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AIDS Research and the Behavioral and Social Sciences

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25. AIDS Research and the Behavioral and Social Sciences

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A National Academy of Sciences' committee is preparing a review of social, behavioral, and statistical research needed to improve our ability to monitor the course of the AIDS epidemic, to control its spread, and to cope with its consequences (*1*). Our purpose here is to highlight a few of the relevant issues that will be discussed in that volume. Our central thesis is that efforts to control the AIDS epidemic and cope with its consequences will depend crucially upon the paradigms, data, and methods of the behavioral and social sciences.

We begin by reminding ourselves of the impending magnitude of the epidemic and the growing demands AIDS will place on this society in the coming decade.

In 1988, America stands at the base of a steeply rising curve of projected AIDS cases and deaths that will occur among relatively young and traditionally healthy segments of our population. It is projected, for example, that during the 12-month period from January through December of 1991, 54,000 Americans will die of AIDS. This exceeds the total number of AIDS deaths we have experienced during the entire period from the first known death in the 1970s through today (5 September 1988).

The AIDS epidemic is striking an American population that has little historical experience of fatal infectious epidemics. Indeed, polio is the only infectious epidemic disease within the memory of a sizable fraction of the American people that endangered equally large numbers of young Americans. However, as Fig. 1A shows, the surge in new AIDS cases in the next 3 years will outstrip the rapid rise in polio cases during the postwar period (if we assume that the CDC's projections are accurate). Furthermore, the American population had a long acquaintance with polio prior to its upsurge in the postwar period, whereas the current population has had no prior familiarity with AIDS. Finally, as shown in Fig. 1B, although polio often crippled, it killed fewer than 10% of those who developed the disease during the postwar period. Thus, at height of the polio epidemic in 1952, annual deaths numbered only 3,145. In contrast, of 72,645 reported cases thus far in the AIDS epidemic, more than half have already died.

Social Implications

The societal and psychological consequences of the impending rapid rise in AIDS cases and deaths are difficult to imagine in detail; however, they are likely to be enormous. If the epidemiological predictions prove correct, the AIDS epidemic is

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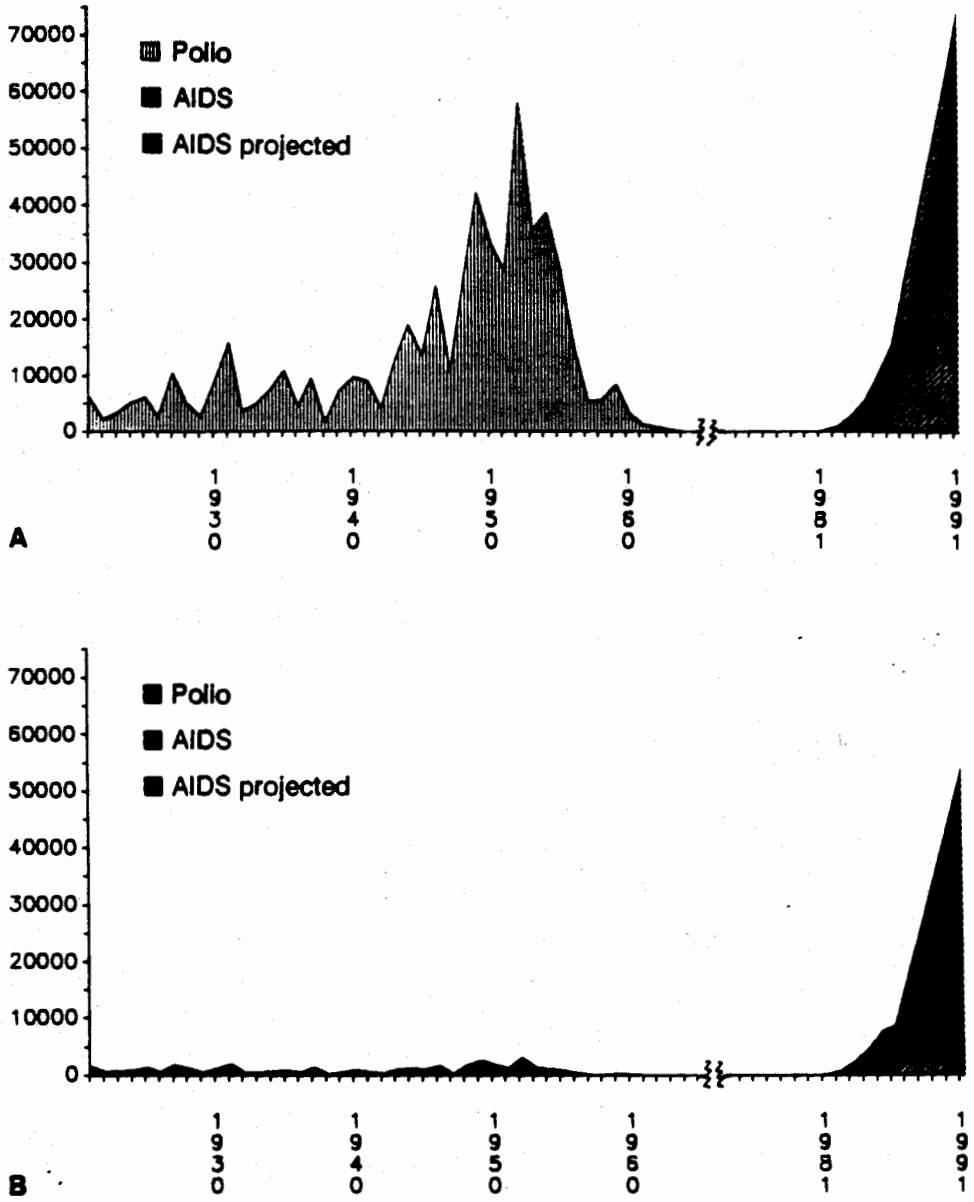

