing at a faster rate than the incidence in gay males. This is similar to changes occurring throughout the United States.

Table 4 clearly reflects these changes. The number of AIDS cases reported in homosexual males in the period 1981-88 was 379, and the number of reported cases in the period 1989-91 was 600, representing a 58% increase. In comparison, the number of AIDS cases reported in male heterosexual IDUs in period 1981-88 was 14, and the number of cases in period 1989-91 is 45; this represents a 221% increase. Comparisons of these and other groups are listed in Table 4.

Table 2. Oregon AIDS cases by risk behavior and year of report, 1981-1991.

Patient Groups	1981-88		1989-1991		1981-1991	
Adult:	No.	(%)	No.	(%)	No.	(%)
Homo/Bisexual men	379	(79)	600	(74)	979	(76)
IDUs	17	(4)	51	(6)	68	(5)
Homo/Bisexual and IDUs	52	(11)	91	(11)	143	(11)
Hemophiliacs	10	(2)	9	(1)	19	(1)
Heterosexuals	5	(1)	24	(2)	29	(2)
Transfusion recipients	12	(3)	16	(2)	28	(2)
Other/undetermined	3	(1)	25	(3)	28	(2)
Subtotal	**478**	**(100)**	**816**	**(100)**	**1,294**	**(100)**
Pediatric:						
Hemophiliacs	1	(50)	2	(40)	3	(43)
Mother with/at risk for HIV infection	1	(50)	2	(40)	3	(43)
Transfusion recipients	0	(0)	1	(20)	1	(14)
Other/undetermined	0	(0)	0	(0)	0	(0)
Subtotal	**2**	**(100)**	**5**	**(100)**	**7**	**(100)**
Total	**480**	**(100)**	**821**	**(100)**	**1301**	**(100)**

Source: Oregon Health Division, 1988, 1989, 1991.

Table 3. U.S. AIDS cases by risk behavior and year of report, 1981-1991.

Patient Groups	1981-88		1989-1991		1981-1991	
Adult:	No.	(%)	No.	(%)	No.	(%)
Homo/Bisexual men	51,087	(62)	67,275	(56)	118,362	(58)
IDUs	16,492	(20)	29,261	(24)	45,753	(23)
Homo/Bisexual and IDUs	5,944	(7)	7,191	(6)	13,135	(6)
Hemophiliacs	785	(1)	928	(1)	1,713	(1)
Heterosexuals	3,654	(4)	8,282	(7)	11,936	(6)
Transfusion recipients	2,071	(3)	2,276	(2)	4,347	(2)
Other/undetermined	2,729	(3)	4,946	(4)	7,675	(4)
Subtotal	**82,762**	**(100)**	**120,159**	**(100)**	**202,921**	**(100)**
Pediatric:						
Hemophiliacs	84	(6)	79	(4)	163	(5)
Mother with/at risk for HIV infection	1,061	(77)	1,875	(89)	2,936	(85)
Transfusion recipients	174	(13)	115	(5)	289	(8)
Other/undetermined	52	(4)	31	(1)	83	(2)
Subtotal	**1,371**	**(100)**	**2,100**	**(100)**	**3,471**	**(100)**
Total	**84,133**	**(100)**	**122,259**	**(100)**	**206,392**	**(100)**

Source: Centers for Disease Control, 1988, 1989, 1991.

Table 4. Oregon AIDS cases by selected group.

Patient Groups	1981-88	1989-91	% Increase
Gay males	379	600	58
IDU, males	14	45	221
IDU, females	3	5	67
Heterosexual males	1	10	900
Heterosexual females	4	14	250

Source: Oregon Health Division, 1991.

These epidemiologic changes are significant because the cost of medical care of AIDS patients likely differs by risk behavior. For example, IDUs generally have a lower overall health status, even without a diagnosis of AIDS, and so the amount of medical care needed after diagnosis is likely to differ from the amount of care required by patients whose risk behavior is male-to-male sexual contact (Ball and Turner, 1991). The health care needs of female AIDS patients have not been well documented, but these also are different from other groups (Minkoff and DeHovitz, 1991).

The changing epidemiologic picture of AIDS is evidence that the medical system is now providing care to an increasingly heterogeneous group of AIDS patients, and the cost of their care is likely to be different than it has been in the past.

Implications For Nursing

Epidemiologic and health economics information related to HIV infection and AIDS is relevant to nurses and the nursing profession. First, a description of the epidemiology of AIDS in Oregon provides information regarding the state's overall prevalence of AIDS, how the disease is distributed within the population, and what environmental or behavioral conditions are associated with the spread of HIV. This information is useful in planning prevention strategies, implementing effective infectious disease control mechanisms, and assisting nurses with preparation for individual and public education and counseling.

Second, information about the cost of health care of AIDS patients provides nurse-managers with important information to plan the use of scarce health care resources. Nurses realize that the primary component of inpatient health care is the provision of nursing care; thus, hospital charges for AIDS patients largely represent money spent on inpatient nursing care of AIDS patients. Nurses can use information about expenditures to plan cost-effective alternatives to extended inpatient admissions when appropriate (e.g., home health or hospice care). This health care planning process is a large part of managed care, which encompasses formulating plans to supervise patient care and treatment regimens and, in turn, provide AIDS patients with high quality, cost-effective care. Nurses are particularly qualified as case managers and care coordinators because they address all areas of patient needs, including the patient's social, psychological, and economic needs as well as his or her physical needs.

Since first being recognized in 1981, AIDS has become a problem of worldwide significance. Between 1981 and 1990, AIDS treatment modalities, sites of care, and affected risk groups have changed. Studies that describe these changes and assess their impact on health care costs are needed because these findings can help nurses and policy makers make important decisions regarding allocation of scarce health care resources.

Aims

This study involves a epidemiologic analysis of trends in the diagnosis of AIDS patients in Oregon and examination of the hospitalization patterns of these patients. Specifically, we examine AIDS patients diagnosed and reported in Oregon between 1981 and 1990 for their patterns of hospitalization and the cost of their hospital care.

The specific aims of this research project are as follows:

1. To describe patterns of AIDS hospital care from 1981 to 1990 in Oregon.
2. To determine whether changing patterns of care for AIDS include an increase of AIDS diagnosis in outpatient settings; specifically, to determine whether outpatients are different from inpatients in terms of their risk-group mix.
3. To determine the overall charges for hospital care for AIDS patients treated in Oregon over the period 1981 - 1990, specifically,
   a. to determine whether average hospital charges per case are different for those who have been diagnosed in outpatient settings compared to those diagnosed in the hospital;
   b. to determine charges for hospital care per capita in the AIDS population;
   c. to describe the average charge per year;

d. to describe the average charge per hospital stay; and,

e. to describe the average charges for hospitalization of all Oregon AIDS cases.

4. To determine whether the charges for AIDS-related hospital care in Oregon vary among risk groups.
5. To determine the mix of payors of inpatient expenses for AIDS; specifically, to determine if this varies among risk groups.
6. To assess whether AIDS survival time has increased over time within risk groups and the relationship to patterns of hospital use and charges in Oregon.

The charges for hospitalization are only one component of the total cost of the care of AIDS patients. The costs of outpatient services, medications, and physician services will not be included in this study, as there is currently no centralized depository for these data. Nevertheless, the charges for hospital care represent a significant portion of the total cost of AIDS care.

This study represents the first phase in an assessment to determine the total health care costs of AIDS patients receiving care in Oregon; such an assessment is necessary before formulating a plan of how to reduce these costs. The analysis of whether the trend to diagnosis AIDS patients in outpatient settings may lead to a decrease in hospital charges is an important descriptive study--one that has not yet been done in the United States. If the data do support cost-reduction without sacrificing quality of care (as measured by survival time after AIDS diagnosis), the implication for nurses involved in policy making or in public health advisory roles is clear: encourage early evaluation and treatment of HIV-infected individuals and promote programs providing such care.

CHAPTER 2

Review of the Literature

Overview

Numerous studies have focused on the cost of care of AIDS. Table 5 summarizes some of the studies of costs of hospital care that have been done.

Table 5. Estimates of lifetime hospital care costs of persons with AIDS.

Investigator	City or State	Year	Estimated lifetime cost
Hardy (1986)	U.S. estimate	1981-85	$147,000
Scitovsky (1986)	San Francisco	1984	27,571
Andrulis (1987)	U.S. survey	1985	22,013
Lafferty, et al (1988)	Washington	1984/85	34,754
Kaplowitz (1988)	Virginia	1983-86	27,264
Seage (1986)	Massachusetts	1984/85	50,380
Seage (1990)	Massachusetts	1984-86	42,399

First National Cost of AIDS Study

Hardy, et al. (1986) published the first estimate of the national cost of AIDS care estimate in January of 1986; this estimate was applied to the first 10,000 AIDS cases reported to the CDC. This study included three components of estimated economic impact: charges for inpatient medical care, resources lost due to AIDS-associated disability, and resources lost due to premature mortality of AIDS patients.

Hardy calculated hospital charges by multiplying an estimate of total hospital days by an estimate of the average charge per hospital day. The estimated hospital days were obtained by surveying three cities--San Francisco, Philadelphia, and New York City. Hardy took these estimates (12, 31, and 50 days, respectively), figured the proportion of total cases in the CDC's surveillance file represented by these three cities as a weighting factor, and calculated a weighted arithmetic mean length of stay for initial hospitalization (31 days).

The average charge per hospital day was obtained from a review of hospital charges for 35 hospitalizations for AIDS that occurred over a 17-month time period in 1983-84 at an acute care hospital in Atlanta, Georgia; the average charge per day was $878.

Estimates of the total number of hospital days used by each case were obtained from a study done in New York City where AIDS cases were followed after their initial hospitalization (Rivin, et al., 1984). Rivin described how many cases died during their initial hospitalization and the percentage of time the other cases spent hospitalized until they died.

Estimates of revenue lost due to disability was obtained by using an estimate of 86% of AIDS cases being disabled during the three months preceding their death (Rivin, et al., 1984). This disability rate was applied to the first 10,000 AIDS cases from their diagnosis to their death.

The cost of the years of work lost was derived by multiplying the years lost by sex- and age-specific employment rates and earnings.

The cost of premature mortality of AIDS cases was derived by using sex- and age-specific lifetime earning estimates and discounting them at 4% (to convert future earnings to their value in 1986). The case-fatality rate two years after diagnosis of AIDS was assumed to be 100%, and so Hardy calculated the number of deaths (of the 10,000 cases) in each age and sex group by their appropriate expected remaining lifetime earning estimates.

Hardy combined all of these estimates to predict that the first 10,000 cases reported to the CDC would spend 1.6 million days in the hospital, resulting in over $1.4 billion in expenses. Losses incurred for the 8,387 days lost due to disability and early death of these cases were estimated to be over $4.8 million. Finally, Hardy estimated that the lifetime cost of each case would be $147,000. Hardy's study did not include a description of the payors of hospital charges.

Hardy's study represented a pioneering effort in estimating the economic impact of AIDS; as such, she provided direction for later studies. Her estimate, however, has proven to be much higher than later studies whose methods were more direct. One of the problems with Hardy's study included obtaining data from a variety of sources, none of which was representative of any other sample. Her estimate of total number of hospital days used per case over a lifetime, for example, was 167; later studies using actual hospital utilization data showed that estimate to be high. Also, her study included findings from hospital surveys done in the early part of 1980s when hospitalizations for AIDS were longer. Finally, Hardy's study included estimates of earnings lost due to disability or death, where later studies concentrated only on hospitalization charges or costs.

California Study

Scitovsky, Cline, and Lee (1986) reported on the cost of medical care expenditures of AIDS cases treated at San Francisco General Hospital (SFGH) during 1984. Their study included data on the following: 1) all AIDS admissions at SFGH in 1984, selected by ICD-9 CM codes; 2) all AIDS admissions to a special AIDS inpatient unit; and 3) all AIDS outpatients treated at the hospital's outpatient clinic. In addition, the outpatient clinic provided a list of AIDS cases who had received all of their inpatient care at SFGH (to provide a lifetime inpatient charge estimate). Charge data were obtained from the patient accounts department.

Based on all AIDS-related admissions during 1984, the average charge per hospital day was $773; the average charge per admission (including physician charges) was $9,024; and the average length of stay was 11.7 days. Based on their sample of cases receiving all of their inpatient medical care from AIDS diagnosis to death in SFGH during 1984, the average number of lifetime admits was 3.2; the average number of hospital days per case was 34.7; the average length of survival

was 224 days; and the average lifetime charge was $27,571. No description of the payors of hospital charges was given.

One of the strengths of Scitovsky's study is that it included charges for outpatient services as well as for inpatient care. Thus, it represents a more complete estimate of the total cost of medical care of AIDS patients than do studies that include inpatient charges only. Another strength is that it included a description of the admitting diagnosis (e.g., KS, diseases of the blood, etc.); this enables the reader to extrapolate the differences of charges based on the patients' diagnoses. Finally, the study is based on actual hospital and outpatient use data rather than on educated estimates.

One of the weaknesses of the study is that it does not provide demographic or risk-behavior information about the cases treated at SFGH. However, Scitovsky states that 97% of all AIDS cases in San Francisco are gay or bisexual men, so we can assume that most of the cases at SFGH were also gay or bisexual men. Also, the charges for treating AIDS in San Francisco tend to be substantially lower than in other parts of the county because of the well-organized social support networks in that city (Arno, 1986). Organizations such as the Shanti Project and the AIDS Foundation provide home health support that frequently allows a patient to be discharged earlier than would otherwise be possible without that support. Likewise, many patients are able to remain at home and stay out of the hospital entirely because of these organizations. Rather than interpreting this as a weakness in the generalizability of the charge estimates, however, the reader could interpret this as lending support to the proliferation of these community-based organizations.

National Teaching Hospital Study

Andrulis, Beers, Bentley, and Gage (1987) conducted a national survey in 1985 of public and private teaching hospitals treating AIDS cases. The hospitals

surveyed all belonged to the National Association of Public Hospitals or the Association of American Medical Colleges' Council of Teaching Hospitals (representing 465 metropolitan public and private teaching hospitals throughout the United States). One hundred ninety-eight hospitals responded to the survey, with 29 of the hospitals reporting that they treated no AIDS cases during 1985. Thus, the study is a report of information regarding provision of AIDS-related care and its financing in 169 large teaching hospitals throughout the United States in 1985. Forty-four percent of the responding hospitals (74) were private hospitals, 38% (64) were public hospitals, and 18% (31) were Veteran's Health Administration Medical Centers. Overall, the hospitals reported treating 5,393 AIDS cases having 8,806 hospital admissions with a total of 171,000 inpatient days. The reported average length of stay (for all hospitals) was 19 days per year; the average number of inpatient days per year was 32; the average cost per day was $635; the average cost per admission was $12,065; and the average cost per year was $20,320 per AIDS case. From these figures, the average cost of care for an AIDS case over a lifetime (assuming a 13 month survival from AIDS diagnosis to death[1]) is $22,013 ($20,320 ÷ 12 x 13). The majority (56%) of these costs were charged to Medicaid and Medicare; other payors include private insurance (17%), self pay (17%), corrections (3%), and other (7%).

The major strength of the Andrulis study is that it is based on figures from a large number of hospitals throughout the nation; thus, it is more generalizable than studies based on a single hospital. The study also includes demographic and risk behavior information, which allows readers to assess the generalizability of the data based on the demographics and risk behaviors of either the AIDS case population in the United States as a whole or the local AIDS case population. In addition, the study included a description of risk behaviors, hospital use patterns, and hospital charges in

[1] For purposes of comparison, a 13-month life expectancy for AIDS cases is assumed to figure lifetime costs where no estimate of these costs is given.

the Northeast, the Midwest, the South, and the West. This information is valuable because the hospital costs are variable between regions, with the East Region frequently reporting higher hospital costs than the West. Indeed, in this study, the cost per patient per year in the East was $20,202, whereas the cost in the West was $11,546. One reason for the variation is probably the differences in reported risk behaviors: in the East, 46% of the cases in this study were heterosexual IDUs, whereas in the West, only 4% were IDUs. IDUs typically have more complicated and expensive hospital admissions than do cases reporting other risk behaviors (Ball and Turner, 1991).

One of the weaknesses of this study is that it only reported hospital use patterns in major teaching hospitals; thus, the cost of caring for AIDS cases in smaller hospitals is not presented. Also, the survey asked the hospital to provide "charge" and "cost" data, but the interpretation of these variables was left to the responding hospital. The authors report their results in terms of costs, but since costs and charges vary among hospitals, their cost data are clearly less reliable than they would have been if the responding hospitals were asked to limit the data either to costs or charges (and were given a strict definition of the selected variable).

Washington State Study

Lafferty, et al. (1988) used two statewide databases to describe AIDS-related hospital charges: the Washington State AIDS registry, and the Commission Hospital Abstract Reporting System (CHARS), a statewide hospital discharge database. The CHARS data base included data from inpatient admissions in all hospitals in Washington State treating AIDS patients except military hospitals. One hundred and sixty-seven cases meeting CDC's AIDS case definition were matched by dates of birth with 344 AIDS-related hospitalizations occurring within the state of Washington between July 1984 and December 1985. (Reviews of hospital records were done to

validate matches.) Lafferty found that the mean charges per hospitalization were $9,166; the mean length of stay per hospitalization was 13.3 days; and the mean number of hospitalizations per case was 2.1 (during the study period). Because the number of months of follow-up was variable across cases (depending on the length of survival of the cases in the study), Lafferty estimated an average of 3.5 hospitalizations per follow-up year, making the estimated average charge for inpatient medical care $32,081 per AIDS case. This estimate included only inpatient hospitalization charges; physician charges during admissions were not included, nor were outpatient charges. Assuming an average survival time of 13 months, the estimated lifetime inpatient medical care of AIDS cases was $34,754 ($32,081 ÷ 12 x 13). Lafferty did not describe the payors of hospital charges.

Lafferty's study was an improvement on the methods used by Hardy because he used actual charge and inpatient utilization data rather than estimates. Also, his study used discharge data from all of the hospitals within Washington (excluding military facilities); thus, his estimate is more representative of the charges for inpatient AIDS care for the population of AIDS cases within an entire state. Finally, Lafferty's study effectively combined two statewide databases to analyze AIDS-related medical care trends. The weaknesses of the study are that it did not include the cost of medications (such as zidovudine), the cost of physician services, and the cost of outpatient services. In addition, the study did not consider differences in costs of hospitalizations due to the severity of illness of the AIDS cases. Finally, Lafferty did not include any demographic data describing the age, sex, race, and risk behavior of the AIDS cases with hospitalizations, and so the generalizability of the data is uncertain.

Virginia Study

Kaplowitz, et al. (1988) looked at all hospitalizations of adult AIDS cases in the Medical College of Virginia Hospitals (MCVH) from October 1983 to December

1986. Data were collected on 102 admissions of 52 AIDS patients. Hospital charge data were obtained from the accounting department of MCVH and included the charges for inpatient care for all admissions as well as the charges for physician fees in 81 of the admissions. In addition, the study included lifetime AIDS-related charges for 25 of the 52 cases who received all of their inpatient AIDS-related care at MCVH and died during the study period; these data included physician charges for 17 of the 25 cases. The average number of AIDS-related hospital admissions for the 52 cases was 2.29; the average length of stay during these admissions was 12 days; the average charge per hospitalization was $13,830; and the average per diem charge for physician services was $1,058. For cases who received all of their inpatient care at MCVH and who died during the study, their average lifetime charges for inpatient medical care was $27,264. These cases survived only an average of 4.5 months after their initial AIDS diagnosis. The payors of these charges include Blue Cross and Blue Shield (20%), other commercial insurance (24%), and Medicaid (18%). No insurance coverage was reported in 26% of the admissions.

Kaplowitz described the demographic characteristics for a population of AIDS cases with hospital admissions. Including demographic information is extremely helpful when considering the generalizability of the results. For example, the finding of 4.5 months of survival after AIDS diagnosis is much less than a more typical estimate of 13 months; it is perhaps explainable considering that 27% of the patient population had injection drug use as their risk behavior (representing 32% of the total hospitalizations); the number of IDUs, thus, was relatively high, and IDUs often have more frequent and lengthier admissions than do cases with other risk behaviors (Ball and Turner, 1991). Also, Kaplowitz listed the reason for hospitalization (e.g., for Kaposi's sarcoma, etc.), enabling the interpretation of the severity of illness of the patient at time of admission. Including physician fees allowed for a more complete

estimate of the charges of AIDS-related hospital admissions. Finally, Kaplowitz studied patients over time rather than looking only at individual hospital admissions.

The major weakness of Kaplowitz's study is that it included hospital admissions from only one hospital. Thus the estimates will be biased downward by the amount of inpatient charges for hospitalizations in facilities other than MCVH. The method of finding the hospital admissions was not presented; it was not clear whether Kaplowitz obtained a list of AIDS cases diagnosed at MCVH and pulled medical records on those cases or if the medical records were pulled based on ICD-9-CM codes or diagnostic related groups (DRGs). It appears from the data that medical records were pulled using an AIDS case list because all of the reasons listed for admissions are not AIDS-defining. Assuming that is the case, the estimate includes the cost of all inpatient care of AIDS cases (diagnosed within the time frame of the study), including admissions unrelated directly to AIDS. Another problem with Kaplowitz's study is that the estimate of lifetime cost of inpatient medical care of AIDS cases was based on a limited number of cases who died during the period of the study; the average survival of this group (4.5 months) is not representative of the population of AIDS cases in general, and so the lifetime estimate is undoubtedly lower than average. Finally, Kaplowitz did not consider the cost of outpatient medical services.

Massachusetts Studies

Seage, et al. (1986) studied costs of inpatient medical care of AIDS cases living as of September 1, 1984, who received their medical care at the New England Deaconess Hospital. Forty-five cases were identified who fulfilled these criteria. Seage retrospectively analyzed medical records from March 1, 1984, and continued to collect data until February 28, 1985. Data on demographics, risk behavior, insurance coverage, occupation, and clinical characteristics were obtained by reviewing the

hospital's outpatient and ambulatory records. Data regarding lengths of stay, pharmacy, laboratory, intensive care unit days, and hospital charges were provided by the hospital billing department. Information about outpatient ambulatory visits was also included in the study. Costs of inpatient care were estimated by using charge/cost ratios obtained from the Massachusetts Rate Setting Commission. Costs for ambulatory services were estimated by using 1984 Blue Cross/Blue Shield customary rates for office visits and diagnostic tests at hospital and private clinic settings.

