

# Stigmatization of Newly Emerging Infectious Diseases: AIDS and SARS

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Both the fear of people who are different and the fear of disease can lead to social stigmatization.<sup>1</sup> Occasionally these fears co-occur, resulting in severe stigmatization of strangers with diseases. Such stigmatization can increase the adverse consequences of a disease in multiple ways. First, stigmatization can substantially increase the suffering of persons with the disease. Second, persons with or at risk for the disease may avoid seeking health care, making it much harder for public health authorities to control the disease. Third, professionals and volunteers working in the field may also become stigmatized, leading to higher rates of stress and burnout.<sup>2</sup> Finally, stigmatization may generate considerable economic losses if people avoid groups or geographic areas associated with the disease.

Many diseases have been stigmatized throughout history. For example, persons with the plague were stigmatized during the Middle Ages, and sexually transmitted diseases have been stigmatized throughout the last several centuries.<sup>3,4</sup> Acquired immunodeficiency syndrome (AIDS) has been one of the most feared and stigmatized diseases of the last 20 years. There is abundant evidence that the stigmatization of AIDS has been detrimental to the health of those with AIDS and has played a role in limiting public health and medical efforts to control the disease.<sup>5,6</sup> For example, early stigmatization of AIDS as a disease of homosexual men contributed to low levels of funding for AIDS research in the 1980s.<sup>3,4,7</sup>

Over the last several years, severe acute respiratory syndrome (SARS) has emerged as a new feared disease associated with strangers (Asians, particularly Chinese) and has generated considerable stigmatization.<sup>8,9</sup> Reduced travel to SARS-affected areas clearly led to large economic losses for those areas,<sup>10,11</sup> but there has been relatively little systematic research on fear of SARS or stigmatization of persons with or at risk for the disease.<sup>12</sup> In one study of medical access patterns in Taiwan,

**Objectives.** We assessed relationships between sociodemographic characteristics and mental health status and knowledge of, being worried about, and stigmatization of 2 emerging infectious diseases: AIDS and SARS.

**Methods.** We conducted a random-digit-dialed survey of 928 residents of the New York City metropolitan area as part of a study of the effects of the September 11, 2001, terrorist attacks. Questions added for this study concerned respondents' knowledge of, worry about, and support of stigmatizing actions to control AIDS and SARS.

**Results.** In general, respondents with greater personal resources (income, education, social support) and better mental health status had more knowledge, were less worried, and were less likely to stigmatize. This pattern held for both AIDS and SARS.

**Conclusions.** Personal resources and mental health factors are likely to influence the public's ability to learn about, rationally appraise the threat of, and minimize stigmatization of emerging infectious diseases such as AIDS and SARS. (*Am J Public Health.* 2006;96:561–567. doi:10.2105/AJPH.2004.054742)

Chang and colleagues found that “fear of SARS” led to substantial reductions in seeking medical care: a 23.9% reduction for ambulatory care, a 35.2% reduction for inpatient care, and a 16.7% reduction for dental care.<sup>13</sup> Presumably, people avoided seeking medical care out of fear of becoming infected with SARS in these medical settings. Studying the stigmatization of SARS may provide us with insight into the stigma associated with emerging infectious diseases and the potential consequences of such stigmatization.

A potentially useful model for considering stigmatization of SARS and other newly emerging infectious diseases may be found in the work of Pryor et al.<sup>14</sup> They suggest a 2-factor theory of HIV-related stigma: (1) an immediate affective reaction, based on multiple negative qualities associated with the disease (e.g., death, promiscuity, drug use, homosexuality), possibly followed by (2) a cognitive rule-based system that ameliorates stigmatization “if perceivers have enough time, motivation, and cognitive resources.”<sup>14(p1189)</sup> Within this formulation, availability of additional information about the disease should lead to a reduction in stigmatization. This prediction is consistent with the activities of many public

health authorities who hope to reduce stigmatization through increased public education on diseases such as AIDS.

We compared stigmatizing attitudes toward AIDS and SARS in a representative sample of persons living in the New York City (NYC) metropolitan area and examined factors associated with these attitudes.

