

WHY DO FIRMS TAKE ACTION ON HIV/AIDS? EVIDENCE FROM NIGERIA¹

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Governments and international organizations are looking to the private sector to join them in partnership to fight HIV/AIDS in the developing world. A survey of manufacturing firms in Nigeria reveals that fewer than one-third of companies are taking any action to prevent HIV/AIDS among employees. Managers' knowledge of the epidemic has a greater impact on companies' actions than do general firm characteristics such as ownership, profitability, or size. This finding points toward relatively inexpensive ways of prompting businesses to take action, including voluntary, anonymous surveys of infection rates within firms' workforces and voluntary counseling and testing programs for employees.

Widespread access to antiretroviral drugs is turning Acquired Immune Deficiency Syndrome (AIDS) from a death sentence to a serious but manageable illness in North America and

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Western Europe. In contrast, effective treatment remains unavailable to most people in developing countries, despite dramatic decreases in the cost of these drugs that have resulted from generic production and political pressure on multinational pharmaceutical companies to donate drugs or reduce their prices.² Consequently, the global death count from AIDS continues to mount, and the human immunodeficiency virus (HIV), which causes the disease, continues to spread. Infection rates in developing countries vastly exceed those in developed countries, reaching the stunningly high levels of 20 to 40 percent of the population in the hardest hit region, southern Africa.

The epidemic threatens the business prospects of companies in the developing world in multiple ways: by raising labor costs, by shrinking consumer markets, and by adding to investment risks (Rosen *et al.* 2003). Responses to the 2003-4 executive opinion survey of the World Economic Forum indicate that 53 percent of companies in developing countries believe that HIV/AIDS has had or will have a serious impact on their business (Bloom *et al.* 2004). International organizations and developing country governments are increasingly looking to the private sector for partnership, leadership, resources, and action in the fight against AIDS. The U.N. Security Council issued a resolution in 2001 that called for a more vigorous corporate response. The International Finance Corporation, the branch of the World Bank that deals with the private sector, now promotes anti-AIDS programs (IFC 2002).

Some companies have responded to these calls for action energetically, joining national and international AIDS business councils, implementing “best practice” prevention and treatment programs, and sponsoring local nongovernmental organizations

² Production of generic versions of HIV/AIDS drugs is now spreading to poor countries, including Benin, Ghana, and Nigeria in Africa (Abubakar 2003).

(NGOs) that educate communities and care for the sick and the orphans they leave behind (UNAIDS 2001). The Global Business Council on HIV/AIDS formed in 1997.³ Since 2001, when it changed its name to the Global Business Coalition on HIV/AIDS, its membership has grown from 17 companies to more than 170. Prominent multinational companies, such as Coca-Cola, which is the largest industrial employer in Africa, have announced aggressive programs to prevent and treat AIDS among their employees (*The Economist* 2001b).

Although more companies are coming to view the fight against AIDS as in their best interests, not just a matter of good corporate citizenship, “the majority of companies are still saying that AIDS is not their problem” (Nattrass *et al.* 2004, p. 7). Moreover, much of the business community’s response has occurred in southern Africa (*The Economist* 2004). Less concern has been evinced in low- and middle-income countries where infection rates have not yet skyrocketed. This “next wave” category includes such heavily populated countries as China, India, Nigeria, and Russia (National Intelligence Council 2002). For example, although the Global Business Coalition on HIV/AIDS includes 18 companies headquartered in Africa, none are in Nigeria. Nearly all are in southern Africa. In all of Asia, including Russia, the Coalition has only 15 member companies. The earlier companies in countries where the epidemic is at an early stage implement programs that reduce the spread of the disease, the greater chance they have to stave off the serious consequences already seen in southern Africa (Barnett & Whiteside 2002, Rosen *et al.* 2003, Nattrass *et al.* 2004).

The efforts of national and international business councils, international organizations, and developing country governments

³ For more information, visit <http://www.businessfightsaids.org/>.

to engage companies in fighting AIDS are hindered by a limited understanding of the factors that compel some firms to take action while others stand by. Systematic evaluations of the business response to AIDS have been slow in coming. Premier management journals such as the *Harvard Business Review* did not publish any articles on HIV/AIDS until the past couple of years. The World Economic Forum did not highlight the business impacts of the epidemic in its influential annual *Global Competitiveness Report* until the 2003-4 article by Bloom *et al.* cited above. Although there is no shortage of information on the types of actions that companies can take and suggestions of “best practices” (e.g., Smart, undated; IFC 2002; GBC 2001), much less information is available on what firms are actually doing and, more important, *why*. The literature review in Bloom *et al.* (2003-4) did not refer to any studies on the reasons companies take action—or fail to. Moreover, nearly all the studies it identified were outside the refereed literature.

This article takes a step toward filling this gap. It focuses on companies’ responses to HIV/AIDS in their workforces, which is where the epidemic first has significant business impacts. On the basis of their global survey results, Bloom *et al.* (2003-4, p. 1) concluded, “The effect on the labour force is likely to be most visible and, particularly in hard-hit countries, damaging. The impacts on markets and costs of capital are harder to detect and are likely to be felt, if at all, in the longer term.” This conclusion is consistent with survey results from South Africa (Ellis & Terwin 2003, p. ii): although “More than a third of the companies surveyed indicated that HIV/AIDS has reduced labour productivity or increased absenteeism and raised the cost of employee benefits,” fewer than 10 percent reported that it has negatively affected their sales, and only 6 percent reported that it has negatively affected their investment decisions.