Seage found that the overall average number of hospitalizations for the period between March 1, 1984, and February 28, 1985, was 3.3; the average cost of inpatient plus outpatient care was $46,505 per case per year; the average length of hospital stay (per admission) was 21 days; the average number of days spent in the intensive care unit was 4 days; the average number of days spent in the hospital by each case was 61.9; and the average cost per hospitalization was $14,189. Regarding outpatient care, Seage found that AIDS cases in his study averaged nearly 12 outpatient visits during the study period; the average cost for all ambulatory care was $2,668 per patient, or approximately 10% of the total for inpatient utilization. Assuming an average survival of 13 months, lifetime medical care expenditures averaged $50,380 per case. The payors of these admissions included Blue Cross and Blue Shield (47%), Medicaid (18%), and private insurance (18%); no insurance was listed in 18% of the admissions.

The strengths of Seage's study are inclusion of outpatient expenses and demographic and risk behavior information. The major weakness of the study was use of charge and utilization information from only one hospital. It is possible that some of the patients received care at other hospitals; if so, the costs and utilization patterns given by Seage underestimate true costs and inpatient/outpatient use.

Seage, et al. (1990) published a follow-up study of hospital costs of AIDS cases. This study examined hospital admissions of 240 AIDS cases who received care in five major teaching hospitals in Massachusetts between March 1, 1984, and February 28, 1986. Four of these hospitals were located in Boston, and the other was selected because it had cared for the largest number of AIDS cases in the state outside of the Boston metro area. All patients who met the CDC's AIDS case definition and received their primary care at one of the selected hospitals were enrolled; cases who were seen for consultation only were excluded. The cases were identified by the participating hospitals. As with their earlier study, socioeconomic, clinical, risk behavior and outpatient utilization data were collected for each case. Likewise, data about hospital utilization (length of stay and charges) were obtained from the billing departments of each of the participating hospitals. Charge information was then converted to cost by using the conversion techniques from their initial study. Outpatient charge data were estimated by using the Blue Cross and Blue Shield reimbursement rates.

For the two years of the Seage study, the overall average number of admissions was 1.95; the average length of stay was 17.3; the average number of intensive care unit days was 1.2; the average cost per admission was $10,868; the average number of ambulatory (outpatient) visits was 7.0; and the average cost per outpatient visit was $269. The cost of inpatient care per case decreased during the two years of the study from $12,463 to $9,957. Reasons for this decrease included shorter hospital stays (from 20.6 days to 16.8 days) and lower charges per admission (from $12,463 to $9,957). Nonetheless, the total cost of care for the cases increased from $34,229 to $42,399. The increase was related to an increase in the median survival after diagnosis (from 10 months to 17 months). Although annual costs of care decreased by 28%, the lifetime costs of treating AIDS cases increased by 24%. Payors charged for the hospitalizations were Blue Cross and Blue Shield (29%),

commercial insurance (14%), Medicaid/Medicare (32%), and health maintenance organizations (12%); no insurance was listed in 12% of the admissions.

Seage's second study was an improvement of the first because he included data from more than one hospital. Also, like the first study, Seage included demographic and risk behavior information. Even so, the study still lacks information about costs of caring for AIDS cases in rural hospitals. In addition, although the author states that cases are followed across hospitals, it is possible that some of the cases were seen in hospitals or clinics other than the five participating in the study. If so, the study would underrepresent these patients' hospital utilization.

Oregon Studies

In collaboration with the Oregon Association of Hospitals (OAH), the Oregon Health Division (OHD) conducted two studies describing the cost of care of Oregon AIDS cases in 1988 and 1989 (OHD, 1990, 1991). The OAH receives hospital admission and utilization data (including charge data) from hospitals throughout Oregon. The OAH extracted admission records for 1988 and 1989 with discharge diagnoses indicative of AIDS (using ICD-9-CM codes). The OHD maintains a database with hospital admission information regarding all AIDS cases hospitalized throughout Oregon. Data are collected systematically by an AIDS Epidemiologist during semi-annual hospital records reviews; these reviews are conducted at all hospitals in Oregon treating AIDS cases. Records are pulled for review by ICD-9-CM codes indicative of AIDS or an AIDS-like diagnosis (see Appendix A); admission information is collected on all diagnosed AIDS cases who have been hospitalized. Outpatient and emergency room visits are excluded. The OHD matched their hospital admission database with records supplied by the OAH, using date of birth, date of admission, date of discharge, medical record number, and hospital site for 1988 and 1989 admissions. Only those admissions found in both the OAH and the OHD

databases were included in the studies. Using charge data supplied by OAH, the OHD described the following: in 1988, the average charge per AIDS-related hospital admission was $10,575, and the average charge per AIDS patient per year was $16,920; in 1989, the average charge per day for AIDS patients was $1,254, the average charge per hospital admission was $11,538, and the average charge per patient per year was $18,460. The strength of these studies is that two independent databases were used, providing validation of the matched admissions. The weaknesses are that many unmatched admissions were not included in the analysis (because the admissions were in only one of the databases), and data from the Veterans' Administration Medical Center were not included because the OAH had inadequate data regarding VA admissions. Also, the studies did not provide demographic data regarding the AIDS cases who were hospitalized.

Important Gaps in Previous Research

The cost-of-care studies reviewed above primarily included charges for inpatient medical care. Those studies that did include charges for outpatient care found that charges for care in ambulatory settings were considerably less than charges for hospital care (Scitovsky, Cline, and Lee, 1986; Seage, et al., 1986). Scitovsky emphasized the savings in costs of inpatient medical care that are realized in San Francisco as a result of community-based organizations. The Shanti Project, San Francisco AIDS Foundation, and other similar organizations allow AIDS patients to receive some of their care within the community, and thus charges for inpatient services are saved. Peter Arno (1986) wrote in detail about the community-based services available in San Francisco and the cost-effectiveness of these organizations. Briefly, the city of San Francisco began investing in the development of community-based organizations early in the AIDS epidemic. Organizations were commissioned by the San Francisco Department of Public Health to provide AIDS-related services,

such as hospice care and psychological support and counseling. Home-based hospice care was provided to 165 AIDS patients at an average cost per day of $94 per patient (Arno, 1986), an amount substantially lower than the $773 per day for inpatient medical care at San Francisco General Hospital described by Scitovsky (1986). Other authors, including Cotton (1988), the Institute of Medicine (1988), and Gee and Moran (1988), advise that much of the therapy used to treat AIDS patients can and should be provided in outpatient settings, as these costs are lower and the setting is frequently more acceptable to the patient. The location of AIDS-related care, then, is significant in that the charges for care in ambulatory settings are lower than charges for care in a hospital. What is not clear, however, is whether care given in outpatient settings effects hospital utilization patterns.

Our study makes a number of important contributions to the body of knowledge of AIDS care and its cost: it provides documentation of the extent to which AIDS patients in Oregon are being diagnosed in outpatient settings (marking their use of outpatient care), and it documents whether there is a difference in charges for hospitalization and/or hospital use patterns of those patients receiving their initial diagnosis of AIDS in outpatient settings versus those who were first diagnosed with AIDS in inpatient settings. In addition, important epidemiologic trends are described, as is a comparison of the charges for care of AIDS patients by risk group. Finally, descriptions of survival trends for patients diagnosed in Oregon and of payors for AIDS-related hospital care are provided.

CHAPTER 3

Methods

This study describes trends in diagnosis and treatment of AIDS patients in Oregon over a ten-year period of time and examines whether or not the trend toward care of AIDS patients in outpatient settings is associated with reduced overall hospital use.

Design

This is a nonexperimental, retrospective analysis of a population-based cohort of AIDS patients in Oregon. The sample includes all Oregon AIDS patients diagnosed and reported between 1981 and 1990. Records of these cases and their hospital admission data from 1981 through September, 1991, were obtained from the Oregon Health Division. Data on all AIDS-related hospitalizations in the state were linked to the registry to obtain total in-state use by residents with AIDS.

The variables of particular interest in this study include site of diagnosis (the independent variable), length of hospital stay, charges, and survival time (the dependent variables). Other important descriptive variables include gender, age race or ethnicity, risk behavior, county of residence, and mortality status.

Data

The Oregon AIDS case registry is housed at the Oregon Health Division in Portland, Oregon. It includes all AIDS cases reported to the state or to local health departments. The standard procedure for reporting a case of AIDS involves completion of an AIDS case report form by a physician or an AIDS Epidemiologist and submission of the form to the local health department or to the Oregon Health

Division. Other mechanisms of eliciting AIDS case reports involve surveillance by an AIDS Epidemiologist. This involves regular contact with hospital infectious control practitioners (ICPs) at reporting hospitals, semi-annual hospital record reviews in hospitals treating AIDS cases, and death certificate reviews. Hospital medical records and death certificates are pulled for review based on ICD-9-CM codes that are indicative of AIDS or an AIDS-like diagnosis (Kizer, 1986). This "coding net" includes the following diagnoses codes: AIDS, AIDS-like disease (illness, syndrome), immunity disorders, malignant neoplasms of the skin (site unspecified), and PCP (see HIV infection codes, Appendix A). If AIDS cases are reported by an ICP, found upon chart review, or suspected after a death certificate is reviewed, they are verified with the diagnosing physician before they are included in the case registry.

After cases are reported and verified, the AIDS Epidemiologist checks the case registry to assure that duplicate cases are not entered. Cases are then assigned an Oregon state number if they are Oregon residents and an out-of-state number if they were diagnosed while they were a resident of another state. (Cases reported as out-of-state cases are confirmed by consulting with that state's AIDS surveillance worker.) Finally, the case is entered into the case registry. The case registry utilizes computer software supplied by the CDC, called AIDS Reporting System, or ARS. Upon entering the state number and name, ARS assigns a phonetic "soundex" code. This, along with the date of birth, is used by CDC as a patient identifier and helps maintain patient confidentiality. Accordingly, our study used only these two pieces of information as case identifiers to protect the confidentiality of patients.

As seen on the appended case report form (Appendix B), one of the pieces of information that is collected at the time of report is whether the diagnosis of AIDS occurred in an inpatient or outpatient setting. Other variables found in each case report that were used in the study include: the assigned state number, soundex code,

date of case report, date of diagnosis, mortality status, age, date of birth, race, sex, risk behavior, state of residence, reporting physician, and the hospital (or clinic) where the case was diagnosed (Table 6).

Table 6. Variables used in AIDS study.

ARS	XARS	Computed
Soundex	Hospital	Number of admissions
Date of birth	Admission date	Total length of stay
Date case entered	Discharge date	Total number of ICU days
State number	Length of stay	Length of survival
Date of birth	Number of ICU days	
Sex	Payor	
Race		
Age		
Risk behavior[1]		
Date of diagnosis		
Date of case report		
Mortality status		
Date of death		
Reporting MD		
Hospital of diagnosis		
Site of diagnosis		

For the study, we transferred the variables listed above for all Oregon AIDS cases diagnosed and reported between 1981 and 1990 into a separate database file. We refer to this file as DB1 (Figure 1). **Our population of AIDS cases, then, includes pediatric and adult patients who were residents of Oregon and were diagnosed and reported as AIDS cases between 1981 and 1990.**

The second database is called XARS. This database contains records of admissions in hospitals throughout Oregon of reported AIDS cases. Records included in XARS are collected by an AIDS Epidemiologist. To obtain these records,

[1] It is possible for patients to have more than one risk behavior. However, risks are coded in ARS in a hierarchical manner, with the most likely modes of transmission (i.e., male-to-male sexual contact, injection drug use, and hemophilia) listed first. Then, ARS is programmed to assign a "risk" based on the data provided. If male-to-male sexual contact is listed as a risk along with injection drug use, the case is designated as a homosexual IDU. However, if the patient is a homosexual who also happens to have had a blood transfusion or happens to be a health care worker, he designated only as a homosexual. If an epidemiologist knows the mode of transmission is something other than that assigned by ARS, he or she can change the risk in the case registry.

an AIDS Epidemiologist reviews inpatient medical records every six months from each hospital in the state reporting AIDS cases. Between 1981 and September, 1990, 28 hospitals in Oregon provided care to AIDS patients.

Table 7. Oregon hospitals with abstracted admission information in XARS.

Bend	**Oregon City**
St. Charles Hospital	Willamette Falls Hospital
Corvallis	**Portland**
Good Samaritan Hospital	Emanuel Hospital
Eugene	Good Samaritan Hospital
Sacred Heart Hospital	Holladay Park Hospital
Eugene Clinic and Hospital	Meridian Park Hospital
Grants Pass	Oregon Health Sciences University
Josephine Memorial Hospital	Portland Adventist Medical Hospital
Gresham	Providence Hospital
Mt. Hood Medical Center	St. Vincent Hospital
Klamath Falls	Veterans Administration Hospital
Merle West Medical Center	Woodland Park Hospital
Medford	**Roseburg**
Providence Hospital	Mercy Medical Center
Rogue Valley Medical Center	Roseburg Veterans Hospital
Newberg	**Salem**
Newberg Community Hospital	Salem Hospital
Newport	**Springfield**
Pacific Communities Hospital	McKenzie Willamette Hospital
Pendleton	**The Dalles**
St. Anthony's Hospital	Mid-Columbia Medical Center

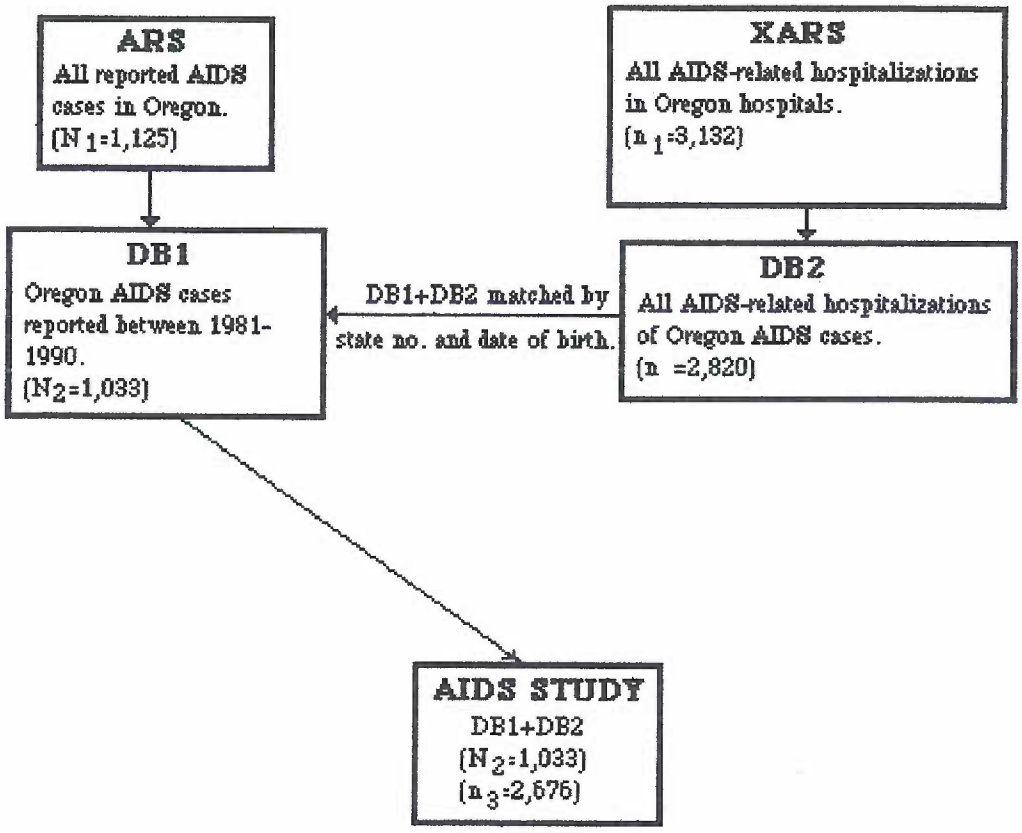
The records of patients with an AIDS-like diagnosis are pulled by medical records personnel using selected ICD-9 CM codes suggestive of an AIDS diagnosis. If the record indicates the patient has AIDS and he or she has been reported to the State Health Division as such, information about the hospital admission is recorded in XARS. If the record indicates (or seems to indicate) the patient has AIDS and he or she has not previously been reported as a case, the diagnosis is confirmed by contacting the admitting physician, the case is recorded in ARS, and information about the hospital admission is recorded in XARS. XARS contains only abstracted admission records from Oregon hospitals of confirmed AIDS cases recorded in ARS; hospital admission records from hospitals outside of Oregon are not included, nor are records of asymptomatic HIV-positive patients.

The variables from XARS that were used in this study include: the patient's soundex code, date of birth, the name of the hospital the case was treated in, the admission and discharge date, the number of inpatient days, the number of days spent in the intensive care unit (ICU), and the payor (Table 6). Only records in XARS of cases included in DB1 were used. One of the objectives of this study is to describe charges for hospital care of AIDS cases residing in Oregon; accordingly, data regarding out-of-state AIDS cases (i.e., cases who were residents of another state at the time of their AIDS diagnosis) were not included. The appropriate records were extracted from XARS and put into a file called DB2. Records from hospitalizations through September, 1991--nine months after the last AIDS case in the study was reported (in December, 1990)--were included in an attempt to capture hospital use by the study's patients more completely.

The cases in DB1 were matched by soundex code and date of birth with their appropriate record(s) in DB2. This matching allowed cases to be tracked over time and across hospitals, thus allowing the resulting patterns of care to more completely represent hospital utilization of each patient as compared with treating each admission independently. The matched records (from DB1 and DB2) were combined to form one database called AIDS STUDY. Figure 1 summarizes this process. Note that all records in DB2 (the hospitalization data file) have a matching state number in DB1, but cases in DB1 do not necessarily have hospitalization records in DB2.

Charges for hospital care were estimated by using the average charge per day cited by the Oregon Health Division's HIV Program (1991). In the *HIV/AIDS Surveillance Report* (03/31/91), the Health Division lists $1,254 as the average charge per day (for inpatient AIDS-related care) (see "Oregon studies" above). This charge was applied to the appropriate index of hospital utilization (i.e., total length of stay) to estimate overall charges for care of the AIDS cases in the study. Then, the payors of hospital charges are described .

Figure 1. Database matching of ARS (Oregon AIDS case registry) and XARS (AIDS hospital admissions database).



Next, the sample is divided into "outpatients" and "inpatients," referring to site of AIDS diagnosis. Hospital use patterns of these two groups were then compared. Hospital use patterns are defined in the following way: average number of hospital days per admission, average number of hospital days per year, and average number of total hospital days. Following the presentation of those data, we compared overall hospital charges (calculated by using $1,254 per day) of "AIDS outpatients" with "AIDS inpatients."

Because charges for hospital care of patients who have died represent the true total lifetime hospital charges, these charges--along with hospital use patterns--were presented. Finally, we figured overall survival time for patients who died. This was done by comparing the date of diagnosis with the date of death.

Reliability and Validity Issues

Information about AIDS cases is primarily provided by physicians; those cases and information about them reported by other sources (e.g., hospital infection control practitioners) are confirmed by consulting with the diagnosing physician. Information about site of diagnosis (outpatient versus inpatient) is confirmed by an AIDS Epidemiologist reviewing XARS in the following manner: cases reported as outpatients but having hospital admissions with a diagnosis code indicating AIDS or an AIDS-like condition within 30 days of diagnosis are reconfirmed with the physician and recoded as inpatients. This helps maintain the integrity of the site of diagnosis variable.

It is possible that patients are lost to follow-up after being diagnosed with AIDS. If AIDS outpatients are lost more frequently than AIDS inpatients (perhaps because they are less sick and thus more capable of relocating to another area), decreased hospital use by this population would reflect fewer cases with follow-up data rather than truly reflecting less hospital use. In Oregon, follow-up data are solicited from reporting physicians every six months. An AIDS Epidemiologist sends letters to all physicians in Oregon with living AIDS cases in the case registry requesting a case-status update on each case. Physicians are asked to indicate which of their patients have died or have been lost to follow-up. These data are then entered into a local use field in ARS. Of the 1,033 AIDS cases in this study, 61 cases were lost to follow-up. Thirty-seven (61%) of these were AIDS inpatients, and 24 (39%) were AIDS outpatients (p=NS). AIDS outpatients, then, were not more likely to be lost to follow-up than AIDS inpatients, indicating that hospital use patterns of AIDS outpatients did not merely reflect fewer follow-up data regarding that population.

There is a possibility that cases who leave Oregon may be lost to follow-up and die without their deaths being reported and recorded in ARS. In those instances, it is possible for their deaths to be missed. The mechanism currently in use to

monitor deaths allows for informal notification across state lines when an AIDS-related death occurs outside of the reporting state. In that case, the person responsible for following up AIDS-related deaths is usually able to ascertain what state originally reported the case (by reviewing medical records, questioning family members or significant others, etc.), and the reporting state can be notified. Currently, Oregon does not utilize a national death index for tracking AIDS deaths. This, then, poses a potential threat to the reliability of the mortality status variable. There currently is no mechanism to determine to what extent this potential problem exists.

Another theoretical possibility exists of reporting bias of AIDS inpatients. That is, since AIDS surveillance sources (other than physician reports) are hospital-based (relying on inpatient medical record review and reports from ICPs), it is possible that outpatient AIDS cases are not reported or detected until they are hospitalized. This would cause an increased "reporting lag," or a longer time from diagnosis of AIDS to report of the case. For the cases in this study, the mean reporting lag in cases diagnosed as inpatients was not significantly different than the reporting lag of cases diagnosed as outpatients. The mean reporting lag for each group was 4.01 months and 4.36 months, respectively, indicating that a reporting bias of AIDS inpatients was not a factor in this study.

