Defining and Measuring the Costs of the HIV Epidemic to Business Firms

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Synopsis

Most published estimates of the costs of the epidemic of human immunodeficiency virus (HIV) infection and acquired immunodeficiency syndrome (AIDS) have been developed from the societal perspective, attempting to measure the burden of the epidemic to society in this country. Although societal cost analysis is well-developed, relatively little is known about many of the factors influencing the costs of the epidemic to business firms. The business community may bear a substantial portion of those costs in the form of health-related benefits provided to workers. Other effects of the epidemic in the workplace are related to fears and stigma associated with the illness.

The author compares frameworks for analyzing the costs of the epidemic to the business community and to society. Societal costs include direct costs, the resources used in providing health care, and indirect costs, the resources lost to society as a result of the epidemic. Costs to business include illness-based employment costs, legal or administrative costs, prevention costs, perception-based employment costs, care giver costs, and nonmonetary costs. Not all societal costs are borne by business, and businesses may incur costs that are not traditionally measured from the societal perspective.

MOST PUBLISHED ESTIMATES of the costs of the epidemic of human immunodeficiency virus (HIV) infection and acquired immunodeficiency syndrome (AIDS) have been developed from the societal viewpoint, and they include direct and indirect costs.

Direct costs are the medical and nonmedical expenditures associated with screening for infection, counseling those who are infected or at high risk for infection, and diagnosing and treating infected persons. Indirect costs are a valuation of the output lost to society owing to premature death and disability *(1–4)*. Societal cost estimation attempts to measure the costs of lost opportunities, such as the value of resources used as a result of the epidemic, that are foregone to society for other purposes.

The business community is one important interest group in the context of the epidemic. A portion of the costs of the epidemic are being borne by the business community through the employer-based system of health insurance and by providing employees with such benefits as life and disability insurance. Businesses also face productivity losses as a result of employee illness and from employees caring for the sick. However, with improvements in treatment, persons with HIV infection are living longer, are hospitalized less often, and lose less time from employment than previously. As a 1990 news report correctly forecast, "The economic impact of AIDS will gradually shift to the work place as companies try to accommodate employees who are being treated for AIDS or HIV" *(5)*.

How business firms respond to the epidemic will be influenced by its perceived costs to them. If costs are perceived as low, firms will tend to ignore the problem. If costs are perceived as high, firms may try to dismiss or avoid hiring employees they fear at risk for infection. However, recent court cases and anti-discrimination legislation, such as the Americans with Disabilities Act of 1990, increasingly expose firms to legal liabilities for such actions. Improved understanding of the impact of the epidemic on employers can help management see their costs in better perspective, develop more rational approaches to managing the effects of the disease among their employees, and retain productive and skilled infected employees for as long as their health permits.

Because information on the business costs of the epidemic is not readily available, businesses may use data on the societal costs inappropriately and assume

Types of Costs Incurred by Business Firms as a Result of Having Employees with HIV Infection

Measurable costs

Health insurance
Medical costs *(16)*
Health insurance (depending on the probability that the firm has health insurance) *(20)*
Out-of-pocket expenses *(20)*
Insurer's rating of the plan with regard to its experience with claims *(22)*

Short- and long-term disability insurance
Disability insurance (based on the probability that the firm has insurance) *(20)*
Weekly salary *(21)*
Fraction of the salary replaced *(20)*
Maximum number of short-term disability days *(20)*
Average number of short-term disability days *(23)*

Life insurance
Life insurance (based on the probability that the firm has insurance) *(20)*
Weekly salary *(21)*
Multiple of salary for benefits *(20)*
Insurer's rating of experience *(22)*

Recruiting, hiring, and training (turnover in personnel)
Weekly salary *(21)*
Fraction salary for hiring costs *(24)*

Pension plan effect
Pension plan (based on the probability that the firm has a pension plan) *(20)*
Percent of final year salary replaced *(20)*
Employment experience *(25)*