Regarding companies' responses, we focus on those related to prevention of new HIV infections in companies' workforces. Companies can take a variety of actions to reduce the risk that their employees will become infected with HIV. These actions range from relatively passive steps, such as disseminating information through oral presentations or posters and pamphlets, to more active interventions, such as distributing condoms, training employees to serve as peer counselors, and providing treatment for other sexually transmitted diseases (STDs). We do not examine responses related to the treatment of HIV infections or AIDS cases, nor do we examine responses unrelated to management of employee health, such as switching to less labor-intensive production processes (George 2002, Ellis & Terwin 2004), shifting the burden of the disease to society by reducing employee benefits (Rosen & Simon 2002, George 2002), or discriminating in hiring against individuals suspected of being infected (Bloom *et al.* 2004). Although prevention is "by no means a comprehensive intervention programme," it is the usual starting point for companies, because it is relatively simple and inexpensive (George 2002, p. 15).⁴

We examine companies' responses in Nigeria, which is Africa's most populous country. Nigeria is of particular concern in the global AIDS battle, because of its large population, its economic importance both regionally and as a major oil exporter, its newly democratic government, and the fragile balance between its ethnic and religious groups. The government of Nigeria estimated that 5.8 percent of its adult population was infected with

⁴ Estimates reported in Rosen *et al.* (2003) suggest that prevention is cheaper than treatment even when the risk of infection is low (2-3 percent).

HIV in 2001 ([National AIDS/STD Control Programme 2001](#)).⁵ Although this rate is small compared to the double-digit rates in southern Africa, given Nigeria's large population it implies that the country already has more than 3 million HIV-positive adults. This is more than triple the number in either North America or East Asia (including China) and about double the number in Latin America. Moreover, this national rate masks tremendous variation within the country, from a low of 1 percent to a high of 15 percent, depending on the locale.

Data for our analysis come from the 2001 Nigeria Firm Survey, which covered manufacturing firms in the country and included questions on responses to HIV/AIDS. Survey results from South Africa indicate that the manufacturing sector is especially at risk of workforce impacts: nearly three-fifths of the manufacturing companies surveyed reported that HIV/AIDS had reduced labor productivity or increased absenteeism, compared to just one- to two-fifths of companies in other sectors ([Ellis & Terwin 2003](#)).

The article both reports on the actions Nigerian firms are taking and analyzes the factors that influence those actions. It begins with a discussion of factors that might be expected to affect firms' actions. That discussion draws on information from previous studies and on consideration of a simple conceptual model of the expected costs and benefits of firms' actions. It then describes the 2001 Nigeria Firm Survey, with a focus on the HIV/AIDS module. Next, it presents results from the survey on the actions taken by the sampled firms. A statistical analysis of the relationship between those actions and hypothesized drivers follows. That analysis is based on logistic regressions.

The article closes with a recap of principal findings and a discussion of implications for programs to prompt firms in

⁵ This estimate is extrapolated from data on infection rates among pregnant women tested at ante-natal clinics, which is the standard procedure for estimating population-wide HIV infection rates in developing countries.

developing countries to take early action on the epidemic. Our most important finding is that what matters most are not general firm characteristics, such as ownership, profitability, or size, but rather the characteristics of firms' managers, specifically their exposure to information about HIV/AIDS and their knowledge of employees who are HIV-positive or have developed AIDS. This is an encouraging finding, because changing what managers know about the epidemic is more feasible than changing firms' characteristics.

1. FIRMS' RESPONSES TO HIV/AIDS: WHICH FACTORS MATTER?

Evidence from the literature

Studies on companies' responses to AIDS fall into two categories: case studies and surveys. Case studies are far more common. They typically cover a small set of companies (5-10). Most pertain to companies in Africa, which is not surprising, given the continent's high infection rates. The best known case studies are probably those conducted by the [Global Business Council on HIV/AIDS \(2001\)](#). They cover seven companies, all large and mainly multinational: DaimlerChrysler, Heineken, Standard Chartered Bank, Chevron Texaco, Unilever, and, within South Africa, Illovo Sugar and the power company Eskom. The studies indicate that multinationals' anti-AIDS efforts are primarily focused on units in Africa and that they primarily involve prevention, which is not surprising given that the case studies were conducted prior to the roll-out of mass treatment initiatives. In addition to chronicling what companies are doing, and which activities appear to be working, the studies directly and indirectly provide some scattered information about factors that affect the companies' actions. For example, scale economies in prevention

programs apparently favor action by larger companies. DaimlerChrysler needed to train 150 peer counselors to achieve its target of having 1 counselor for every 30 employees at its three South African sites. Its cost per trainee would have been higher had it not been able to spread the total cost of the training program across such a large number of trainees. Scale economies can also occur between countries. Heineken conducted HIV/AIDS risk assessment studies in three countries (Burundi, Ghana, Thailand) and drew on the results to design its responses in other countries. This suggests that information flow from parent companies to subsidiaries might be important. The quality of a company's accounting might also matter. The cases indicate that companies are searching for cost-effective responses, but that identifying those responses is not easy. Chevron Texaco's finance department launched a special study to assess the costs of the actions it was taking.

Case studies by George (2002) of ten companies in the South African province of KwaZulu Natal, which has the highest infection rate in the country, provide information on a more representative (for Africa) range of companies. The companies were mainly domestically owned and included an even mix of large and small. The most common action across the companies was simple awareness programs. An important reason appears to be that this was often a "zero budget" (George's term) action, with pamphlets and other informational materials provided free of charge by city health departments and NGOs. Action was less common among small companies. The case studies suggest several reasons for this. One is a lack of relevant infrastructure within the company. For example, large companies are more likely to have their own health clinics. Another is that small companies have a smaller number of managers, each of whom performs multiple functions. In larger companies, responsibilities can be more readily reallocated among managers if one of them is given additional

responsibilities related to AIDS prevention. A third is that managers of small companies are less likely to have observed cases of AIDS in their workforces and thus are less likely to consider the epidemic to be a significant risk.

Only a few surveys of companies' responses to HIV/AIDS have been conducted. All those with large samples have been conducted since the early 2000s. We review here two of the largest and best known, a survey by [Ellis & Terwin \(2003\)](#), which is the largest survey on South African companies' responses to HIV/AIDS ever conducted, and the World Economic Forum survey by [Bloom *et al.* \(2003-4\)](#), which was the first global survey on the topic. We provide more detail on these surveys than on the case studies, because our own analysis is survey-based.