The completeness of AIDS case reporting in Oregon is periodically assessed at the Oregon Health Division using the capture-recapture methodology (the Chandra Sekar and Deming method [Chandra Sekar and Deming, 1949]) and is reported to CDC. This method consists of estimating the population of AIDS patients in Oregon, using the number of solicited and unsolicited cases that are reported. (Cases are considered unsolicited if they are reported independently by a physician and solicited if they are confirmed by a physician after first being discovered by an AIDS Epidemiologist.) The number of cases that has been reported is compared with the estimated number of cases, and an estimate is made regarding the completeness of

reporting. In February of 1992, Oregon determined the overall completeness of case reporting to be 96.4% (Oregon Health Division, unpublished data).

The method of accessing the appropriate records (that include AIDS-like diagnoses) from hospitals around the state using ICD-9 CM codes was described above. Other states have found this "coding net" to be very successful at capturing almost all of the appropriate hospital admissions (Kizer, 1986); Oregon has not evaluated the validity of this "net."

A possible threat to internal validity in this study is changing medical technology over time. The treatment for AIDS has varied from year to year; thus, the year of diagnosis of AIDS is probably correlated with length of stay, survival time, and cost of care. We controlled for this by stratifying AIDS cases by year of diagnosis when we calculated measurements of length of survival. Also, the initial opportunistic infection can be important in determining the number of hospital days, procedures performed, and length of survival.

Limitations of Study

There are two major limitations to this study. One of them is the marker for the site of AIDS diagnosis. While diagnosis of AIDS in an outpatient setting does by definition indicate that the patient was seen in an outpatient setting, diagnosis as an inpatient may not indicate that the patient was seen first in the hospital. Some inpatient cases were probably seen in outpatient settings before their diagnosis; their subsequent diagnosis in an inpatient setting might instead reflect the type of opportunistic infection they presented with. PCP, for example, presents as an acute condition requiring hospitalization much more frequently than does HIV dementia or KS. Nevertheless, AIDS cases reported as outpatients provide important information about treatment and AIDS care trends. Also, the use of data regarding site of AIDS

diagnosis in a study examining costs of care represents an innovative approach at utilizing routinely collected epidemiologic data.

The second limitation to the study is that only Oregon AIDS cases were included in the analysis. The decision to not include out-of-state cases was based on concern regarding the integrity of the data collected on out-of-state cases. Specifically, the risk identification (i.e., the mode of infection) and site of diagnosis variables are not closely scrutinized in these cases, whereas these variables are carefully monitored in resident cases (where all cases without a defined risk are investigated and the site of diagnosis of each case is verified).[1] The limitation imposed by restricting the analysis to resident cases is an underestimation of total hospital use by AIDS patients. In this study, 92 out-of-state cases were hospitalized 312 times (average 3.4 admissions) and a total of 2,887 days (average 9.3 days per admission). The estimated charges for hospitalization (in Oregon) of out-of-state cases between 1981-90 were $3,620,298.

[1] Out-of-state cases are not included in Oregon's AIDS surveillance data but are counted as cases in the state of residence at the time of their AIDS diagnosis. It is the responsibility of the cases' state of residence to follow up these cases.

CHAPTER 4

Results

The results of the study are presented in three sections. Section I focuses on the total patient population; Section II describes temporal patterns; and Section III discusses AIDS fatalities. Demographics, risk behavior, site of AIDS diagnosis, and survival times are presented in each section, as are patterns of hospital use, hospital charges, and payors of hospital charges.

Section I

Total Patient Population

Demographics.

Between 1981 and 1990, 1,033 AIDS cases who were residents of Oregon (having listed a home address in Oregon at the time of AIDS diagnosis) were reported to the Oregon Health Division. Of these, 836 had abstracted hospital admissions in XARS.

Of the 1,033 AIDS cases in the study, 966 (96%) are male, and 27 (4%) are female (Table 8). One thousand twenty seven cases (99%) are adults or adolescents (more than 13 years of age at time of diagnosis), and six (1%) are children (Table 9).

Nine hundred sixty (93%) of the AIDS cases are white, 28 (3%) are African American, 35 (3%) are Hispanic, four (less than 1%) are Asian or Pacific Islander, and six (less than 1%) are American Indian or Alaskan Native (Table 8, Figure 2).

The majority of the AIDS cases (700, or 68%) live in Multnomah County (Table 10).

Table 8. AIDS cases by race and sex (N=1,033).

Race	Male		Female		Total	
	No.	(%)	No.	(%)	No.	(%)
White	929	(93)	31	(84)	960	(93)
African American	25	(3)	3	(8)	28	(3)
Hispanic	32	(3)	3	(8)	35	(4)
Asian/Pacific Islander	4	(<1)	0	(0)	4	(<1)
American Indian	6	(1)	0	(0)	6	(1)
Total	**996**	**(100)**	**37**	**(100)**	**1,033**	**(100)**
χ^2=7.40, df=5, p=NS						

Table 9. Oregon AIDS cases by age group (N=1,033).

Age group	No. of cases	Percent
0 to 9	4	<1
10 to 19	3	<1
20 to 29	193	19
30 to 39	467	45
40 to 49	252	24
50 to 59	76	7
60 to 69	32	3
70 to 79	4	<1
80 to 89	2	<1
Total	**1,033**	**100**

Figure 2. Oregon AIDS cases by race or ethnicity (N=1,033).

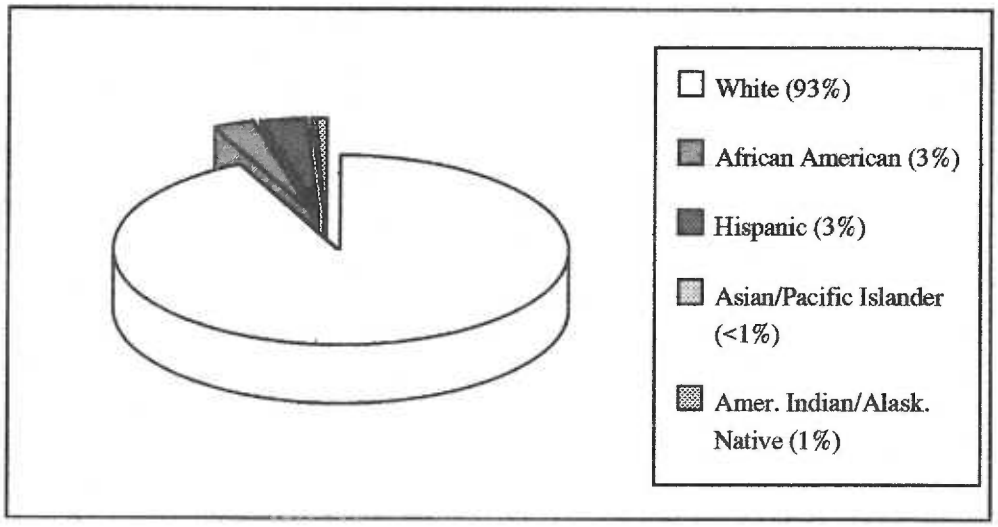


Table 10. County of residence of AIDS cases (N=1,033).

County	# Of Cases	Percent	Rate*
Baker	1	<1	6.6
Benton	9	1	12.7
Clackamas	50	5	17.9
Clatsop	3	<1	9.0
Columbia	7	1	18.4
Coos	10	1	16.7
Crook	1	<1	7.1
Curry	1	<1	5.3
Deschutes	8	1	10.7
Douglas	18	2	18.9
Gilliam	1	<1	58.8
Grant	1	<1	12.5
Hood River	2	<1	11.8
Jackson	18	2	12.3
Jefferson	1	<1	7.1
Josephine	7	1	11.1
Klamath	1	<1	1.7
Lane	63	6	22.3
Lincoln	6	1	15.4
Linn	12	1	13.2
Malheur	1	<1	3.8
Marion	32	3	14.0
Multnomah	700	68	119.9
Polk	4	1	8.0
Tillamook	2	<1	9.1
Umatilla	1	<1	1.7
Union	1	<1	4.2
Wallowa	1	<1	14.3
Wasco	6	1	27.3
Washington	55	5	17.6
Yamhill	10	1	15.2
Total	**1033**	**100**	**35.6**

* Rate per 100,000, based on 1990 U.S. Census.

Risk behavior.

Seven hundred ninety-one of the 1,033 cases (77%) are homosexual or bisexual men, 45 (4%) are IDUs, 106 (10%) are homosexual or bisexual men and IDUs, 18 (2%) are hemophiliacs, 22 (2%) are heterosexuals, 25 (2%) are blood transfusion recipients, 20 (2%) have undetermined risk factors, two (less than 1%) are child hemophiliacs, three (less than 1%) are children of mothers who are HIV antibody positive, and one (less than 1%) is a child who received a blood transfusion (Tables 11 and 12). Risk behavior is significantly different for males and females

(p<.001); most males (80%) with AIDS are homosexual or bisexual men, whereas the largest portion of female cases (35%) became infected through heterosexual contact.

Table 11. Oregon AIDS case groups (N=1,033).

Risk Behavior	Males		Females		Total	
Adult	No.	(%)	No.	(%)	No.	(%)
Homo/bisexual men	791	(80)	0	(0)	791	(77)
IDUs	38	(4)	7	(19)	45	(4)
Homo/bisexual men and IDUs	106	(11)	0	(0)	106	(10)
Hemophiliacs	18	(2)	0	(0)	18	(2)
Heterosexuals	9	(1)	13	(35)	22	(2)
Transfusion recipient	15	(2)	10	(27)	25	(2)
Other/undetermined	15	(2)	5	(13)	20	(2)
Pediatric						
Hemophiliacs	2	(<1)	0	(0)	2	(<1)
Mother with/at risk for HIV infection	2	(<1)	1	(3)	3	(<1)
Transfusion recipients	0	(0)	1	(3)	1	(<1)
Total	**996**	**(100)**	**37**	**(100)**	**1,033**	**(100)**
χ^2=406.22, df=9, p=<.001						

Risk behavior also differs significantly by race (p<.001). While the majority of cases in all races are homosexual or bisexual men (except for American Indians, where 50% of the cases are homosexuals and 50% are homosexual or bisexual IDUs), there are more IDUs with AIDS who are Hispanic and African American than there are IDUs who are white (6% and 21%, respectively, versus 4%). There are also more heterosexual cases who are Hispanic or African American (9% and 7%, respectively) than who are white (2%) (Table 12).

Table 12. AIDS cases by race and risk behavior (N=1,033).

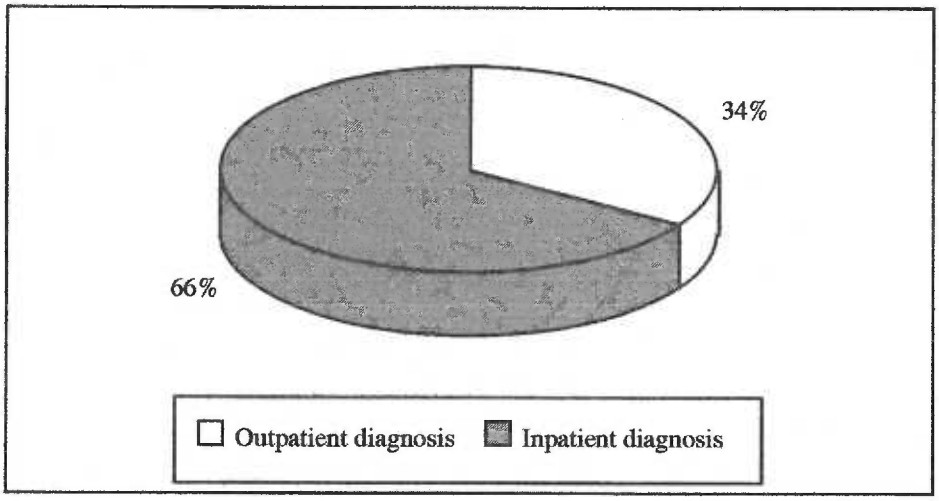
Risk behavior	White No. (%)	African American No. (%)	Hispanic No. (%)	Asian/Pacific Islander No. (%)	American Indian No. (%)
Homosexual	747 (78)	18 (64)	20 (57)	3 (75)	3 (50)
IDU	37 (4)	6 (21)	2 (6)	0 (0)	0 (0)
IDU and Homosexual	93 (10)	1 (4)	8 (22)	1 (25)	3 (50)
Hemophiliac	17 (2)	0 (0)	1 (3)	0 (0)	0 (0)
Heterosexual	17 (2)	2 (7)	3 (9)	0 (0)	0 (0)
Transfusion Recipient	23 (2)	1 (4)	1 (3)	0 (0)	0 (0)
Undetermined Risk	20 (2)	0 (0)	0 (0)	0 (0)	0 (0)
Hemophiliac, Children	2 (<1)	0 (0)	0 (0)	0 (0)	0 (0)
Children, Mother HIV+	3 (<1)	0 (0)	0 (0)	0 (0)	0 (0)
Transfusion Recipient, Child	1 (<1)	0 (0)	0 (0)	0 (0)	0 (0)
Total	**960(100)**	**28 (100)**	**35 (100)**	**4 (100)**	**6 (100)**

χ^2=54.43, df=45, p<.001

Site of AIDS diagnosis.

Of the 1,033 AIDS cases in this study, 680 (66%) received their diagnosis of AIDS in inpatient settings, while 353 cases (34%) received their diagnosis in outpatient settings (Figure 3.).

Figure 3. Site of AIDS diagnosis (N=1,033).



Risk behavior and site of AIDS diagnosis.

Of the 353 AIDS cases diagnosed in outpatient settings, the majority (82%) are homosexual or bisexual men. In addition, seven (2%) are IDUs, 37 (10%) are homosexual or bisexual men and IDUs, three (less than 1%) are adult hemophiliacs, seven (2%) are heterosexuals, three (1%) are adult blood transfusion recipients, four (1%) have an undetermined risk factor, and one (less than 1%) is a child who received a blood transfusion. The risk behavior proportions of AIDS outpatients differ significantly from the risk behavior proportions of AIDS inpatients ($p<.005$). AIDS outpatients are more likely to be homosexual or bisexual men and less likely to have other risk behaviors. The comparison of outpatient and inpatient risk behavior proportions is presented in Table 13.

Table 13. Risk behavior and site of AIDS diagnosis (N=1,033).

Risk behavior	Outpatient diagnosis		Inpatient diagnosis	
	No.	(%)	No.	(%)
Homo/Bisexual	291	(82)	500	(74)
IDUs	7	(2)	38	(6)
Homo/Bisexual IDUs	37	(10)	69	(10)
Hemophiliac, Adult	3	(<1)	15	(2)
Heterosexuals Transfusion	7	(2)	15	(2)
Recipients, Adult	3	(1)	22	(3)
Other/Undetermined	4	(1)	16	(2)
Hemophiliac, Child	0	(0)	2	(<1)
Child w/HIV+ Mother	0	(0)	3	(<1)
Transfusion Recipient, Child	1	(<1)	0	(0)
Total	353		680	
$\chi^2=23.64$, df=9, $p<.005$				

Survival.

Of the 1,033 AIDS cases in Oregon, 610 cases (59%) have died. Mortality status did not differ by mode of HIV transmission. However, mortality status did differ significantly by site of AIDS diagnosis (i.e., outpatient versus inpatient) ($p<.001$). Fifty-seven percent of AIDS outpatients are still living, compared with 33% of AIDS inpatients.

Of those cases who are still living, the mean survival time is 16.3 months. This figure is accurate to the extent our mortality information is complete; this figure is also influenced by the lag time between the death of an AIDS case and entrance of that information in ARS. The lag time for receiving case death notices is variable depending on the location of the death. Deaths occurring within Multnomah County have virtually no lag time, whereas the lag time of notification of deaths occurring in other counties in Oregon is about four months. The lag time for AIDS-related deaths occurring in other states or countries is not known.

Patterns of inpatient hospital care.

Between 1981 and September, 1991, 1,316[1] resident Oregon AIDS patients were admitted to Oregon hospitals 2,676 times (mean=2.0). These patients spent a total of 20,677 days and 946 ICU days in the hospital during that time, or a mean of 7.7 days and 0.4 ICU days per admission.

AIDS inpatients spent a total of 16,506 days in the hospital; this compares with AIDS outpatients, who spent a total of 4,171 days in the hospital. The mean length of hospital stay per admission for AIDS inpatients was 8.5 days; this differed significantly from the mean length of stay of AIDS outpatients (5.6 days) ($p<.001$). This finding supports our hypothesis of healthier AIDS outpatients, though the reason for the shorter hospital stays remains unclear.

The mean length of stay per hospitalization by risk behavior was significantly different ($p<.001$). The mean lengths of stay are: homosexual or bisexual men, 7.3 days; IDUs, 8.3 days, homosexual or bisexual IDUs, 6.8 days; adult hemophiliacs, 11.3 days; heterosexuals, 9.9 days; adult transfusion-associated cases, 22.5 days; adults with undetermined risks, 11.6 days; pediatric hemophiliacs, 3.1 days; pediatric

[1] This number represents the sum of the number of patients admitted each year from 1981 through September, 1991. While the count of patients with admissions during each year is unduplicated, the sum of the patients admitted each year (1,316) represents a duplicate count of many of the 836 Oregon AIDS patients with admission data.

cases whose mother was HIV-infected, 10.3 days; and pediatric transfusion-associated cases, 1.0 days.

Charges for hospital care.

Using $1,254 average charge per day, the total charges for hospital care of AIDS patients in Oregon between 1981 and September, 1991, were $25,928,958. For AIDS inpatients, the total charges were $20,698,524; for AIDS outpatients, total charges were $5,230,434.

Charges for care by risk behavior.

The charge for hospital care by risk behavior (or group) is found by determining the total number of inpatient days (total LOS) used by each group and multiplying that number by the average cost per day ($1,254). These charges are presented in column three of Table 14. In column four of that table, the total charges for hospital care ($25,928,958) are compared with the charges for each group, giving the percentage of overall charges per risk group. Finally, the percent of AIDS cases in each risk group (in this study) is presented in column five for comparison with the percent of inpatient care charges (column four). Although the percentages of total charges versus the percentages of cases in each risk group are relatively proportional, this ratio for homosexual and bisexual men is slightly lower than is the ratio for IDUs. Since lengths of stay differ between risk groups, the charges for care (per admission) would also be expected to differ.

Table 14. Charges for hospital care by risk behavior (N=1,033).

Risk behavior	Total LOS	Charges	% of total charges	% of total cases
Homo/Bisexuals	14,822	$18,586,788	72	77
IDUs	1,117	$1,400,718	5	4
Homo/Bisexual IDUs	1,934	$2,425,236	9	10
Hemophiliac, Adult	419	$525,426	2	2
Heterosexuals	645	$808,830	3	2
Transfusion recipients	1,082	$1,356,828	5	2
Other/Undetermined	603	$756,162	3	2
Hemophiliac, Child	22	$27,588	<1	<1
Child, Mother with AIDS or HIV+	31	$38,874	<1	<1
Transfusion recipients, Child	2	$2,508	<1	<1

Payors of hospital care charges.

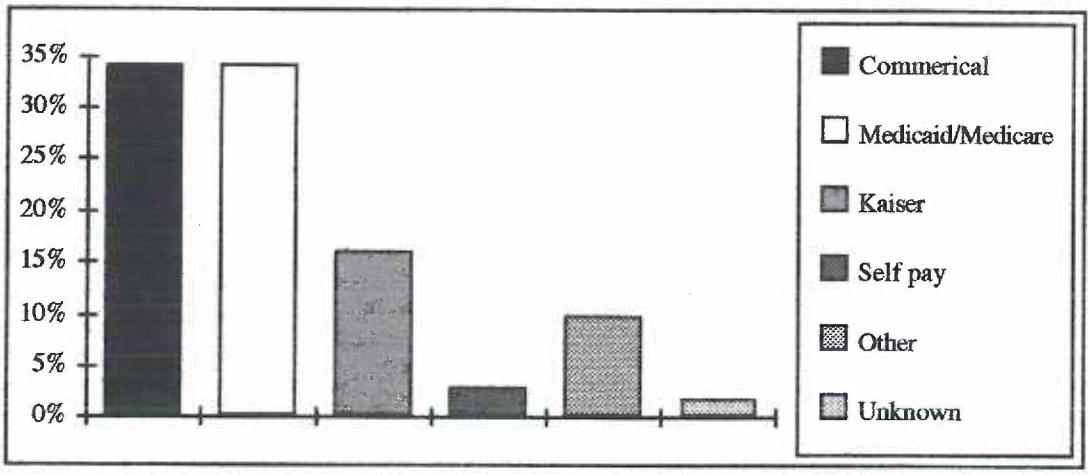
The payors of hospital care charges have been grouped into six categories: commercial insurance, Medicaid and Medicare, Kaiser Permanente, self-pay, other, and unknown. Commercial insurance includes Blue Cross and Blue Shield of Oregon, as well as other companies. Medicare and Medicaid are public payors, both with differing patient qualification requirements. One way to qualify for Medicaid is to have a medical disability; currently, patients with an AIDS diagnosis are presumptively eligible to receive Social Security and Medicaid if specified financial criteria are met. A patient is not eligible for Medicare reimbursement until 24 months after they have become disabled; thus, most AIDS patients relying on the public sector for payment of medical expenses currently are using Medicaid rather than Medicare (because they usually do not survive the requisite 24 months). Kaiser Permanente is one of the largest health maintenance organizations (HMOs) in Oregon. Although Kaiser pays for AIDS-related care for its' members throughout Oregon, most AIDS patients enrolled in Kaiser's program receive their care at one of two large hospitals in the Portland metro area (Bess Kaiser and Kaiser Sunnyside Medical Centers). Many patients without insurance who have not yet met eligibility requirements for Medicaid list "self" as the guarantor for payment of medical

services. Hospitals are often forced to absorb these charges as "bad debt." For our study, "other" payment sources included Veterans' Administration, as well as other sources. Finally, when no insurance carrier or guarantor was listed, the admission was coded as having an "unknown" payment source.

