COMMENTS

An Economic Analysis of Liability for AIDS-Contaminated Blood Products*

The occurrence of acquired immunodeficiency syndrome (AIDS) in America has raised difficult new questions in the fields of medicine, religion, and ethics. AIDS has invaded the bedroom, the boardroom, and the hospital room—in the latter case in the form of contaminated blood products. The law has dealt with this challenge by relying on liability doctrines developed to deal with the threat of other blood-borne diseases such as hepatitis. But because AIDS and hepatitis differ markedly in their communicability, preventability, duration, and severity, reliance on those doctrines is ill-advised.

The purpose of this Comment is to develop an economic analysis of possible blood products liability rules in order to determine what the effects of such rules are on blood users and providers. To the extent that current liability rules fail to promote an efficient allocation of risks and resources, this Comment will propose changes designed to correct such deficiencies.

The economic analysis of liability rules relating to blood products contamination requires an understanding of the nature of the risks posed by AIDS and of the precautions that blood providers and blood users may take to avoid those risks.

AIDS¹ destroys the body's ability to fight infections, and thus leaves its victim vulnerable to a host of opportunistic dis-

[•] The author wishes to thank Professor Thomas J. Holdych, Professor of Law, University of Puget Sound School of Law, and Professor Bruce Mann, Professor of Economics, University of Puget Sound, for their helpful comments and advice. However, the author retains exclusive responsibility for the substantive accuracy of this Comment.

^{1.} AIDS has been defined as "a disease, at least moderately predictive of a defect in cell-mediated immunity, occurring in a person with no known cause for diminished resistance to that disease." Miller, *Potential Liability for Transfusion Associated AIDS*, 253 J. A.M.A. 3419 (1985) [hereinafter Miller] (quoting Update on Acquired

eases.² AIDS is nearly always fatal. As of May, 1984, nearly half of all persons diagnosed as having AIDS had died from the disease.³

A wealth of information has been developed about the methods of transmission of the disease since it was first reported in the United States in June, 1981.⁴ Although not conclusively proved, AIDS is thought to be transmitted by a virus known as human t-cell leukemia virus III.⁵ The most common means of transmission of the virus are blood-to-blood contact through the use of contaminated hypodermic needles, and homosexual or heterosexual intercourse.⁶ AIDS can also be communicated to hemophiliacs through the injection of contaminated clotting agents made from blood⁷ and by the transfusion of other AIDS-contaminated blood and blood products.⁸

It is not known how many of those persons infected with HIV will develop the AIDS complex, although the conversion rate is now thought to be much higher than the twenty percent rate originally estimated.⁹ The minimum dose of the virus needed to cause infection is also unknown.¹⁰

The long incubation period of HIV has hampered efforts to calculate the extent of the spread of AIDS. The median incu-

4. Curran, Acquired Immunodeficiency Syndrome (AIDS) Associated with Transfusions, 310 NEW ENG. J. MED. 69, 71 (1984) [hereinafter Curran].

5. Other related viruses are suspected as well. For simplicity, they will hereafter be collectively referred to as human immunodeficiency viruses (HIV). Marx, *supra* note 3, at 475.

6. Curran, supra note 4, at 69.

7. Id.; Miller, supra note 1, at 3419.

8. Friedland & Klein, Transmission of the Human Immunodeficiency Virus, 317 NEW ENG. J. MED. 1125 (1987) [hereinafter Friedland & Klein].

9. Prevention and Control of Acquired Immunodeficiency Syndrome, 258 J. A.M.A. 2097, 2097 (1987) [hereinafter Trustee's Report]. The extent of the spread of AIDS is difficult to estimate. As of October, 1987, 1.5 million Americans had been infected with HIV and 35,000 people had developed AIDS, of whom 20,000 had died. Id. The number of AIDS cases is steadily growing, doubling every six months. Check, supra note 2, at 568. It is estimated that by 1991, over 300,000 people will have contracted AIDS and 200,000 people will have died from it. Trustee's Report, supra at 258.

10. Friedland & Klein, supra note 8, at 1126.

Immune Deficiency Syndrome (AIDS) — United States, 31 MORBIDITY & MORTALITY WEEKLY REP. 507 (1982)).

^{2.} These diseases include Kaposi's sarcoma and other forms of cancer, *pneumocystis carinii* pneumonia, herpes viruses, and various fungi. AIDS patients usually suffer from a combination of these diseases. Check, *Preventing AIDS Transmission: Should Blood Donors Be Screened?*, 249 J. A.M.A. 567, 568 (1983) [hereinafter Check].

^{3.} Marx, Strong New Candidate for AIDS Agent, 224 SCI. 475 (1984) [hereinafter Marx].

bation period of HIV is estimated to be 4.5 years.¹¹ During the incubation period, an AIDS victim may have no apparent symptoms.¹² It also appears that HIV antibodies, the presence or absence of which is used as a test for AIDS, may not appear for some time after infection has occurred.¹³

The spread of AIDS has been geographically concentrated. Although AIDS cases have been reported in forty-seven states, Washington D.C., Puerto Rico, and thirty-six foreign countries, eighty percent of all cases reported as of June, 1985 had occurred in six metropolitan areas, principally New York City.¹⁴ Seventeen percent of AIDS cases occurred among intravenous drug users. Eighty-two percent of these cases occurred in New York City.¹⁵

Much progress has been made in developing precautionary medical procedures to safeguard the general population from accidental AIDS infection by the transfusion or use of blood and blood products.

Currently, transfusion-related AIDS is prevented by heattreating blood products, by deferring donations of blood by members of high-risk groups, and by testing¹⁶ donated blood for the presence of HIV antibodies.¹⁷ These measures have been credited with reducing the risk of transfusion-related AIDS infection to an extremely low level, currently estimated to be between 1 in 100,000 and 1 in 1,000,000.¹⁸ In 1986, the present value of direct and indirect losses caused by AIDS was \$275,890/individual/year, and is expected to increase to \$384,629/individual/year by 1991.¹⁹ For the purposes of this

16. Although it was recognized early in 1983 that those persons at high risk for AIDS were also likely to belong to the same groups as those at high risk for hepatitis B, and could thus be detected by the use of the hepatitis B test, widespread testing was not advocated at that time. Check, *supra* note 2, at 570. The cost of such widespread testing was a major factor in this decision. It was then estimated to cost between \$5 million and \$100 million. *Id*. The test also failed to register positive in approximately 10% of the cases in which it was administered to those known to have AIDS. *Id*.

17. Human Immunodeficiency Virus Infection in Transfusion Recipients and Their Family Members, 257 J. A.M.A. 1860, 1860 (1987) [hereinafter HIV Infection in Transfusion Recipients].

18. Friedland & Klein, supra note 8, at 1126.

19. Scitovsky & Rice, Estimates of the Direct and Indirect Costs of Acquired Immunodeficiency Syndrome in the United States, 1985, 1986, and 1991, 102 PUB. HEALTH REP. 5, 7 (1987) [hereinafter Scitovsky & Rice].

1988]

^{11.} Id. at 1125.

^{12.} Curran, supra note 4, at 73.

^{13.} ULENE, SAFE SEX IN A DANGEROUS WORLD 12 (1987) [hereinafter ULENE].

^{14.} Friedland & Klein, supra note 8, at 1127.

^{15.} Id.

Comment, these rough probability and loss estimates will be multiplied to produce an approximation of the present expected value of the risk of receiving HIV-contaminated blood equal to \$1.82 per unit of transfused blood.²⁰

It is estimated that 600 persons were infected with HIV by transfusion during a period in which 60,000,000 units of blood were transfused. Of this infected group, all but one or two received transfusions before widespread blood testing was commenced in early $1985.^{21}$

The current test for HIV antibodies is not fail-safe;²² it does not detect those persons who, though infected with HIV, have not yet developed HIV antibodies. These antibodies may not develop until after one is infectious.²³ At least one case of HIV infection has been traced to donated blood that tested negative for HIV.²⁴ The virtual cessation of transfusion-related AIDS since the commencement of testing suggests, however, that such cases are exceedingly rare.²⁵

I. WHO ARE THE VICTIMS?

The victims of blood-related AIDS infection can be roughly divided into three groups. The first group of victims is comprised of hemophiliacs. Hemophilia is a hereditary disease that causes its victims to bleed excessively.²⁶ Hemostatic integ-

22. Nor is it cheap. Although the initial personal screening test costs about \$6.50 wholesale, patients wishing to know their immune status will pay between \$20 and \$150, depending on the geographic location. ULENE, *supra* note 13, at 77.