Partially measurable costs

Legal or administrative costs
Analyzing Federal and State legislation
Discrimination suits
Privacy suits
HIV testing

Prevention costs
Workplace policy development and implementation
Worksite education and information programs
Supervisor training

Nonmeasurable costs

Perception-based employment costs
Reduced productivity of coworkers of employees with infection
Business losses from customers' fears of infected employees

Care giver costs
Reduced productivity of employees caring for a person with AIDS

Nonmonetary costs
Loss of persons who make a unique contribution to the business
Change in strategy and approach of the business

NOTE: Italicized numbers cite references. HIV = human immunodeficiency virus. AIDS = acquired immunodeficiency syndrome.

that those costs will be borne entirely by the firm. However, only a portion of the direct and indirect costs of the epidemic is typically borne by business. Businesses also may incur costs that are not traditionally measured from the societal perspective.

The author has developed a framework for estimating the costs of the HIV epidemic that are likely to be borne by business. The framework is described and used to compare those costs with the traditional societal cost approach. Societal cost analysis is reviewed, and costs to business firms are defined and compared with societal costs. The measurement of the costs to business firms is discussed and issues associated with the different perspectives are summarized. The focus of this article is businesses that are not in the health care sector and do not routinely expose employees to HIV infection on the job.

Societal Costs

The costs to society of the epidemic include monetary and nonmonetary costs *(6–10)*. Monetary costs include direct and indirect costs. Direct costs are personal medical care costs (diagnosis and treatment) as well as nonpersonal costs for biomedical research and prevention programs (educational campaigns, blood screening, and outreach efforts). Indirect costs are the foregone earnings of affected persons from morbidity and mortality and the value of lost household services (household management, child care, and cooking) they would have provided. Nonmonetary costs, which are less well defined and more difficult to measure, are "the value that AIDS patients, their families and friends, and other members of society place on the suffering and death

of AIDS patients and on the need to behave differently to avoid contracting or transmitting AIDS'' *(6)*.

Direct costs. Most empirical studies of the epidemic have focused on monetary costs, with the greatest attention devoted to direct personal medical costs. Costs include those of hospitalization, inpatient and outpatient physician services, outpatient ancillary services, nursing home care, home care, hospice care, and drugs *(4, 11–16)*.

Estimates of the lifetime medical cost of treating a person with AIDS (PWA) and of the aggregate direct costs of the epidemic have been reported. The lifetime medical costs of treating a PWA have been estimated to range from $60,000 to more than $100,000. Hellinger's estimates of $75,000 in 1990, $85,000 in 1991, and $102,000 in 1992 included more detailed estimates of the costs of drugs and other new treatments than did earlier studies *(13–15)*. His 1993 estimate of $69,000 *(16)*, which was based on data in the AIDS Cost and Service Utilization Survey, resulted from lower estimates of both the average length of hospital stay and the frequency of hospitalization than were reported in earlier studies.

Hellinger *(15)* estimated the aggregate societal medical costs of treating PWAs to be $6.8 billion in 1992. Using his updated cost estimates *(16)* and the number of AIDS cases reported to the Centers for Disease Control and Prevention between July 1992 and June 1993 *(17)*, that figure would be $5.8 billion.

Indirect costs. Although the indirect costs of the epidemic were projected to be $55.6 billion in 1991 *(4)*, that estimate is outdated because it was based on epidemiologic and cost data from the early 1980s. There have been no comprehensive updates of those estimates to reflect recent changes in the natural history of the epidemic or new knowledge about employment patterns of PWAs. Using the $5.8 billion direct medical cost figure and the assumption that indirect costs are about four times the amount of the direct costs of the illness *(4)*, a rough estimate of indirect costs would be $23.2 billion in 1992. Indirect costs are dominated by the mortality costs or lost wages of young workers as a result of the prevalence of the illness among those in the 25—44-year age group.