All hospital admissions (N=2,676) were divided into admissions for each risk group, and the payors of these admissions were determined. Then, the percent of the admissions charged to each payor by risk group was calculated. For example, homosexual and bisexual men had a total of 2,041 admissions. Eighty-four percent of the total number of admissions charged to commercial insurance was from this risk group, as was 62% of the admissions charged to Medicaid or Medicare, 89% of the admissions charged to Kaiser Permanente, 77% of the self-pay admissions, and 78% of the admissions charged to a source other than these sources (including the Veterans' Administration). Seventy-three percent of the admissions whose payor was unknown were from this risk group. These data are presented in Table 15.

Over all, commercial insurance and Medicaid or Medicare were the primary payors of AIDS-related hospital charges, each being charged with 34.3% of the admissions. Kaiser was charged with 16% of the admissions, self pay was listed in 3% of the admissions, 10% of the admissions were charged to some other payor, and 2% of the admissions had no known payor (Figure 4).

Figure 4. Payors of hospital charges of all AIDS admissions (N=2,676).



Payors of admissions by risk behavior.

Primary payors varied among risk behaviors. Medicaid and Medicare were charged with more hospital admissions of IDUs (both heterosexual [63%] and homosexual [68%]) than any other group; this may be because IDUs are frequently disenfranchised by society and thus rely on public sources for payment of medical care. The primary payors of charges for care of adult hemophiliacs were commercial insurance (43%) and Medicaid and Medicare (46%). Medicaid and Medicare were also the primary payors for charges for care of heterosexual AIDS cases (43%), whereas commercial insurance was charged with 31% and Kaiser was charged with 17% of these admissions. Commercial insurance (25%), Medicaid and Medicare (27%) and Kaiser (27%) were the primary payors of charges for care of adult transfusion-related AIDS cases. Commercial insurance was the primary payor for care of patients with an undetermined risk, hemophiliac children, and for children who became infected after receiving a blood transfusion, being charged with 69%, 100%, and 100% of these admissions, respectively. Finally, Medicaid and Medicare were the primary payors for care of children whose mothers are HIV-infected, being

charged with 67% of these admissions. These data are depicted in Figures 7 through 16.

Table 15. Risk group mix by payor of hospital charges (N=1,033).

Risk behavior	Commercial insurance (No.	%)**	Medicaid/ Medicare (No.	%)	Kaiser (No.	%)	Self pay (No.	%)	Other* (No.	%)	Unknown (No.	%)
Homo/Bisexual (n=2,041)***	772	84	569	62	379	89	63	79	211	78	47	73
IDU (n=135)	15	1	85	9	7	2	7	9	17	6	4	6
Homo/Bisexual and IDU (n=286)	37	4	194	21	10	2	8	10	27	10	10	16
Hemophiliac, Adult (n=37)	16	2	17	2	3	1	0	0	1	<1	0	0
Heterosexual (n=65)	20	2	28	3	11	3	1	1	4	1	1	1.5
Blood transfusion (n=48)	12	1	13	1	13	3	0	0	9	3	1	1.5
Undetermined risk (n=52)	36	4	10	1	1	<1	1	1	3	1	1	1.5
Hemophiliac, Child (n=7)	7	1	0	0	0	0	0	0	0	0	0	0
Child, Mother with AIDS or HIV+ (n=3)	1	<1	2	<1	0	0	0	0	0	0	0	0
Blood transfusion, child (n=2)	2	<1	0	0	0	0	0	0	0	0	0	0
Total by payor (N=2,676)	**918**	**100**	**918**	**100**	**424**	**100**	**80**	**100**	**272**	**100**	**64**	**100**

* Includes Veterans Administration.
** Percent of total admissions each payor was charged.
*** n=number of admissions of patients in each risk group.

Figure 5. Payors of hospital admissions by risk behavior: homosexuals.

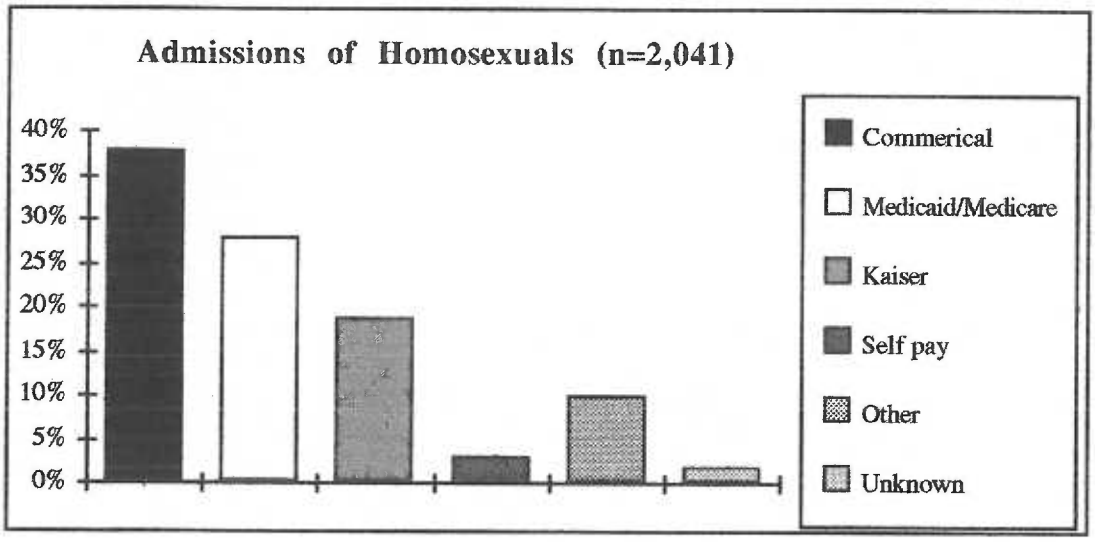


Figure 6. Payors of hospital admissions by risk behavior: IDUs.

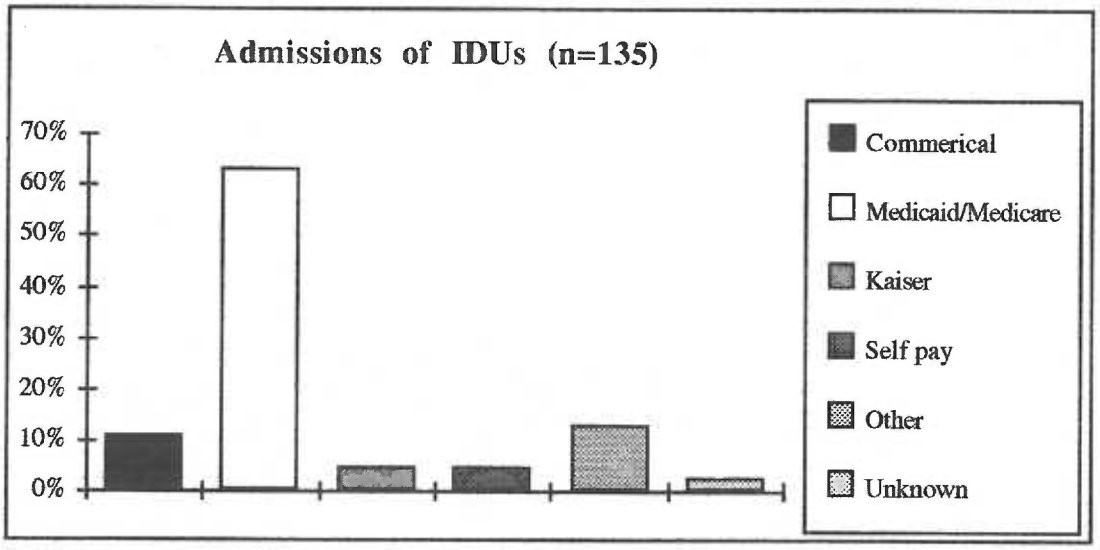


Figure 7. Payors of hospital admissions by risk behavior: IDU and homosexual.

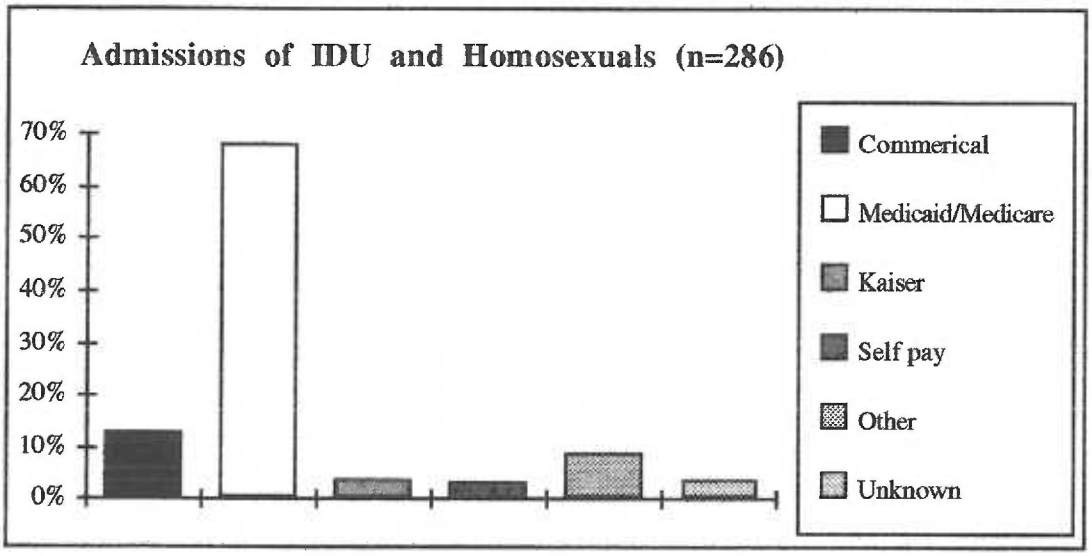


Figure 8. Payors of hospital admissions by risk behavior: adult hemophiliacs.

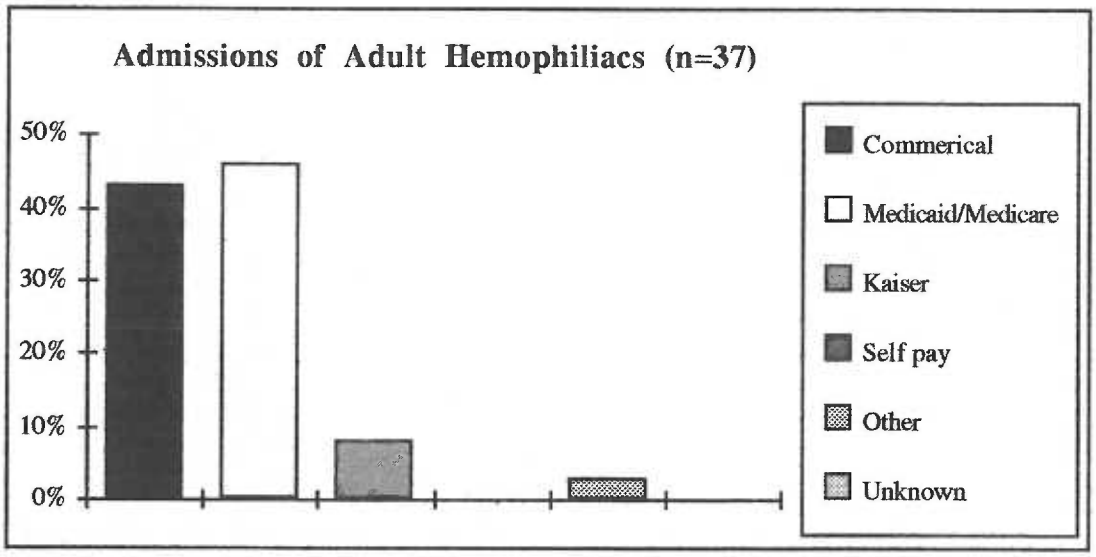


Figure 9. Payors of hospital admissions by risk behavior: heterosexuals.

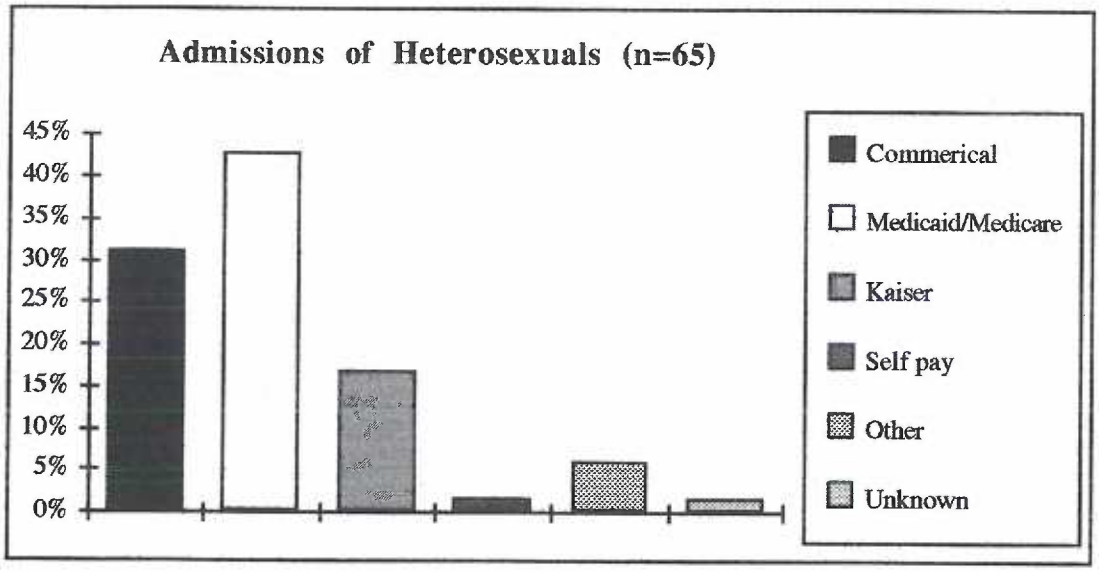


Figure 10. Payors of hospital admissions by risk behavior: blood transfusion recipients.

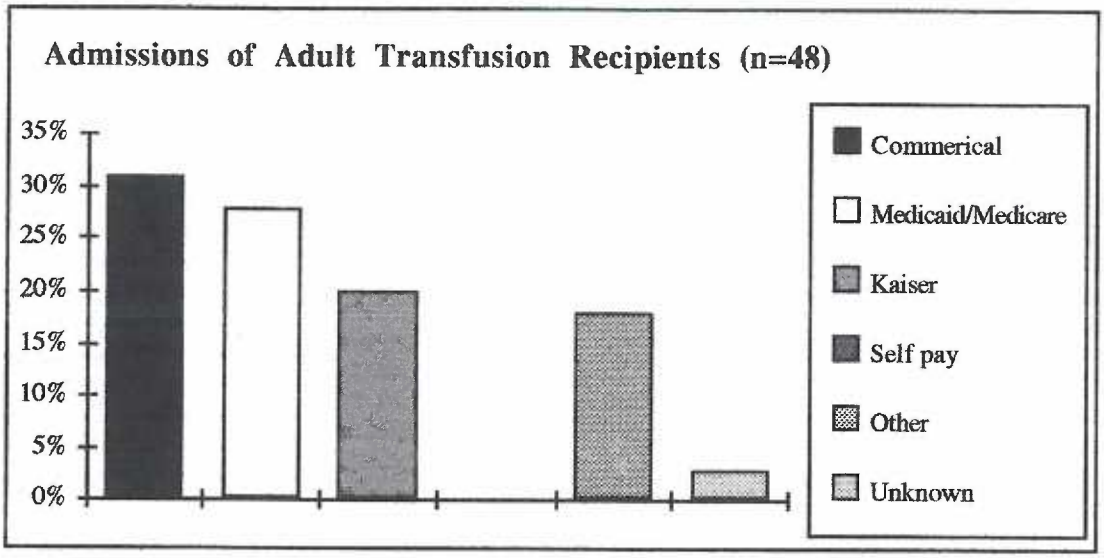


Figure 11. Payors of hospital admissions by risk behavior: undetermined risk behaviors.

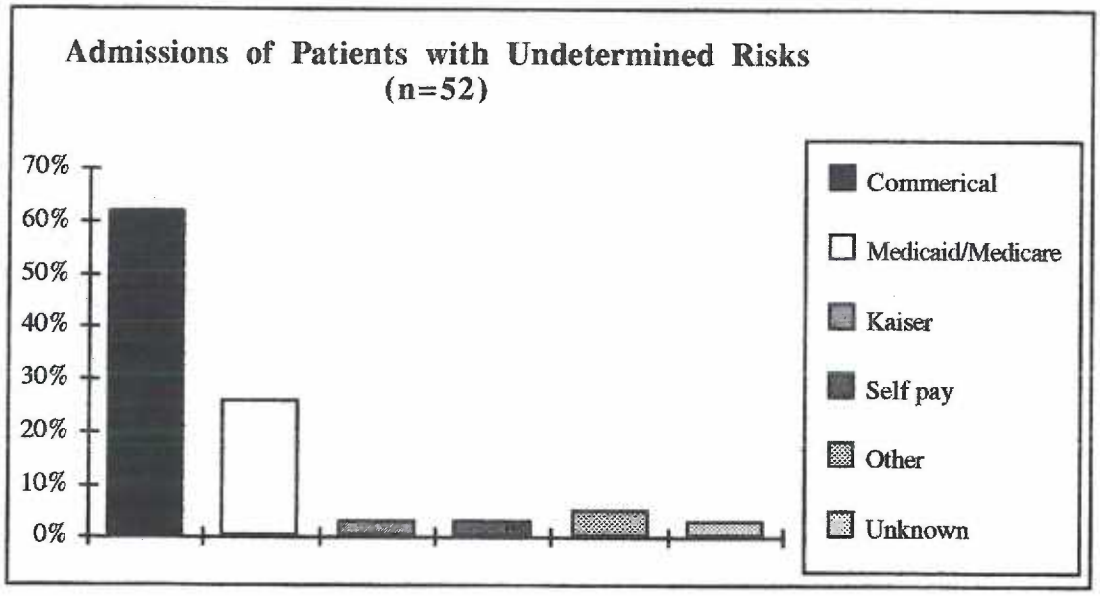


Figure 12. Payors of hospital admissions by risk behaviors: children who are hemophiliacs.

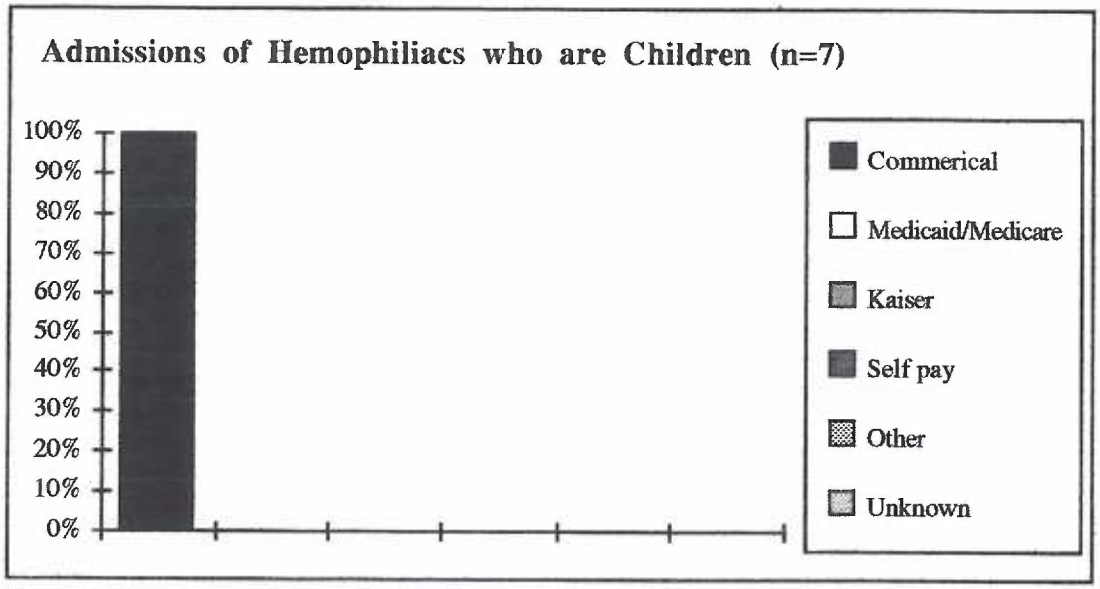


Figure 13. Payors of hospital admissions by risk behavior: children whose mother is HIV-positive.