[Ellis & Terwin \(2003\)](#) conducted a mail survey of companies in the manufacturing, retail/wholesale, and construction industries throughout South Africa in October-November 2003. They sent questionnaires to 3,003 companies and received responses from 1,006. Although they did not select the sample randomly, they argue that it is nevertheless "broadly representative" of the formal sector in these industries. The average company in their sample had 191 full-time employees.

Despite the estimated high HIV prevalence rates among working-age adults in the country—as of 2003, more than 30 percent of males aged 25-44 and females aged 20-39 were estimated to be infected—[Ellis & Terwin](#) found that fewer than half of the companies in their sample had taken any action against HIV/AIDS. The most common response was to implement a workplace awareness program, which 41 percent of the companies were doing. This exceeded the proportion of companies with a written HIV/AIDS policy, 26 percent. The more active the interventions, the less common they were: 18 percent of the companies offered voluntary, anonymous counseling and testing

for HIV; 13 percent offered HIV/AIDS care, support, and treatment; and only 6 percent offered anti-retroviral therapy.

Ellis & Terwin did not formally analyze the reasons some companies had taken action and others had not. Some implications can be drawn, however, from the disaggregated results they present for categories of companies. One way they categorized responses was by company location within South Africa. They noted that the HIV prevalence rate at antenatal clinics ranged from 12.4 percent in the Western Cape Province to 36.5 percent in KwaZulu-Natal, and they speculated that such variation in “HIV prevalence within ... the area of operation” might affect companies’ motivation to respond to the epidemic. Yet, they found only small differences across provinces in the percentage of companies that took action, regardless of the type of action. This suggests that population-wide prevalence rates are not a significant driver of company action.

A second categorization was by company size. Seventy-nine percent of the respondents were small companies (fewer than 100 employees); 16 percent were medium sized (100-500 employees), and 5 percent were large (more than 500 employees). Ellis & Terwin found a strongly positive relationship between action and company size. For example, 94 percent of large companies had a workplace awareness program, versus 79 percent of medium companies and only 29 percent of small companies. Although this suggests that company size is a strong predictor of action, results for the third categorization, which was by industrial sector, potentially undermine this conclusion. Slightly more than a third of the respondents (36 percent) were in the manufacturing sector. Ellis & Terwin found that a higher proportion of the respondents in this sector had taken action. For example, 62 percent of manufacturing companies had a workplace awareness program, compared to only 29 percent of non-manufacturing companies. But the average manufacturing company had more employees than the average non-manufacturing company, 255

compared to 155 . The authors' tabulated results thus do not permit a disentangling of the effects of industrial sector from the effects of company size, because sector and size are correlated in their sample.

A final implication pertains to [Ellis & Terwin's](#) (p. 26) speculation that "the level of knowledge and awareness of its [a company's] leadership of the existing and potential impact of the epidemic on the company" could be an important factor explaining the variation in responses across companies. They noted that companies were generally not very well informed about HIV/AIDS in their workforces. Only 14 percent had conducted studies to assess risks associated with the disease among their employees. Ellis & Terwin did not directly examine the correlation between knowledge and action in the survey responses, however.

The survey by [Bloom et al. \(2003-4\)](#) was an internet and mail survey that obtained responses from 7,789 companies in 103 countries. As in the survey by [Ellis & Terwin](#), the sample of companies was not drawn randomly, and no information is available on response rates across countries. Given these limitations in the sampling, the findings must be treated with caution. Findings are very similar to those reported by [Ellis & Terwin](#). Among the firms that responded, most are not taking any action. Those that are taking action are mainly disseminating information to their employees (16 percent of the respondents), and most of them do not have a written HIV/AIDS policy (only 6 percent have such a policy). Only around a tenth are taking more aggressive preventive action, such as distributing condoms (9 percent), offering voluntary counseling and testing (9 percent), or treating other sexually transmitted diseases (10 percent). Actions related to treatment of HIV/AIDS are generally less common than actions related to prevention; for example, only 5 percent of the companies make anti-retrovirals available to all infected

employees. The average company is not well informed about the potential impacts on it of HIV/AIDS. Only 13 percent of the respondents had conducted studies of HIV infection rates within their workforces. In comparison, higher proportions of respondents within Africa have an HIV/AIDS policy (12 percent), are taking preventive action (30 percent have awareness programs, 25 percent distribute condoms, 17 offer voluntary counseling and testing, 17 percent treat other sexually transmitted diseases), or are offering HIV/AIDS treatment (9 percent provide anti-retrovirals); slightly more have conducted studies on the workforce impacts (16 percent).

Unlike Ellis & Terwin, Bloom *et al.* attempted to identify drivers of action by conducting a statistical analysis of the survey responses. They claimed to address the question, “How does the policy environment impact the business response?” In fact, they addressed the question, “How does the policy environment impact respondents’ perceptions of the severity of the epidemic’s impact on their companies?” They did not analyze the companies’ responses per se. Instead, they ran logistic regressions that related perceived severity of impact against various factors, mainly ones related to the national policy environment, as opposed to company or respondent characteristics. Perceived impact is arguably a precursor to action. Their main finding was that, after controlling for differences in national infection rates and company size, respondents expect the epidemic to have a lesser impact if their companies are located in countries that are better governed. Respondents are more concerned if their companies are located in a country with a higher infection rate or if they estimate that the infection rate in their own workforces is higher.

Aside from the estimated workforce infection rate, Bloom *et al.* found little evidence that company characteristics affected the level of concern. They found that company size had only a modest effect, with larger companies tending to be somewhat more

concerned, and that ownership (private vs. government, domestic vs. foreign) had no effect. They speculated that reputation might be a driver for action by multinational companies with highly visible brands, but they did not formally analyze this proposition.