Fig. 1. (A) Number of new polio cases diagnosed during each year between 1921 and 1966 and number of new AIDS cases diagnosed during each year between 1981 and 1985 plus estimated AIDS cases for 1986 and 1991. (B) Number of known polio deaths reported during each year between 1921 and 1966 and number of known AIDS deaths reported during each year between 1981 and 1985 plus estimated AIDS deaths for 1986 and 1991. *SOURCES*: Polio: unpublished data, Data Management Branch, Division of Immunization, Center for Prevention Services, CDC (Dr. Hutchin, personal communication). AIDS: 1981 through 1986 from Centers for Disease Control, *AIDS Weekly Surveillance Report United States*, March 7, 1988, p. 5. Projections for 1987 through 1991 have been interpolated from 1986 and 1991 estimates in Coolfont report (Public Health Service, 1986).

likely to make extraordinary demands on almost every sector of American society during the 1990s.

Indeed, there is already evidence of stress that has developed in a variety of institutions and organizations. Increasingly, educational institutions are being drawn into conflicts over the content of AIDS education programs as well as the provision of schooling for children with AIDS and HIV infection. Hospitals in some regions are experiencing major shifts in their populations and in the needs of their patients. Policymakers in government and the private sector are facing varied demands for testing, identification, and control of infected individuals along with counter-demands to combat discrimination in employment, housing, health insurance, and the provision of medical care. Perhaps most dramatically, the stigma of the disease together with the unfounded fears that HIV may spread via casual contact have resulted in numerous instances where infected adults and children have been excluded from classrooms, workplaces, and other settings. And in one instance, we have witnessed incineration of the home in which three seropositive children lived.

Although a biomedical solution to this crisis will hopefully be found eventually, the consensus among biomedical experts is that fully effective treatments and vaccines may not be available for at least 5 years and perhaps not for considerably longer. In the interim, society will have to confront the immense social, psychological, and economic problems posed by this disease. It is our contention that the paradigms, data, and methods of the behavioral and social sciences will play a crucial role in the national response to the AIDS epidemic. The range of urgently needed research is extraordinarily broad. Here we provide illustrations of three types of work that are needed. The first involves a field of research that has been relatively neglected in recent years—studies of human sexual behavior.

Human Sexual Behavior

It is now widely recognized that controlling the spread of the AIDS epidemic will require a national effort to persuade a sizable fraction of the population to modify their sexual behaviors. This will be critical for the segments of the population that are currently sexually active with multiple partners (concurrently or serially) and for young persons who will become sexually active in future years. This need, in turn, has generated a renewed appreciation of the need to sustain rigorous programs of basic research on human sexual behavior. Understanding the varieties of sexual behaviors and how people integrate those behaviors into their lives will be crucially important if we wish to persuade individuals to modify their sexual behavior in order to diminish the risk of spreading the infection.

The urgency of the AIDS epidemic has cast a harsh light on the gaps in scientific knowledge about sexual behavior in the American population. These insufficiencies have handicapped our efforts to predict the future course of the AIDS epidemic. For example, current epidemiological projections of the magnitude of the AIDS epidemic depend on estimates of the size of the population of homosexual men (or more precisely the size of the population of men engaging in homosexual sex, whether or not they define themselves as homosexual). The most recent CDC estimates (*2*) of the prevalence of HIV infection in the population use data collected by Kinsey (*3*) in the 1940s to estimate the current number of male homosexuals in the United States. Even 30 years ago, Kinsey's data were widely regarded (*4*) as unreliable for use in making

such estimates because Kinsey's research did not employ probability sampling, and because his respondents were disproportionately drawn from the Midwest and college campuses. Today, a further leap of faith is required since we must also assume that the relative size of the (self-reported) homosexual population is the same in the 1980s as it was in the 1940s.

Similarly, as noted by Anderson and May (*5*), mathematical models of the dynamics of the spread of HIV infection require an understanding, among other things, of the distribution of the rate of acquisition of new sexual partners in the population. The number of contacts over a period of time (together with the probability of transmitting the infection to a new contact) are key determinants of the "reproductive rate" of the epidemic (that is, the number of new infections generated by a single infected individual). Currently we lack reliable data on sexual contacts for representative samples of adults in the national population. Indeed, we lack fully trustworthy information from which to estimate the size of the nonmonogamous heterosexual population.

In contrast to the paucity of data on adult sexual behaviors, a series of surveys of adolescent sexual behaviors does exist. These data collection efforts were motivated by concerns about teenage pregnancy. With reference to educational campaigns advising teenagers to just "Say No to Sex," it is worth noting that careful surveys of large representative samples indicate that roughly three-quarters of young women and four-fifths of young men begin having sexual intercourse during their teen years (*6*). Indeed, the 1983 National Longitudinal Survey of Youth found that 29% of boys and 13% of girls reported that they had intercourse prior to their 16th birthday (*7*). Furthermore, a 1979 survey (*8*) of 15- to 19-year-old females residing in metropolitan areas found that of those who reported having intercourse, slightly more than half reported having had two or more sexual partners. Indeed, 8% reported having had a total of four or five sexual partners, and another 8% reported having six or more partners.

These data suggest that current disputes over "appropriate" AIDS education for teenagers reflect a societal unwillingness to confront the facts about adolescent sexual behavior. Data such as these underscore the importance of including explicit information about the protective value of condoms in educational campaigns aimed at sexually active teenagers.

Educating the Public

A second role the social and behavioral sciences will play in combating AIDS involves the design of interventions to produce appropriate behavior changes.

Controlling the spread of the AIDS epidemic must rely on efforts to induce widespread and lifelong changes in human behavior. Probably the most important lesson learned from the literature (*9*) on attempts to encourage adolescent contraceptive behaviors, treat chemical dependency, and prevent sexually transmitted diseases is that effective efforts must go beyond the dissemination of information. Education is only a preliminary step.