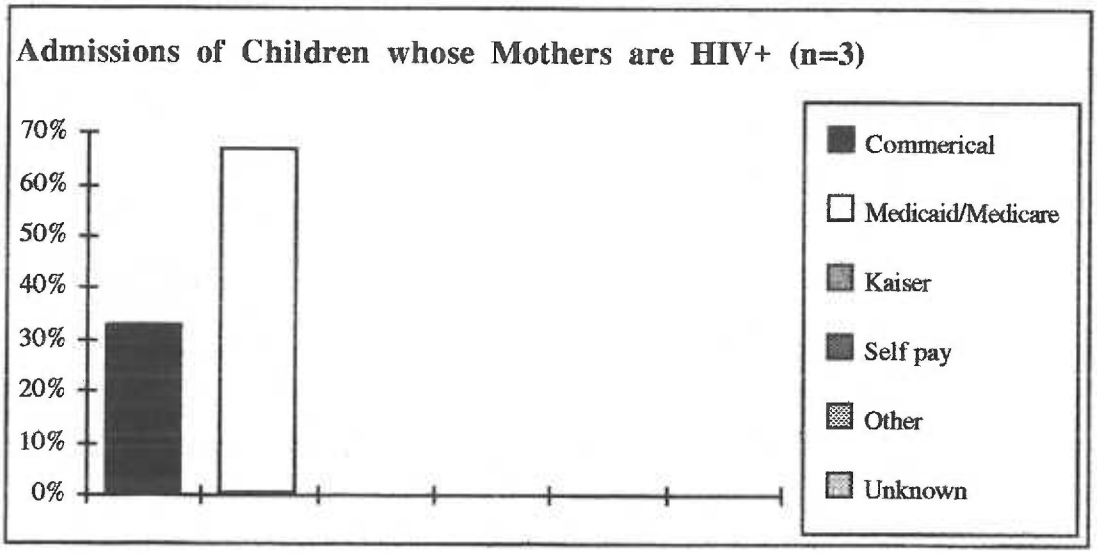
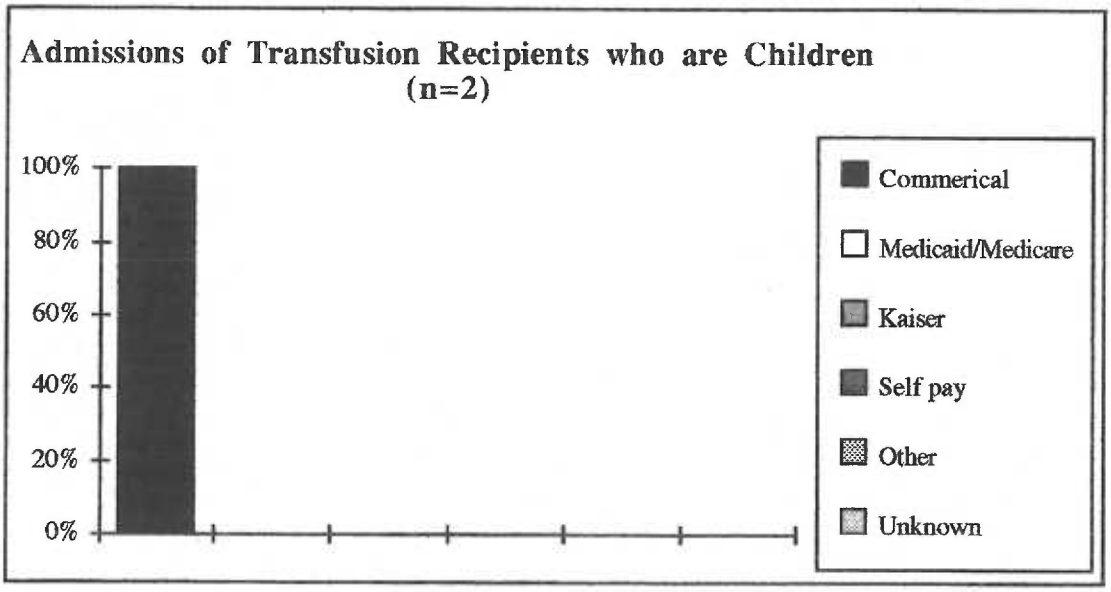


Figure 14. Payors of hospital admissions by risk behavior: children who are transfusion recipients.



Payors of admissions by site of diagnosis.

Payors of hospital admissions differed significantly ($p<.001$) by site of AIDS diagnosis. A higher percentage of patients diagnosed in outpatient settings had medical insurance (57.6%, including commercial insurance and Kaiser Permanente) than did

patients diagnosed in inpatient settings (47.2%). Medicaid and Medicare paid for almost equal proportions of admissions of inpatients and outpatients, although the proportion was slightly higher for AIDS inpatients. Self pay was the payor in a slightly higher proportion of AIDS inpatients. Finally, the proportion of AIDS inpatients' admissions charged to "other" (including the Veterans' Administration) was nearly twice that of AIDS outpatients.

Although the reasons for the mix of payors of inpatient and outpatient admissions cannot be ascertained by data presented here, the mix makes intuitive sense. First, provision of outpatient care is frequently done by independent practitioners (often infectious disease specialists); it seems predictable that independent physicians would prefer to treat patients who had commercial insurance because rates of reimbursement are generally higher. Secondly, Kaiser Permanente is a large, well-organized health maintenance organization (HMO). Kaiser has a large outpatient clinic in Portland that specializes in the care of AIDS patients. It is not surprising, then, that more AIDS outpatients are covered by Kaiser than inpatients because physicians treating AIDS cases there would aggressively manage patients on an outpatient basis to the extent possible. Such outpatient management would be more cost-effective for the HMO than would inpatient care. The breakdown of payors by site of diagnosis is presented in Table 16.

Table 16. Payor of hospital admissions by site of AIDS diagnosis.

Payor	Inpatient	Outpatient
Commercial Insurance	32.5 %	38.8%
Medicaid/Medicare	34.6%	33.2%
Kaiser Permanente	14.7%	18.8%
Self Pay	3.7%	1.0%
Other	11.5%	6.5%
Unknown	2.7%	1.4%
Total	**100 %**	**100 %**
χ^2=41.51, df=5, p<.001		

AIDS cases with no hospital admission information.

Of the 1,033 AIDS cases reported in Oregon between 1981 and 1990, 197 cases had no hospital admissions. The majority of these (78%) were diagnosed in 1989 and 1990 (52 and 102, respectively), and most (65%) were residents of Multnomah County. One hundred ninety (96%) of these cases are males, and seven (4%) are females.

One hundred forty cases without admission information are still living, making the case-fatality rate 29% for this group. This low case-fatality rate is likely related to the very recent diagnosis of most of these cases. Ten of these cases were diagnosed in states other than in Oregon, including Colorado, California, Florida, Kentucky, Wisconsin, and Mississippi.[1] Demographic and risk behavior data regarding these cases are presented in Tables 17-20. Like the risk behavior mix of the total population, risk behavior differs significantly by sex in cases without hospital admissions. The majority of cases in men are found in homosexual or bisexual men (79%), whereas the largest percent of cases in women is split among three risk behaviors: IDUs, heterosexuals, and transfusion recipients.

Since most of the cases without hospital admissions have been diagnosed recently, it is likely that many of them will be hospitalized at least once within the next year. It is also likely that some of these cases received hospital care in states other than Oregon, although this was impossible to verify with our data.

[1] Although these cases were diagnosed in other states, they were counted as Oregon cases because they lived in Oregon at the time of their initial AIDS diagnosis.

Table 17. Sex and risk behavior of AIDS cases without hospital admissions (n=197).

Risk Behavior	Males		Females		Total	
Adult	**No.**	**(%)**	**No.**	**(%)**	**No.**	**(%)**
Homo/bisexual men	151	(79)	0	(0)	151	(77)
IDUs	6	(3)	2	(29)	8	(4)
Homo/bisexual men and IDUs	23	(12)	0	(0)	23	(12)
Hemophiliacs	4	(2)	0	(0)	4	(2)
Heterosexuals	2	(1)	2	(29)	4	(2)
Transfusion recipient	2	(1)	2	(29)	4	(2)
Other/undetermined	2	(1)	0	(0)	2	(1)
Pediatric						
Hemophiliacs	0	(0)	0	(0)	0	(0)
Mother with/at risk for HIV infection	0	(0)	1	(14)	1	(<1)
Transfusion recipients	0	(0)	0	(0)	0	(0)
Total	**190**	**(100)**	**7**	**(100)**	**197**	**(100)**

χ^2=94.87, df=7, p<.001

The majority of these AIDS cases are found in the 30 to 49 age groups, which is similar to the overall population of AIDS cases (Table 18).

Table 18. Age groups of AIDS cases without hospital admissions (n=197).

Age group	No. of cases	Percent
0 to 9	1	1
10 to 19	0	N/A
20 to 29	34	17
30 to 39	83	42
40 to 49	54	27
50 to 59	16	8
60 to 69	8	4
70 to 79	1	1
Total	**197**	**100**

The race or ethnicity of these AIDS cases did not differ significantly by sex. The majority of cases were in white males (94%); the majority of female cases were also white (86%). The breakdown by race and sex is presented in Table 19.

Table 19. AIDS cases without hospital admissions by race and sex (n=197).

Race	Male		Female		Total	
	No.	(%)	No.	(%)	No.	(%)
White	179	(94)	6	(86)	185	(94)
African American	5	(3)	0	(0)	5	(3)
Hispanic	4	(2)	1	(14)	5	(3)
Asian/Pacific Islander	1	(0.5)	0		1	(<1)
American Indian	1	(0.5)	0		1	(<1)
Total	**190**	**(100)**	**7**	**(100)**	**197**	**(100)**
χ^2=4.29, df=5, p=NS						

Most of the AIDS cases without hospital admissions were residents of Multnomah County (65%). The number and percent of total cases is described in Table 20.

Table 20. County of residence of AIDS cases without hospital admissions (n=197).

County	# Of Cases	Percent	County	# Of Cases	Percent
Benton	3	1.5	Lincoln	1	.5
Clackamas	10	5.0	Linn	6	3.0
Clatsop	10	5.0	Malheur	1	.5
Curry	1	.5	Marion	7	3.6
Deschutes	2	1.0	Multnomah	128	65.0
Douglas	8	4.0	Wasco	2	1.0
Jackson	6	3.0	Washington	5	2.5
Josephine	1	.5	Yamhill	2	1.0
Lane	13	6.6			
			Total	**197**	**100**

Demographic summary of sub-population and total population.

The sex, risk behaviors, age groups, races or ethnicities, and counties of residence of the AIDS cases without hospital admission information are nearly identical with the overall population of AIDS cases in this study. The majority of the cases in both groups were men (96.5 and 96%, respectively) who had sex with other men (both 77%) and may have used injection drugs (12, and 10%, respectively); most cases were between 30 and 49 years of age (both 69%); the majority of the cases were white (94 and 93%, respectively); and most of the cases lived in Multnomah County (65 and 68%, respectively). Because the population of patients without hospital admissions were similar to our larger population of

AIDS patients, hospital use patterns would likely also be similar to the patterns observed in the study.

Section II

Temporal Patterns

In this section, year-by-year patterns of select variables discussed above are described so as to elucidate changes over time in these variables. The variables to be discussed include: demographic mix, risk behavior mix, site of diagnosis of AIDS, survival patterns, patterns of hospital use, hospital charges, and payors of hospital charges.

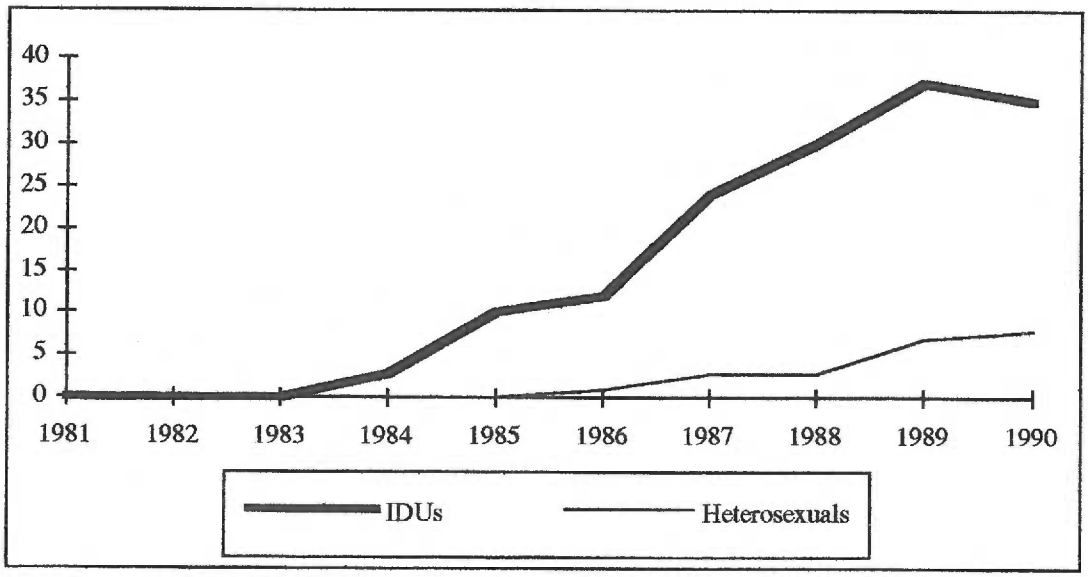
Changes in demographics.

During the first three years of the AIDS epidemic (i.e., 1981-83), all patients with AIDS in Oregon were white males. In 1984, the first case of AIDS in the Hispanic population was reported. The first case of AIDS in a woman was reported the following year (in 1985). Between 1984 and 1990, 72 additional AIDS cases in people of color and 36 more AIDS cases in women were reported. Thus, the population of AIDS patients in Oregon has slowly become more heterogeneous. Even so, the majority of cases in Oregon (93%) are still diagnosed in white men. This is similar with other states in the Western region reporting AIDS cases and relates to the predominant risk behavior of the cases (i.e., male-to-male sexual contact). The Eastern region of the United States reports a higher percentage of AIDS cases in people of color; many of these cases are related to injection drug use (Ball and Turner, 1991). As the race and sex mix of AIDS cases becomes more and more heterogeneous over time, it is possible that charges for their care will intensify because a simultaneous anticipated increase in the number of IDUs might also be expected. (This would include even more IDUs than have been diagnosed to date in Oregon.)

Changes in risk behavior.

In 1981, two cases of AIDS were diagnosed; one patient was reported as a homosexual, and the second case's risk was undetermined. For the next two years, all of the diagnosed AIDS cases were homosexuals. In 1984, the three cases of homosexual IDUs were reported. The following year, ten additional IDUs (both homosexual and heterosexual) were diagnosed, along with the first cases in hemophiliacs. The following year, the first case of heterosexually-acquired AIDS was reported (along with additional IDUs and hemophiliacs). Between 1981 and 1990, a total of 151 IDU AIDS cases and 22 heterosexual AIDS cases had been diagnosed in Oregon (Figure 15). Even though the majority (77%) of AIDS cases diagnosed between 1981 and 1990 were in homosexual or bisexual men, AIDS in Oregon is clearly evolving into a disease affecting an increasingly diverse population.

Figure 15. Numbers of IDU and heterosexual AIDS cases diagnosed in Oregon between 1981 and 1990.



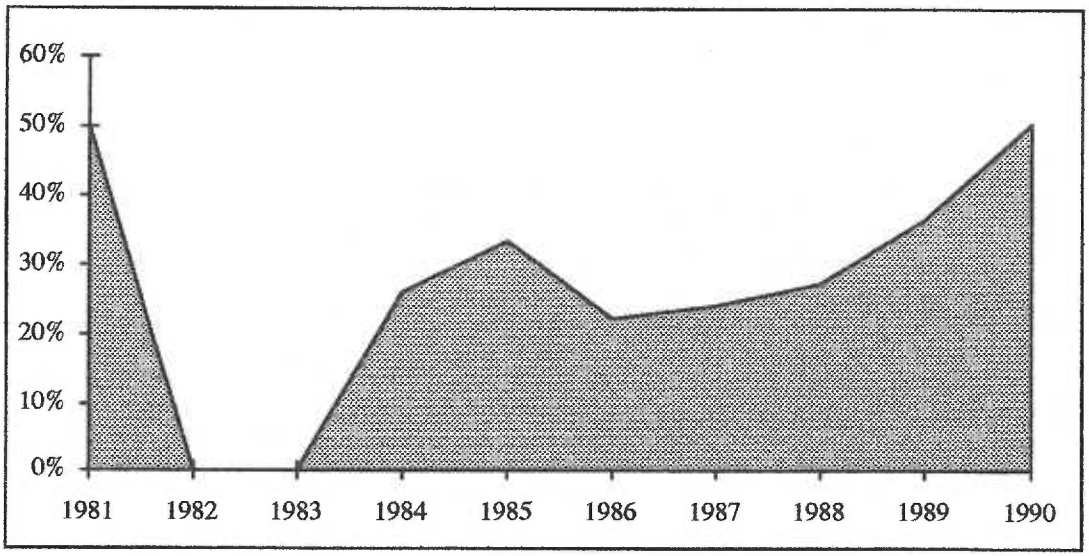
Changing patterns in site of diagnosis of AIDS.

Between 1981-90, more AIDS cases in Oregon were diagnosed in inpatient settings than were diagnosed in outpatient settings. The number of cases diagnosed in outpatient settings has varied over time but has generally been increasing. The year-by-year breakdown of outpatient diagnosis is presented in Table 21, and the increase in outpatient AIDS diagnosis is represented in Figure 16. It should be noted that although the figure depicts 50% of the cases being diagnosed in outpatient settings in 1981, only two cases were diagnosed during that year.

Table 21. Patterns of outpatient diagnosis (N=1,033).

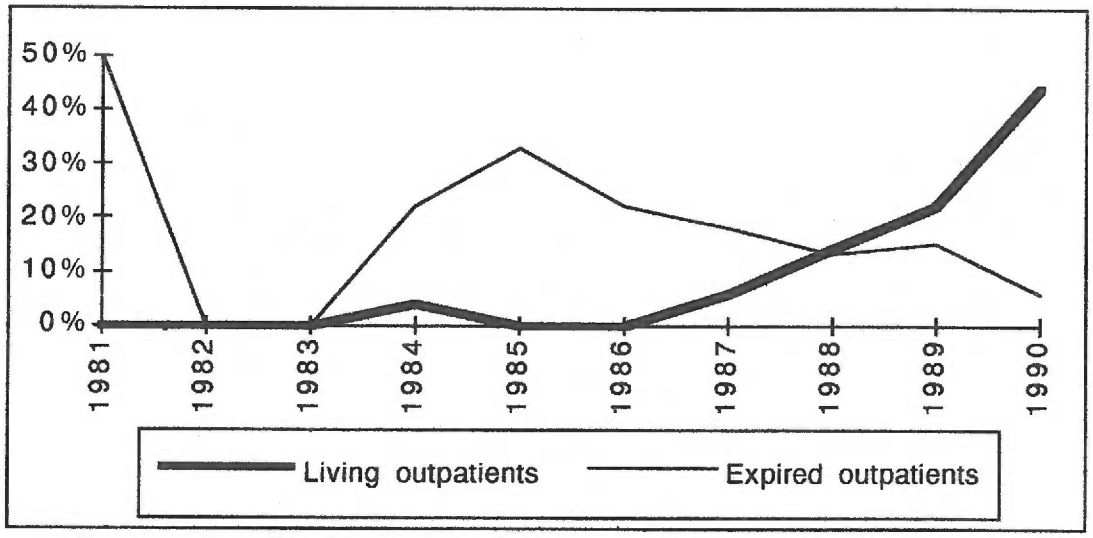
Year of diagnosis	No. of outpatients diagnosed	% of total cases diagnosed/year
1981	1	50
1982	0	0
1983	0	0
1984	6	26
1985	19	33
1986	18	22
1987	42	24
1988	52	27
1989	95	37
1990	120	50

Figure 16. Percent of Oregon AIDS cases diagnosed in outpatient settings between 1981 and 1990 (n=353).



The rise in outpatient diagnosis in recent years can also be seen when comparing the percentage of living outpatient AIDS cases with the percentage of outpatient cases who have died. This is depicted in Figure 17. Since the number of outpatients diagnosed each year is increasing, the percent of living outpatients is likely to be higher than the percent of deceased outpatients. This reflects the more recent diagnosis of AIDS outpatients.

Figure 17. Percent of living and dead AIDS outpatients by year of diagnosis (living outpatients=200, deceased outpatients=153)



Changes in survival patterns.

The overall mean length of survival from AIDS diagnosis to death is 12.3 months. Survival does differ by year, however, and the length of survival is getting longer. Changes in the length of survival over time are shown in Table 22.

Table 22. Changes in length of survival (in months) by year.

Year	Mean	Median	Mode
1983	11.0	12.0	2.0
1984	6.4	5.0	1.0
1985	6.4	5.0	0.0
1986	9.3	9.0	0.0
1987	6.8	4.0	0.0
1988	12.1	10.0	1.0
1989	13.0	12.0	0.0
1990	16.4	14.0	9.0
1991*	12.1	12.0	12.0
*Includes only one death			

Patterns of AIDS hospital care.

Markers used for examining the patterns of hospital care of AIDS patients include: the number of patients diagnosed during each year; the number of admissions during each year; the number of patients with hospital admissions during each year; the average number of admits for patients with hospital admissions during the year; total length of stay (LOS) (including all inpatient days used by AIDS patients for each year); average length of stay (average LOS); and total intensive care unit (ICU) days (including all days spent in the ICU by AIDS patients during each year). In general, the average number of admits per year has remained relatively stable (after a peak in 1983), but the average length of stay during an admission has been decreasing over time. Markers for 1981-91 for hospital care of Oregon AIDS patients are listed in Table 23 below.

Table 23. Patterns of hospital care of AIDS patients (N=1,033).

Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
No. of pts. dx'd	2	2	6	23	57	81	175	190	259	238	N/A
Pts. with admits during year	2	2	6	19	58	111	199	232	289	280	118
No. of admits	2	4	23	31	144	223	398	456	583	595	217
Ave. no. of admits	1.0	2.0	3.8	1.6	2.5	2.0	2.0	2.0	2.0	2.1	1.8
Total pt. days	7	51	318	302	1444	1673	3643	3342	4741	3748	1408
Ave. LOS	3.5	12.8	13.8	9.7	10.0	7.5	9.2	7.3	8.1	6.3	6.5
Total ICU days	0	12	40	59	29	96	178	137	204	142	49
Average ICU days	N/A	3	1.7	1.9	.2	.4	.4	.3	.4	.2	.2

Overall charges for hospital care.

The overall charges for hospital care of AIDS patients in Oregon are shown by year in column three of Table 26. The average charge per hospital admission is found by dividing the total charge for care per year by the number of hospital admissions during that year (given in Table 23 above); this is presented in column five of Table 24. The average charge for hospitalization of AIDS patients is shown by year in column six of Table 24. It is defined as the total charges for hospital care per year divided by the number of AIDS patients diagnosed during that year. (All charges are based on the fixed charge of $1,254 per day.)

The average charge for hospitalization of cases per year is decreasing; this may be due to increased use of medications used to prevent the occurrence of opportunistic infections (such as PCP), treatment of cases earlier in the course of HIV disease, increased physician and nurse experience in treating and caring for AIDS patients, and the increased use of medical monitoring in outpatient settings.

Table 24. Total estimated hospital charges (N=1,033).