A simple economic model of companies' responses

The studies reviewed above propose various factors that could influence companies' responses (or, in the case of Bloom *et al.*, their perceptions of the impact of the epidemic). The factors include the national policy environment; industrial sector, which could affect the workforce impacts of the epidemic (*e.g.*, higher in more labor-intensive industries); size of company, which relates to scale economies, relevant in-company infrastructure (*e.g.*, company health clinic), and the opportunity cost of managers' time; connections to international parent companies (*i.e.*, foreign ownership), which relates to information flow and perhaps reputational incentives; private vs. government ownership; quality of accounting systems, which relates to the ability of companies to determine the financial impacts of the epidemic and the costs of alternative responses; managers' awareness of HIV/AIDS in their own workforces and the general population; and information about the epidemic, in particular risks within a company's own workforce.

Not all the studies find support for all these factors. Indeed, and as emphasized, with the exception of Bloom *et al.*, previous studies have not formally analyzed the effects of these factors, and Bloom *et al.* analyzed their effects on perceived impacts of the epidemic, not on companies' responses to it. But these factors are also mentioned commonly by other studies, and so, at the very least, there is merit in investigating them more rigorously and attempting to determine which are most important. For example, Smart (undated) highlights the need for companies to obtain new

types of information: “To minimise the effects of the epidemic requires concerted and sustained efforts in areas not traditionally addressed by organizations—efforts aimed at minimising workforce susceptibility and organizational vulnerability,” and such efforts require “understanding the current and future profile of the epidemic, measuring its impact within the workplace and on markets.” Natrass *et al.* (2004, p. 2) elaborate on the impact of the quality of a company’s accounting: “many of the more serious costs of the pandemic cannot be measured by traditional cost accounting mechanisms. Rather, corporate strategists must be engaged in such analysis, along with actuaries and accounting departments, so that the impact of an unpredictable, uncertain epidemic on the stability businesses crave can be incorporated.”

This is a long list of factors. An economic model of managerial decision-making, in which managers take action when they believe the expected benefits to the firm outweigh the expected costs, provides a useful conceptual framework for organizing them and generating hypotheses that we can test with data from the survey of Nigerian manufacturing companies. Given that our data pertain to companies in a single sector in a single country, the following description of such a model does not refer to the effects of sector characteristics or national policies, which are beyond the scope of our data.

The model can be thought of as containing two broad sets of variables. The first refers to the information available to managers about HIV/AIDS, which influences managers’ ability to judge benefits and costs. Both general and firm-specific information could matter. *General information* about AIDS and ways to prevent HIV infections is important for the simple reason that managers cannot be expected to take any action if they know nothing about the disease or believe that nothing can be done about it. We therefore hypothesized that firms are more likely to take action when managers have better access to information about the

epidemic. Public health agencies, NGOs, and religious groups are the usual sources of this information. Information might also flow to managers through less direct channels. For example, managers of companies linked to the global economy through trade and investment might be more likely to hear about preventive actions already taken by firms in countries where HIV and AIDS are more prevalent (*e.g.*, South Africa), although, as noted, international ownership might also be linked to scale economies (which reduces the costs of taking action) and reputational effects (which increases the benefits). On the other hand, headquarters of multinational companies sometimes mandate that local affiliates have an “AIDS program,” but the mandate is often unfunded, and the locals struggle to figure out how to respond.

Firm-specific information refers to managers’ understanding of the current status and likely future course of the epidemic within their workforces. This information is needed to determine whether HIV/AIDS poses a high or low risk and to determine the timing and magnitude of potential impacts (thus, to determine the potential returns to preventive actions). Seroprevalence surveys of employees provide the most reliable source of such information, but they are rare in developing countries other than South Africa. Instead, managers typically must gauge the risk of the disease in their workforces on the basis of their first-hand knowledge of existing employees who are HIV-positive or who died or left the workforce due to AIDS. Managers of firms with on-site medical clinics likely receive better information about the risks of HIV/AIDS in their workforces and more assistance in interpreting that information. Managers might also draw on their experience with the disease outside the workforce. For example, managers might be more familiar with AIDS if their firms are located in regions of a country with high HIV prevalence rates.

The second broad set of variables refers to *firm characteristics that affect the benefits and costs of action*. Characteristics that appear especially likely to have an effect include:

Size: Costs of action might be lower for larger companies, due to scale economies and the greater possibility of reshuffling responsibilities among multiple managers if one or more are given additional responsibilities for managing HIV/AIDS.

Medical clinic: Costs of action might be lower for firms with health practitioners on staff.

Financial status: More profitable companies might be more likely to take action, because they have more ample financial resources. Profitability might also signal management efficiency: more efficient managers are more likely to be vigilant about risk management, including the management of risks associated with AIDS.

Ownership: Greater accountability to company owners might cause the managers of private enterprises to examine financial aspects of HIV prevention programs more carefully than the managers of state-owned enterprises. This would be expected to make action more likely, if, as [Rosen et al. \(2003\)](#) argue, prevention programs pay off for a wide range of companies.

Accounting practices: Managers of firms with better accounting practices might be better able to assess the financial impacts of AIDS and the costs of prevention programs, which could affect the likelihood of action.

Ethnicity: Owners' cultural and religious beliefs might affect the set of feasible programs considered by managers. For example, programs to promote condom use have been deemed unacceptable in some parts of Africa, including Nigeria ([The Economist 2001a](#)).

In the remainder of the article, we describe how we used data from the 2001 Nigeria Firm Survey to analyze the impacts of these two groups of factors—the availability of information about

HIV/AIDS, and the characteristics of firms—on the likelihood of action by firms to prevent HIV/AIDS in their workforces.

2. THE 2001 NIGERIA FIRM SURVEY

The 2001 Nigeria Firm Survey was conducted by the World Bank's Africa Private Sector Group, under its Regional Program on Enterprise Development (Marchat *et al.* 2002). It covered a range of topics, from basic characteristics of firms (size, ownership, international connections, etc.) to issues affecting their competitiveness domestically and internationally (*e.g.*, labor quality, credit constraints, infrastructure, tax regulations, access to technology). It also included a module that contained questions about HIV/AIDS. We designed that module in cooperation with World Bank staff.