Costs after infection and before AIDS diagnosis. All cost estimates in the two preceding sections apply only to those with diagnosed AIDS, the very late stage of HIV infection. Until recently, virtually nothing was known about costs associated with the estimated 1 million persons who are HIV seropositive, but not yet diagnosed with AIDS *(18)*. Those costs become increasingly significant as more people begin treatment with antiviral and other prophylactic drugs.

Building on the work of Arno and coworkers *(19)* and others, Hellinger estimated the annual cost of treating an HIV-infected person not diagnosed with AIDS to be $5,150 *(14)*. In 1992, he increased his estimate to $10,000, which is an average of $13,525 for those with CD4+ lymphocyte (T-cell) counts less than 200 and $6,444 for those with T-cell counts equal to or greater than 200 *(15)*. Hellinger's most recent estimate *(16)* of the cost of treating a person with HIV from the time of infection to diagnosis with AIDS is $50,174, or about $5,000 per year on average. That estimate assumes that a person is identified as HIV positive and treated immediately following infection; thus it is an upper-bound estimate.

Defining Costs to Business Firms

The epidemic has imposed costs on business firms that are measurable or partially measurable in dollar terms (see accompanying box); there are other costs that presently are not measurable. Measurable costs include those employment costs directly associated with the illness, such as recruiting, hiring, and training; health, disability, and life insurance; and pensions. Partially measurable costs are those legal or administrative costs associated with legislative, discrimination, and privacy issues and costs associated with prevention efforts, such as the costs of HIV education and policy development.

Perception-based employment costs resulting from fears and stigma surrounding the epidemic, care giver costs, and other nonmonetary costs have not been measured in dollar terms.

Illness-based employment costs. Illness-based employment costs to business of employees with HIV infection result from changes in health insurance; short- and long-term disability insurance; life insurance; recruiting, hiring, and training; and pension plans, an offset, or cost-savings (accompanying box). A firm's HIV-related health insurance costs are influenced by the number of infected employees, the costs of treatment, the nature and extent of the health benefits provided different types of employees, the health insurer's rating of the plan with regard to its degree of experience with the illness, the extent to which employees report medical claims to their insurer, and the reactions of insurers to the epidemic

(the use of HIV testing or the decision to exclude certain groups in the underwriting process). Medical providers, such as hospitals, may engage in cost shifting to maximize their reimbursement from different employer insurance plans and to cover the cost of uncompensated care. That can result in differential health insurance costs to large and small businesses.

Disability insurance costs are affected by the work history of HIV-infected employees and the amount of income replacement required for long-term disability policies for different types of employees. Life insurance costs are influenced by the amount of death benefits provided and by the insurer's rating of the plan regarding its degree of experience with the illness. Recruiting, hiring, and training costs depend upon the average cost of those activities and the average duration of employment among different types of employees. Pension plan offsets depend upon the amount of income replaced, the number of years for the average pension, the probability of an employee being vested, and the probability of an employee surviving to collect a pension.

The indirect costs to society, or the lost value of market and nonmarket output, are not out-of-pocket expenses incurred by employers. Assuming that employees can be replaced, illness-based employment costs are the major costs to employers of a worker with HIV infection.

The amounts of both business and societal costs result from the interplay of separate factors. The illnesses of older employees are likely to be more costly for employers, given the higher salaries and accrued benefits of those employees. However, the deaths of older employees will result in larger pension plan savings to employers, because of the larger benefits accrued by those employees and the shorter time until they begin receiving them. The costs of illnesses of young employees will be large from a societal perspective, because of the number of years over which lost future earnings will be distributed.

Information on employee benefits and the relevant labor market variables to calculate illness-based employment costs (accompanying box) has been provided by the Bureau of Labor Statistics *(20, 21)* and other studies *(22–25)*. Data on medical costs related to HIV infection have been reported *(16)*, as has relevant epidemiologic data *(26)*. Certain variables, such as the fraction of expenses not reported to an insurer, or the fraction of expenses not eligible for insurance coverage, may have to be derived from expert opinion. It may be possible also to examine only subsets of the entire range of issues. For example, cost estimates may be based on the assumption that an HIV-infected employee is already employed by a firm, in view of the lack of data on the number of cases of AIDS and HIV infection in different work settings.