23. Miller, supra note 1, at 3422.

24. Transfusion-Associated Human T-Lymphotropic Virus Type III/ Lymphadenopathy-Associated Virus Infection from a Seronegative Donor-Colorado, 35 MORBIDITY & MORTALITY WEEKLY REP. 389-91 (1986), reprinted in REPORTS ON AIDS: JUNE 1986-MAY 1987, 2 MORBIDITY & MORTALITY WEEKLY REP. 3 (1987) [hereinafter Transfusion].

25. Further, the absolute number of donated units of blood that tested positive for HIV is small, and is declining. Of all units tested in the U.S. in 1985, 0.04% tested positive for HIV. By 1986, the number had dropped to 0.02%. *Id.*

26. Such bleeding is caused by a deficiency of the antihemophilic factor (factor VIII in classic hemophilia or factor IX in hemophilia B), usually present in the blood in trace amounts and necessary for the formation of blood clots. The spectrum of disability caused by hemophilia runs from those who bleed excessively only after a major injury to the circulatory system and who may lead normal lives, to those who

^{20.} This figure was arrived at by averaging the projected costs for 1986 and 1988, and multiplying that figure by an average of the low and high estimates of the probability of contamination. Thus, $((\$275,\$90.00 + \$384,629.00)/2) \times ((1/100,000 + 1/1,000,000)/2) = \1.82 .

^{21.} Mayer, The Community: Still the Best Supply of Blood, HASTINGS CENTER REP., Apr., 1987 at 5 [hereinafter Mayer]; HIV Infection in Transfusion Recipients, supra note 17, at 1860.

rity of the blood may be achieved for several hours by the injection of potent concentrates of antihemophilic factor VIII (factor VIII), which is made from the blood plasma of donors.²⁷ This injection is usually accomplished by the patient himself, with factor VIII being provided by prescription on an outpatient basis.²⁸

Factor VIII is made in two ways.²⁹ The method most commonly employed by commercial plasmapheresis centers, which produce eighty percent of the clotting agent used,³⁰ involves the pooling of the blood of between 5,000 and 50,000 paid donors.³¹ This pooling method creates a high risk of contamination, since the entire batch may be contaminated by one infected donor. Each batch of clotting factor is then distributed to 100 hemophiliacs.³² Risk of exposure is further heightened by the fact that a hemophiliac may be exposed to several batches of factor VIII over the course of a few years.³³

The second method of production is the cryoprecipitate process. In this process, only one donor's blood is used to create a particular batch of factor VIII.³⁴ Thus, the risk of infection from a particular batch of cryoprecipitated factor VIII is several hundred times lower than the risk presented by pooled factor VIII. The cryoprecipitate method is primarily used by blood banks and hospitals.³⁵

The second group of victims is comprised of elective donees. As defined in this Comment, elective donees are those who receive whole blood or blood components as part of elective medical treatment, usually surgery. Elective donees differ from other transfusion-related AIDS victims in that their exposure to blood products is, by definition, completely voluntary.

The third group of victims of transfusion-related AIDS is

35. Id.

suffer crippling deformities due to internal bleeding in the joints. 6 McGraw-Hill Encyclopedia of Science and Technology 554 (1982).

^{27.} Id.

^{28.} Miller, supra note 1, at 3423.

^{29.} Hepatitis, AIDS and the Blood Product Exemption from Strict Products Liability in California: A Reassessment, 37 HASTINGS L.J. 1101, 1116 (1986) [hereinafter Blood Product Exemption].

^{30.} Check, supra note 2, at 567.

^{31.} Blood Product Exemption, supra note 29, at 1125 n.169.

^{32.} Check, supra note 2, at 568; Marx, supra note 3, at 475.

^{33.} Check, supra note 2, at 568.

^{34.} Blood Product Exemption, supra note 29, at 1126.

comprised of emergency donees. As defined in this Comment, emergency donees are those persons who need blood transfusions on an emergency basis but who, because of the emergent nature of their need, are unsuitable candidates for autologous transfusions. Emergency donees are likely to use the same type of whole blood products as elective donees, since both are administered to replace blood lost either through surgery or trauma.

Hemophiliacs, elective donees, and emergency donees differ markedly in their ability to avoid the risk of AIDS-contamblood products. significant percentage inated Α of hemophiliacs can successfully substitute cryoprecipitated factor VIII for factor VIII mass-produced by the pooling method,³⁶ reducing their exposure to HIV infection. However, cryoprecipitated factor VIII has several drawbacks. It is not as convenient as mass-produced factor VIII, which is freeze dried and requires no special refrigeration to store.³⁷ Cryoprecipitated factor VIII is also not as effective as freeze dried concentrate in treating severe hemophilia. Further, because pooling allows factor VIII to be mass-produced, it is likely to be less costly than cryoprecipitated factor VIII, which is produced in single lots.

Furthermore, substituting cryoprecipitated factor VIII for freeze dried factor VIII may no longer be cost effective as a preventive measure. As stated above, the heat disinfection of blood products has reduced the risk of AIDS infection to virtually zero. Although there is a .02 percent chance of contracting HIV through the use of heat treated factor VIII made from the blood of unscreened donors, there have been no documented cases of infection from factor VIII when both screening tests and heat treatment are used.³⁸ Because blood screening tests and heat disinfection are both used by all U.S. producers,³⁹ the risk of HIV infection and the need for substitutes are negligible.

Elective donees may take a number of precautionary measures to avoid exposure to HIV. They can abstain from

^{36.} Blood Product Exemption, supra note 29, at 1127 n.180.

^{37.} Id. at 1126.

^{38.} Survey of Non-U.S. Hemophilia Treatment Centers for HIV Seroconversions Following Therapy With Heat-Treated Factor Concentrates, 36 MORBIDITY AND MORTALITY WEEKLY REP. 121, 123 (1987) [hereinafter Survey of Non-U.S. Hemophilia Treatment Centers].

^{39.} See id. at 123.

surgery, they can use blood donated by persons known to them, or they can use their own blood during surgery through the process of autologous transfusion. Whether elective donees *should* take such precautions depends on whether the expected value of the risk of infection is high enough to warrant the costs attending such precautions.

Abstaining from surgery in order to avoid blood transfusion absolutely prevents the possibility of contracting AIDS from transfused blood. However, this may not be an efficient precautionary measure. Although not the subject of documented studies, it is logical to assume that, for many people, the benefits of a proposed surgical treatment far outweigh the slight risk of contracting AIDS through transfused blood, valued above at \$1.82 per unit.⁴⁰

It is unclear whether directed donation is a cost effective method of preventing HIV infection through elective blood use. Directed donations are those that an elective donee solicits from donors whom he knows personally. The rationale behind directed donation is that pre-selected donors will be less likely to be infected with HIV and more likely to disclose such infection if they are infected.⁴¹ Both issues are currently debated in the medical profession.⁴²

42. Compare, Mayer, supra note 21 with Goldfinger, supra note 41. Proponents of directed donation argue that potential donees can select donors who are at low risk of having AIDS, such as their own parents, siblings, and pre-sexual teenagers. Goldfinger, supra note 41, at 7-8. They also argue that, unlike paid donors, preselected donors will have an incentive to disclose an abnormal risk of HIV infection because they know the recipient. Id. at 7.

Opponents of directed donation, most notably the American Red Cross and the American Association of Blood Banks, have stated that directed donation is not in the best interest of the patient. *Id.* They argue that directed donation is not safer than anonymous volunteer donation. *Id.* They agree with proponents of directed donation that volunteer donors are more likely to be repeat donors, and thus more likely to have been previously screened for HIV. Mayer, *supra* note 21, at 6. They contend, however, that directed donors will be unlikely to disclose their potential exposure to HIV because of the stigma of membership in high risk groups such as homosexuals and intravenous drug users. *Id.* They support this contention with the report of a directed donor who intentionally donated blood, even though he knew he was infected with HIV. *Id.* Because volunteer donors are more likely than directed donors to have been previously screened for HIV, and thus eliminated from the test pool, the fact that

^{40.} See supra note 20 and related text.

^{41.} Further, because they are not paid for their blood, they have no economic incentive to lie about their potential exposure to HIV, unlike those who sell their blood out of necessity. A study completed at Cedars-Sinai Hospital indicates that there is no statistically significant difference in the occurrence of HIV infection in directed donors versus randomly selected volunteer donors. Goldfinger, *The Case for Directed Donations*, HASTINGS CENTER REP., Apr., 1987 at 8 [hereinafter Goldfinger].