Key questions in the HIV/AIDS module were as follows.⁶ One question pertained directly to managers' access to external information about the epidemic:

1. "Did you receive any information about HIV/AIDS from outside the company last year?"

If respondents answered "Yes," they were asked to select the sources of information from the following list: government, nongovernmental health or medical organization, religious organization, some other nongovernmental organization, or other. They could select more than one source.

Two questions pertained to managers' experience with the disease in their workforces:

⁶ The question numbers shown here do not correspond to the actual numbers in the questionnaire.

2. "To your knowledge, is anyone in your company currently HIV-positive?"
3. "To your knowledge, has anyone in your workforce died or left your company in the past two years due to HIV/AIDS?"

Finally, one question pertained to firms' actions in response to the epidemic:

4. "Did your firm undertake any activities in the last accounting year to prevent HIV/AIDS among employees?"

If respondents answered "Yes," they were asked to select the activities from the following list (they could select more than one):

- a Put up posters
- b Handed out informational materials
- c Arranged speakers/performances about AIDS prevention
- d Distributed condoms on company premises
- e Trained employees to serve as peer educators or counsellors
- f Provided additional resources for treatment of STDs
- g Implemented HIV prevention projects in the community
- h Other

Note that activities a through c pertain to information dissemination, while activities d through g pertain to more active prevention measures. Also, note that all the activities refer to things that firms actually did, not things their policy statements said they should do. While noting that "Without a coherent and succinct HIV/AIDS policy, a company could find itself faced with an epidemic raging out of control," [George \(2002, pp. 76-77\)](#) pointed out that "It must also be remembered that formulating a

policy without implementing it is pointless.” As discussed earlier, the surveys by both [Ellis & Terwin \(2003\)](#) and [Bloom *et al.* \(2003-4\)](#) found that many of the companies that were taking action did not have official HIV/AIDS policies.

The survey was conducted during March-April 2001. It was administered through face-to-face interviews. All the firms in the sample were manufacturing firms in the formal sector, defined as firms that had registered with the Nigerian federal government’s “National Directory of Establishments.” Unlike the surveys by [Ellis & Terwin \(2003\)](#) and [Bloom *et al.* \(2003-4\)](#), the sample was drawn randomly, which provides more assurance that the survey results are representative of the entire population of firms. The sample frame was derived from the most recent directory, which was for 1996. Non-manufacturing firms were removed from this list, as were firms with fewer than 20 employees. These adjustments yielded a population of 15,574 firms, which was then stratified by location and industrial sector. The stratified sample frame included 1,853 firms, of which 311 were randomly selected for the survey.

A total of 232 firms were successfully interviewed, for a 75 percent response rate. The remaining 79 firms either refused to be interviewed or had gone out of business or switched sectors since 1996. The owner or general manager of each firm was the principal respondent. If a firm had a human resources director or personnel manager, that person was interviewed for the HIV/AIDS module. We obtained answers to at least one of the questions in the HIV/AIDS module from all but 2 of the 232 firms.

For more information on implementation of the survey, see [Marchat *et al.* \(2002\)](#).

3. RESPONSES TO THE SURVEY QUESTIONS

Table 1 and Table 2 provide basic information on the firms in the survey sample. Table 1 shows their distribution by industrial sector and workforce size. The firms were relatively evenly distributed across the 10 sectors. Size varied considerably, both across and within sectors. The largest firm in the sample had nearly 5,000 employees. These patterns are consistent with the sample providing a good representation of the Nigerian manufacturing sector (Marchat *et al.* 2002).

Table 2 shows the distribution of the firms by Nigerian states. We have grouped the states into three HIV prevalence regions: low (<4 percent of the population is infected), medium (4-8 percent infected), and high (>8 percent infected). These groups are based on infection rates reported in National AIDS/STD Control Programme (2001). Although most of the firms were in the low prevalence region, nearly one-third were in the medium and high prevalence regions.

Table 3 summarizes the responses to the questions in the HIV/AIDS module. Nearly half of the respondents reported receiving information about HIV/AIDS from some external source during the previous year. The main sources were health or medical organizations, followed by the government. Many fewer respondents reported direct experience with HIV/AIDS in their workforces. Only about 1 in 7 reported being aware of an AIDS-related death or retirement in the past two years, and even fewer—only about 1 in 13—knew of anyone in the company who was currently HIV-positive.

The small number of affirmative responses to Question 2 and Question 3 could be viewed as consistent with a finding by Bloom *et al.* (2003-4), that companies around the globe tend to estimate infection rates among their workers that are lower than population-wide estimates from official sources, such as UNAIDS.

Bloom *et al.* found that the disparity is most extreme in Africa. Moreover, in view of the statistics in Table 1 and Table 2, the small number of affirmative responses to these two questions is not surprising. With approximately 100 employees and an average HIV prevalence rate of about 6 percent in the adult population, the median firm would be expected to have only 6 HIV-positive

Table 1: Classification of firms by industrial sector and size of workforce

Industrial sector	Number of employees			Total number of firms
	<100	100-500	>500	
Chemicals and paints	13	10	3	26
Food and beverage	11	17	6	34
Machinery and tools	4	4	2	10
Metal	10	20	1	31
Non-metal	8	9	1	18
Paper/printing and publishing	13	7	0	20
Pharmaceuticals	11	8	2	21
Plastics	14	8	1	23
Textile and leather	5	8	15	28
Wood	14	4	1	19
All sectors	103	95	32	230

Table 2: Classification of firms by HIV prevalence
region and state

Prevalence regions and states	HIV prevalence (2001)	Number of firms
<i>Low HIV prevalence region</i>		
Abia	3.3%	15
Jigawa	1.8%	3
Kano	3.8%	32
Lagos	3.5%	98
Ogun	3.5%	10
All states	-	158
<i>Medium HIV prevalence region</i>		
Anambra	6.5%	14
Enugu	5.2%	3
Kaduna	5.6%	17
Kwara	4.3%	4
Oyo	4.2%	17
River	7.7%	10
All states	-	65
<i>High HIV prevalence region</i>		
Benue	13.5%	5
Plateau	8.5%	4
All states	-	9