A number of surveys conducted since 1985 showed that almost every American adult already knew the correct answer when asked whether the AIDS virus can be transmitted by sexual intercourse or sharing needles (see Fig. 2). However, as shown in Fig. 3, considerable public confusion remained about the transmissibility of AIDS

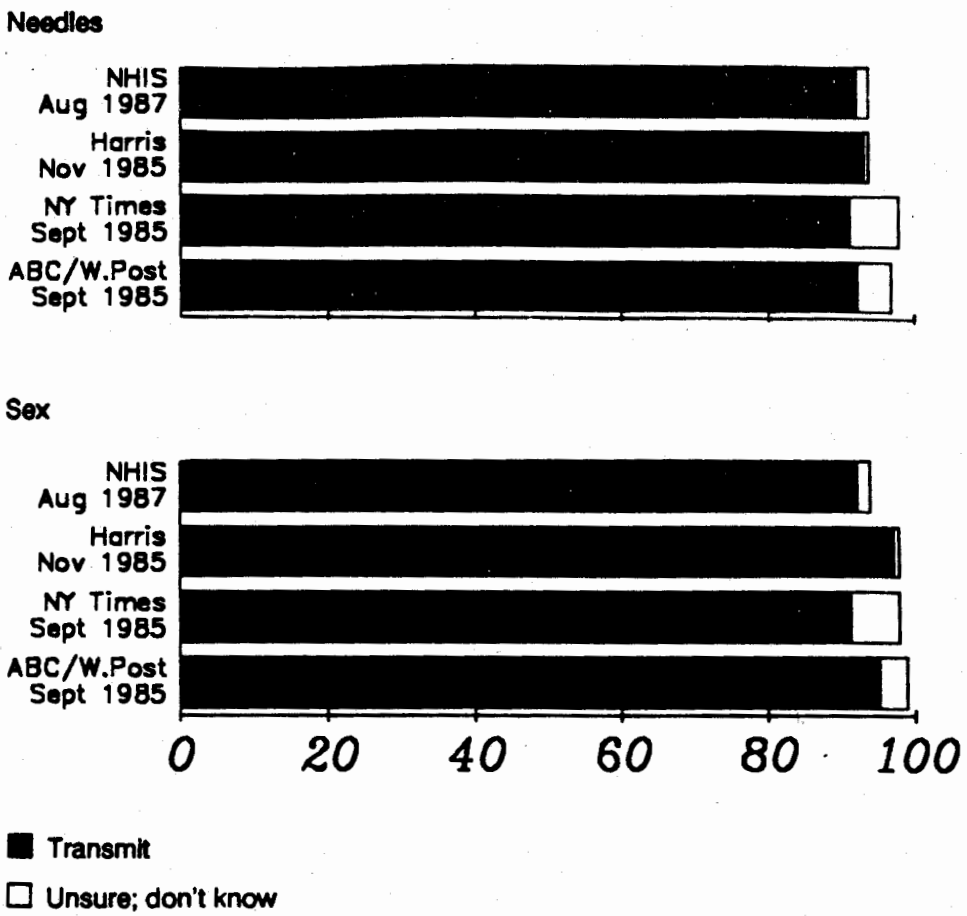

Fig. 2. Alternative estimates of the percentage of American adult population aware that AIDS infection can be transmitted by sex and by needle sharing. The questions were:
Harris: Now let me ask you how you think AIDS can be spread. Do you think people are highly likely to catch AIDS {from homosexual sex acts} {from use of contaminated needles in the injection of drugs}? (*Note*: Alternate response categories were: somewhat likely, not very likely at all, not sure. Survey questionnaire is unclear as to how interviewers were to present these alternatives.) Percent saying very likely or somewhat likely shown as "transmit" in the above figure.
NY Times: Here are ways some people say you can get AIDS. For each of them, tell me whether you think it's possible to get AIDS that way. Can you get AIDS {by using a hypodermic needle that a person with AIDS has just used?} {by having sex with a person who has AIDS?}
ABC/W.Post: I'm going to read you a list. For each item please tell me if you think that it is or is not a way for someone to catch AIDS from someone who has it. If you are not sure, please tell me. Can you catch AIDS {from intimate sexual contact} {from sharing intravenous needles}.
NHIS (National Health Interview Survey): How likely do you think it is that a person will get the AIDS virus from {sharing needles for drug use with a person who has AIDS} {having sex with a person who has AIDS}. (Response categories were: very likely, somewhat likely, somewhat unlikely, very unlikely, and definitely not possible. Percent saying very likely or somewhat likely shown as "transmit" in above figure.)