Legal or administrative costs. In their effort to minimize the illness-related employment costs of employees with HIV infection, firms may have an incentive not to hire infected applicants and to determine who may be at risk. However, those decisions, which are constrained by Federal and State legislation, such as the Americans with Disabilities Act of 1990, and by possible discrimination or privacy suits, can result in legal or administrative costs to the firm (accompanying box).

When fully implemented, the Americans with Disabilities Act will prohibit employers with 15 or more employees from discriminating in their employment practices on the basis of an actual or perceived employee disability. AIDS and HIV infection are disabilities covered under that law. Firms should invest resources in analysis of that legislation. They should consider the consequences of noncompliance, such as the costs of lawsuits and negative publicity.

Testing for HIV infection as a condition of employment is specifically illegal in only 10 States, but it is effectively illegal in the 24 other States where discrimination on the basis of an employee's HIV status is prohibited. Firms subject to Federal law, such as those holding government contracts and grants, fall into this category. The Americans with Disabilities Act of 1990 contains an explicit prohibition on pre-employment medical screening *(27)*. Established public policy prohibits firms from using tests or trying to determine the risk or infection status of applicants. HIV testing of employees has been found not to be cost-beneficial for most firms, in view of the low probability of HIV infection in most workplaces *(27)*.

Prevention costs. HIV and AIDS prevention costs occur when employers develop policies regarding the treatment of employees with HIV infection or AIDS and undertake AIDS education and information programs to reduce the likelihood of infection and to minimize employee fears and disruptions in the workplace.

Decisions have to be made about the types of programs to be offered and the materials to be used, the length of the education efforts, the types of employees to include in the programs, and whether the programs will be provided by internal medical or human resources personnel or by external groups,

such as the Red Cross *(28)*. Costs are incurred both for education programs for the general employee population and for supervisor training programs that can help managers avoid situations leading to discrimination and privacy litigation.

Perception-based employment costs. Perception-based costs are those arising from the fears of coworkers and customers of associating with employees with HIV infection. The costs include reduced productivity, the disruptive behavior of employees who fear being associated with infected fellow workers, and business losses resulting from customers' fears of patronizing a firm with infected employees.

Care giver costs. The costs to business of employees providing care to HIV-infected persons include the reduced productivity of those employees. The costs incorporate lost hours of work, as well as reduced productivity from emotional stress. Although those costs have been recognized, but not measured for HIV infection, they have been analyzed for other illnesses *(29, 30)*.

Nonmonetary costs. Nonmonetary business costs involve the loss of those who make a unique contribution to a business, such as the founder, particularly creative or driving personalities within the firm, technical innovators, or other key persons. Their loss could result in a less dynamic or innovative operation. In certain sectors of the economy, such as the arts or fashion design, unique personal creativity and innovation are key characteristics and equivalent replacements for infected persons are unlikely. The impact of their loss is substantial in certain industries *(31)*, but cannot be measured adequately from either the societal or business perspective with existing data.

Measuring the Costs to Business Firms

Estimating the cost impact of HIV infection on businesses requires integrating different types of data. Epidemiologic, socioeconomic, employee benefit, and survey data are needed for companies of different sizes and different types of work forces. Existing evidence is sketchy, dated, and derived primarily from surveys, journalistic accounts, and descriptive research *(32–35)*.

The ability to generalize such results is limited, since the response rate for the surveys is low, and data from many firms are incomplete. Investigators in only a few studies have attempted to estimate the illness-based employment costs for HIV infection. Rigorous analyses of other categories of HIV-related business costs are almost nonexistent.