[Vol. 12:75

Autologous transfusion, usually involving the pre-deposit of the patient's own blood for use during surgery, is a much less controversial alternative to directed donation, and is considered safe and effective.⁴³ Autologous blood transfusion cannot spread infection and eliminates all risk of adverse reactions to blood donated by others.⁴⁴ Although it is the safest source of transfusible blood, autologous transfusion is not currently used in every case in which it is a medically possible alternative to volunteer donations.⁴⁵

Besides being safe, autologous transfusion may be cost effective. Ten of eighteen blood centers studied did not charge their patients more for autologous transfusions than for other transfusions.⁴⁶ Five charged more for autologous transfusions, citing the need to recoup added costs of shipping and handling.⁴⁷ Three charged less on the basis of reduced donor recruitment costs.⁴⁸ Indirect costs to the patient include deferring surgery until such time as pre-deposit is completed, as well as the expense incurred by the patient in travelling to the donation site and the physical discomfort of giving blood.⁴⁹ However, there is no indication that these costs would be systematically greater for autologous blood donors than for volunteers.⁵⁰ Such a determination would likely depend on the facts

directed donors did not have a higher incidence of HIV infection than public volunteers has been interpreted as demonstrating that directed donors are, as a class, less likely to be infected with HIV. Goldfinger, *supra* note 41, at 8.

43. Mayer, supra note 21, at 7.

44. Toy, Predeposited Autologous Blood for Elective Surgery, 316 NEW ENG. J. MED. 517 (1987) [hereinafter Toy].

45. Id.

49. Id. at 519.

50. Opponents of directed donation argue that giving patients the option to request directed donation may have adverse effects on both the patient and the community blood supply. Patients who cannot immediately find directed donors may postpone needed treatment until such donors are found, thereby endangering the patient's health. Reiss & Pindyck, *Reconciling Patients' Wishes with the Public Good*, HALTINGS CENTER REP. Apr., 1987, at 9. Proponents counter that, unless given the right to use pre-selected donors, patients may forego needed treatment. *Id.* Opponents also fear that directed donors an incentive to withhold their blood supply by giving potential volunteer donors an incentive to withhold their blood in anticipation of being called to donate specifically for a friend or relative. Mayer, *supra* note 21, at 6. Proponents counter that interviews with directed donors have indicated that not only are directed donors unlikely to withhold blood, but they are actually likely to begin to donate blood voluntarily, thus reducing recruitment costs to blood banks while increasing the community blood supply.

^{46.} Id. at 518.

^{47.} Id.

^{48.} Id.

of individual cases.

Autologous transfusion may create external benefits for the community blood supply. One authority has estimated that autologous pre-deposit of blood could reduce the demands of elective donees upon the community blood supply by ten percent.⁵¹ This may be especially important in light of new regulations regarding the screening of blood for hepatitis, which may reduce the blood supply by as much as seven percent.⁵² This decrease in the demand of elective donees would make more blood available to other users unable to pre-donate.⁵³ Allowing autologous donees to pay the same price for blood as those receiving volunteer donations may be a legitimate means of allowing autologous donees to capture some of the external benefit that they bestow upon other donees.

Emergency donees can take few cost effective measures to prevent the risk of transfusion-related AIDS. Persons engaged in high risk employment or high risk recreational activities could decrease their participation in those activities, and thus decrease their chances of requiring emergency blood transfusions. But given the current slight risk of transfusion-related AIDS, it is unlikely that such a decrease in employment or recreation would prove to be a cost effective precaution. It seems even less likely that persons engaged in activities that entail a slight risk of serious injury, such as driving a car, would be willing to forego those activities in order to gain a marginal increase in safety.

Aside from the ability to avoid the risk of AIDS, the three groups of victims differ in their ability to insure against the costs of the disease if it does strike. Thus, the efficiency of providing insurance for these groups by imposing strict liability⁵⁴ differs as well. Because elective and emergency donees are not demographically distinct groups, insurers are unlikely to classify them as a separate risk pool. Their ability to procure firstparty insurance should, therefore, be unaffected by the risk of transfusion-related AIDS. The following discussion of insurability will therefore deal only with hemophiliacs.

The insurability⁵⁵ of a risk varies with the randomness of

^{51.} Toy, supra note 44, at 519.

^{52.} Surgenor, The Patient's Blood is the Safest Blood, 316 NEW ENG. J. MED. 542 (1987).

^{53.} Toy, supra note 44, at 519.

^{54.} See infra text accompanying notes 100-105.

^{55.} The following discussion is based upon Hammond & Shapiro, AIDS and the

its occurrence: the more random the risk, the more likely that it will be underwritten.⁵⁶ In the case of hemophiliacs, the chance of infection by contaminated clotting factor has gone from nearly one (represented by a ninety-two percent infection rate before widespread blood screening and heat disinfection) to nearly zero.⁵⁷ The randomness of the risk of infection to those hemophiliacs not yet infected is therefore similar to the risk facing the general population and favors insurability.

Insurability also increases as uncertainty of the likelihood or magnitude of a loss decreases.⁵⁸ Because of the great public interest in AIDS, and the passage of almost seven years since AIDS was first reported in the United States, the risk to hemophiliacs of infection through blood products has been regularly documented by the Centers for Disease Control, and has been the subject of numerous studies.⁵⁹ The cost of AIDS claims has also been established by the medical community.⁶⁰ Although uncertainty as to both the occurrence of HIV infection and the cost of the disease remains, such uncertainty may now be reduced to a manageable level.

The price of insuring a risk directly affects an insurer's ability to underwrite that risk.⁶¹ If insurance premiums are too high, they may be unaffordable to the people who need coverage for the risk. When an insurer calculates a premium, he must charge an amount over the expected value of the risk in order to provide for the contingency of unexpectedly high adverse claim results.⁶² When the probability or magnitude of loss is uncertain, the contingency load must be high, and may make the total premium unaffordable.⁶³

In the case of hemophiliacs, the present risk of HIV infection through factor VIII use is very low. Furthermore, a significant amount of information is available regarding the

Limits of Insurability, 64 MILBANK Q. 143 (Supp. I 1986) [hereinafter Hammond & Shapiro].

57. Survey of Non-U.S.'Hemophilia Treatment Centers, supra note 38, at 121, 123.

58. Hammond & Shapiro, supra note 55, at 146-47.

59. E.g., Surveillance of Hemophilia-Associated Acquired Immunodeficiency Syndrome, 256 J. A.M.A. 3205 (1986). Jason, HTLV-III/LAV Antibody and Immune Status of Household Contacts and Sexual Partners of Persons with Hemophilia, 255 J. A.M.A. 212 (1986).

60. Scitovsky & Rice, supra note 19.

61. Hammond & Shapiro, supra note 55, at 145.

- 62. Id. at 147-48.
- 63. Id.

^{56.} Id. at 145-56.

potential cost of an AIDS claim. Thus, the contingency load reflecting the relative uncertainty of these factors should not be significantly higher than that charged to insure hemophiliacs before the onslaught of AIDS.

Moral hazard also affects the ability to insure a risk. If, because he is insured, a person is motivated to take significantly less precaution against a risk, or fails to minimize damages once an insured event occurs, moral hazard is present.⁶⁴

Information asymmetry and the adverse selection that may result from this asymmetry may increase moral hazard and are potential obstacles to the insurability of all AIDS victims. Because the HIV antibody test is available to the general public, a person who believes himself at risk for HIV infection may undergo voluntary testing to determine whether he, in fact, has the disease. If insurers are legally barred from using the same test to screen policy applicants, those applicants will be able to insure themselves against a risk that they already know has matured; this causes a chronic adverse selection problem.⁶⁵

If insurers are barred from using the HIV screening test, they will likely turn to other means of avoiding adverse selection, such as the use of demographic proxies (e.g., sex, geographic location, and marital status).⁶⁶ Using such proxies to combat adverse selection, however, would cause needless uncertainty, increasing the contingency load of insurance premiums and, therefore, the total cost of the premium.

Hemophiliacs can do little, if anything, to increase their exposure to HIV through blood products.⁶⁷ Further, the chance that hemophiliacs will recklessly engage the risk against which they are insured is lessened by the fact that AIDS is a fatal disease. Although it is possible that hemophiliacs who are insured may consume more health care than they would if not insured, this threat is no different than that posed by insurance against other terminal illnesses.⁶⁸

^{64.} Id.