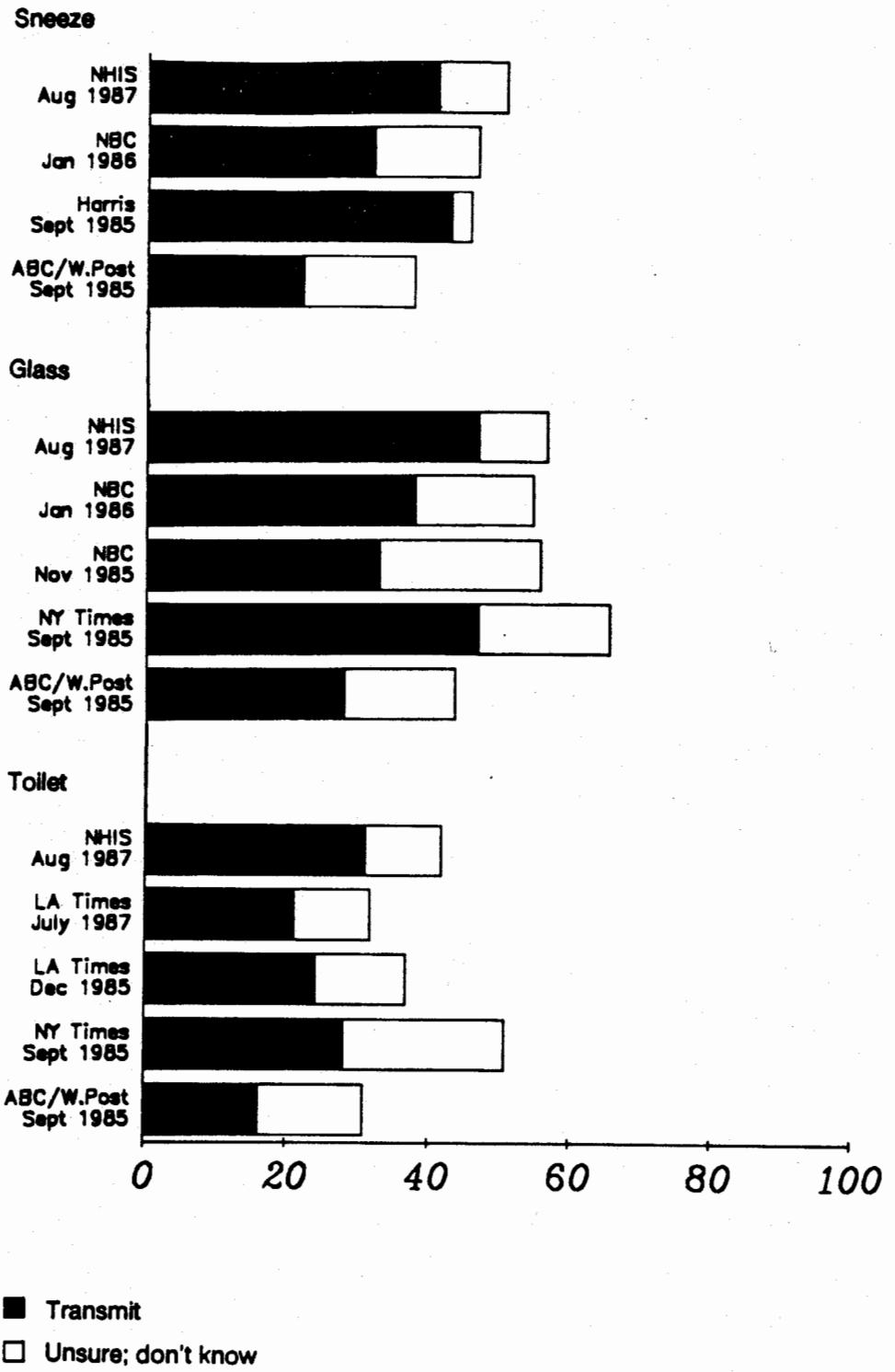
Sneeze
NHIS Aug 1987
NBC Jan 1986
Harris Sept 1985
ABC/W.Post Sept 1985
Glass
NHIS Aug 1987
NBC Jan 1986
NBC Nov 1985
NY Times Sept 1985
ABC/W.Post Sept 1985
Toilet
NHIS Aug 1987
LA Times July 1987
LA Times Dec 1985
NY Times Sept 1985
ABC/W.Post Sept 1985
0
20
40
60
80
100
Transmit
Unsure; don't know

Fig. 3. Alternative estimates of percent of American adult population believing that AIDS infection can be transmitted by drinking glasses, sneezes, and toilets. The questions were:
Harris: Now let me ask you how you think AIDS can be spread. Do you think people are highly likely to catch AIDS from inhaling sneezes and coughs of those with AIDS? (*Note*: Alternate response categories were: somewhat likely, not very likely at all, not sure. Survey questionnaire is unclear as to how interviewers were to present these alternatives.) Percent saying very likely or somewhat likely shown as "transmit" in the above figure.
NY Times: Here are ways some people say you can get AIDS. For each item, tell me whether you think its possible to get AIDS that way. Can someone get AIDS {by drinking from a glass just used by a person with AIDS} {from a toilet seat} ("No opinion" response shown as "unsure.")
ABC/W.Post: I'm going to read you a list. For each item please tell me if you think that it is or is not a way for someone to catch AIDS from someone who has it. If you are not sure, please tell me. Can you catch AIDS {from using the same drinking glass} {from being sneezed on} {from sitting on a toilet seat}.
NBC/1985-86: From what you know, do you think you could get AIDS from drinking from the same glass as someone who has AIDS? (1985 survey used "can get" instead of "could get")
LA Times: In your opinion, can someone catch AIDS from a toilet seat?
NHIS (National Health Interview Survey): How likely do you think it is that a person will get the AIDS virus from {sharing plates, forks or glasses with someone who has AIDS} {using public toilets} {being coughed or sneezed on by someone who has AIDS}. (Response categories were: very likely, somewhat likely, somewhat unlikely, very unlikely, and definitely not possible. Percent saying very likely or somewhat likely shown as "transmit" in above figure.)

by casual contact. Indeed, the most recent measurements give some of the largest estimates of the proportions believing in transmission via casual contact. Differences in question wording and survey procedures, however, make this finding difficult to interpret. Nonetheless, between 1985 and 1987,

- between 33 and 47% of American adults reported believing that sharing a drinking glass can transmit AIDS;
- between 22 and 43% of American adults reported believing that the infection can be communicated by sneezes;
- between 16 and 28% of American adults reported suspecting that toilets can transmit the AIDS infection.

Such results suggest that, at least at the level of knowledge being tapped by these simple questions, education for the general public may be most necessary to impart knowledge about how AIDS is not spread.

Widespread public awareness that sex and needle-sharing can transmit infection does not, however, automatically translate into appropriate risk-reduction behaviors or, indeed, a realistic appraisal of personal risk.