## METHODS

### Participants

We obtained data from a cohort of persons who were living in the NYC metropolitan area on September 11, 2001. Briefly, the cohort was recruited through a random-digit-dialed telephone survey between March 25 and June 25, 2002, for the purpose of understanding the consequences of the September 11 terrorist attacks in the NYC area. The sampling frame consisted of all adults (aged 18 years and older) in the NYC metropolitan area. (Additional details are provided elsewhere.<sup>15</sup>) Interviews were conducted in English, Spanish, Mandarin, and Cantonese by trained interviewers using translated and back-translated questionnaires and a computer-assisted telephone interview system. In each

eligible household, the adult whose birthday was closest to the interview date was chosen to participate. Up to 10 attempts were made to conduct the interview. The response rates among those eligible for survey participation were 56% in the metropolitan area and 60% in New York City itself.

Contact information for follow-up interviews was obtained from respondents and their key family members. Follow-up was conducted between September 25, 2002, and January 31, 2003, and between September 24, 2003, and February 29, 2004. We completed follow-up interviews with 1832 (67%) of the 2748 baseline respondents during the second follow-up, at which time we asked the questions reported on here. Each participant received a nominal \$10 incentive to participate in each survey wave, and each interview was approximately 35 minutes long.

### Survey Instrument

Demographic data for this analysis came from the baseline interview, during which we collected information on respondents' age, race/ethnicity, gender, and education. Data about self-assessed knowledge of and attitudes toward SARS and AIDS were collected from a randomly selected subset of participants in the second cohort follow-up. These questions were modified from previous work (J. Ahern, J. Stuber, and S. Galea, unpublished data, 2005).

We first asked if the respondent had heard about SARS; those who said yes were asked if they had heard "a great deal," "some," or "not much" about the disease. We then asked respondents who had heard about SARS how much they agreed or disagreed with each of the following statements as a method for controlling the disease: "requiring Americans with SARS to wear identification tags," "the government announcing it will execute people who knowingly spread SARS," "quarantining or separating all people with SARS from others in the United States," "avoiding areas in the United States that are heavily populated by Chinese," "forcing all Chinese people to be medically checked for SARS," and "not allowing Chinese people to enter the United States." An additional statement concerned whether people who developed the disease could be blamed: "People with SARS got what they deserved." Response options were "agree strongly," "agree

somewhat," "disagree somewhat," or "disagree strongly." We asked equivalent questions about AIDS, substituting "HIV or AIDS" for "SARS" and "gay men" for "Chinese."

We also constructed a summary stigmatization scale for each disease by summing the responses to the 6 questions about stigmatizing methods of controlling the disease. The Cronbach  $\alpha$  was 0.80 for the AIDS stigmatization scale and 0.72 for the SARS stigmatization scale. We also asked respondents how worried they were about contracting SARS or AIDS— "not at all worried," "somewhat worried," or "very worried."

We were interested in whether worry and stigmatization were associated with psychological conditions such as depression. To assess depression, we used an adapted version of the major depressive disorder scale from the non-patient version of the structured clinical interview for the *Diagnostic and Statistical Manual of Mental Disorders, Revised Third Edition (DSM III-R)*,<sup>16</sup> which has been used in other population studies.<sup>17,18</sup> We followed *DSM-IV* guidelines, considering that respondents met the criteria for depression if they had experienced 5 or more symptoms for at least 2 weeks. We also asked when was the last time the respondent experienced these symptoms. The Cronbach  $\alpha$  for the 8 symptoms used in this scale was 0.79.<sup>19</sup> We asked about depressive symptoms in the previous 12 months and in the 1 month before the interview.

### Analyses

We used means to summarize responses to each of the questions about AIDS and SARS attitudes and then assessed the correlations between responses. We used  $\chi^2$  tests, *t* tests, and Pearson correlations to assess relationships between various factors and knowledge of and attitudes toward AIDS and SARS. The analyses were weighted to correct potential selection bias related to the number of household telephones, the number of persons in the household, and oversampling, as well as to make the sample demographically similar to the NYC metropolitan area population according to 2000 US Census estimates. We used SUDAAN software (release 8.0; Research Triangle Institute, Research Triangle Park, NC) to estimate standard errors and to adjust analyses for weighting.

## RESULTS

The sample was weighted to approximate the 2000 US Census data for the NYC metropolitan area: 45% male, 55% female; 54% White, 19% African American, 5% Asian, 20% Hispanic, 3% other; 11% aged 18 through 24 years, 26% aged 25 through 34 years, 21% aged 35 through 44 years, 18% aged 45 through 54 years, 12% aged 55 through 64 years, and 12% aged 65 years or older.