^{65.} Id. at 151.

^{66.} Id. at 149-50.

^{67.} Although foreign factor producers may not screen blood used, the increased risk as opposed to American products, which are both screened and heat treated, is not statistically significant. Survey of Non-U.S. Hemophilia Treatment Centers, supra note 38, at 121-24.

^{68.} Hammond & Shapiro, supra note 55, at 148.

Thus, moral hazard does not pose an obstacle to the insurability of hemophiliacs.

In sum, the problems of randomness, uncertainty, high contingency loading, moral hazard, and adverse selection, which have been cited as obstacles to the insurance of homosexuals against AIDS, do not present serious problems for the insurance of hemophiliacs. This is especially true when insurers are allowed to use relatively accurate HIV screening tests to prevent adverse selection.

II. WHO ARE THE PROVIDERS OF BLOOD AND BLOOD PRODUCTS?

Just as the users of blood products can be grouped according to their relative abilities to avoid the risk of receiving contaminated blood products, blood providers can also be grouped according to their ability to avoid manufacturing or providing contaminated products.

Hospitals comprise the first group of producers. It is assumed that hospitals and similar medical facilities are responsible for the majority of blood transfused in the United States. Such transfusions are usually incidental to the provision of more comprehensive medical treatment. Hospitals also produce factor VIII, using the cryoprecipitate method. Hospitals do not use paid donors as a source of blood for either transfusions or factor VIII production.⁶⁹ The close nature of hospital contact with patients allows hospitals to administer more precisely a program of autologous transfusion than can blood banks.⁷⁰

Blood banks comprise a second group of producers. Blood banks do not administer blood transfusions. Their roles are limited to the collection of whole blood and blood components, and to the cryoprecipitate production of factor VIII.⁷¹ Blood banks do not use paid donors.⁷² Unlike hospitals, blood banks do not deal directly with patients and have no ability to weigh the relative benefits and costs of transfusion to particular patients. Blood banks are in a superior position, however, to

^{69.} Blood Product Exemption, supra note 29, at 1126.

^{70.} Goldfinger, supra note 41, at 8.

^{71.} Office of Technology Assessment, U.S. Congress, Blood Policy and Technology 4 (1985) [hereinafter BLOOD POLICY].

^{72.} Blood Product Exemption, supra note 29, at 1126; cf. CAL. HEALTH & SAFETY CODE § 1626 (West 1979).

judge the suitability of prospective donors and to assure that candidates belonging to groups at high risk of HIV infection do not donate blood. Like hospitals, blood banks have a relatively large base of ultimate consumers over which they can spread losses caused by HIV infected blood.⁷³

Commercial blood products manufacturers comprise the third group of producers. Commercial manufacturers differ from hospitals and blood banks in both their total share of the factor VIII market and in the methods that they employ in the production of factor VIII. While hospitals and blood banks both use the cryoprecipitate method of production, blood products manufacturers pool the blood of up to 50,000 donors to make factor VIII.⁷⁴ Blood products manufacturers also differ from hospitals and blood banks in that they rely on paid donors for their blood supply.⁷⁵ Like blood banks, commercial manufacturers are easily able to screen potential donors through the use of blood screening tests and questionnaires, and by keeping records of those individuals whose blood has tested positive for HIV after previous donations.

III. LIABILITY RULES AND THEIR ECONOMIC EFFECTS

A. No Liability

Those who adhere to the popular modern sentiment that "someone should pay" when a person has been injured would likely vehemently resist a rule that allowed blood products manufacturers to completely escape liability for AIDS infection caused by their products. Ironically, although no jurisdiction has established absolute immunity for blood-related AIDS transmission, a rule of no liability may be precisely the practical result of developments in the theories of strict liability and negligence in this context.

B. Negligence

Judge Learned Hand implicitly recognized the economic underpinnings of negligence law in *United States v. Carroll Towing Co.*,⁷⁶: "in algebraic terms[,]⁷⁷ if the probability [of an

^{73.} The number of transfusions is great. Between 1981 and 1985, over 60,000,000 units of blood were transfused. Mayer, *supra* note 21, at 5.

^{74.} Blood Product Exemption, supra note 29, at 1125 n.169.

^{75.} Id. at 1116.

^{76. 159} F.2d 169, reh'g denied, 160 F.2d 482 (2d. Cir. 1947).

^{77.} The orthodox, non-mathematical formulation of negligence is generally

injury occurring] be called P; the injury L; and the burden [of taking precautions against the injury] B; liability depends upon whether B is less than L multiplied by P; i.e., whether B [is less than] PL."⁷⁸ In essence, Hand's formulation recognized that the law should encourage all parties to a potential accident to take all economically efficient precautions, as calculated under the assumption that every other party is also taking due care to avoid the accident.⁷⁹

Two economically important defenses exist that, to differing degrees, will protect the defendant from liability for negligence. First, comparative or contributory negligence on the part of the plaintiff will diminish the plaintiff's recovery in proportion to his own responsibility for his injury. Second, the defendant will be protected if he can show that the plaintiff voluntarily assumed the risk of injury, or has knowingly entered into an agreement, before the accident, to release the defendant from negligence liability. These rules are designed to give victims an incentive to take all cost effective precautions against a risk.

Negligence is essentially the only theory under which plaintiffs can now recover for injuries caused by the use of HIV contaminated blood products.⁸⁰ Existing negligence law, however, does not provide a source of hope for such plaintiffs.

For example, in *Tufaro v. Methodist Hospital, Inc.*,⁸¹ the plaintiff brought an action in negligence against a blood bank for failing to detect malaria in a unit of blood that it had provided for transfusion. The court cited the low incidence of malaria in the United States as insufficient cause to require a blood bank to take any precautions other than to ask potential donors whether they had ever contracted malaria and to follow established industry procedures if the answer was positive. The risks discussed in *Tufaro* are analogous to the risk of HIV

81. 368 So. 2d 1219 (La. Ct. App. 1979).

expressed as "the failure to use such care as a reasonably prudent and careful person would use under similar circumstances or failure to do what a person of ordinary prudence would have done under similar circumstances." Amoco Chem. Corp. v. Hill, 318 A.2d 614, 617 (Del. 1974).

^{78.} Carroll Towing Co., 159 F.2d at 173.

^{79.} R. POSNER, ECONOMIC ANALYSIS OF LAW 147-51 (3rd ed. 1986) [hereinafter R. POSNER].

^{80.} Matthews & Neslund, The Initial Impact of AIDS on Public Health Law in the United States—1986, 257 J. A.M.A. 344, 346 (1986); Rabkin & Rabkin, Individual and Institutional Liability for Transfusion-Acquired Diseases, 256 J. A.M.A. 2241, 2242 (1986) [hereinafter Rabkin & Rabkin].

infection to persons using blood products. The incidence of blood products related AIDS is now so low that it would be reasonable for a court to mimick *Tufaro* in holding that the current procedures for preventing HIV contamination are sufficient, if followed, to avoid negligence liability.

Further, the practical problems of proving a case of negligence are substantial for all classes of blood products related HIV victims. Those problems may, in fact, completely bar hemophiliacs from recovery in negligence. Hemophiliacs use several lots of coagulant in the course of a year.⁸² Because users infected with HIV will be asymptomatic for a lengthy period of time, a hemophiliac plaintiff may not realize that he has been infected until after he may have inadvertently destroyed evidence identifying the manufacturer of the infectious coagulant. Thus, he may be unable to establish that any particular producer was the cause-in-fact of his injury. This problem would be eliminated if he brought suit in a jurisdiction applying the "enterprise liability" theory of *Sindell v. Abbott Laboratories.*⁸³

83. Such negligence is normally established only where there is a violation of the guidelines governing the operation of blood banks. (The reference work usually relied upon is STANDARDS FOR BLOOD BANKS AND TRANSFUSION SERVICES (P. Schmidt 11th ed.)). In order to hold one liable for negligent behavior, there must be more than simply a showing that the defendant was the cause in fact of the plaintiff's injury. First, the plaintiff must establish that the defendant is under a duty to use reasonable care to avoid injuring the plaintiff. Second, the plaintiff must show that the defendant failed to conform his behavior to the proper standard of care, as described by Judge Hand, above. Third, the plaintiff must show that the defendant's negligence was the proximate cause of the plaintiff's injury. Proximate cause is established only when the plaintiff can show that the defendant's actions were the cause in fact of the plaintiff's injury, and that the injury to the plaintiff was reasonably foreseeable to the defendant. Fourth, the plaintiff must prove that he suffered cognizable damages as a result of the defendant's actions. W. PROSSER, J. WADE & V. SCHWARTZ, TORTS 144 (7th ed. 1982).