Table 3: Managers' responses to questions about HIV/AIDS

Question	Number of firms that responded to question	Proportion responding "Yes"
1. Did you receive any information about HIV/AIDS from outside the company last year?	225	45.3%
<i>If "Yes", what was the source?</i>	<i>Proportion of those responding "Yes"</i>	
Health or medical organization	62.9%	
Government	48.5%	
Other NGO	28.7%	
Religious organization	11.0%	
Other	7.4%	
2. To your knowledge, is anyone in your company currently HIV-positive?	196	7.7%
3. To your knowledge, has anyone in your workforce died or left your company in the past two years due to HIV/AIDS?	214	13.6%

4. Did your firm undertake any activities in the last accounting year to prevent HIV/AIDS among employees?	227	31.7%
<i>If "Yes", what did it do?</i>	<i>Proportion of those responding "Yes"</i>	
c. Arranged speakers/ performances about AIDS prevention		70.3%
a. Put up posters		64.4%
b. Handed out informational materials		61.6%
d. Distributed condoms on company premises		34.7%
e. Trained employees to serve as peer educators or counsellors		20.8%
f. Provided additional resources for STD treatment		5.6%
g. Implemented HIV prevention projects in the community		4.2%
h. Other		10.3%

workers.⁷ Since the onset of AIDS occurs many years after infection with HIV, and since AIDS is manifested as the symptoms of other diseases that workers develop as their immune systems become increasingly compromised (*e.g.*, pneumonia and tuberculosis), most managers might not have known about current workers who were HIV-positive and past workers who had succumbed to AIDS. In much of sub-Saharan Africa, even official death records typically list opportunistic infections as the cause of death for those with AIDS (Dorrington *et al.* 2001). Moreover, the

⁷ This is a crude calculation that ignores, among other things, employee gender and age. A more precise calculation would not change our main point, however.

stigma associated with being found to have HIV means that employees might go to great lengths to hide evidence of their infection from their employers (*The Economist* 2001a). For these reasons, we strongly suspect that more than 8 percent of the firms had HIV-positive employees in their workforces at the time of the survey and that more than 14 percent had lost employees to AIDS.

Despite their apparently limited direct experience with HIV/AIDS, almost one-third of the respondents reported that their firms had undertaken activities to prevent HIV infection among their employees. Activities related to information dissemination were by far the most common. Among the more active preventive measures, only the distribution of condoms on company premises and the training of employees to serve as peer educators and counselors were being implemented by many (but still a minority of) firms. These results are broadly consistent with those reported by *Ellis & Terwin (2003)* and *Bloom et al. (2003-4)*.

The evidence that most firms had not taken any action on HIV/AIDS, and that those that had taken action had done so in a relatively passive way, is understandable when seen in the context of the business climate in Nigeria. Responses to other questions in the survey indicate that Nigerian firms incur extraordinarily high costs for basic inputs, such as electricity and water, and for a range of transactions with labor unions, private institutions such as banks, and government agencies (*Marchat et al. 2002*). These conventional business problems can be expected to contribute to keeping HIV/AIDS off the list of priority concerns of Nigerian managers.

4. STATISTICAL ANALYSIS OF THE RESPONSES

We used logistic regression models to determine why, despite the difficult business environment in Nigeria, some firms

nevertheless had taken action on AIDS. The dependent variables in these models—that is, the actions we sought to explain—were based on the responses to [Question 4](#). The explanatory variables included those related to both sets of factors discussed at the end of [section 1](#): [general](#) and [firm-specific](#) information about HIV/AIDS available to managers, and [firm characteristics](#) that might affect the benefits and costs of action.

To explore relationships in the data, we first estimated univariate models, in which we regressed each dependent variable on each explanatory variable, one at a time. This identifies the existence of simple correlations between the pairs of variables. We then investigated the relative importance of the different explanatory variables more carefully, by estimating multivariate models, which included more than one variable at once. The multivariate analysis amounts to a competition among the explanatory variables, in which only the strongest (*i.e.*, the ones that are statistically most significant) survive.

Below, we first describe the construction of the variables that we used in the logistic regression models, then we present the results for the univariate and multivariate analyses in turn.

Construction of the dependent and explanatory variables

We analyzed two dependent variables. The first, which we labeled “Information dissemination,” equaled 1 if the firm had taken *any* of the three actions described in parts a, b, and c of [Question 4](#), and 0 otherwise. The second, “Active prevention,” equaled 1 if the firm had either distributed condoms or trained employees to serve as peer educators or counselors (parts d and e of [Question 4](#)), and 0 otherwise.

Information for constructing the explanatory variables came from both the HIV/AIDS module and other parts of the survey. The responses to [Question 1](#), [Question 2](#), and [Question 3](#) enabled us to construct 0-1 variables related to managers’ exposure

to external information about HIV/AIDS ([Question 1](#)) and their experience with the disease among workers ([Question 2](#) and [Question 3](#)). Responses to questions in other parts of the survey enabled us to construct the following firm-level variables:

International linkages (as discussed in [section 1](#), possibly related to access to information about HIV/AIDS, though also to scale economies and reputation): foreign ownership (percent); firm is part of a family of firms or an industrial group (0-1 variable); exports (percent of output).

Size: employees (total number); annual sales last accounting year (million naira, the Nigerian currency).

Medical clinic: firm has on-site medical services (0-1 variable).

Financial status: gross profits before taxes last accounting year (million naira).

Ownership: government ownership (percent of equity); foreign ownership (percent of equity); firm is listed on the Nigerian stock market (0-1 variable).

Accounting practices: firm keeps accounts on an annual basis (0-1 variable); accounts are audited by an outside agency (0-1 variable).

Ethnicity: ethnic origin of owners of private firms (0-1 variables for European, Indian, Lebanese, other).