Sexual risk-taking

Although there are few scientific data on the sexual habits of American adults, some commercial surveys and opinion polls have begun to gather reports from national samples of the adult population. Although not without problems, these data provide the only available information on sexual behavior and sexual risk-taking derived from large cross-sections of the national adult population. This dearth of scientific data will continue until the NICHHD survey program goes into the field in 1989 (*10*). We believe it to be a national embarrassment that today, in the eighth year of the AIDS

epidemic, we must rely on second-hand data provided to us by the generosity of commercial pollsters.

One such commercial telephone poll of 2095 adults was designed as a probability sample of telephone-owning households. The sample design incorporated both a national sample and an over-sampling of the five cities with the greatest numbers of AIDS cases (Los Angeles, Miami, New York City, Newark, and San Francisco). The survey was conducted by the *Los Angeles Times* from 24 to 28 July 1987.

In reviewing the details of this survey's execution, we conclude that failure to obtain complete response from all designated respondents (because of their refusal to be interviewed, for example) (*11*) prevents us from confidently projecting the survey results to the entire adult population of the nation. Rather, the estimates reflect that one-third to one-half of the adult population can be reached by telephone (within three call-backs) and will consent to a telephone interview as part of a "public opinion survey" being conducted by a newspaper. This portion of the population is, of course, atypical in certain respects (for example, they are, by definition, more compliant to such telephone requests or more likely to be at home). It should be noted, however, that most non-respondents' unwillingness to be interviewed was unrelated to the content of the survey; that is, they refused to be interviewed prior to being asked questions on AIDS or sexual behaviors (1279 of the 1471 refusals occurred prior to the second household screening question).

Analysis of the demographic characteristics of the resultant sample indicates rough agreement between the sample characteristics and Census estimates for age and marital status (see Table 1). There is, however, some underrepresentation of men and blacks in the sample and a more substantial underrepresentation of persons with less than a high school education. The latter bias in the education distribution is a well-known deficiency of the samples obtained by many commercial and academic telephone surveys (*12*). [In the following substantive analysis, we have used the case weights provided by the survey organization. These weights incorporate adjustments to provide a better match to Census demographics, as may be seen in the column (3) of Table 1].

Overall, the reports provided by the respondents in this survey indicated that neither chastity nor monogamy is universally practiced in contemporary America (see Table 2) (*13*). For example, Table 2 indicates that

- among unmarried 18-to-24-year-olds, only 16% of women and 14% of men had said "No" to sex throughout the entire preceding year;
- 39% of unmarried men and 17% of unmarried women aged 18 to 24 had three or more partners in the preceding 12 months;
- self-reported religious fervor was not a completely reliable indicator of a chaste lifestyle. Thus 66% of unmarried men and 40% of unmarried women who described themselves as "strongly religious" Christians reported at least one sexual partner in the last year; and 25% of men and 12% of women reported two or more partners over the last 12 months.

It should also be noted that Table 2 and subsequent tables contain anomalies that begin to suggest some of the difficulties of conducting rigorous research on human sexual behaviors (*14*).

Given that Table 2 indicates monogamy has not become a universal norm and that almost every American adult is aware that AIDS can be transmitted by sexual

intercourse, one might wonder about condom use by the more sexually active segments of the population. Of particular interest are condom purchases by persons reporting a large number of sexual partners during the preceding year. Although Table 3 indicates that the frequency of condom purchases (by males and females) increased with the number of sexual partners, we still find that 45% of the men reporting nine or more partners during the last year and 65% of the women reporting three or more partners also report that they had never purchased condoms during the past year. While we cannot rule out the possibility that condoms were used without being purchased by the respondent or that other low-risk sexual practices were employed, these tabulations suggest that unprotected sexual intercourse may be fairly common, even among people who have a large number of sexual partners.

Other data from this survey suggest that large numbers of the most sexually active portions of the population also believe they are not at risk of contracting AIDS. For example, one survey question asked respondents to rate their risk of contracting AIDS on a scale of 1 to 7, with 1 representing the lowest possible risk and 7 the highest. As can be seen from Table 4, the majority of persons with nine or more sexual partners rated their risk at the lowest level. Moreover, even when analyses were restricted to urban areas that have experienced the greatest number of AIDS cases (New York, Newark, San Francisco, Los Angeles, and Miami), we still find that almost one-half of respondents with nine or more partners assessed their risk of contracting AIDS at the lowest level. We also found that high levels of condom use could not account for the optimistic risk assessments of many of these respondents. Thus, as Table 5 indicates, among persons reporting five or more sexual partners during the last 12 months, 30% of those who rated their risk as low (1 or 2) reported that they never purchased condoms and 25% reported only 1 to 4 purchases. Indeed, Table 5 indicates that there is no significant association between condom purchasing and perceived risk among persons with five or more partners.

As these analyses begin to suggest, the psychological and social processes that underlie sexual behaviors are complex. This is consistent with the literature that evaluates changes in sexual behavior among gay men. Sexual behaviors are influenced by many factors, and change is not as consistent within or across individuals as we might desire. Furthermore, there is substantial basis for pessimism that education conceived as merely providing information about risks will cause appropriate behavior change. In a recent review of the literature on HIV risk-reduction behavior among users of intravenous (IV) drugs, Des Jarlais and Friedman (*15*) concluded that AIDS prevention information will not lead to behavioral change unless there is (i) an opportunity for face-to-face interaction to clarify information and to modulate emotional tone of message, (ii) access to treatment and services, and (iii) changes in the norms of the local population of IV drug users. Similar conclusions arise from studies of the effectiveness of interventions designed to reduce the incidence of unplanned pregnancy among adolescents (*16*).