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Employment and insurance issues. The degree to which firms have been affected by employees with HIV infection is largely unknown. Twenty percent of the executives responding to the 1987 Business Response to AIDS Survey *(32)* reported HIV infection among their employees. Those companies that reported having an HIV-infected employee or employees were likely to be large, in the service sector, and in the western part of the country. In the 1987 Alexander and Alexander Survey *(33)*, slightly more than 10 percent of the responding employers indicated they had HIV-infected employees. However, both surveys had very low response rates, 26 and 18 percent. More than 70 percent of the respondents in the second survey did not know whether their company had employees with HIV infection.

Greenberg conducted a nonrandom telephone survey of five Blue Cross-Blue Shield firms, five health maintenance organizations (HMO), five commercial insurers, and five private employers *(34)*. Those organizations were selected from firms in the four States that had the largest number of AIDS cases in 1987. The organizations reported only a limited number of AIDS cases relative to their total enrollment or employment. The number of AIDS cases in 1987 reported by insurers and HMOs ranged from none to about 500. However, the number was unknown for five of those organizations (one-third of the total sample). For the 5 employers, the number of AIDS cases per firm was not more than 20. The number of cases for the largest employer (299,599 employees) was not known.

The American Council of Life Insurance and the Health Insurance Association of America *(35)* have studied AIDS-related claims in life, accident, and health insurance since 1986. The claims totalled $1.3 billion in 1991, 11.54 percent higher than in 1990.

However, that survey did not include payments made directly to employees of self-insured companies or claims paid by Blue Cross-Blue Shield plans. The figures in those surveys were probably underestimations reflecting reporting inaccuracies on death certificates as well as on filed claims.

Illness-based employment costs. Bloom and Glied *(27)* provided the first estimates of the HIV illness-based employment costs for a representative large (1,000 employees) and small (50 employees) firm in a high (New York) and low (San Francisco) cost of treatment city as part of their study of the costs and benefits of HIV testing from the business firm perspective.

Their estimates of the expected costs to a firm of hiring an HIV-infected person are, for a small firm, $2,300 in a low-cost city and $4,400 in a high-cost city; the estimated costs for a large firm are $20,600 in a low-cost city and $31,800 in a high-cost city (all in 1987 dollars). The cost differences between small and large firms result primarily from differences in employee benefit packages among the firms.

Farnham and Gorsky *(36, 37)* developed a conceptual framework for analyzing the incremental illness-based costs of having an HIV-infected employee. The framework combines detailed epidemiologic, medical, insurance, and behavioral assumptions. The model can be used in calculating the expected costs to a firm and in investigating the sensitivity of the cost estimates to changes in various parameters of the model.

Very little is known about the employment history and work patterns of HIV-infected persons. The information is needed to improve estimates of both the indirect societal costs of the HIV epidemic and its illness-based employment costs. In calculating the wages lost by persons who are unable to work, Scitovsky and Rice *(4)* applied average earnings by age and sex to work loss years for those currently employed and made arbitrary assumptions about worker disability rates.

Only Yelin and coworkers *(38)* have provided more detailed results on AIDS patients' employment patterns. Those results were derived from a sample of 193 persons with symptoms of HIV-related illness attending the AIDS clinic at the University of California, San Francisco, in 1988–89. Those in the sample were predominantly white, homosexual men with an average age of 38 years. Although they had lost substantial work time, only 14 percent of those with AIDS had stopped work prior to their diagnosis. Sixty percent were working 1 year later.

A commonly held opinion is that injecting drug users usually are not employed. They represent 24 percent of all AIDS cases reported through June 1993 and 26 percent of cases reported in the 12-month period from July 1992 through June 1993 *(17)*. That opinion has been questioned by the findings of a District of Columbia study that many street-level drug dealers hold legitimate jobs *(39)*. The subjects were 18–40 years of age, on probation, and had obtained income from selling drugs in the 6 months before entering probation. Of them, 64 percent were employed at a legitimate job; 60 percent reported working 5 or more days a week. The illness-based costs to business of this behavior would depend upon the extent of employee benefits in their occupations.