We measured managers' experience with HIV/AIDS outside their companies by constructing a variable that equaled the prevalence rate in the state where each firm was located (*i.e.*, the rates in [Table 2](#)).

Results for univariate models: which factors matter when analyzed one at a time?

We found that several of the explanatory variables were not significantly associated with either of the dependent variables at a 5-percent significance level ($p \leq 0.05$): foreign ownership percentage, export percentage, both accounting variables, the

owner being of non-European origin, and HIV prevalence in the state where a firm was located. The insignificance of the last variable is informative from a public health standpoint: firms in states where the epidemic is more severe are no more likely to have taken action against it than those where HIV is not very prevalent. This might reflect the relatively early stage of the epidemic in Nigeria, where large increases in illness and death due to AIDS are not yet obvious. However, given that Ellis & Terwin (2003) reported a similar finding for South Africa, where the epidemic is most certainly not at an early stage, the more likely explanation is that firms do not view population-wide infection rates as sufficient evidence of a business risk that should prompt them to take action.

Table 4 presents the odds ratios for explanatory variables that were statistically significant for one or more of the dependent variables. An odds ratio indicates the magnitude of an explanatory variable's impact on the probability that firms took a particular action. For example, the odds ratio of 9.48 in the first row of the first column indicates that firms with managers who received external information about HIV/AIDS during the past 2 years were 9.48 times more likely to disseminate information about HIV/AIDS to their employees than were firms whose managers did not have this experience. The variables are listed in decreasing order of the odds ratios for information dissemination. Odds ratios that were significantly different from the neutral value of 1 are marked by an asterisk (*), with 95-percent confidence intervals shown in parentheses.

The univariate results in Table 4 indicate that the factors affecting information dissemination and active prevention were very similar. Six variables had large, statistically significant impacts on both actions, where "large" is defined as an odds ratio greater than 2: the respondent received information about HIV/AIDS from outside the company, the respondent knew of

Table 4: Univariate models: odds ratios for predictors of actions by firms against HIV/AIDS

<i>Variable</i>	<i>Actions by firms against HIV/AIDS</i>	
	<i>Information dissemination</i>	<i>Active prevention</i>
Firm received information about HIV/AIDS last year, from any outside source	9.48* (4.80, 18.70)	14.39* (4.22, 49.10)
Someone who worked for the firm died or left due to HIV/AIDS in the last 2 years	6.91* (2.94, 16.26)	6.04* (2.45, 14.87)
Firm has an on-site medical clinic	4.18* (2.29, 7.64)	4.18* (1.87, 9.35)
Someone in the firm is known to be HIV-positive	4.16* (1.41, 12.29)	5.69* (1.82, 17.73)
Owner is of European origin	3.64* (1.26, 10.5)	4.92* (1.57, 15.47)
Firm is listed on the Nigerian stock market	2.77* (1.34, 5.72)	5.95* (2.56, 13.82)
Firm is part of a family of firms or an industrial group	2.66* (1.41, 5.04)	2.17 (0.89, 5.30)
Total number of employees	1.00* (1.00, 1.00)	1.00* (1.00, 1.00)
Gross profits before taxes last accounting year	1.00* (1.00, 1.01)	1.00* (1.00, 1.01)

*Note: Table 4 shows results only for explanatory variables that were statistically significant at the 5-percent level for at least one of the two types of action. 95-percent confidence intervals are shown below the point estimates. * = statistically significant at $p \leq 0.05$.*

someone who had died or left the company due to HIV/AIDS, the company has on-site medical services, the respondent knew of someone in the firm who was HIV-positive, the company owner is of European origin, and the company is listed on the Nigerian stock exchange. The significance of information from outside the company supports the argument that companies need new types of information to understand and respond to HIV/AIDS (Smart, undated) but are typically ill-informed (Ellis & Terwin 2003, Bloom *et al.* 2003-4). The significance of knowledge of employees who were HIV-positive or had died or left the company due to HIV/AIDS is in line with Bloom *et al.*'s (2003-4) finding that respondents were more concerned about the impacts of HIV/AIDS if they estimated that the infection rate in their own workforces was higher. The significance of on-site medical services is consistent with George's (2002) South African case studies. The significance of European ethnicity could be signaling international linkages, as opposed to the owner's ethnicity per se. Along these lines, note that a seventh variable, the firm belonging to a family of firms or an industrial group, had a large, significant impact on information dissemination and nearly so on active prevention. This is consistent with evidence from the case studies that subsidiaries benefit from scale economies and better access to information and with Bloom *et al.*'s (2003-4) speculation that reputation can motivate more visible firms. Finally, the significance of being listed on the stock exchange could reflect various factors in addition to the effects of public ownership, in particular size (larger companies tend to be listed) and quality of accounting practices (because of requirements related to listing).

Strictly speaking, total number of employees was statistically significant, but it has an odds ratio greater than 1 only at the third decimal place, which is not shown in Table 4. The same is true of the gross profits variable, which is highly correlated with company size, because it is expressed as *total* gross profits.

The negligible impact of these two variables contrasts with the emphasis on the importance of company size in the case study literature. On the other hand, it is in line with Bloom *et al.*'s (2003-4) finding that size had only a modest impact on respondents' concern about HIV/AIDS in their global survey and with evidence in Rosen *et al.* (2003, p. 86) that the magnitude of the "AIDS tax" (the total annual cost of AIDS as a percentage of salaries and wages) is not related to company size. Our results indicate that, rather than size itself, what matters are specific factors that might be associated with size—for example, whether a company has a health clinic and whether its managers are likely to observe cases of AIDS in their workforces.

Results for multivariate models: which factors matter when analyzed in combination?

Table 5 shows our final multivariate models, which include only explanatory variables that were statistically significant at a 5-percent level. We started with models that included all the explanatory variables. We then sequentially removed variables that were the least statistically significant (backwards elimination). We arrived at the final specifications shown in Table 5 by adding the eliminated variables back in, one by one, to check that they remained insignificant (forward selection).