Year	No. of pts. dx'd./yr.	Charges/yr.	Ave. LOS	Ave. chg./admit	Ave. hosp. charge per case
1981	2	$8,778	3.5	$4,389	$4,389
1982	2	$63,954	12.8	$15,989	$31,977
1983	6	$398,772	13.8	$17,338	$66,462
1984	23	$378,708	9.7	$12,216	$16,466
1985	57	$1,810,776	10.0	$12,575	$31,768
1986	81	$2,097,942	7.5	$9,408	$25,901
1987	175	$4,568,322	9.2	$11,507	$26,105
1988	190	$4,190,868	7.3	$9,170	$22,057
1989	259	$5,945,214	8.1	$10,198	$22,954
1990	238	$4,699,992	6.3	$7,899	$19,748
1991	N/A	$1,765,632	6.5	$8,137	N/A
Total	**1033**	**$25,928,958**	**7.7**	**$9,689**	**$25,101**

Hospital use patterns by site of AIDS diagnosis.

Between 1981 and September 1991, 959 AIDS inpatients were hospitalized in Oregon hospitals 1937 times, or an average of 2.0 times per patient. These patients

spent a total of 867 days in the ICU and a total of 16,506 days in the hospital overall (including ICU days). Three hundred fifty-seven AIDS outpatients were hospitalized 739 times, or an average of 2.1 times per patient. These patients spent a total of 79 days in the ICU and a total of 4,171 days in the hospital. These data are presented by year of admission in Table 25.

Table 25. Hospital use of AIDS inpatients and outpatients (N=1,033).

Year	Site of dx	No. of admits	Total days	Total ICU days	No. of pts. with admits
1981	Inpatient	2	7	0	2
	Outpatient	0	0	0	0
1982	Inpatient	4	51	12	2
	Outpatient	0	0	0	0
1983	Inpatient	23	318	40	6
	Outpatient	0	0	0	0
1984	Inpatient	28	274	59	16
	Outpatient	3	28	0	3
1985	Inpatient	101	1159	24	44
	Outpatient	43	285	5	14
1986	Inpatient	141	1254	90	81
	Outpatient	82	419	6	30
1987	Inpatient	332	3249	178	161
	Outpatient	65	394	0	38
1988	Inpatient	344	2820	134	184
	Outpatient	113	522	3	48
1989	Inpatient	468	4001	199	219
	Outpatient	115	740	5	70
1990	Inpatient	383	2594	114	179
	Outpatient	212	1154	28	101
1991	Inpatient	111	779	17	65
	Outpatient	106	629	32	53

Overall, the average length of stay per hospitalization was significantly different for inpatients in comparison with outpatients ($p<.001$). The mean length of stay for inpatients was 8.5 days, compared with 5.6 days for outpatients. This

finding supports our contention that AIDS outpatients are likely to spend less time hospitalized than AIDS inpatients.

Charges for hospital care by site of diagnosis of AIDS.

The charges for inpatient hospital care are estimated by using the total length of stay each year for AIDS inpatients and AIDS outpatients and the estimated charge per day of $1,254. Using these figures, the charges for hospital care between 1981-91 are $20,698,524 for AIDS inpatients and $5,230,434 for AIDS outpatients. The total estimated charges for hospital care of all Oregon AIDS cases are $25,928,958. Although AIDS outpatients represented 34% of our AIDS-case population, their charges represented only 20% of the total charges for hospital care ($5,230,434 of $25,928,958). These data are presented in Table 26.

Table 26. Estimated charges for hospital care of AIDS patients by site of diagnosis (N=1,033).

Year	Site of dx	Total days	Charges per year	Total charges	% of total charges
1981	Inpatient	7	$8,778	$8,778	100
	Outpatient	0	0		N/A
1982	Inpatient	51	$63,954	$63,954	100
	Outpatient	0	0		N/A
1983	Inpatient	318	$398,772	$398,772	100
	Outpatient	0	0		N/A
1984	Inpatient	274	$343,596	$378,708	91
	Outpatient	28	$35,112		9
1985	Inpatient	1,159	$1,453,386	$1,810,776	80
	Outpatient	285	$357,390		20
1986	Inpatient	1,254	$1,572,516	$2,097,942	75
	Outpatient	419	$525,426		25
1987	Inpatient	3,249	$4,074,246	$4,568,322	89
	Outpatient	394	$494,076		11
1988	Inpatient	2,820	$3,536,280	$4,190,868	84
	Outpatient	522	$654,588		16
1989	Inpatient	4,001	$5,017,254	$5,945,214	84
	Outpatient	740	$927,960		16
1990	Inpatient	2,594	$3,252,876	$4,699,992	69
	Outpatient	1154	$1,447,116		31
1991	Inpatient	779	$976,866	$1,765,632	55
	Outpatient	629	$788,766		45
Total	Inpatient	16,506	$20,698,524	$25,928,958	80
	Outpatient	4,171	$5,230,434		20

Changes in payors of hospital charges.

The percentages of AIDS-related hospital admissions charged to each payor have changed over time. For example, Medicaid and Medicare were charged for 16% of the admissions in 1984 but were charged for 41% of the admissions in 1990.[1] These data are presented in Table 27. The increase in the government's burden of AIDS-associated health

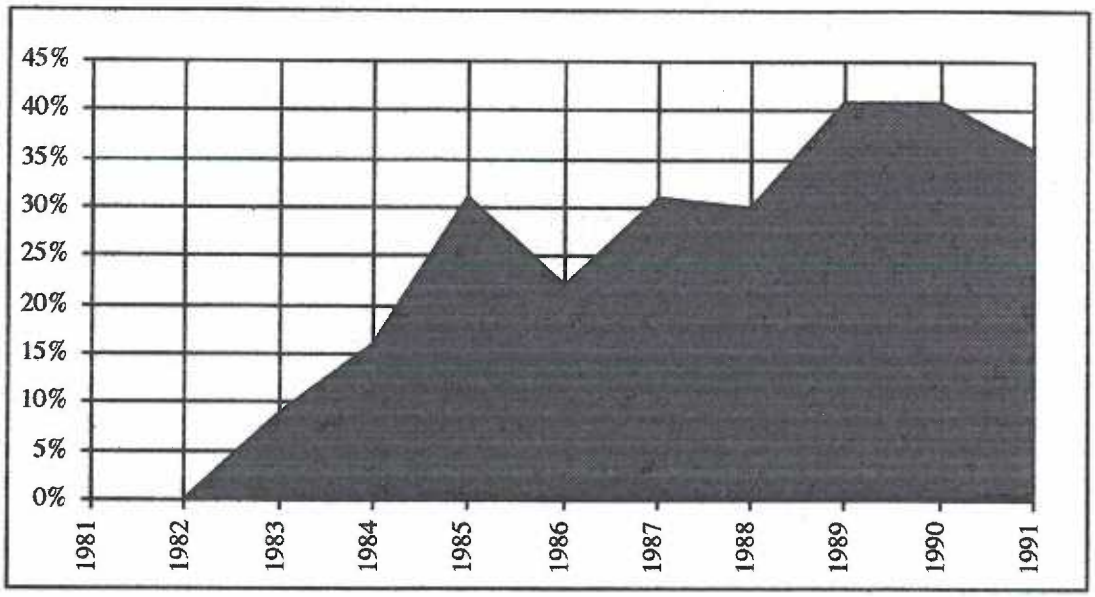
[1] The total charges billed to Medicaid or Medicare during 1991 is likely higher than data indicate here because the hospital admission data (in XARS) used in this study were only collected through September 1991. Typically, it takes the OHD nine to 12 months to complete hospital record reviews that include all hospital admissions from the previous year.

care costs represents an alarming trend that is also being seen in other areas in the United States (Green and Arno, 1990). Green and Arno termed this trend the "Medicaidization of AIDS." They state that the share of hospitalization costs charged to public sources has increased from 25% in 1984 to 41% in 1987. One of the danger this presents is many primary care physicians may choose not to accept patients who are relying on Medicaid or Medicare for their source of payment because of lower rates of reimbursement; this, in turn, might decrease the number of patients who are managed in outpatient settings. Since hospital charges are lower, this change could have dramatic, negative consequences.

Table 27. Payors of hospital charges each year by percent of total charges.

Year	Commercial insurance	Medicaid/ Medicare	Kaiser	Self pay	Other	Unknown
1981	50%	0%	0%	0%	50%	0%
1982	25%	0%	0%	0%	75%	0%
1983	43%	9%	4%	0%	43%	0%
1984	45%	16%	19%	6%	10%	3%
1985	38%	31%	18%	1%	11%	1%
1986	48%	22%	16%	3%	9%	3%
1987	31%	31%	15%	5%	16%	2%
1988	34%	30%	14%	5%	12%	4%
1989	34%	41%	12%	3%	7%	3%
1990	30%	41%	18%	1%	8%	2%
1991	35%	36%	23%	1%	5%	0%

Figure 18. Percentage of hospital charges billed to Medicaid or Medicare, 1981-91.



Section III

AIDS Fatalities

The final section of our results focuses on the AIDS cases in our study who have died. Demographics, mode of transmission, site of AIDS diagnosis, survival, hospital use patterns and costs, and payor information are presented.

Information about AIDS fatalities is particularly important in relation to hospital patterns and charges. The descriptions given above regarding hospital use patterns and charges were complete only to the extent that the period of follow-up was inclusive of all hospital use. In order to accurately describe total hospital use, cases must be followed until they die. Therefore, the patterns of hospital use and ensuing charges for the sub-population of AIDS cases who have died are very important.

Demographics.

Six hundred ten of the 1,033 AIDS cases in the study (59%) have died. The majority of theses cases (77%) were men who have had sex with other men and may have used injection drugs (10%); 4% of this sub-population were heterosexual IDUs; 2% were hemophiliacs; 2% were heterosexuals; 3% were transfusion recipients, and 2% had undetermined risk behaviors. Less than 1% of these cases were pediatric patients. Like the total population, risk behavior differed significantly by sex. The majority (80%) of the male cases with AIDS were homosexual or bisexual men. Most (36%) women with AIDS, however, were transfusion recipients, with 32% of the cases in women who acquired their infection through heterosexual contact. The demographic information regarding this sub-population is presented in Tables 29 through 31.

Table 28. AIDS case groups of cases who have died (n=610).

Risk Behavior	Males		Females		Total	
Adult	No.	(%)	No.	(%)	No.	(%)
Homo/bisexual men	469	(80)	0	(0)	469	(77)
IDUs	22	(4)	4	(16)	26	(4)
Homo/bisexual men and IDUs	61	(10)	0	(0)	61	(10)
Hemophiliacs	12	(2)	0	(0)	12	(2)
Heterosexuals	2	(<1)	8	(32)	10	(2)
Transfusion recipient	8	(1)	9	(36)	17	(3)
Other/undetermined	9	(1.5)	4	(16)	13	(2)
Pediatric						
Hemophiliacs	1	(<1)	0	(0)	1	(<1)
Mother with/at risk for HIV infection	1	(<1)	0	(0)	1	(<1)
Total	**585**	**(100)**	**25**	**(100)**	**610**	**(100)**
χ^2=304.96, df=8, p<.001						

Only 4% of the Oregon AIDS cases who have died are females. The majority (93%) of these cases are white. There was no significant difference in these cases by race and sex. The breakdown by race or ethnicity and sex is presented in Table 29.

Table 29. AIDS cases who have died by race and sex (n=610).

Race	Male		Female		Total	
	No.	(%)	No.	(%)	No.	(%)
White	547	(94)	23	(92)	570	(93)
African American	10	(2)	2	(8)	12	(2)
Hispanic	19	(3)	0	(0)	19	(3)
Asian/Pacific Islander	3	(0.5)	0	(0)	3	(0.5)
American Indian	6	(1)	0	(0)	6	(2)
Total	**585**	**(100)**	**25**	**(100)**	**610**	**(100)**
χ^2=6.03, df=4, p=NS						

Sixty-six percent of the AIDS cases who have died lived in Multnomah County; this is similar to the percentage of Multnomah County residents found in our total population (68%). The counties of residence of the expired AIDS cases are listed in Table 30.

Table 30. County of residence of AIDS cases who have died (n=610).

County	# Of Cases	Percent	County	# Of Cases	Percent
Benton	6	1	Lane	40	7
Clackamas	34	6	Lincoln	4	1
Clatsop	2	<1	Linn	6	1
Columbia	6	1	Malheur	1	<1
Coos	6	1	Marion	16	3
Crook	1	<1	Multnomah	402	66
Deschutes	6	1	Polk	4	1
Douglas	8	1	Tillamook	1	<1
Gilliam	1	<1	Umatilla	1	<1
Grant	1	<1	Wallowa	1	<1
Hood River	1	<1	Wasco	2	<1
Jackson	9	2	Washington	36	6
Jefferson	1	<1	Yamhill	6	1
Josephine	7	1			
Klamath	1	<1	**Total**	**610**	**100**

Most of the AIDS fatalities (70%) were between 30 and 49 years of age. Again, this is similar to the percentage of our total population in this age group (69%). These age groups are presented in Table 31.

Table 31. Age groups of AIDS cases who have died (n=610).

Age group	No. of cases	Percent
0 to 9	1	<1
10 to 19	2	<1
20 to 29	100	16
30 to 39	282	46
40 to 49	144	24
50 to 59	48	8
60 to 69	28	5
70 to 79	3	1
80 to 89	2	<1
Total	**610**	**100**

Risk behavior and site of AIDS diagnosis.

The majority of AIDS cases diagnosed in inpatient and outpatient sites were homosexual and bisexual men. These cases did not differ significantly by risk behavior and site of diagnosis, which is different from the total population of AIDS cases (that was significantly different [at $p<.005$] by site of diagnosis and risk behavior). The two populations had similar breakdowns (of percentages) of risk behaviors. The major difference was the percentage in each population of cases diagnosed in outpatient settings. In the total population, 34% of the AIDS cases were diagnosed in outpatient settings; this compares with 25% of AIDS fatalities being diagnosed in outpatient settings. The difference reflects the more recent diagnosis of most outpatients. This difference is also apparent in a comparison of case-fatality rate between AIDS outpatients and AIDS inpatients: 43% versus 67%. A breakdown of the risk behaviors and site of AIDS diagnosis is presented in Table 32.

Table 32. Risk behavior and site of AIDS diagnosis (n=610).

Risk behavior	Outpatient diagnosis No.	(%)	Inpatient diagnosis No.	(%)
Homo/Bisexual	128	(84)	341	(77)
IDUs	2	(1)	24	(5)
Homo/Bisexual IDUs	13	(8)	48	(10.5)
Hemophiliac, Adult	1	(1)	11	(2)
Heterosexuals Transfusion	3	(2)	7	(1.5)
Recipients, Adult	3	(2)	14	(3)
Other/Undetermined	3	(2)	10	(2)
Hemophiliac, Child	0	(0)	1	(<1)
Child w/HIV+ Mother	0	(0)	1	(<1)
Total	**153**	**(100)**	**457**	**(100)**
χ^2=8.98, df=8, p=NS				

Length of survival.

The length of survival of those cases who have died is derived by subtracting the number of months from diagnosis of AIDS to death. Of the 610 AIDS patients who have died, 153 of these were AIDS outpatients, and 457 were AIDS inpatients. The overall relative risk of death of AIDS inpatients versus AIDS outpatients is 1.55. The case-fatality rate of AIDS outpatients is 43%, and the case-fatality rate of AIDS inpatients is 67%. The overall case-fatality rate of the cases in this study is 59%. The case-fatality rates for each year by site of diagnosis are presented in Table 33.

Table 33. Case-fatality rate by site of diagnosis.

Year	Site of dx	# dx'd	# who died	Case-fatality rate	Relative risk
1981	Inpatient	1	1	100%	1.0
	Outpatient	1	1	100%	
1982	Inpatient	2	2	100%	N/A
	Outpatient	0	0	N/A	
1983	Inpatient	6	6	100%	N/A
	Outpatient	0	0	N/A	
1984	Inpatient	17	17	100%	1.2
	Outpatient	6	5	83%	
1985	Inpatient	38	38	100%	1.0
	Outpatient	19	19	100%	
1986	Inpatient	63	60	95%	.95
	Outpatient	18	18	100%	
1987	Inpatient	133	122	92%	1.21
	Outpatient	42	32	76%	
1988	Inpatient	138	95	69%	1.44
	Outpatient	52	25	48%	
1989	Inpatient	164	90	55%	1.38
	Outpatient	95	38	40%	
1990	Inpatient	118	26	22%	1.69
	Outpatient	120	15	13%	

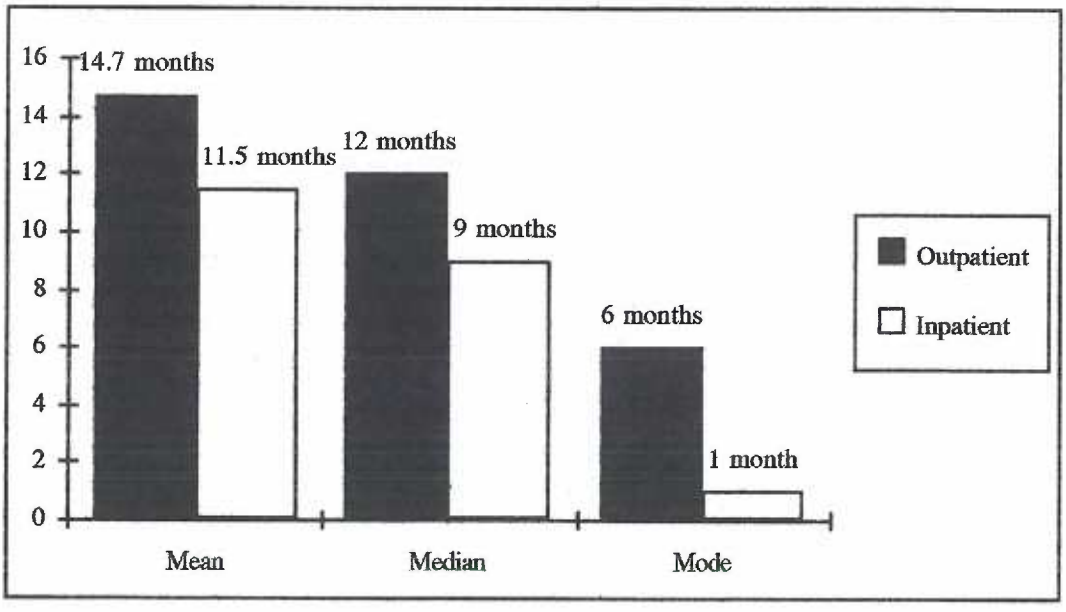
The mean length of survival is not significantly different by risk behavior. The mean survival times by risk behavior are : 12.7 months for homosexual or bisexual men; 12.9 months for IDUs; 11.2 months for homosexual or bisexual IDUs; 10.0 months for adult hemophiliacs; 9.1 months for heterosexual adults; 10.2 months for adult transfusion recipients; 9.8 months for adults whose risk is undetermined; 9.0 months for hemophiliacs who are children; and 8.0 for children whose mothers are HIV-infected. The overall mean survival time (including all risk behaviors) is 12.3 months. The survival times (in months) for patients by their risk behavior are presented in Table 34.

Table 34. Average survival in months by risk behavior.

Risk behavior	Mean	Median	Mode
Homo/Bisexuals	12.7	11.0	0
IDUs	12.9	11.0	0
Homo/Bisexual IDUs	11.2	10.0	0
Hemophiliac, Adult	10.0	10.0	0
Heterosexuals	9.1	3.0	0
Transfusion recipients	10.2	4.0	1.0
Other/Undetermined	9.8	5.0	1.0
Hemophiliac, Child	9.0	9.0	9.0
Child, Mother with AIDS or HIV+	8.0	8.0	8.0

The average length of survival of cases differs based on the site of their AIDS diagnosis. The mean survival time of AIDS inpatients of 11.5 months (median=9.0 months, mode=1.0 month) is significantly shorter than is the 14.7 month survival time of AIDS outpatients ($p<.002$) (median=12.0 months, mode=6.0 months). These data are depicted in Figure 19. The differing lengths of survival may be due to earlier care and the administration of prophylactic medications for AIDS outpatients.

Figure 19. Length of survival of AIDS cases by site of diagnosis.



Hospital use patterns of AIDS fatalities.

Hospital use by AIDS patients who have died represent true lifetime usage patterns; accordingly, those patterns are important when studying hospital use of AIDS patients.

The markers of hospital care of AIDS cases who have died are presented in Table 35. The number of patients diagnosed each year continue to increase until 1990, when 68% fewer cases were reported than in 1989. The reason for this decrease is the base population for these cases were all Oregon cases diagnosed and reported through 1990; since the average length of survival after diagnosis of AIDS for this population is 12.3 months, more AIDS patients diagnosed in 1990 were living at the end of that year than had died (197 versus 41). This also explains the decrease in total patient days and in total ICU days during 1990.

Table 35. Patterns of hospital care of AIDS patients who have died (n=610).

Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
No. of pts. dx'd	2	2	6	22	57	78	154	120	128	41
Pts. with admits during year	2	2	6	19	57	105	182	184	195	104
No. of admits	2	4	23	31	143	213	368	386	425	244
Ave. no. of admits	1	2	3.8	1.6	2.5	2.0	2.0	2.1	2.1	2.3
Total pt. days	7	51	318	302	1,434	1,622	3,486	2,807	3,468	1,625
Ave. LOS	3.5	12.7	13.8	9.7	10.0	7.6	9.5	7.3	8.2	6.7
Total ICU days	0	12	40	59	29	96	178	104	156	65
Average ICU days	0	3	1.7	1.9	.2	.5	.5	.3	.4	.3

Hospital use and charges of AIDS inpatient and outpatient fatalities.

Although not separated out in Table 36, the average lengths of stay per hospital admission are extremely important. Considering the overall average length of stay per admission of AIDS outpatients who have died compared with AIDS inpatients who have died, they differed significantly ($p<.001$). The average length of stay of outpatients was 6.1 days compared with 8.9 days for AIDS inpatients. This is important because shorter lengths of stay per admission result in fewer charges.

Hospital use of AIDS inpatients and outpatients who have died continued to increase each year until 1990. Increased use was not observed during 1990 because most of the 610 patients had already died by then. Hospital use patterns are listed in Table 36.

Table 36. Hospital use of AIDS inpatients and outpatients who have died (n=610).