Clearly, improving our understanding of the ways in which affect, cognitions, and community standards mold and support behavior will be crucial to designing educational programs that not only inform but also motivate behavior change. This challenge lies at the heart of our hopes to design effective interventions that will motivate the individual risk reduction behaviors required to contain the spread of the AIDS epidemic.

Evaluating the Effects of AIDS Interventions

Our final example of social and behavioral research that will be required to cope with the AIDS epidemic involves evaluation research. The initiation of large-scale and long-term AIDS education programs inevitably raises the question: How will we know if these programs are having the desired effects?

One might hope that the effects of such programs would be evident from declines in the national or local incidence rates for AIDS. However, given the lengthy incubation periods for these diseases, this is not a realistic expectation in the short term. Incidence rates for these diseases reflect infections contracted several years prior to the onset of the disease. Reliable data on seropositivity in representative samples of the population would provide a more timely indicator, but even aggregate incidence rates for HIV infection will change for reasons quite unrelated to the effects of particular educational programs. Furthermore, aggregate incidence rates do not identify who has been exposed to particular educational programs, and so they cannot provide accurate assessments of the relative effectiveness of different educational programs.

Fortunately, a technology for conducting reasonable evaluation studies does not need to be invented. Two decades of evaluation research have provided a basic conceptual framework (*17*) for undertaking these evaluations, and there have been several somewhat analogous (that is, decentralized national) programs that have been subjected to evaluation. Competent evaluation will require the development of valid and reliable indicators that are closely tied to the immediate objectives of the education programs. These include measures of knowledge of AIDS risks and, even more important, measures of the frequency of "risky" behaviors. The hope of an education program is that changes will show up rapidly in these indicators, that these

Table 1. Comparison of demographic and social characteristics of the adult population estimated by the Census Bureau and estimates derived from a *Los Angeles Times* national survey sample by (1) tabulating unweighted sample data, (2) tabulating data weighted by number of adults in the household, (3) tabulating data using weights supplied by survey organization. Because the survey used a household sample design which first drew a probability sample of telephone-owning households and then selected one adult from within that household, the probability a given eligible respondent will be selected varies inversely with the number of eligible adults in their household. Thus unweighted tabulations (1) by design, over-represent persons living in smaller households. Weighting tabulations by the number of eligible adults in the household (2) adjusts for this feature of the sample design. The weights encoded in the dataset by the survey organization (3) have been described to us as the product of sampling weights (to adjust for strata that have been disproportionately sampled), household weights, and post-hoc weighting explicitly designed to provide better agreement between the demographics of the sample and certain known characteristics of the population. In evaluating the adequacy of sample design and execution, the tabulations using household weights (2) are most appropriate. For our substantive analysis, use of the survey organizations weights (3) allows us to make use of data from the strata that have been oversampled, and it *may* correct for some of the imperfections of sample execution. It does not, however, provide a reliable basis for making inferences about that segment of the population that could not be interviewed. They doubtlessly differ in many ways besides the divergences in demographics observed in this tabulation. Unweighted estimates (1) and estimates using household weights (2) are based on the 1208 cases from the sample described to be a probability sampling of

telephone owning households in the United States. Estimates using the weights supplied by the survey organization (3) also include data from an additional 870 cases resulting from the oversampling of respondents in Newark, New York, San Francisco, Los Angeles and Miami.

Characteristic	Estimates from *LA Times* sample: Unweighted (1)	Weighted (2)	Weighted (3)	Census estimate*
Gender				
Female	58.9%	58.0%	52.3%	52.1%
Male	41.1	42.0	47.7	47.9
Race				
White	87.2	86.3	85.3	87.1
Black	8.8	8.8	10.3	10.8
Other	4.0	5.0	4.4	2.1
Age				
18 to 29 years	22.9	25.8	30.5	28.5
30 to 39 years	26.8	25.5	18.5	21.6
40 to 49 years	17.2	19.0	14.9	14.6
50 to 59 years	10.1	10.4	11.7	12.7
60 years and over	23.0	19.3	24.2	22.5
Marital status				
Single	17.2	18.6	19.1	21.5
Married	63.5	68.5	64.2	63.0
Divorced	10.3	7.5	8.3	7.9
Widowed	9.0	5.4	7.7	7.6
Education				
0 to 8 years	5.6	4.8	9.6	13.9
9 to 11 years	9.3	10.3	18.6	12.2
High school graduate	36.8	36.9	37.5	38.2
1 to 3 years college	21.9	21.6	15.3	16.3
College graduate	26.5	26.5	19.0	19.4

*Census comparisons use estimates restricted to the population aged 18 and over, except for education. In the case of education, both the Census estimate and *LA. Times* sample have been restricted to persons aged 25 and over. Census estimates are derived from: U.S. Bureau of the Census, *Statistical Abstract of the United States, 1987*, (Washington DC, Government Printing Office, 1987), Tables 13 (gender), 44 (marital status), 39 (education), 20 (age), and from 1980 Census Voume PC80-1-B1, *General Population Characteristics, United States*, Table 43 (Race). For race, Census percentages were calculated using the number of persons ages 18+ reported in the categories white, black, and for "other" the categories of "Asian and Pacific Islander" plus "American Indian, Eskimo, and Aleut." Approximately 4 million (of 162 million) respondents aged 18+ could not be assigned to one of these categories in the 1980 Census. These respondents have been excluded from the percentage tabulation shown above. For marital status comparison, *LA. Times* respondents who reported themselves to be "separated" were treated as legally married (in order to conform to Census coding).

Table 2. Number of sexual partners during last year by gender, marital status, age, and religiosity (tabulated from 1987 *Los Angeles Times* survey). Percentage distributions were calculated using weights encoded in the dataset by the survey organization. Sample sizes shown are unweighted *N*s. The questions were: "About how many sexual partners would you say you have had in the last year?" and "Would you say you are a strongly religious person, or moderately religious, or don't you really practice a religion?" (This question was only asked of respondents who indicated they were Catholic or Protestant in answering the question: "What religion were you brought up in?") In this tabulation, "unmarried" includes divorced, separated, widowed, and never-married persons.