The hemophiliac plaintiff may have ways of improving his chances for recovery. For example, the doctrine of enterprise liability may apply. In Sindell v. Abbott Laboratories, 26 Cal.3d 588, 607 P.2d 924, 163 Cal.Rptr. 132, *cert. denied*, 449 U.S. 912 (1980), the plaintiff was injured by a drug administered to her mother during pregnancy. The plaintiff knew the type of drug involved, but could not identify the manufacturer of the drugs actually ingested. Although the plaintiff was unable to identify the manufacturer who was the cause in fact of her injuries, making a traditional case of negligence impossible to prove, the Sindell court nevertheless held a group of drug manufacturers liable. The court based its holding largely on the difficulties of proof presented to the plaintiff whose injury manifests itself long after exposure to the defendant's product. The court stated that:

"as between an innocent plaintiff and negligent defendants, the latter should bear the cost of the injury. Here, . . . [the] plaintiff is not at fault in failing to

^{82.} Blood Product Exemption, supra note 29, at 1125 n.169.

Even if the plaintiff can thus establish causation, it may be impossible to determine when the infectious coagulant was produced. It would therefore be impossible to identify the standard of care within the industry at the time the lot was manufactured, or to show that the defendant's conduct failed to meet that standard of care. The latter point would not hold if the plaintiff could show that the defendant had never exercised due care, or if the defendant could show that he had always exercised due care.

Proof of negligence in the case of elective and emergency donees should be somewhat easier. In the case of both of these groups of victims, their exposure to blood products will be documented by hospital records.⁸⁴ Thus, the ability of these types of victims to identify their injurer,⁸⁵ to determine the standard of care at the relevant time, and to show whether that standard was observed should be considerably easier than in the case of hemophiliacs.

1. Economic Effects of Negligence Liability

Shavell's analysis of the economic effects of strict liability and negligence⁸⁶ demonstrates that a liability rule of negli-

84. Such records would be admissible as evidence. FED. R. EVID. 803(6).

85. The question of donor liability for contaminated blood is not settled. The court in Hubbell v. South Nassau Communities Hosp., 46 Misc. 2d 847, 260 N.Y.S.2d 539 (N.Y. Sup. Ct. 1965), although not deciding the case on the merits, implied that normal negligence rules might apply to suits against blood donors who know, or should know, that they are infected with HIV and yet donate blood. However, problems may exist in discovering the identities of such negligent donors. At least one court has endorsed a hospital's refusal to make records of donors available to plaintiffs suing for injuries received from infected blood. Rasmussen v. South Florida Blood Serv. Inc., 500 So. 2d 533 (1987) (prohibiting discovery of blood donor records); *but see* Gulf Coast Regional Blood Center v. Houston, 745 S.W.2d 557 (1988) (permitting discovery of blood donor records).

86. The following discussion is taken from Shavell, Strict Liability Versus Negligence, 9 J. LEGAL STUD. 1 (1980).

provide evidence of causation, and although the absence of such evidence is not attributable to the defendants either, their conduct in marketing a drug the effects of which are delayed for many years played a significant role in creating the unavailability of proof."

Id. at —, 607 P.2d at 936, 163 Cal. Rptr. at 144. In essence, the burden of proof was shifted to the defendants, who were required to demonstrate affirmatively that they could not have made the substance which injured the plaintiff. A willing court could easily analogize the plaintiff in Sindell to an HIV-infected hemophiliac and thereby rationalize imposing liability on all manufacturers of factor VIII, subject to their ability to disprove fault. The Sindell rule was recently modified. See Brown v. Superior Court, No. 25059 (Cal. March 31, 1988) (1988 WL 26807) (drug companies cannot be held jointly liable for the entire amount of a judgment recovered under a theory of enterprise liability).

gence will cause producers to ignore the external costs of nonnegligently caused injuries.⁸⁷ This, in turn, will cause them to charge a price for their product that does not reflect the expected value of non-negligent accidents.⁸⁸ If consumers of the product fail to perceive correctly the full cost of the product, which is the sum of both the price charged by the manufacturer and the expected value of any damages they will suffer due to non-negligently caused accidents, consumers will buy a different amount than they would deem efficient, in light of their tastes and preferences.⁸⁹ Because this amount is different than the precise amount that the consumer would deem efficient if fully and accurately informed, the amount is economically suboptimal.⁹⁰ Conversely, when the consumer knows the full cost of the product, he will purchase an optimal quantity of the product.⁹¹ Aside from the effects of negligence liability on supply and demand, negligence liability with a defense of contributory or comparative negligence will motivate both producers and users to exercise due care to avoid blood products related infection.

Under a negligence rule of liability, producers would exercise due care to avoid risks in order to avoid legal liability. As stated earlier, due care is defined as taking precautions against a risk up to the exact point that the cost of those precautions equals the expected value of the risk. A producer will not expend resources to take precautions that cost more than the expected value of the risk to be avoided because they will not be responsible for losses caused by failure to take such precautions, and thus, they have no incentive to do so.

Under a negligence rule, users would also exercise due care to avoid contamination from HIV-contaminated blood products. This is so because, under a rule of comparative or contributory negligence, an injured person's damage award is reduced if he is at all responsible for his own injury. Users will also be motivated to take due care in order to avoid bearing the entire cost of losses resulting from the non-negligent behavior of producers.⁹²

^{87.} Id. at 2.

^{88.} Id.

^{89.} Id. at 3.

^{90.} Id.

^{91.} Id.

^{92.} For this observation I thank Professor Thomas Holdych of the University of Puget Sound School of Law.

Some inefficiencies may result under a rule of negligence liability. Parties to a transaction will expend inefficient amounts of care to the extent that they incorrectly estimate the likelihood that the other party will be held liable for any resulting injuries. If users over-estimate the safety of a product, and thus over-estimate the likelihood that the product's producer will be held negligent for manufacturing the product, two effects will follow.

First, the user's estimation of the probability of an accident will be lower, which will decrease the amount of care he will be willing to take to avoid an accident. Second, a user's estimation of the likelihood that a manufacturer will be liable for that loss will decline because it will appear more likely that the loss was not caused by the manufacturer's lack of due care. This will increase the perceived magnitude of potential losses to be borne by the user, and he will correspondingly increase the amount of care he takes. The net effect of these forces may be to cancel one another, having no impact on the incentives to producers and users.

C. Strict Liability in Tort and in Contract

Strict liability may be established in two ways. First, strict liability may theoretically⁹³ be imposed on the basis of a breach of an express or implied warranty. Under section 2-313 of the Uniform Commercial Code (U.C.C.), an express warranty is created when a seller represents that his goods will be of a certain quality.

Second, under section 2-314 of the U.C.C., a warranty is implied by law when the seller is a merchant of the type of goods in question. The seller is deemed by law to have warranted that the quality of his goods will essentially be unobjectionable to those who regularly purchase his products.

Finally, under section 2-315 of the U.C.C., an implied warranty of fitness for a particular purpose may arise when the seller knows that the buyer is going to use the product for a particular purpose and the buyer relies on the seller to select and provide goods suitable for that purpose.

The economic benefits of liability based upon breach of warranty are that the seller has much greater certainty con-

^{93.} Some states have legislatively classified the provision of blood as a sale, rather than a service, thereby exempting it from the operation of the Uniform Commercial Code. See, e.g., CAL. HEALTH & SAFETY CODE § 1606 (West 1979).

cerning both to whom he will be liable and, if the seller has included a proper limitation of warranty in the contract, the extent of such liability. Thus, a seller will need to keep less resources available to pay for unexpectedly adverse liability. He can instead put this money to more productive use.

The cost of resolving disputes over the quality or safety of goods sold may also be lower under a warranty standard than under a negligence standard, at least when the warranty is express. In such a case, goods are warranted by the seller to have attributes "X," "Y," and "Z." The trier of fact in any resulting suit will be limited to simply determining whether or not the product had attributes "X," "Y," and "Z." Since these facts are objectively determinable, the costs of such a determination are likely to be much lower than under the objective, "reasonable man" standard of negligence.