Table 1 shows the means for the responses to the questions on AIDS and SARS and the correlations between the AIDS and SARS responses. The means were quite similar for both sets of responses. There was only 1 question with a 1-point difference in the means: there was substantially more agreement on quarantining people with SARS than on quarantining people with AIDS ( $t=-38.8$ ;  $P<.0001$ ). Thus, given the modes of transmission and length of incubation period for the 2 diseases, quarantine would be an acceptable public health measure for controlling SARS, but not AIDS, in New York City. There was a 0.5-point difference between mean responses to the question "How much have you heard about [AIDS/SARS]?" Respondents reported having heard more about AIDS than about SARS ( $t=25.2$ ;  $P<.0001$ ). There was relatively little agreement with the "blaming" question ("People with [AIDS or SARS] got what they deserved") for either AIDS or SARS (means of 1.23 and 1.11, respectively, on a scale of 1 [disagree strongly] to 4 [agree strongly]).

The correlations between responses to the AIDS questions and responses to the SARS questions were statistically significant for all questions and ranged from a low of 0.14, for allowing gay men or Chinese into the country, to a high of 0.71, for executing persons who knowingly spread AIDS or SARS. The correlation for the question on being worried about getting AIDS/SARS was significant but modest at 0.29.

Responses to the questions concerning relatively extreme forms of stigmatization (requiring persons with the disease to wear identification tags, executing persons who knowingly spread the disease, forcing all gay men to be checked for AIDS or Chinese for SARS) were highly correlated, with correlation coefficients between 0.51 and 0.71. The correlation for

**TABLE 1—Mean Responses to Survey Questions About AIDS and SARS: New York City Metropolitan Area, 2003 (n = 928)**

	Mean Response, AIDS	Mean Response, SARS	<i>r</i>
How much have you heard about AIDS (SARS)? <sup>a</sup>	3.78	3.26	0.327
Should Americans with AIDS (SARS) be required to wear identification tags? <sup>b</sup>	1.77	1.93	0.674
Should people who knowingly spread AIDS (SARS) be executed? <sup>b</sup>	1.92	1.71	0.710
Should people in the United States with AIDS (SARS) be quarantined? <sup>b</sup>	1.62	3.00	0.287
Should people avoid areas in the United States heavily populated by gay men (Chinese)? <sup>b</sup>	1.68	1.70	0.339
Should all gay men (Chinese) be forcibly checked for AIDS (SARS)? <sup>b</sup>	2.24	2.12	0.508
Should gay men (Chinese) not be allowed to enter the United States? <sup>b</sup>	1.43	1.68	0.138
Did people with AIDS (SARS) get what they deserve? <sup>b</sup>	1.23	1.11	0.492
How worried are you about getting AIDS (SARS)? <sup>c</sup>	1.34	1.49	0.288

Note. Parenthetical wording pertains only to questions regarding SARS. All *Ps* < .0001.

<sup>a</sup>Coded from 2 (not much) to 4 (a great deal).

<sup>b</sup>Coded from 1 (disagree strongly) to 4 (agree strongly).

<sup>c</sup>Coded from 1 (not at all) to 3 (very).

the question on blaming persons with the disease (“They got what they deserved”) was also relatively high (0.49).

There were few significant associations between sociodemographic variables (age, gender, and race/ethnicity) and knowledge of and attitudes toward AIDS and SARS. Younger respondents (younger than 45 years) and Whites were less likely than others to express stigmatizing attitudes toward AIDS. Younger respondents were more likely than older respondents to report being “somewhat” or “very” worried about getting AIDS, and women were more likely than men to report that they were “somewhat” or “very” worried about getting SARS. Whites were less likely than those of other races to be concerned about getting AIDS and SARS (data available from the first author).

As shown in Table 2, educational level was related to almost all of the responses on the AIDS and SARS questions. There were multiple significant relationships between higher educational levels and decreased agreement with the stigmatizing methods of controlling the diseases. The relationships were generally negative, with more educated respondents expressing less agreement with the stigmatizing methods of disease control. The question on the use of quarantine was a notable exception to this general pattern.

Table 3 shows, for each disease, correlations between knowledge (“heard about”), the summary stigmatization scale, blaming, and being worried about getting the disease. There were consistent patterns among knowledge, stigmatization, blaming, and worry for both diseases. Greater knowledge was modestly associated with less stigmatization and less blaming. Within the group of respondents who were “very worried” about getting either disease, however, having heard more about the disease was associated with greater stigmatization ( $r=0.26$  for AIDS,  $r=0.16$  for SARS; both *Ps* > .05).