Year	Site of dx	No. of admits	Total days	Total ICU days	No. of pts. with admits
1981	Inpatient	2	7	0	2
	Outpatient	0	0	0	0
1982	Inpatient	4	51	12	2
	Outpatient	0	0	0	0
1983	Inpatient	23	318	40	6
	Outpatient	0	0	0	0
1984	Inpatient	28	274	59	16
	Outpatient	3	28	0	3
1985	Inpatient	100	1,149	24	43
	Outpatient	43	285	5	14
1986	Inpatient	133	1,207	90	77
	Outpatient	80	415	6	28
1987	Inpatient	308	3,099	178	148
	Outpatient	60	387	0	34
1988	Inpatient	290	2,345	101	146
	Outpatient	96	462	3	38
1989	Inpatient	345	2,880	155	151
	Outpatient	80	588	1	44
1990	Inpatient	169	1,124	39	71
	Outpatient	75	501	26	33

The estimated charges for hospital care of AIDS inpatients and outpatients who have died are $18,960,480 ($15,617,316 and $3,343,164, respectively). Although AIDS outpatients represent 25% of the cases who have died, they used only 18% of the total estimated charges for hospital care. These charges are presented by year and site of diagnosis in Table 37.

Table 37. Estimated charges for hospital care for AIDS patients who have died by site of diagnosis (n=610).

Year	Site of dx	Total days	Charges per year	Total charges	% of total charges
1981	Inpatient	7	$8,778		100
	Outpatient	0	0	$8,778	N/A
1982	Inpatient	51	$63,954		100
	Outpatient	0	0	$63,954	N/A
1983	Inpatient	318	$398,772		100
	Outpatient	0	0	$398,772	N/A
1984	Inpatient	274	$343,596		91
	Outpatient	28	$35,112	$378,708	9
1985	Inpatient	1,149	$1,440,846		80
	Outpatient	285	$357,390	$1,798,236	20
1986	Inpatient	1,207	$1,513,578		74
	Outpatient	415	$520,410	$2,033,988	26
1987	Inpatient	3,099	$3,886,146		89
	Outpatient	387	$485,298	$4,371,444	11
1988	Inpatient	2,345	$2,940,630		84
	Outpatient	462	$579,348	$3,519,978	16
1989	Inpatient	2,880	$3,611,520		83
	Outpatient	588	$737,352	$4,348,872	17
1990	Inpatient	1,124	$1,409,496		69
	Outpatient	501	$628,254	$2,037,750	31
Total	Inpatient	12,454	$15,617,316		82
	Outpatient	2,666	$3,343,164	$18,960,480	18

The total estimated charges for care of AIDS cases who have died include charges for cases who were diagnosed in both inpatient and outpatient settings. Compared with all Oregon cases (N=1,033), the average number of patient days per year is slightly higher in cases who have died, as is the average charge per admission. The overall average hospital charge per case (defined as the total charges per year divided by the number of patients diagnosed that year) is considerably higher in cases who have died ($31,083 compared with $25,101). This is because the number of deceased cases diagnosed between 1988 and 1990 was much lower than the number

of overall cases diagnosed during those years. This suggests that the majority of hospital care is used by patients with more advanced illness. The year-by-year breakdown of these charges is presented in Table 38.

Table 38. Total estimated hospital charges for care of AIDS cases who have died (n=610).

Year	No. of pt's dx'd/yr.	Charges/yr.	Ave. pt. days	Ave. chg./admit	Ave. hosp. charge per case
1981	2	$8,778	3.5	$4,389	$4,389
1982	2	$63,954	12.7	$15,989	$31,977
1983	6	$398,772	13.8	$17,338	$66,462
1984	22	$378,708	9.7	$12,216	$17,214
1985	57	$1,798,236	10.0	$12,575	$31,548
1986	78	$2,033,988	7.6	$9,549	$26,076
1987	154	$4,371,444	9.5	$11,879	$28,386
1988	120	$3,519,978	7.3	$9,119	$29,333
1989	128	$4,348,872	8.2	$10,233	$33,976
1990	41	$2,037,750	6.7	$8,351	$49,701
Total	**610**	**$18,960,480**	**8.2**	**$10,310**	**$31,083**

The charges for hospital care by risk group of AIDS cases who have died are nearly identical with similar charges for all Oregon cases. This demonstrates that overall charges for hospital care of patients with each risk behavior are relatively stable over their lifetimes. These charges are presented in Table 39.

Table 39. Charges for hospital care of AIDS cases who have died by risk behavior (n=610).

Risk behavior	Total pt. days	Charges	% of total charges	% of total cases
Homo/Bisexuals	10,946	$13,726,284	72	77
IDUs	846	$1,060,884	5.6	4
Homo/Bisexual IDUs	1,344	$1,685,376	9	10
Hemophiliac, Adult	383	$480,282	2.5	2
Heterosexuals	220	$275,880	1.5	2
Transfusion recipients	909	$1,139,886	6	3
Other/Undetermined	434	$544,236	3	2
Hemophiliac, Child	13	$16,302	<1	<1
Child, Mother with AIDS or HIV+	25	$31,350	<1	<1

Payors of hospital charges of AIDS fatalities.

The payors of the AIDS fatalities were not significantly different from the payors of the total population. These payors include: commercial insurance (35%); Medicaid and Medicare (34%); Kaiser (15%); self pay (3%); and other payors (including the Veterans' Administration) (11%). In addition, the payors in 2% of the admissions were unknown.

CHAPTER 5

Discussion

Our study of AIDS-related hospital care confirmed findings from previous studies and elucidated some new and important findings. These include changes in the case mix of AIDS patients, changes in the site of AIDS diagnosis, increasing survival after diagnosis of AIDS, changing patterns of care, and changes in the mix of payors for hospital charges for AIDS.

Case Mix and Hospital Charges

The health care system is providing services for an increasingly diverse group of AIDS cases. Even though the majority of AIDS cases in Oregon are still homosexual or bisexual men, numbers of cases of AIDS in women and in persons with risk behaviors other than male-to-male sexual contact is increasing. The medical care needs of this increasingly diverse group of cases are likely to vary--at least somewhat--from the needs of the stereotypical AIDS patient. For example, women who have AIDS often suffer from severe, chronic vaginal candidiasis--a condition foreign to men who have AIDS. Reproductive issues are another example of the problems faced by women with AIDS. Changes in sex and race mix of cases complicate an already difficult management problem, and these changes will force providers to expand their knowledge base in relation to management of HIV disease.

The charges for hospital care by risk groups are relatively proportional to the percentage of total AIDS cases in each risk group. However, the charges for care of homosexual and bisexual men are slightly lower than the percentage of overall cases in that risk group (72% of total hospital charges versus 77% of the total diagnosed cases). In contrast, the charges for care of IDUs are slightly higher than the percentage of cases in that risk group (5% of total care costs versus 4% of the total

diagnosed cases). This difference is small, yet it supports our earlier finding of decreased charges for hospital care of cases diagnosed in outpatient settings, as that population is more likely to include homosexual or bisexual men and is less likely to include IDUs (who are not also homosexual or bisexual men). Charges for care in each risk group remained relatively stable over a lifetime.

Note that the aggregate charges for AIDS-related hospital care in Oregon are underestimated in this study by $3,620,298, the estimated charges for care of out-of-state AIDS cases. Thus, our estimated charges of $25,928,958 are 12% lower than they would have been if charges for care of out-of-state cases were included in the analysis.

Site of AIDS Diagnosis

The number and rate of AIDS cases diagnosed in outpatient settings in Oregon is increasing over time. This trend shows that the number of AIDS patients being seen in outpatient settings is increasing, but it is also related to the rising incidence of AIDS cases overall. In addition, changes in AIDS surveillance in the United States and in Oregon in 1987 contributed to increased diagnosis of AIDS in outpatient settings as well as to detection of those cases.

In the United States, the CDC revised the surveillance case definition of AIDS in 1987 to include cases where certain conditions were diagnosed presumptively[1] and to include HIV encephalopathy (dementia related to HIV infection) and HIV wasting syndrome (CDC, *MMWR*, 1987); all of the conditions included in the revised definition are readily diagnosed in outpatient settings. Changes in the case definition were applied retrospectively, and so patients not satisfying CDC's AIDS surveillance

[1] These conditions include esophageal candidiasis, cytomegalovirus retinitis, KS, *mycobacterium avium* complex, *mycobacterium kansasii*, *mycobacterium tuberculosis* (disseminated or extrapulmonary), other (or unidentified) species of *mycobacterium*, PCP, and toxoplasmosis of the brain. Cases diagnosed with presumptive conditions must have evidence of HIV infection (e.g., a positive HIV antibody test or a positive HIV detection test).

definition in 1986 but satisfying the revised definition were included in the AIDS case registry. And, before they were included, the diagnosing physician was queried regarding the site of diagnosis. Therefore, although the change in AIDS case definition in 1987 increased the incidence of AIDS diagnosis in outpatient settings (because conditions easily diagnosed in outpatient settings were included), retrospective application of this definition supports the validity of the patterns of outpatient diagnosis we described in this study.

Changes in the method of AIDS surveillance in Oregon were implemented in 1987, when the Oregon Health Division began active AIDS surveillance. Rather than relying solely on physicians to report AIDS cases, AIDS Epidemiologists began soliciting case reports from physicians, medical records, hospital infection control practitioners, and death certificate reviews. The change to active AIDS surveillance improved the completeness of AIDS reporting in Oregon from 64.4% to 99% in 1987 (Modesitt, 1990). Since then, overall completeness of AIDS case reporting Oregon has consistently been estimated at greater than 95% and was estimated to be 96.4% in February of 1992 (Oregon Health Division, unpublished data). The result of the change in surveillance methods has been an increase in the detection of AIDS cases diagnosed in outpatient as well as in inpatient settings.

The increase in diagnosis of AIDS in outpatient settings in Oregon, then, is a result of the interaction of many complex factors. These factors include the change in CDC's AIDS surveillance definition in 1987 as well as the implementation of active AIDS surveillance in Oregon.

AIDS patients diagnosed in outpatient settings comprised 34% of the total patients in our study yet used only 20% of the total charges for hospital care ($5,230,434 of $25,928,958, see Table 18). The overall average charges for hospital care for AIDS inpatients were $30,439, whereas the average charges for

hospital care for AIDS outpatients were $14,817; thus, hospital charges for care of AIDS outpatients represent only 49% of the hospital charges of AIDS inpatients.

Lifetime hospital charges are accurately described by including only AIDS cases who have died. Twenty-five percent of the AIDS cases who have died were outpatients, yet this group used only 18% of the total hospital charges of AIDS fatalities. This compares with AIDS inpatients, who comprised 75% of this sub-population yet used 82% of the hospital charges. The overall average charges for hospital care for AIDS outpatients and inpatients over their lifetimes were $21,851 and $34,174, respectively; thus, the overall average hospital charges for hospital care of AIDS outpatients were $12,323 lower than the average charges of AIDS inpatients.

Comparing hospital utilization patterns and charges for all Oregon AIDS cases with those who have died showed that the charges for care of AIDS outpatients remained lower than AIDS inpatients over a lifetime in this study, but the difference in charges between the two groups decreased over a lifetime. The percentage of outpatient cases in the total population was 34%, yet AIDS outpatients used only 20% of the overall hospital charges. This difference in percent of cases and percent of charges decreased in the group of AIDS fatalities: 25% of AIDS fatalities were AIDS outpatients, and they used 18% of the hospital charges of AIDS fatalities. This decrease in the difference between the portion of cases diagnosed in outpatient settings and their portion of hospital charges suggests that hospital use intensified as the time from diagnosis of AIDS increased.

If all 610 of the AIDS cases in our study who had died were diagnosed in inpatient settings (assuming the calculated average charges for hospital care of AIDS inpatients who have died [$34,174]), the total lifetime charges for hospital care would be $20,846,140. Our estimated overall charges for hospital care (of dead AIDS inpatients and outpatients) of $18,960,480 are 9% lower than these charges (i.e.,

$20,846,140) and represent a savings of $5,514,529. Reasons for lower hospital charges for AIDS outpatients might be attributed to earlier, prophylactic medical care (preventing occurrences of acute opportunistic infections or treating them before they become life-threatening) as well as increased use of nursing case management and care coordination in outpatient settings that results in an over-all improvement in the health of AIDS outpatients.

As was mentioned above, we acknowledge that AIDS cases diagnosed as inpatients might have been seen in outpatient settings before their initial diagnosis. If that is indeed the case, the difference in medical care cost between AIDS outpatients and AIDS inpatients might be indicative of the severity of the initial medical condition(s) the inpatient cases were diagnosed with rather than necessarily reflecting a poorer health status of AIDS inpatients. With the current AIDS case report form and mechanisms, it is impossible to detect the extent to which this is true (i.e., data are not collected regarding whether or not cases were monitored in outpatient settings prior to their diagnosis of AIDS).

In our study, AIDS outpatients were likely to be homosexual or bisexual men (291 of 353, or 82%). There were more IDUs diagnosed as inpatients than as outpatients (6% of inpatients versus 2% of outpatients). Homosexual or bisexual men who are also IDUs were represented in equal proportions in both patient populations. The smaller number of IDUs in the population of AIDS outpatients might partially account for the decreased charges for hospital care of this population. This phenomenon (of increased cost of hospital care of IDUs) is demonstrated in New York, where large numbers of AIDS cases are IDUs. These patients are often disenfranchised by society; frequently, they are indigent with limited resources and few social support systems. Cost of care of these patients is typically higher because lengths of hospital admissions are longer (Ball and Turner, 1991). In comparison, the case mix of AIDS cases in San Francisco includes 97% homosexual or bisexual

men and only 1 - 2% IDUs, and the cost of care for patients there is lower (Scitovsky, Cline, and Lee, 1986). Reasons for these cost differences include the fact that homosexual and bisexual men often have a good social network and adequate financial resources, and so their lengths of stay in hospitals are generally shorter (Ball and Turner, 1991).

It is possible that the AIDS outpatients in this study differed from AIDS inpatients in ways we have neither described nor measured. For example, AIDS outpatients may have been more assertive in their health care management, they may have had better access to health care than AIDS inpatients, and/or they may have lived nearer to large outpatient clinics where HIV disease is managed. If personality or environmental characteristics of AIDS outpatients are somehow different from those of AIDS inpatients, decreased charges for hospital care, shorter lengths of hospital stays, and longer survival may be related to these differences rather than being related to the provision of preventive medical management in outpatient clinics. Since this study did not examine these potential differences, we can not rule out the possiblility of their influence on our findings.

Patterns of Care

Hospital use by Oregon AIDS patients is increasing over time in the aggregate, with the average number of inpatient admissions per year per patient remaining relatively constant. Hospital use in 1991 appears to decrease slightly (from 280 patients admitted 595 times in 1990 to 118 patients admitted 217 times in 1991). However, this decrease is undoubtedly because abstracted hospital records were collected only through September of 1991; thus, the follow-up time was not long enough to capture complete hospital admissions of all the patients. Average lengths of stay have fluctuated over time but have decreased since 1983 (range three days to 184 days, overall average length of stay=7.7 days). This decrease may be related to

increased physician experience over time in treating the common opportunistic conditions as well as the use of better medications to treat these conditions.

Total lengths of stay per admission were significantly different for AIDS outpatients and AIDS inpatients. AIDS outpatients had shorter lengths of stay per admission than did AIDS inpatients. This difference contributed to lower hospital charges for AIDS outpatients and may be related to preventive care and early treatment of infections and other conditions.

Survival

The length of survival from diagnosis of AIDS to death of patients who have died varies over time and between risk groups. AIDS outpatients have a lower case-fatality rate than AIDS inpatients (43% for AIDS outpatients versus 67% for AIDS inpatients). The relative risk of death of inpatients as compared with outpatients is 1.55. On a year-by-year breakdown, stratifying case-fatality rates by year of diagnosis removes the confounding factor of history; that is, both AIDS outpatients and AIDS inpatients were grouped by year of diagnosis, and thus health care providers for both groups had access to similar treatment regimens and pharmaceuticals. Nevertheless, AIDS outpatients had lower case-fatality rates than AIDS inpatients for every year except 1986 (where AIDS inpatients had a 95% rate and AIDS outpatients had a 100% rate). In addition, AIDS outpatients had a significantly longer survival time (14.7 months) than AIDS inpatients (11.5 months). The lower case-fatality rate of AIDS outpatients and the increased length of survival may be related to earlier diagnosis and treatment of opportunistic infections in outpatient settings and could also reflect better case management.

Since site of AIDS diagnosis is currently the only marker available to indicate use of outpatient settings, we conclude that use of outpatient settings resulted in increased survival. We acknowledge, however, that our data cannot indicate which

(if any) of the AIDS inpatients were seen in outpatient settings prior to their diagnosis, and so we cannot exclude the possibility that the increased case-fatality rate in this population is related to increased severity of the initial medical condition.

Payors of Hospital Charges

Payors of hospital charges varied between risk groups. The primary payor of hospital charges for care of homosexual or bisexual men was commercial insurance (38% of these admissions); the second most common payors were Medicaid and Medicare (28% of the admissions). This contrasts with the primary payors (Medicaid and Medicare) of the hospital care charges of IDUs (both heterosexual and homosexual [63% and 68% of these admissions, respectively]). Again, this supports the theory that many IDUs are disenfranchised by society and often rely on local, state, or federal funds to pay for their medical care. On the other hand, homosexual and bisexual men are more likely to be employed (at least during the early months of their diagnosis) and to either have private insurance or belong to an HMO.

The most important of our findings in regard to payors of hospital charges is the increased burden for payment by the public sector (i.e., Medicaid and Medicare). Our findings indicate the percentage of hospital charges for AIDS-related care in Oregon increased from 0% in 1981 to 36% in 1991 (with a high of 41% in 1990). This is indeed a disturbing trend with significant implications, including the need for major reforms in the Medicaid system. These reforms might include allocation of resources to insure a basic level of health care (i.e., a basic health care package) to all persons. This would involve rationing of some health care services (i.e., eliminating coverage for some medical services) in order to have financial resources to allow improvement of access to others. An innovative plan for Oregon incorporating many of these components of reform was proposed by Kitzhaber (1990).

CHAPTER 6

Summary and Conclusions

The Evolution of AIDS and its Social Impact

AIDS is a new medical condition whose devastating effects are touching individuals, communities, and local, state, and national governments. The multiple problems caused by AIDS are not abating but are intensifying as the epidemic progresses. This paper has considered a very limited aspect of the effects of AIDS: the charges for hospitalizations of Oregon residents who were diagnosed and reported as having AIDS in Oregon from 1981 through 1990. The cost of care of those afflicted with AIDS is immense; paying for these costs is challenging health care systems both in Oregon and throughout the world. Cost of HIV/AIDS care issues have been considered by other researchers in the past, but their reevaluation is justified here for a number of reasons.

First, knowledge about AIDS and its associated conditions has been accumulating since it was first recognized in 1981; therefore, its medical management is a new science that is evolving over time. New pharmaceuticals have been developed to treat the infections and cancers associated with AIDS. Consequently, the cost of treating AIDS patients has been increasing over time. Cost of care studies should be repeated as the epidemic progresses.

Second, researchers and physicians have discovered the value of early identification and medical management of patients who are HIV-antibody positive but asymptomatic. Whereas early in the epidemic, HIV-infected patients presented for care only after developing acute (often life-threatening) infections, many are now seeking medical care and management in outpatient settings before they develop infections or other medical conditions. This has led to an increase in the diagnosis of

AIDS in outpatient settings. Since the nature of outpatient care is preventive, it seems to follow that patients who utilize outpatient clinics will be healthier than those who do not. Therefore, it seems logical that these patients would spend less time hospitalized for acute medical conditions. This theory has not yet been previously explored in the literature and warrants study.

Finally, the epidemiology of AIDS is changing both in Oregon and throughout the United States. AIDS used to be thought of as "the gay man's problem." This was especially the case in Oregon. Now, however, the epidemic is spreading to other "at risk" populations. Specifically, it is being seen increasingly in populations of IDUs and their partners and in sexually active, non-monogamous heterosexuals. Additionally, it is being seen more frequently in women and in their infants. At the same time, the numbers of newly-infected hemophiliacs and blood transfusion recipients are decreasing. (This is directly related to the routine screening for the HIV antibody of blood and blood products since March of 1985.) Since lifestyle, gender, age, and preexisting medical conditions influence how one's body responds to disease, changes in the epidemiology of AIDS translate into the possibility that the medical conditions are different. The resultant costs of treating these conditions would likely be different, too. Thus, changes in the epidemiology of AIDS also justify ongoing cost-of-care studies.

Findings of This Study

Our study involved examining 1,033 Oregon AIDS cases who were diagnosed and reported to the Oregon Health Division between 1981 and 1990, and it included data on all hospitalizations in Oregon of these patients between 1981 and September, 1991. We described the gender, risk behavior, and site of diagnosis of these patients. In addition, we examined inpatient use patterns of these cases, and we

used the length of hospital stay to calculate and describe the charges for their hospital care.

Our study showed that the number of AIDS patients diagnosed in outpatient settings is increasing over time. Between 1982 and 1986, between zero and 18% of Oregon's AIDS cases were diagnosed in outpatient settings; this percentage increased to 50% of the reported cases of AIDS diagnosed during 1990. This pattern reflects changes in the CDC's AIDS case definition that was implemented in 1987 as well as changes in the locus of AIDS-related care (i.e., from acute care settings to outpatient settings).

The charges for hospital care of patients who were diagnosed in outpatient settings were considerably lower than the charges for hospital care of patients who were diagnosed as inpatients. Whereas an overall total of 34% of the cases in our study were diagnosed as outpatients, the charges for hospital care comprised only 20% of the total charges for all of the patients in the study. While our study could not define the reason for these lower charges, we postulate that patients diagnosed in outpatient settings might receive more comprehensive case management and preventive care and might thus be healthier than their counterparts diagnosed in acute care settings. As the cost of medical care continues to escalate, the potential to save money by increasing the use of outpatient clinics (and thus use better overall case management) is worth exploring. As our study supported decreased hospital charges for care of these AIDS outpatients, we feel that nurse-managers, policy makers, and others involved in the care or referral of HIV-infected patients should intensify their efforts to identify and treat HIV positive and AIDS patients primarily in outpatient settings rather than in acute care settings.