On the other hand, implied warranties of merchantability offer little more certainty than the objective standard of negligence. Determinations of what is "reasonable care" and what is "merchantable" are equally vague, requiring relatively more resources to establish, and offering little precedential value.

Because strict liability in warranty is theoretically limited to those in privity of contract with the seller, those persons not in privity who are injured by products will not be compensated. Proponents of liberal compensation of victims have developed both legislative and judicial methods to circumvent this limitation.

For example, legislatures may choose to extend a duty of warranty to third parties. Section 2-318 of the U.C.C. presents three alternative extensions of a seller's warranty to third parties. Under alternative "A," a seller's warranty extends to members of the buyer's family and guests in his home if it is reasonable to expect that they will be affected by the goods.⁹⁴ Under alternative "C," a seller's warranty extends to all persons who may foreseeably be affected by the product whether or not they are related to the buyer.⁹⁵ The damages recoverable under such third-party warranties vary from providing only compensation for personal injury⁹⁶ to providing compensation for both personal injury and property damages.⁹⁷

^{94.} U.C.C. § 2-318, Alternative A (1977).

^{95.} Id. Alternative C.

^{96.} Id. Alternative B.

^{97.} Id. Alternatives A & C.

Strict liability has also been imposed in tort and may completely eclipse any limitations imposed by contract law. Section 402A of the Restatement (Second) of Torts provides that a seller of an injury-causing product shall be liable to the ultimate user or consumer of the product for both personal injury and property damage. Section 402A applies even though the seller has exercised all possible care, not merely reasonable care, and even though the user or consumer has no contractual relationship with the seller.⁹⁸

Product defects under section 402A fall into two general categories: "design defects" and "manufacturing defects."⁹⁹ A product is defective in design if the safety expectations of the ordinary consumer are not met,¹⁰⁰ or if the risks of its design outweigh the design's benefits.¹⁰¹ Thus, liability is not, strictly speaking, "strict." Not only must an injured plaintiff prove causation, but the defendant must be unable to prove that the product met both of the aforementioned standards.¹⁰²

A manufacturing defect exists when a particular unit of those goods produced by a manufacturer fails to meet the manufacturer's own expectations, such as when one machine in a million contains a broken gear.¹⁰³ In such a case, a plaintiff need prove causation only, and liability is, in fact, strict. Contaminated blood products fall into this category.

"There are some products which, in the present state of human knowledge are quite incapable of being made safe for their intended and ordinary use. These are especially common in the field of drugs. . . . Such a product, properly prepared, and accompanied by proper directions and warning, is not defective, nor is it *unreasonably* dangerous. The same is true of many other drugs, vaccines, and the like, many of which for this very reason cannot legally be sold except to physicians, or under the prescription of a physician."

Id. It appears likely that courts could make the required finding that the benefits of using coagulants, in light of the irreducibly low incidence of HIV infection, outweigh the risks of such use.

99. Barker v. Lull Eng'g Co., 20 Cal.3d 413, 573 P.2d 443, 143 Cal.Rptr. 225 (1978).

100. Id.

101. Id.

102. Id.

103. Id.

^{98.} RESTATEMENT (SECOND) OF TORTS § 402A (1965). In states that have enacted statutes classifying the provision of blood as a service rather than a sale, strict liability claims based upon products ingested before such legislation will be impossible after 1987, when the longest statute of limitations for blood products expired. Rabkin & Rabkin, *supra* note 80, at 2243. Other courts could avoid the application of strict liability by invoking the rationale of RESTATEMENT (SECOND) OF TORTS § 402A comment K, which states:

1. Economic Effects of Strict Liability

Under a rule of strict liability, producers are responsible for both negligently and non-negligently caused accidents. Assuming an inelastic demand, producers will pass the cost of non-negligent accidents caused by a product through to purchasers of that product by incorporating such costs in the price charged.¹⁰⁴ The price charged for a producer's product under strict liability will, therefore, reflect the full social cost of the use of that product.

Strict liability may thus perform an important informational function. If buyers of a product misperceive the full social cost of a product (which includes the expected value of any injuries caused by the product), they will consume a suboptimal amount.¹⁰⁵ Strict liability will correct this suboptimal consumption by informing buyers of the full social cost of a product through its price.

Strict liability will also have the effect of creating an insurance pool for consumers of the product. When such consumers are unable to procure first-party or other forms of insurance more cheaply, this may be beneficial. However, because the expected value of losses varies among consumers, a pricing scheme that allocates strict liability losses among buyers on an "average loss" or pro rata basis will cause cross-subsidization of those with a high expected risk value by those with a low expected risk value.¹⁰⁶ If such cross-subsidization is high enough to justify searching out firms with less cross-subsidization, buyers will do so or may leave the market altogether. However, as demand nears inelasticity, as in the case of emergency blood consumers, the amount of cross-subsidization needed to provoke market exit will increase.

A final aspect of strict liability is its effect on the cost of

105. See infra pp. 116-17.

106. Some buyers will have a superior ability to take care, and thus avoid a risk. For them, the expected value of a loss will be lower. Other buyers are less able to take care, and thus have a higher expected loss value. Further, some buyers will have unusually high incomes, increasing their potential damages, and thus increasing their expected loss value above the average. Others will have inordinately low incomes, thus decreasing their expected damages.

^{104.} To the degree that demand is elastic, an increase in price will lead to a decrease in consumption and a loss of profits to the shareholders of the producer. This will occur when the full social cost of a product, as reflected in the price of a product, exceeds the full social cost as perceived by the consumer (which may be lower). To the degree that a consumer thinks he is being overcharged for the product, he will refrain from buying the product, reducing the manufacturer's profit.

administering a compensation system. Because there is no issue of fault under strict liability, no resources will be spent to resolve that issue at trial.¹⁰⁷ Therefore, the total cost of trials will be lower. Because the total cost of litigation will be lower, more victims will find it cost effective to bring suit and the number of trials will increase. If the societal benefit achieved by compensating more individuals exceeds the increased costs of trials, a net societal benefit will be achieved.¹⁰⁸

IV. HOW WILL PRODUCERS BEHAVE UNDER VARIOUS RULES?

A. Hospitals

1. No Liability

Hospitals will continue to have an incentive to exercise due care, even if they are immune from liability for transfusion-related AIDS transmission. Although they would not face legal liability, they would, nevertheless, be motivated by competition with other hospitals to take due care. Because the full cost to patients of services provided by hospitals includes the expected value of accident costs borne by the patient, institutions will have an incentive to take due care in order to reduce those costs and to minimize the total cost of the service to their patients. Otherwise, other hospitals would attempt to provide services at a lower total cost. However, the market discipline function of competition would have a minimal effect under a rule of no liability when patients had little knowledge of the relevant risks. If this were the case, suboptimal consumption would occur, as described by Shavell.¹⁰⁹

Such suboptimal consumption seems likely in the case of hospital patients. The processes that directly determine the likelihood of infection through blood products are complex and probably unknowable to the average hospital patient at a costeffective price. Although hospitals might then have an incentive to make information available to patients concerning the relative safety of their blood products, this information may again be so complex as to be incomprehensible. In such a case, hospital patients could not use blood safety as a criterion of comparison; competition would not regulate blood quality. Only if the quality of transfused blood (or any product of a

108. Id.

^{107.} R. POSNER, supra note 79, at 164.

^{109.} See supra text accompanying notes 86-91.

hospital) became so low as to harm the reputation of the hospital, would blood quality become a basis for comparison of hospitals, and thus develop the potential to discipline the market.¹¹⁰

The foregoing argument is tempered by the fact that only a minority of consumers in a market, those on the margin, influence the conduct of producers. Producers will only compete for those buyers who will change their conduct in response to product changes that are cost effective for the producer to implement. Thus, only a minority of blood consumers would need to be informed of the relative risks associated with various blood providers for the consumers' choices to induce providers to offer an optimal degree of blood safety.

Such a market-disciplining minority of consumers is unlikely to exist among hospital patients. First, the percentage of blood users who are able to change their usage patterns, and thus, are theoretically able to discipline the market, will not include emergency donees who, by definition, will be unable to choose among hospitals.

Of those remaining, it is likely that most will be unable to gather and process information on blood risks in a cost effective manner, given that their total prevention costs, including the cost of gathering and analyzing such information, must be lower than \$1.82 per unit of blood in order to be economically efficient.