Table 4 shows associations between concern about getting AIDS or SARS and having experienced symptoms of depression in the year before the interview. All of the associations were of positive-response form, with higher rates of depression within each category of increasing worry. In a cross-sectional study we cannot ascertain the direction of cause and effect.

## DISCUSSION

We found a number of similarities between attitudes toward AIDS and attitudes toward SARS. Some sociodemographic characteristics, especially lower educational levels, were associated with endorsement of a

variety of stigmatizing methods for the control of each disease. Increasing levels of worry about getting each disease were associated with depression.

## Similarities and Differences Between AIDS and SARS

There are several strong similarities between AIDS and SARS from a psychological perspective, suggesting that they may serve as a model for stigmatizing attitudes toward serious emerging infectious diseases in general. Both AIDS and SARS are relatively new, both are fatal for a high percentage of persons who develop the disease, and both are associated with “stranger” groups (gay men and injection drug users for AIDS, Asians in general and Chinese in particular for SARS). However, there are very important differences in the epidemiology of the 2 diseases, and New York City’s experiences with AIDS and SARS have been radically different.

HIV/AIDS has truly been a public health catastrophe for the city, with a cumulative total of 122 062 cases of AIDS<sup>20</sup> and an estimated 3105 new HIV infections per year in the city at the time of data collection (September 2003).<sup>21</sup> In contrast, there were only 9 cases of SARS reported in the metropolitan area, there was no known local transmission of SARS, and by the time of data collection the World Health Organization had officially declared that SARS had been contained globally.<sup>22</sup> The modes of transmission (and thus, the ability of an individual to avoid infection) are also quite different for the 2 diseases—primarily sexual and blood-to-blood contact for AIDS, and primarily droplet transmission for SARS.

This study showed great consistency in attitudes toward both diseases, suggesting that the psychological similarities between the 2 diseases may be more important in shaping attitudes toward them than the epidemiological differences. For example, the means of responses on the “worried” question were almost identical for the 2 diseases (approximately 1.5 on a 3-point scale from “not at all worried” to “very worried”). The associations between educational level and attitudes toward the diseases were nearly identical as well. Also, for each disease there were relatively high correlations between the severe stigmatization questions

**TABLE 2— Survey Respondents’ Knowledge and Attitudes About AIDS and SARS, by Educational Attainment: New York City Metropolitan Area, 2003 (n = 928)**

Question	AIDS							P	SARS							P
	Not much, %	Some/a great deal, %	Agree, %	Disagree, %	Not at all, %	Somewhat, %	Very, %		Not much, %	Some/a great deal, %	Agree, %	Disagree, %	Not at all, %	Somewhat, %	Very, %	
How much have you heard about AIDS (SARS)?																
<High school	6.0	94.0						.215	22.0	78.0					.224	
High school or equivalent	6.4	93.6							18.1	82.0						
Some college	1.6	98.4							13.2	86.8						
College degree	4.7	95.3							11.3	88.7						
Graduate work	0.7	99.4							7.4	92.6						
Should Americans with AIDS (SARS) be required to wear identification tags?																
<High school			47.6	52.4				.0003			38.2	61.8			.010	
High school or equivalent			33.5	66.5							37.6	62.4				
Some college			21.2	78.8							28.8	71.2				
College degree			21.6	78.4							25.4	74.6				
Graduate work			10.4	89.6							12.4	87.6				
Should people who knowingly spread AIDS (SARS) be executed?																
<High school			45.0	55.0				.005			28.6	71.4			.315	
High school or equivalent			36.4	63.7							20.8	79.2				
Some college			29.0	71.0							25.5	74.5				
College degree			24.8	75.3							20.2	79.8				
Graduate work			15.0	85.0							12.7	87.3				
Should people in the United States with AIDS (SARS) be quarantined?																
<High school			34.8	65.3				.0002			55.4	44.6			.091	
High school or equivalent			25.6	74.4							73.3	26.7				
Some college			19.4	80.6							76.0	24.0				
College degree			11.8	88.2							73.6	26.4				
Graduate work			6.1	93.9							60.9	39.1				
Should people avoid areas in the United States heavily populated by gay men (Chinese)?																
<High school			30.9	69.1				.001			16.0	84.0			.009	
High school or equivalent			25.4	74.6							22.1	77.9				
Some college			23.3	76.7							20.8	79.2				
College degree			12.4	87.6							19.8	80.2				
Graduate work			7.2	92.8							5.5	94.5				

Continued

and blaming people with the disease. This suggests that the responses to these questions may be relatively independent of the specific characteristics of AIDS and SARS,

including the objective likelihood of contracting the diseases.