Our study also showed that AIDS outpatients enjoyed a significantly longer survival time after diagnosis of AIDS than did their counterparts diagnosed in inpatient settings; in addition, the case-fatality rate of AIDS outpatients was lower

than that of AIDS inpatients. These findings also support our hypothesis that AIDS patients who receive care in outpatient settings and thus most likely receive close monitoring and prophylactic medicines are healthier over all than AIDS patients who do not receive such care.

Recommendations for Testing

The findings of our study regarding the effect of outpatient diagnosis of AIDS indicate that it behooves HIV-infected persons to seek care and monitoring as early as possible. It is beneficial for a person to know if he or she is infected with HIV. One of the ways to influence people to seek HIV testing (and thus become aware of their HIV infection status) is to educate them. If people can be made aware of the behaviors that put them at risk for HIV infection and simultaneously be educated about the advantages of early management of HIV disease, they might voluntarily seek testing. The major problems to overcome in this regard are the stigmatism and the discrimination associated with being HIV-positive. Although these problems still exist, they are decreasing both with time and as the AIDS case mix becomes increasingly heterogeneous. Nurses can contribute to the effort of increasing HIV testing by educating their clients about HIV epidemiology and about the benefits of knowing one's HIV infection status. In addition, nurses can help decrease the public's prejudice against HIV-infected persons by acting as role models and being non-judgmental toward their HIV-infected clients and treating them with respect.

Recommendations for Future Research and Impending Changes

A recommendation for future research is to use other data sources to determine more definitively which AIDS patients received care in outpatient settings. This might be done by linking the AIDS registry database with databases at selected outpatient clinics who have historically treated many AIDS patients (e.g., Multnomah

County's HIV Clinical Services clinic and the Oregon Health Science University's HIV Clinic). One predictable problem for such a study is that access to patient records is difficult (and justifiably so), so obtaining the cooperation of outpatient clinics might be difficult.

Further research in the area of medical care costs is also needed. As the knowledge about and treatment of AIDS cases is continually evolving, cost-of-care studies are almost outdated by the time they are completed. Also, studies of the charges for outpatient care, ancillary services, hospice care, and home health care need to be done. As our data only contained records of inpatient care, we could not consider these charges. Studies including these charges would obviously be valuable in more clearly defining the total charges of medical treatment of AIDS patients.

Finally, studies including the cost of outpatient and inpatient care will need to be done after Oregon implements CDC's new AIDS case definition (planned in July, 1992) (see Appendix C for a copy of the new AIDS case definition form). The new AIDS case definition will include all conditions listed in the 1987 definition and will add all HIV-positive adults and adolescents with CD4 lymphocytes (T-cell) less than $200/mm^3$. CDC's rationale for changing the case definition is to reflect HIV-related morbidity and mortality more accurately. Under the current definition, many HIV-infected persons suffer debilitating illnesses related to severe immunocompromise, but they are currently not included in AIDS statistics because they do not satisfy the AIDS case definition. The new AIDS case definition will include these persons, and thus, the sensitivity of AIDS surveillance data will increase. Currently, CD4 cell counts are frequently done in outpatient clinics as a part of routine management of HIV infection; therefore, if CD4 testing continues at current levels, the number of AIDS cases diagnosed in outpatient settings should increase sharply after the case definition is implemented. Other implications of this change include longer life expectancies after AIDS diagnosis (because AIDS patients will receive an AIDS

diagnosis 1.6 years earlier in their illness [Chang, Mitchell, and Hernandez, 1992]), with subsequently higher lifetime medical care costs. In addition, it is likely that the percentage of medical care costs charged to Medicare will increase because more patients will survive the requisite twenty-four month waiting period, further intensifying the public sector's burden of AIDS-related costs. These changes need to be carefully evaluated after the new case definition is implemented.

Other impending changes in the medical care arena in Oregon include changes in terminal AIDS care. The Oregon Basic Health Services Act (Kitzhaber, 1990) proposes universal access to basic health care and rationing of some medical services to Medicaid recipients. Based on a prioritized list of services established by the Oregon Health Services Commission, some medical services will not be covered for individuals dependent upon Medicaid (in order to improve access to other services). One of the changes is that treatment that "is not generally effective or is futile" (as is the case in end-stage HIV disease) will not be covered (Oregon Department of Human Resources, 1991). Comfort care and hospice care in these situations, however, will be covered. These changes, if implemented, will have far reaching effects on the patterns of hospital care of AIDS patients. We can probably expect that those AIDS patients dependent upon Medicaid for payment of hospital charges will have a decrease in the number of AIDS-associated admissions, shorter lengths of stay, and increased use of home health services. An important indicator of the effect of these changes will be survival times. It will be important to compare survival times of Medicaid or Medicare patients with those of patients with other payment sources in order to determine the effects of the change. Survival times of these two groups (i.e., those with Medicaid or Medicare and those with other payment sources) should not differ significantly, as treatable infections and conditions will still be covered.

Nursing Implications

Nurses need to be active as policy makers in the fight against AIDS. Such activity not only insures high quality, consistent care of AIDS patients, but helps insure development of epidemiologically-sound disease prevention protocols. In addition, nurses as health care planners can proactively develop plans to educate their clients (both individual clients and the public as a client) about HIV and about the benefits of early detection and treatment of HIV infection; these plans could, in turn, work to increase HIV testing of persons at risk for HIV infection.

As the number of AIDS cases continues to escalate, it is imperative that health care professionals develop comprehensive plans to meet the needs of those afflicted with AIDS. One way to achieve that goal is to analyze health care utilization patterns from the past and apply knowledge gleaned from those studies in the development of health policy. Nurses can use this information to design alternative management programs that are cost-effective yet do not compromise AIDS patients' quality of care. Nurses are particularly qualified to plan patient care management programs to address a myriad of problems faced by AIDS patients, thus providing them with compassionate care and increasing the quality of their remaining lifetimes. Unless we are effective in our health care planning, AIDS-related health care costs will continue to escalate and might become prohibitive, and the suffering experienced by AIDS patients will unduly intensify.

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APPENDIXES

APPENDIX A

HUMAN IMMUNODEFICIENCY VIRUS (HIV) INFECTION CODES (CDC, 1987)

Background

The increasing importance of HIV infection has created a demand for specific disease codes that allow public health officials, clinical researchers, and agencies that finance medical care to accurately monitor diagnoses of AIDS and other manifestations of HIV infection as they are coded on death certificates and medical records.

Definitions

The ICD-9-CM classification is not intended for purposes of staging or specifying severity of illness. Rather, it is based on well-defined groupings of disease manifestations most compatible with the manner in which patients with HIV infection are currently categorized by providers of health-care services, clinical investigators, researchers, and public health officials. Thus, the spectrum of HIV infection is divided into three categories:

1. HIV infection with specified secondary infections or malignant neoplasms, or AIDS (042).
2. HIV infection with other specified manifestations in the absence of either specified secondary infections or malignant neoplasms (043). Conditions in this category may or may not satisfy CDC's AIDS surveillance definition.
3. Other HIV infection not classifiable above (044). Conditions in this category do not satisfy CDC's AIDS surveillance definition.

Selected codes

Five codes have been reliable in indicating AIDS (Kizer, 1986). These include:

042

HIV Infection with specified conditions.

Includes: AIDS

043

HIV infection causing other specified conditions.

Includes: AIDS-like syndrome, AIDS-related complex (ARC)

Excludes: HIV infection classifiable to 042.

136

Pneumocystis carinii pneumonia

173

Kaposi's sarcoma

279

Disorder of the immune system

Patient's Name _____ Telephone No.: (___) _____

Address: _____

ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS)
ADULT CONFIDENTIAL CASE REPORT
(Patients ≥13 years of age at time of diagnosis)

Physician's Name: _____ Telephone No.: (___) _____

Hospital: _____ Medical Record No.: _____

Person Completing Form: _____ Telephone No.: (___) _____

DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
CENTERS FOR DISEASE CONTROL
AIDS PROGRAM, CID, ATLANTA, GEORGIA 30333

ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS)
ADULT CONFIDENTIAL CASE REPORT
(Patients ≥13 years of age at time of diagnosis)

FORM APPROVED
OMB NO. 0920-0009

This report is authorized by law (Sections 304 and 306 of the Public Health Service Act, 42 USC 242b and 242k). Response in this case is voluntary for federal government purposes, but may be mandatory under state and local statutes. Your cooperation is necessary for the understanding and control of AIDS. Information in the surveillance system that would permit identification of any individual or establishment is collected with a guarantee that it will be held in confidence, will be used only for the purposes stated in the assurance on the reverse of the form, and will not otherwise be disclosed or released without the consent of the individual or the establishment in accordance with Section 308(d) of the Public Health Service Act (42 USC 242m).

DATE FORM COMPLETED: Mo. Day Year

CDC PATIENT NUMBER

HEALTH DEPARTMENT USE ONLY

SOUNDEX NAME CODE

STATUS OF THIS REPORT: [1] New Case [2] Update Report

REPORTING HEALTH DEPARTMENT: State _____ City/County _____

STATE PATIENT NUMBER

CITY/COUNTY PATIENT NUMBER

I. BASIC PATIENT INFORMATION

DATE OF BIRTH: Mo. Day Year

AGE AT DIAGNOSIS OF AIDS: Years

CURRENT STATUS: [1] Alive [2] Dead [9] Unknown

DATE OF DEATH: Mo. Day Year

SEX: [1] Male [2] Female

RACE/ETHNICITY: [1] White (not Hispanic) [2] Black (not Hispanic) [3] Hispanic [4] Asian/Pacific Islander [5] American Indian/Alaskan Native [9] Not Specified

COUNTRY OF BIRTH: [1] U.S. [2] Canada [3] Dominican Republic [4] Haiti [5] Mexico [8] Other (specify) _____

RESIDENCE AT ONSET OF ILLNESS SUGGESTIVE OF AIDS: City _____ County _____ Zip Code _____ State _____ Country _____

HOSPITAL WHERE DIAGNOSIS OF AIDS ESTABLISHED: OUT PATIENT DX?

Name _____ City _____ State _____ Country _____

II. SOCIAL AND RISK FACTORS

AFTER 1977 AND PRECEDING THE DIAGNOSIS OF AIDS, DID THIS PATIENT (check all that apply)

	Yes	No	Unk
• Have sexual relations with a male partner?	1	0	9
• Have sexual relations with a female partner?	1	0	9
• Use needles for self injection of drugs not prescribed by a physician?	1	0	9
• Receive any blood products (i.e., factor VIII or IX, cryoprecipitate, or fibrinogen) for the treatment of a coagulation disorder?	1	0	9
If yes, specify disorder: [1] Hemophilia A (factor VIII) [2] Hemophilia B (factor IX) [8] Other, specify: _____			
• Have heterosexual relations with any of the following: (check all that apply)			
• I.V. drug abuser	1	0	9
• Bisexual man	1	0	9
• Person with hemophilia/coagulation disorder	1	0	9
• Blood transfusion recipient with AIDS or documented HIV infection	1	0	9
• Person with AIDS or documented HIV infection	1	0	9
• Person born in a country where heterosexual transmission predominates (e.g., African or Caribbean country) Specify country: _____	1	0	9
• Has patient received a transfusion of blood/blood components?	1	0	9
If yes, and this is only risk factor, give date of first and last transfusion: First Mo. Yr. Last Mo. Yr.			
• Work in a health-care or clinical laboratory setting?	1	0	9
If yes, specify occupation: _____			

III. DISEASES INDICATIVE OF AIDS (check all that apply)

DISEASE	DIAGNOSIS Definitive*	DIAGNOSIS Presumptive	DISEASE	DIAGNOSIS Definitive*	DIAGNOSIS Presumptive
Candidiasis, bronchi, trachea, or lungs	1	NA	Kaposi's sarcoma	1	2
Candidiasis, esophageal	1	2	Lymphoma, Burkitt's (or equivalent term)	1	NA
Coccidioidomycosis, disseminated or extrapulmonary	1	NA	Lymphoma, immunoblastic (or equivalent term)	1	NA
Cryptococcosis, extrapulmonary	1	NA	Lymphoma, primary in brain	1	NA
Cryptosporidiosis, chronic intestinal (> 1 mo. duration)	1	NA	*Mycobacterium avium* complex or *M. kansasii*, disseminated or extrapulmonary	1	2
Cytomegalovirus disease (other than in liver, spleen, or nodes)	1	NA	*M. tuberculosis*, disseminated or extrapulmonary	1	2
Cytomegalovirus retinitis (with loss of vision)	1	2	*Mycobacterium*, of other species or unidentified species, disseminated or extrapulmonary	1	2
HIV encephalopathy	1	NA	*Pneumocystis carinii* pneumonia	1	2
Herpes simplex: chronic ulcer(s) (>1 mo. duration) or bronchitis, pneumonitis, or esophagitis	1	NA	Progressive multifocal leukoencephalopathy	1	NA
Histoplasmosis, disseminated or extrapulmonary	1	NA	Salmonella septicemia, recurrent	1	NA
Isosporiasis, chronic intestinal (>1 mo. duration)	1	NA	Toxoplasmosis of brain	1	2
			Wasting syndrome due to HIV	1	NA

*Refer to instructions on back for definition of definitive diagnosis.

Of diseases checked above, date first disease diagnosed: Mo. Yr.

IV. LABORATORY DATA

1. HIV SERUM ANTIBODY TESTS

	Pos	Neg	Inc*	Not Done
• ELISA	1	0	8	9
• Western blot/immunofluorescence assay	1	0	8	9
• Other (specify) _____	1	0	8	9

*Inc = Inconclusive

2. HIV DETECTION TESTS (Applicable only if serum antibody tests are not positive.)

	Pos	Neg	Inc*	Not Done
• Culture of HIV confirmed by both specific HIV antigen test and reverse transcriptase detection	1	0	8	9
• HIV serum antigen test	1	0	8	9
• Other HIV test (specify) _____	1	0	8	9

*Inc = Inconclusive

	Yes	No	Unk
3. If HIV tests were not positive or were not done, does this patient have an immunodeficiency that would disqualify him/her from the AIDS case definition?	1	0	9
4. IS ABSOLUTE T-HELPER LYMPHOCYTE COUNT <400 per mm^3? (Applicable only if tests results are negative for HIV infection.)	1	0	9

V. ADDITIONAL INFORMATION OR COMMENTS

CDC 50.42A (REV. 6-88)

COPY 1 - CDC

APPENDIX B

Adult AIDS Case Report Form, CDC (8/88).

APPENDIX C

Revised Adult AIDS Case Report form, CDC (8/91).

LOCAL USE ONLY

Patient's Name: _____ Phone No.: ( ) _____
(Last, First, M.I.)

Address: _____ City: _____ County: _____

– DETACH HERE – – *Patient Identifier information is not transmitted to CDC* –

ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS) ADULT CONFIDENTIAL CASE REPORT

(Patients ≥ 13 years of age at time of diagnosis)

Form Approved
OMB No. 0920-0009
Exp. 11/30/92

Public burden for this collection of information is estimated to average 10 minutes per response. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to PHS Reports Clearance Officer; ATTN: PRA; Hubert H. Humphrey Bldg, Rm 721-B, 200 Independence Ave., SW; Washington, DC 20201; and to the Office of Management and Budget; Paperwork Reduction Project (0920-0009); Washington, DC 20503.

This report is authorized by law (Sections 304 and 306 of the Public Health Service Act, 42 USC 242b and 242k). Response in this case is voluntary for federal government purposes, but may be mandatory under state and local statutes. Your cooperation is necessary for the understanding and control of AIDS. Information in the surveillance system that would permit identification of any individual on whom a record is maintained, is collected with a guarantee that it will be held in confidence, will be used only for the purposes stated in the assurance on file at your local health department, and will not otherwise be disclosed or released without the consent of the individual in accordance with Section 308(d) of the Public Health Service Act (42 USC 242m).

HEALTH DEPARTMENT USE ONLY

DATE FORM COMPLETED: Mo. Day Yr.

SOUNDEX CODE:

REPORT STATUS: [1] New Report [2] Update

REPORTING HEALTH DEPARTMENT: State: _____ City/County: _____

State Patient No.:

City/County Patient No.:

I. BASIC PATIENT INFORMATION

CDC PATIENT NUMBER:

DATE OF BIRTH: Mo. Day Yr.

AGE AT DIAGNOSIS OF AIDS: Years

CURRENT STATUS: Alive [1] Dead [2] Unk. [9]

DATE OF DEATH: Mo. Day Yr.

STATE OF DEATH:

SEX: [1] Male [2] Female

RACE/ETHNICITY:
[1] White (not Hispanic) [2] Black (not Hispanic) [3] Hispanic
[4] Asian/Pacific Islander [5] American Indian/ Alaskan Native [9] Not Specified

COUNTRY OF BIRTH:
[1] U.S. [2] U.S. Dependencies and Possessions (including Puerto Rico)
(specify): _____
[8] Other (specify): _____ [9] Unknown

RESIDENCE AT DIAGNOSIS OF AIDS:
City: _____ County: _____ State/ Country: _____ Zip Code:

II. FACILITY OF DIAGNOSIS

FACILITY NAME:

City: _____

State/ Country: _____

[1] Outpatient (Clinic, Private Physician, HMO)
[2] Hospital, Inpatient
[8] Other (specify): _____

III. SOURCE OF REPORT

SOURCE:
[1] Healthcare provider/on-site review
[2] Death certificate review
[3] HIV report follow-up
[4] Alternate database
(specify): _____
[8] Other (specify): _____

IV. PATIENT HISTORY

AFTER 1977 AND PRECEDING THE DIAGNOSIS OF HIV INFECTION OR AIDS THIS PATIENT HAD:
(Respond to ALL Categories)

	Yes	No	Unk
• Sex with male	1	0	9
• Sex with female	1	0	9
• Injected nonprescription drugs	1	0	9
• Received clotting factor for coagulation disorder	1	0	9
– Specify disorder: [1] Factor VIII (Hemophilia A) [2] Factor IX (Hemophilia B) [8] Other (specify): _____			
• Heterosexual relations with:			
– Intravenous/injection drug user	1	0	9
– Bisexual male	1	0	9
– Person with hemophilia/coagulation disorder	1	0	9
– Transfusion recipient with HIV infection	1	0	9
– Person with HIV/AIDS infection, risk not specified	1	0	9
– Person born in a country where heterosexual transmission predominates	1	0	9
(specify country): _____			
• Received transfusion of blood/blood components (other than clotting factor) First Mo. Yr. Last Mo. Yr.	1	0	9
• Received transplant of tissue/organs or artificial insemination	1	0	9
• Worked in a health-care or clinical laboratory setting	1	0	9
(specify occupation): _____			

LOCAL USE ONLY

Physician's Name: _____ Phone No.: ( ) _____

Hospital/Facility: _____ Med Rec. No.: _____

Person completing form: _____ Phone No.: ( ) _____

– DETACH HERE – – *Patient identifier information is not transmitted to CDC* –

V. SELECTED DISEASES *(check all that apply)*

AIDS INDICATOR DISEASE	Initial Diagnosis Def.	Initial Diagnosis Pres.	Initial Date Mo.	Initial Date Yr.
Candidiasis, bronchi, trachea, or lungs	1	NA		
Candidiasis, esophageal	1	2		
Coccidioidomycosis, disseminated or extrapulmonary	1	NA		
Cryptococcosis, extrapulmonary	1	NA		
Cryptosporidiosis, chronic intestinal (>1 mo. duration)	1	NA		
Cytomegalovirus disease (other than in liver, spleen, or nodes)	1	NA		
Cytomegalovirus retinitis (with loss of vision)	1	2		
HIV encephalopathy	1	NA		
Herpes simplex: chronic ulcer(s) (>1 mo. duration); or bronchitis, pneumonitis or esophagitis	1	NA		
Histoplasmosis, disseminated or extrapulmonary	1	NA		
Isosporiasis, chronic intestinal (>1 mo. duration)	1	NA		
Kaposi's sarcoma	1	2		

AIDS INDICATOR DISEASE	Initial Diagnosis Def.	Initial Diagnosis Pres.	Initial Date Mo.	Initial Date Yr.
Lymphoma, Burkitt's (or equivalent term)	1	NA		
Lymphoma, immunoblastic (or equivalent term)	1	NA		
Lymphoma, primary in brain	1	NA		
Mycobacterium avium complex or *M.kansasii*, disseminated or extrapulmonary	1	2		
M. tuberculosis, disseminated or extrapulmonary	1	2		
Mycobacterium, of other species or unidentified species, disseminated or extrapulmonary	1	2		
Pneumocystis carinii pneumonia	1	2		
Progressive multifocal leukoencephalopathy	1	NA		
Salmonella septicemia, recurrent	1	NA		
Toxoplasmosis of brain	1	2		
Wasting syndrome due to HIV	1	NA		

Def. = definitive diagnosis Pres. = presumptive diagnosis

• Has patient been diagnosed with pulmonary tuberculosis? 1 Yes 2 No 9 Unk. DATE: Mo. Yr.

VI. LABORATORY DATA

I. HIV TESTS (If more than one positive test, indicate date of *first* positive test.)

	Reactive	Non-reactive	Incon-clusive	Not Done	TEST DATE Mo.	TEST DATE Yr.
• HIV-1 SERUM ANTIBODY TESTS:						
– EIA	1	0	–	9		
– Western blot/immunofluorescence assay	1	0	8	9		
• OTHER HIV-1 TEST: (specify):	1	0	8	9		
• HIV-2 SERUM ANTIBODY TESTS:						
– EIA	1	0	–	9		

II. If HIV tests were not positive or were not done, does this patient have an immunodeficiency that would disqualify him/her from the AIDS case definition? Yes 1 No 2 Unk. 9

III. IMMUNOLOGIC LAB TESTS (If more than one test, indicate lowest available test.)

		TEST DATE Mo.	TEST DATE Yr.
• T HELPER (CD4+) LYMPHOCYTE COUNT:			
– Absolute number/mm³	cells/mm³		
– Percent	%		

VII. COMMENTS