Perception-based employment costs. Workers' knowledge, attitudes, and behavior regarding persons with HIV infection or AIDS have a major impact on perception-based employment costs. Employee protests have occurred, such as New England Bell Telephone employees walking off the job before television cameras in protest against working with a coworker with AIDS *(40)*. Numerous surveys in the past 5 years have indicated the substantial concern of many employees about AIDS and related work place issues *(41–44)*.

An October 1992 national survey showed that 50 percent of employees cited AIDS as their chief health concern *(45)*. The data indicate that perception-based employment costs may be substantial, although there are no estimates of their magnitude. Those costs are likely to differ by type of workplace. Many of the existing surveys of employee attitudes and behaviors regarding HIV infection and AIDS have provided little information about the nature of employment or have been limited in the range of workplaces examined. Surveys based on national random samples of employers and employees need to be undertaken to provide rigorous, indepth analyses of those issues.

One source for future work is the National Center for Health Statistics' National Health Interview Survey (NHIS) AIDS Supplement *(46)*. NHIS is a national multistage probability survey of households in the United States. The survey uses an extensive set of questions that are asked of each member of a sampled household. Since 1987, one adult 18 years of age or older has been randomly selected from each household to complete the AIDS supplement, which has questions on self-assessed knowledge about AIDS, attitudes about the likelihood of contracting AIDS by working near a person with the illness, self-assessed risk of getting HIV infection or AIDS, and the likelihood of having a coworker or friend with HIV or AIDS. Variations in the responses of

employees in different industries could be explored to provide further insights on how knowledge, attitudes, and perceived risk regarding HIV infection or AIDS may influence productivity among employees in different types of businesses.

Prevention costs. Little research has been undertaken regarding the costs and effectiveness of HIV infection prevention efforts or AIDS education interventions in the workplace. The first step would be to inventory existing worksite programs to provide a typology of programs useful for analysis. Cost data can be collected for alternative types of programs through surveys or direct interviews. Although there are little data on the costs and outcomes of HIV infection prevention and AIDS worksite programs, research can rely on the frameworks and analyses of programs in the areas of smoking cessation, medical screening, and physical fitness *(24, 47, 48)*.

Summary

The subject of the costs of the HIV epidemic for business firms has been neglected by researchers. Most studies have focused on the costs to society in general, which are different from those imposed upon business, since business firms bear only a portion of the societal costs. Businesses also may incur costs that typically are not measured from the societal perspective. The magnitude of the costs to business firms will have a significant influence on how the business sector responds to the epidemic, both in terms of negative factors, such as discrimination and potential lawsuits, and positive factors, such as involvement with information and education programs and community service.

Some costs to business firms can be reduced by incurring expenditures in other categories. For example, firms may reduce their legal or administrative costs and their perception-based employment costs by incurring prevention costs. Prevention efforts include developing workplace policies, educating supervisors and other employees, and initiating activities that can reduce fears and disruptions in the workplace.

Illness-based employment costs associated with an HIV-infected worker may exist even in the absence of any costs arising from fears and stigma in the workplace. However, illness-based costs are likely to be less than costs measured from the societal perspective. Moreover, a business will benefit from keeping an HIV-infected employee on the job as long as possible, particularly in terms of the skills and productivity that employee brings to the job.

Relatively little is known about many of the factors influencing the different categories of business costs. Although several studies have provided data on the illness-based employment costs of the epidemic, more analyses are needed of prevalences in different types of workplaces; factors influencing employee knowledge, attitudes, and behaviors toward coworkers with HIV infection; and employee responses to workplace education programs.

The factors influencing employer responses to the epidemic, in terms of workplace policies, employee education programs, and reactions to antidiscrimination legislation, such as the Americans With Disabilities Act, need to be analyzed in more depth. Future surveys of both employers and employees must be conducted on a more scientifically sound basis than in the past. With increased information about the costs and impacts of the epidemic, business firms will be able to develop more rational, informed, and compassionate policies toward employees with HIV infection, a factor that will become increasingly important in the second decade of the epidemic.

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