Even among those informed consumers remaining after the above groups have been excluded, only those shopping specifically for the attribute of blood safety will affect the quality of that attribute by their choices. Most informed consumers will likely compare hospitals based on a combination of factors not related to blood safety. For example, some informed consumers may compare hospitals based on the distance they have to travel to each hospital, the quality of food served, or other such attributes.

Although blood users themselves may not be able to effectively discipline the market concerning the quality of blood provided by hospitals, one may argue that insurance companies might be able to do so. Insurance carriers are likely to possess accurate information about their claims experience with competing hospitals. Further, insurance carriers would have an

^{110.} See Meyer, A Model of Multiattribute Judgments Under Attribute Uncertainty and Informational Constraint, 18 J. MARKETING RES. 428 (1981).

incentive to limit their insureds to the use of only those hospitals providing services at the lowest cost, including the cost of blood-related infections. This would, in turn, allow insurers to pass these savings on to their insureds in the form of lower premiums, improving the insurer's competitive position. Thus, insureds would benefit from insurers imposing an optimal level of blood quality on the market.

The above argument is weak in two respects. First, lower prices for hospital services may be perceived by insureds not as an indication of safety, but rather, of poor quality. Secondly, insurers interested only in minimizing the cost of claims may ignore the value of aesthetic hospital attributes, such as the quality of the food served or the decor of the hospital. To the extent that insureds value such attributes, they will be willing to pay higher premiums to obtain them or to trade blood safety for more palpable, aesthetically pleasing attributes. This will result in a market segmentation with an essentially different product being offered to a new class of insureds. Although members of the old class of insureds would benefit from increased blood safety, members of the new class, having traded blood safety for other attributes, would not. Thus, the effect on the market of insurers shopping for blood safety will be mitigated to the extent that this segmentation occurs.

In sum, the number of blood users who will be able to make an informed choice between hospitals based on blood safety is likely to be very small. The percentage of these users who will, in fact, shop for blood safety is likely to be insubstantial and will not effectively discipline the market. Further, the effect of attribute shopping by insurers will have, at best, only a partial effect on blood safety.

Aside from the incentives a rule of no liability would generate for producers, a no liability rule would also generate incentives for blood users. Under such a rule, blood users would take due care to avoid infection, and that amount of care would be greater than that expended by users if producers were under a rule of negligence or strict liability. This is so because the total cost of a product depends on how much of any losses resulting from the use of that product will be borne by the user. This, in turn, depends on whether no liability, negligence, or strict liability applies. Under a negligence rule, the total cost of a product to its user is the sum of the product's price and the expected value of any non-negligently caused accidents. Under a rule of no liability, the total price to the user again includes both the product's price and the value of non-negligently caused accidents, but also includes the cost of those accidents that occur due to the non-negligent failure of the producer to take due care. In other words, the total product cost includes the cost of accidents that occur due to some minimum of negligence on the part of producers that will occur even though they have every incentive to take due care, and take all reasonable steps to do so.

2. Negligence

Under a rule of negligence, hospitals again would have an incentive to take due care, both in order to compete with other producers and to avoid legal liability for failing to do so. As was the case under a no liability standard, buyers' ignorance of the relative risks and, therefore, of the total cost of goods sold by competing hospitals, is likely to prevent competitive market discipline. Suboptimal consumption is also likely to follow, as was the case under a rule of no liability.

As with a rule of no liability, users under a rule of negligence would have an incentive to take due care because they would bear the full cost of any losses caused by the non-negligent behavior of producers.

Further, the demand for blood will increase relative to consumption under a rule of no liability. Imposition of a rule of negligence liability will force producers to sell a compound product (blood and "insurance") against infection caused by the producer's negligence. If the producer can insure against that risk more cheaply than the user, the user will pay the producer, in the form of a higher price for blood, to assume that ' risk. The user will then consume relatively more blood because his total cost for blood and insurance is lower when the producer supplies the insurance than it is when the user self-insures.¹¹¹

It is likely that hospitals could insure against their own negligence more cheaply than users. This is so because they will likely have vastly superior knowledge of the probability of

^{111.} This will be true even in the case of emergency donees, whose demand for blood is relatively, if not completely, inelastic. This is so because the other product they are buying, insurance, is a product for which their demand may be highly elastic. Thus, while their demand for blood is inelastic, their demand for the compound product of blood and insurance may be considerably more elastic.

their own negligence as compared to users. Although hospitals will have slightly inferior knowledge of the potential losses of users since the hospitals' knowledge will be based on average loss figures available in the medical and insurance communities, this disadvantage should be far outweighed by the hospitals' superior knowledge of the probability of their own negligence.

3. Strict Liability

Under strict liability, hospitals will have an incentive to take due care since they will want to avoid all losses that they can eliminate by taking cost effective precautions. Thus, strict liability, will operate like negligence liability. It has been observed that imposing strict liability on product manufacturers informs buyers of the product's full cost by incorporating into its price the expected value of all losses resulting from the use.¹¹² This will allow consumers to choose the safest product by choosing the one with the lowest price. This argument is unpersuasive, however, in the case of hospitals.

As with many other complex products, the safety of a particular attribute of a package of hospital services will not be easily discernible from the total package price because of the compound nature of such services. Thus, even though the price of a transfusion may be clearly reflected on a hospital bill, that information is likely to be only one bit of a confusing jumble of information regarding many equally important safety characteristics. The end result will be that, even though patients have accurate and full information from which they might judge the safety of a particular hospital's blood, they will not have the ability to incorporate that information into a cost effective and comprehensive assessment of the relative safety of that hospital as compared to others. The task will simply be too complex.

Another rationale often used to support strict liability for blood products related infection is that it creates a *de facto* insurance policy for users of a product.¹¹³ This insurance function causes a chronic cross-subsidization problem that presents one of the greatest drawbacks to holding hospitals strictly liable for AIDS transmission.

^{112.} Blood Product Exemption, supra note 29, at 1107 (fourth rationale for strict products liability).

^{113.} Id. (third rationale for strict products liability).

The patients of hospitals, generally elective and emergency donees, usually already have, or have access to, firstparty health insurance. They therefore do not need the additional insurance provided by a rule of strict liability. Further, because emergency donees, by definition, cannot elect to do without blood, they will be unable to escape cross-subsidizing elective donees by abstaining from blood use. Neither could emergency donees switch to another provider who might minimize cross-subsidization by providing blood exclusively to emergency donees.¹¹⁴

A further drawback of the cross-subsidization caused by strict liability is that it will reduce the cost to elective donees of blood transfusions. Those elective donees with higher-thanaverage expected loss values will be able to adversely select against hospitals, thereby artificially lowering the cost that they pay for blood. Elective donees will therefore consume more blood products than they would under a rule of negligence, causing inefficient over-consumption.

While the rationale usually invoked for imposing strict liability on a producer is to "compensate helpless victims" of harm-producing products by requiring the producers of such products to bear the losses caused thereby, strict liability for hospitals would have the opposite result.

Because elective donees will receive the benefit of a crosssubsidization by emergency donees, elective donees will consume relatively more blood products under a rule of strict liability than under negligence. More hospital services will be rendered and more profits realized by the hospitals. Hospitals will have a "situational" monopoly of emergency blood services because emergency donees, by definition, cannot refuse to accept and pay for blood without risking serious health problems or death. Thus, hospitals will have an incentive to attract elective donees by exacting monopoly profits from emergency donees, who would be very unlikely to refuse, and by using those profits to subsidize elective donees or other hospital services.¹¹⁵

^{114.} Cf. Hammond & Shapiro, supra note 55, at 151.

^{115.} Hospitals have a disincentive to pass the cost to elective donees, since elective donees could reduce consumption or leave the market if the price of blood increased.

B. Blood Banks

1. No Liability

As with hospitals, blood banks that are under no liability for damages caused by HIV-infected blood will nevertheless take due care because of competition from other blood banks. Unlike the clients of hospitals, the clients of blood banks—hospitals themselves—are likely to be highly sophisticated purchasers. Hospitals are likely to correctly perceive the relative risks of different blood banks and will be able to correctly compare the total cost of the products of each. Market competition should therefore discipline blood banks and provide them with an incentive to take due care. Further, because hospitals correctly perceive the risk of the products that they buy from blood banks, Shavell's theory dictates that the amount of products demanded and the amount supplied would be optimal, and that suboptimal consumption would not occur.