The multivariate results mirror the univariate ones. Receiving information about HIV/AIDS from any external source was a significant predictor of both actions. External information did not tell the whole story, however. Information dissemination and active prevention were also significantly affected by other variables, especially managers knowing a current worker infected with HIV or a past worker who had died or left because of HIV/AIDS. (Combining the two variables into one worked better than including them separately.) Two firm characteristics also

mattered for information dissemination (the firm is part of a family or group of firms; the firm has an on-site medical clinic), and one

Table 5: Multivariate models: odds ratios for predictors of actions by firms against HIV/AIDS

<i>Variable</i>	<i>Actions by firms against HIV/AIDS</i>	
	<i>Information dissemination</i>	<i>Active prevention</i>
Firm received information about HIV/AIDS last year, from any outside source	7.83* (3.46, 17.69)	9.64* (2.69, 34.42)
Someone who worked for the firm died or left due to HIV/AIDS in the last 2 years <i>or</i> Someone in the firm is known to be HIV-positive	6.36* (2.30, 17.57)	4.20* (1.57, 11.25)
Firm is part of a family of firms or an industrial group	2.86* (1.22, 6.71)	n.s.
Firm has an on-site medical clinic	2.22* (1.04, 4.76)	n.s.
Firm is listed on the Nigerian stock market	n.s.	4.39* (1.60, 12.05)

*Note: Table shows results only for models in which all predictors were statistically significant at the 5-percent level. 95-percent confidence intervals are shown below the point estimates. * = statistically significant at $p \leq 0.05$. n.s.: Excluded from final version of model due to lack of statistical significance.*

mattered for active prevention (the firm is listed on the Nigerian stock market).

As in the univariate models, the odds ratios for external information are extremely large. There is a statistical reason why both the univariate and multivariate models could conceivably exaggerate the impact of external information on firms' actions. These models are based on an implicit assumption that managers are passive recipients of external information. It is possible that managers instead actively seek information about HIV/AIDS in order to disseminate it to their workers or to use it to design more aggressive prevention programs. If that is the case, then the receipt of external information will be highly correlated with firms' actions in the survey data, even though the former did not cause the latter. Based on interviews with the survey respondents, we doubt that this "endogenous information" effect is very large, but we note it here as a possibility that future studies should examine more carefully.

5. DISCUSSION

Our overall finding is that firms' actions on AIDS are determined primarily by what managers know about the epidemic: their exposure to external information about it and their knowledge of workers who are HIV-positive or have left the workforce because of AIDS. The significance of managers' first-hand experience is consistent with results from studies on the reasons individuals change sexual and other behaviors that place them at a high risk of HIV infection. Those studies have found that knowing someone who died of AIDS is a key reason for behavioral change. As one study puts it, it's "who you knew" that matters ([Macintyre et al. 2001](#)). We also found evidence that "what you know" matters: firms with managers who received information about

HIV/AIDS from some outside source were more likely to take action than firms with managers who did not receive outside information, even if both groups of managers had first-hand experience with the disease in their workforces.

Managers' knowledge is the main driver, regardless of the type of action taken by the firms in our sample: information dissemination or active prevention. Once it is taken into account, few characteristics of firms have much predictive power, and there is little consistency in their impacts across different actions. One exception might be a firm being listed on the Nigerian stock exchange. Although this variable has a statistically significant impact only on active prevention in the multivariate models, it has a significant impact on both actions in the univariate models. Another might be a firm having on-site medical services. This variable has a significant impact on just information dissemination in the multivariate model but on both information dissemination and active prevention in the univariate models.

The dominant role of managers' knowledge is an encouraging finding, because changing what managers know about HIV/AIDS is obviously more feasible than changing, say, a firm's ownership, profitability, or size. In combination with the large odds ratios for the knowledge variables, the relative insignificance of general firm characteristics suggests that providing better information to managers will greatly increase the odds that a broad range of firms will respond to AIDS even in countries like Nigeria, where firms face many other challenging business problems.

Business associations, national governments, and international organizations can all facilitate the provision of better information (Bloom *et al.* 2003-4). Dissemination of high-quality information by international associations, such as the Global Business Coalition on HIV/AIDS, and multilateral organizations, such as UNAIDS and the World Health Organization, can lay the foundation for actions by firms in developing countries. The ability

of international bodies to deliver this information to firms with weak international linkages is limited, however. Government agencies, trade associations, local chambers of commerce, and labor unions must bridge this gap. Government agencies need to provide up-to-date and location-specific information on the extent of the epidemic. Trade associations, local chambers, and labor unions can then use this information to encourage firms in heavily affected or emerging epidemic areas to take action. An encouraging development in this regard was a July 2003 meeting organized by the World Economic Forum, which brought together national anti-AIDS business coalitions from 15 African countries, including Nigeria, to share information and develop joint strategies (WEF 2003). This was the first time the coalitions had met.

Our results indicate that company-specific information is the most important type of information for prompting action. Managers' first-hand experience with the disease is significantly associated with Nigerian firms taking action, but the infection rate in the general adult population is not. Some South African companies now regularly conduct HIV seroprevalence surveys to obtain accurate information on the extent of the disease in their workforces. These surveys are anonymous, and employees have the right to opt out if they so choose. They are relatively inexpensive (\$3-4 per test, according to Rosen *et al.* 2003). Seroprevalence surveys are probably even more important in countries like Nigeria, where the epidemic is less advanced and therefore less visible and where managers evidently underestimate the number of workers infected. International and national organizations and business associations can play a role in promoting such surveys. As a more modest step, they can also promote voluntary counseling and HIV testing of workers. Compared to seroprevalence surveys, voluntary counseling and testing involves less systematic and less comprehensive collection

of information on workforce infection rates, as it is an “on demand” approach, under which participation is initiated by employees. For such reasons, the Global Business Coalition instead strongly favors seroprevalence surveys (see www.businessfightsaids.org). Voluntary counseling and testing might nevertheless generate information that prompts companies to take action, if worker participation is good and aggregate results are made available to managers on a regular basis.

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