	Sexual partners in last year				
Category	None	One	Two	Three or more	Total % (*N*)
Men	9.3%	74.2%	4.1%	12.5%	100 (835)
Women	21.2	71.3	4.2	3.3	100 (1184)
Unmarried men	20.0	41.5	9.0	29.5	100 (330)
Married men	3.7	90.8	1.6	3.9	100 (500)
Unmarried women	41.1	43.5	8.9	6.7	100 (536)
Married women	7.4	90.9	0.7	1.1	100 (638)
		By age			
Unmarried men					
18–24 years	14.1	38.6	8.7	38.6	100 (83)
25–34	8.1	61.3	8.1	22.5	100 (99)
35–49	3.7	34.3	22.2	39.9	100 (64)
50–64	13.9	44.4	6.3	35.4	100 (43)
65+	80.0	12.2	5.5	2.3	100 (37)
Unmarried women					
18–24	16.3	56.1	10.4	17.3	100 (112)
25–34	17.7	69.2	10.6	2.5	100 (108)
35–49	23.5	57.9	12.0	6.6	100 (107)
50–64	52.8	32.5	12.8	1.9	100 (85)
65+	92.7	7.3	0.0	0.0	100 (114)

Married men					
18–24	0.0	84.3	3.2	12.5	100 (22)
25–34	0.1	92.6	2.1	5.2	100 (127)
35–49	4.1	92.0	0.0	3.8	100 (190)
50–64	3.4	94.9	0.6	1.1	100 (91)
65+	11.4	83.4	4.0	1.2	100 (64)
Married women					
18–24	2.6	97.4	0.0	0.0	100 (44)
25–34	0.1	97.9	2.0	0.1	100 (156)
35–49	3.4	92.6	0.7	3.3	100 (235)
50–64	17.5	82.5	0.0	0.0	100 (125)
65+	15.9	84.0	0.1	0.0	100 (66)
		By religiosity (Christians only)			
Unmarried men					
Strong Christian	33.7	40.6	8.3	17.3	100 (60)
Moderate Christian	14.0	40.8	8.2	37.0	100 (114)
Nonpracticing Christian	19.4	43.1	13.7	23.8	100 (83)
Unmarried women					
Strong Christian	59.9	27.9	10.8	1.4	100 (146)
Moderate Christian	34.5	51.5	8.9	5.1	100 (234)
Nonpracticing Christian	25.2	57.2	9.2	8.3	100 (90)

Table 3. Frequency of condom purchases during last year by number of sexual partners during last year (tabulated from 1987 *Los Angeles Times* survey). Percentage distributions were calculated using weights encoded in the dataset by the survey organization. Sample sizes shown are unweighted *Ns*. The questions were: "About how many sexual partners would you say you have had in the last year?" and "Have you, yourself, purchased a pack of condoms within the last year or not?" (*If yes*): "About how many times in the past year have you purchased a package of condoms?" (*Probe, if respondent is unsure*): "Well, about how many?"

	Frequency of condom purchases in last year				
Number of sexual partners	Never	Once	Two to four times	Five or more times	Total (N)
			Men		
None	85.7%	2.5%	5.4%	6.3%	100% (78)
1	86.1	4.6	4.3	4.9	100 (572)
2	55.5	7.5	28.0	9.0	100 (52)
3–4	26.0	15.9	8.6	49.5	100 (60)
5–8	24.8	11.9	25.8	37.5	100 (37)
9+	45.1	0.0	5.5	49.3	100 (26)
			Women		
None	95.7	0.1	3.3	0.8	100 (255)
1	90.2	4.4	3.4	2.1	100 (829)
2	89.4	7.9	1.8	0.9	100 (51)
3–4	65.5	14.6	2.6	17.4	100 (31)
5–8	*	*	*	*	100 (7)
9+	*	*	*	*	100 (3)

*Percent not calculated because base for calculation included fewer than 20 (unweighted) cases.

changes will be sustained over time, and that this, in turn, will produce a long-term decline in rates of disease transmission.

Evaluation research on AIDS education and other interventions will allow us to grapple with the question of which intervention programs are "working" and why. Tools and expertise from a wide range of disciplines will be needed to assist in the search for answers to these questions. This work is important because rigorous evaluation provides the key to determining which intervention efforts are working—thereby affording us the opportunity to monitor our performance and improve our future efforts.

Conclusion

The issues we have discussed, improving our understanding of the varieties of human sexual behavior in the population, mounting effective intervention programs, and monitoring the effectiveness of our efforts to control the epidemic, are only three of the many areas in which social and behavioral sciences will play an important role in formulating an effective national and international response to the AIDS epidemic.

At least until therapies and vaccines are developed, and probably long after that time, efforts by thoughtful and dedicated social and behavioral scientists must parallel

Table 4. Perceived level of personal risk of contracting AIDS by number of sexual partners in the last year for national sample and sample drawn from five cities with largest numbers of AIDS cases (tabulated from the 1987 *Los Angeles Times* survey). Percentage distributions were calculated using weights encoded in the dataset by the survey organization. Sample sizes shown are unweighted *Ns*. Five cities oversampled were metropolitan areas of New York, Newark, San Francisco, Los Angeles, and Miami. The questions were: "About how many sexual partners would you say you have had in the last year?" and "Medical researchers say that certain groups of people are more likely to contract AIDS. These include active homosexual or bisexual men, intravenous drug users who share hypodermic needles, and hemophiliacs and others who have received contaminated blood. The risk of contracting AIDS is also increased by sexual contact over the last 5 years with more than one sexual partner or with partners whose health status is not known to you. On a scale of one to seven, how would you rate your own personal risk of contracting AIDS? Would you say your chances are a 'ONE' very low or a 'SEVEN' very high or a 'FOUR' medium?"