2. Negligence

Blood banks under a rule of negligence will behave like hospitals subject to negligence liability. Blood banks will take due care, both in order to avoid legal liability and to compete with other blood banks. Hospitals dealing with blood banks will also take due care to avoid any problems of contributory or comparative negligence and to avoid bearing the full cost of any non-negligent accidents. Further, because hospitals will correctly perceive the risks of receiving negligently and nonnegligently infected products from blood banks, and thus the full cost of such products, they will again purchase the optimal amount of blood products, as described in Section 3(B)(1) of this Comment.

3. Strict Liability

A rule of strict liability for blood banks would be inappropriate. As the primary customers of blood banks, hospitals have expert knowledge of the risks involved with blood products. There is no need to impart that information to them through the price of the product sold by placing its manufacturers under a rule of strict liability.

The insurance function of strict liability is also unneeded in the case of hospitals. Because of their expertise, hospitals should have knowledge of the factors relevant to self-insuring at least equal to, if not greater than, that possessed by blood banks. Furthermore, hospitals are likely to have sufficient commercial sophistication and bargaining power to enable them to effectively bargain for market insurance. The extra insurance protection, in the form of strict liability, that would be forced on hospitals by a strict liability rule would therefore be unnecessary.

C. Commercial Producers

1. No Liability

A rule of no liability for commercial producers of blood products, most notably factor VIII, may be efficient. Commercial producers would be induced to take due care because of the same competitive forces that motivate other manufacturers of blood products.

Hemophiliacs should have knowledge of the relevant risks of treatment superior to that of elective and emergency donees. Unlike donees, hemophiliacs have long-term experience with the products they use. Because hemophilia is hereditary, hemophiliacs are, by definition, related to other hemophiliacs whose expertise they can share. They may also belong to hemophiliac support groups.¹¹⁶ These informal information sources could be sufficient to guide them to the safest coagulant producer.

The cost of such information gathering and processing by an individual would probably be uneconomical in light of the present slight risk of factor VIII-related AIDS. Even if producers failed to take due care under a no liability rule and thereby multiplied the risk of infection many times over, the risk might still amount to no more than a negligible sum per lot of clotting factor used.

This problem could be overcome by a hemophiliac support group service that could monitor, analyze, and distribute information to its members at low marginal cost. If this occurred, full cost comparisons of factor VIII suppliers would be possible, and no barrier to market discipline of coagulant producers would exist through competition.

2. Negligence

Under a negligence rule, producers of factor VIII will have

little incentive to take due care in order to escape legal liability, although they would still have an incentive to take due care to the extent that competition would discipline them. This is so because, as stated above, negligence claims brought by hemophiliacs are practically impossible to prove, thus nullifying the effect of legal liability.

As was the case under a no liability rule, hemophiliacs are potentially able to distribute data comparing different brands of factor VIII through hemophiliac support groups. This information would allow them to perceive correctly the total cost of the clotting factor they buy and insure that they will buy the economically optimal amount.

The imposition of negligence liability in the context of current government regulation may cause a geographic cross-subsidization. Because the concentration of HIV-infected donors varies geographically¹¹⁷ and because the blood used to make factor VIII is usually collected in the same geographic area in which the end product is sold, the risk of contracting HIV factor VIII varies geographically. Therefore. through hemophiliacs living in high risk areas such as the Northeastern United States will be exposed to a higher degree of risk than those living in the Northwest. Theoretically, negligence law would dictate that the precautions taken by factor VIII producers should vary geographically, according to the risk. This is not currently the case, however. All factor VIII, whether produced in a high risk area, such as New York City, or in a lowrisk area, such as North Dakota, must be prepared using an identical treatment procedure involving both donor screening and heat treating.¹¹⁸ Thus, precaution costs, and therefore the ultimate price of clotting factor, are the same, while the risk varies geographically. Charging one price to all users, regardless of their individual risk, creates cross-subsidization.

3. Strict Liability

Strict liability of commercial factor VIII producers will have the positive effect of efficiently and accurately informing hemophiliacs of the total cost of the blood products that they buy. A rule of strict liability would thus cure the information problems of factor VIII buyers that would occur under a rule

^{117.} ULENE, supra note 13, at 49-53.

^{118.} See supra note 39.

of no liability or negligence if hemophiliacs failed to form support groups.

However, strict liability also creates severe cross-subsidization problems. The amount of damages incurred by each hemophiliac will vary according to his age and potential income. Thus, young hemophiliacs with relatively long life expectancies and high earning potentials would be subsidized by elderly hemophiliacs with short life expectancies and low earning potentials.

Aside from these cross-subsidization problems, spreading the cost of factor VIII among hemophiliacs by holding commercial producers strictly liable is likely to be economically unfeasible. As the number of hemophiliacs with AIDS increases, the total expense to be spread will increase. Assuming that AIDSrelated deaths will greatly outpace births among hemophiliacs, the pool over which the risk would be spread will decrease, increasing the cost borne by each member of the pool. The total long-term cost to each of those hemophiliacs who outlive all those currently infected could well total tens of thousands of dollars, likely exceeding the ability of most hemophiliacs to pay.¹¹⁹

V. CONCLUSION

The foregoing analysis indicates that efficient rules of liability must be narrowly tailored to take into account the economic interaction of the parties to a given purchase and sale.

In the case of hospital transactions with emergency and elective donees, a rule of negligence liability should be established. A rule of strict liability would be undesirable because, although it would impart accurate information to consumers of hospital services, that information would be useless because of the complexity of the calculation in which it would be used.

Negligence liability would correct suboptimal purchasing by elective donees that would be caused by the cross-subsidization occurring under a rule of strict liability. Further, negligence liability may be necessary to discipline the market. Because it is unlikely that consumers of hospital services would be able to shop among hospitals specifically for the attri-

^{119.} This cost would be in addition to the already significant cost hemophiliacs must pay for the factor VIII, estimated to be \$4,500 to \$13,000 per year. BLOOD POLICY, *supra* note 71, at 8.

bute of blood safety, imposition of a negligence standard may be necessary to ensure that due care is taken by hospitals.

Judicial action may be necessary to implement a standard of negligence liability for hospitals. Because of informational constraints, it is unlikely that a sufficient percentage of health care consumers will bargain specifically over blood safety. If so, market discipline would fail to establish the proper level of blood safety. Judicial imposition of a negligence liability rule would thus eliminate the effects of high transaction costs resulting from a lack of information on the part of health care consumers that would otherwise prevent market discipline.

Between blood banks and hospitals, a rule of no liability or negligence liability should be imposed. Under a rule of no liability, competition among blood banks would likely ensure that they take due care. Hospitals, as experts, would have adequate information to choose among blood banks and could thereby discipline the market.

Negligence liability would have the same effects, but would be more efficient in disciplining the market. This is so because legal liability for negligence would have an immediate effect on producers' incentives to take due care in the form of money damages, while the incentives of competition among producers would be long range and less precise. This would be an important consideration only to the extent that blood banks were "short term" market participants.

However, a negligence standard would be more costly for the parties to enforce. Trials would be needed to establish liability; and because the negligence standard is relatively vague, those trials would be expensive. A rule of no liability would entail none of these enforcement costs. Thus, the issue is whether the efficiency gains inherent in the immediate incentives of negligence liability would be worth the added costs of enforcement of that standard through trials.

This question should be answered through the process of contractual bargaining. Contractual bargaining is appropriate in the case of the hospital/blood bank transaction because hospitals have bargaining power equal to that of blood banks. Further, allowing hospitals and blood banks to bargain over the standard of liability from positions of equal strength will assure that the optimal standard, as determined by the parties, is implemented.

As between commercial blood products manufacturers and

hemophiliacs, a rule of no liability or negligence liability should be established. Under either rule, hemophiliacs are likely to have sufficient information to correctly choose among coagulant manufacturers and thereby discipline the market. However, the choice between rules of no liability or negligence liability is subject to the same considerations of enforcement costs as described above in connection with the hospital/blood bank transaction. Unlike the hospital/blood bank transaction, however, the commercial producer/hemophiliac transaction may not be properly resolvable by bargaining.

Because the number of blood products manufacturers is small, a natural geographic monopoly may exist that would eliminate hemophiliacs' ability to bargain and the resultant disciplining effect of competition. Judicial imposition of a negligence standard would ensure that due care is observed to avoid liability, rather than out of fear of competition, and would provide optimal incentives for both hemophiliacs and commercial coagulant producers.

George Ferrell