	Perceived risk of contracting AIDS								
	Very low			Medium			Very high		
Number of sex partners last year	1	2	3	4	5	6	7	Unsure	Total (*N*)
				National sample					
None	83.5%	1.7%	0.2%	9.5%	0.0%	0.0%	1.3%	3.9%	100.0% (330)
1	87.3	3.6	1.6	4.3	0.5	0.1	1.2	1.4	100.0 (1414)
2	75.3	7.5	2.3	14.8	0.2	0.0	0.0	0.0	100.0 (105)
3 to 4	56.4	15.1	15.1	9.4	3.0	0.5	0.0	0.4	100.0 (90)
5 to 8	65.5	11.3	1.1	21.7	0.3	0.0	0.1	0.0	100.0 (44)
9+	58.9	14.6	5.1	17.1	3.4	0.0	0.9	0.0	100.0 (30)
				Five cities with most AIDS cases					
None	88.3	0.2	1.5	7.6	0.0	0.0	0.0	2.8	100.0 (137)
1	85.8	3.6	2.0	6.1	0.2	0.0	0.5	1.9	100.0 (569)
2	81.4	8.9	2.7	7.0	0.0	0.0	0.0	0.0	100.0 (54)
3 to 4	58.4	15.8	6.6	11.2	4.0	0.0	0.0	4.0	100.0 (45)
5 to 8	68.6	13.1	5.7	10.8	1.3	0.0	0.4	0.0	100.0 (25)
9+	47.6	3.9	11.2	28.6	0.0	0.0	8.6	0.0	100.0 (17)

Table 5. For persons reporting five or more sexual partners during last year, frequency of condom purchases during last year by perceived risk of contracting AIDS (tabulated from 1987 *Los Angeles Time* survey). Percentage distributions were calculated using sample weights encoded in dataset by survey organization. Sample sizes are unweighted *N*s.

	Frequency of condom purchase in last year (%)			
Perceived level of personal risk	Never	One to four times	Five or more times	Total % (*N*)
Low (1 or 2)	30	25	45	100 (47)
Moderate or high (3+)	36	24	39	100 (26)

those of biomedical scientists. Their efforts are essential to containing the spread of this epidemic and coping with its consequences.

References and Notes

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4. See, for example, W. G. Cochran, F. Mosteller, J. W. Tukey, *J. Am. Statistical Assoc.* **48**, 673 (1953).
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6. See, for example, K. Moore *et al.*, Statistical Appendix, Table 1.4, in *Risking the Future: Adolescent Sexuality, Pregnancy and Childbearing*, vol. 2, S. Hofferth and C. Hayes, Eds. (National Academy Press, Washington DC, 1987).
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10. National Institute of Child Health and Human Development surveys of adolescent and adult sexual behavior; see R. Wilson, this volume, p. 237.
11. For the entire survey (1208 cases in national sample and 887 cases in five-city oversample), we calculated a 33% response rate using a procedure that conforms to the guidelines adopted by the Council of American Survey Research Organizations. Rates calculated in this manner are, of necessity, much lower than rates calculated by other common procedures that may, for example, eliminate noncontacts from the denominator of the

response rate. Since the *LA Times* survey drew an 887 case oversample from five urban areas (New York, Newark, Los Angeles, San Francisco, Miami) where response rates are traditionally much lower, we believe the effective response rate for the national sample (excluding the oversample) would be higher than 33%. Unfortunately, the survey organization could not easily provide information on the final disposition of sample elements separately for different sample strata. Similarly, there were no data collected to allow an appropriate allocation of never answered telephones that were due to malfunctioning telephone company equipment (rather than respondent unavailability). Thus, no adjustment could be made, and all such numbers were included in the denominator of the response rate (with the prescribed allocation for proportions estimated to be businesses or residences lacking an eligible respondent).

12. See C. F. Turner and E. Martin, Eds., *Surveying Subjective Phenomena* (Russell Sage Foundation and Basic Books, New York, 1985), vol. 1, figure 3.1.

13. Because of the complex sample design and the use of case weights in making tabulations, the variances for estimates in Table 1 cannot be calculated using formulae appropriate for simple random samples (SRS). We have, however, calculated appropriate variances for some of the point estimates in Table 1. This analysis indicates that actual variances would be roughly 1.5 times those given by SRS formulae. Here again the high refusal and nonresponse rates will limit the generalizability of these estimates (as discussed in the text).

14. We note, for example, that nontrivial proportions of the married respondents in Table 2 reported that they had no sexual partners during the preceding year. For some married respondents, this may, indeed, be a true statement, and the fact that the proportions increase with age supports this view. However, it is also possible that some respondents may not consider their spouses to be sexual partners, when asked a survey question such as this. This would be one example of the many possible ways in which the language and frames of reference that researchers and respondents bring to the survey may differ. These differences, in turn, can have important implications for the meaningfulness and interpretability of the resultant data, and they mandate careful pretesting and pilot work for those who will take seriously the task of using surveys to learn about sexual behaviors in the population.

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16. See, for example, review in *Risking the Future: Adolescent Sexuality, Pregnancy, and Childbearing* (National Academy Press, Washington DC, 1987), vol. 1, pp. xx.

17. See, for example, T. Cook and D. T. Campbell, *Quasi-Experimentation: Design and Analysis for Field Settings* (Houghton-Mifflin, Boston, 1979); H. Riecken *et al., Social Experimentation* (Academic Press, New York, 1974); D. T. Campbell and J. C. Stanley, in *Handbook of Research on Teaching*. N. Gage, Ed. (Rand McNally, Chicago, 1963).

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