Zajonc has described the “primacy of affect” in psychological processes,<sup>23</sup> and our

findings do strongly suggest that the negative emotions aroused by the 2 diseases generate similar patterns of stigmatization and override the differences in their epidemiology.

TABLE 2—Continued

Should all gay men (Chinese) be forcibly checked for AIDS (SARS)?										
<High school	77.9	22.1		<.0001	48.6	51.4			<.0001	
High school or equivalent	53.4	46.7			48.7	51.3				
Some college	43.1	56.9			38.9	61.2				
College degree	34.9	65.1			26.2	73.8				
Graduate work	17.4	82.6			11.0	89.0				
Should gay men (Chinese) not be allowed to enter the United States?										
<High school	9.7	90.3		.012	28.1	72.0			.002	
High school or equivalent	14.8	85.2			20.8	79.3				
Some college	13.4	86.6			25.8	74.2				
College degree	5.4	94.6			12.2	87.8				
Graduate work	3.2	96.8			6.2	93.8				
Did people with AIDS (SARS) get what they deserve?										
<High school	6.5	93.5		.121	3.5	96.5			...	
High school or equivalent	7.0	93.0			2.7	97.3				
Some college	5.3	94.7			0.8	99.2				
College degree	1.7	98.3			0.0	100.0				
Graduate work	6.9	93.1			0.0	100.0				
How worried are you about getting AIDS (SARS)?										
<High school		59.2	22.0	18.9	<.0001		53.3	33.4	13.3	.098
High school or equivalent		64.6	25.0	10.4			53.6	42.9	3.6	
Some college		66.7	31.9	1.4			48.9	43.9	7.2	
College degree		71.1	26.9	2.0			56.6	38.6	4.9	
Graduate work		86.2	12.8	1.0			70.9	27.4	1.7	

Note. Parenthetical wording pertains only to questions regarding SARS.

### Stigmatization of Emerging Infectious Diseases

People with diseases appear to have been stigmatized throughout history. This stigmatization and the resulting social shunning may have served to reduce transmission of infectious diseases in the past, and quarantine and avoidance of people and places associated with a disease may still be useful in controlling some diseases. With emerging infectious diseases in the context of economic globalization, however, stigmatization and the fear of stigmatization may also actively increase the spread of the diseases. Individuals with or at risk for stigmatized diseases may avoid seeking health care in order to avoid being stigmatized. Governments may attempt to suppress information about emerging infectious diseases in their jurisdictions because

of the potentially severe economic consequences associated with stigmatization of an infectious disease. Thus, in the current era, control of emerging infectious diseases will require that we increase our ability to ameliorate the stigmatization associated with such diseases.

### Reducing Stigmatization of AIDS and SARS

Public health authorities have used a variety of methods to attempt to reduce stigmatization associated with HIV/AIDS.<sup>24</sup> These methods have included (1) basic public education about HIV/AIDS, such as national mailing of an informational pamphlet from the US surgeon general; (2) mass media (print, radio, and television) campaigns; (3) publicized symbolic acts by

public leaders indicating that there is no need to fear people and places associated with the disease, such as pictures of the US president with AIDS patients; (4) creating or invoking laws or policies prohibiting stigmatization and discrimination, such as invoking the Americans with Disabilities Act to protect the rights of people with HIV/AIDS; and (5) drawing attention to sympathetic people with AIDS, such as Ryan White.

These efforts have been partially successful. National probability sample telephone surveys conducted throughout the 1990s<sup>5</sup> showed that overt expressions of stigmatization declined over time. However, inaccurate beliefs, such as a belief in transmission via casual contact, and punitive beliefs (that people with HIV/AIDS deserved the disease) increased. In 1999, one third of the sample

**TABLE 3—Correlations Between Survey Respondents' Knowledge and Attitudes About AIDS and SARS, Overall and by Degree of Worry About Getting the Disease: New York City Metropolitan Area, 2003 (n = 928)**

	AIDS (n = 917)						SARS (n = 863)					
	How Much Heard About the Disease <sup>a</sup>		Stigmatization Scale <sup>b</sup>		People With the Disease Got What They Deserve <sup>c</sup>		How Much Heard About the Disease <sup>a</sup>		Stigmatization Scale <sup>b</sup>		People With the Disease Got What They Deserve <sup>c</sup>	
	r	P	r	P	r	P	r	P	r	P	r	P
Stigmatization scale <sup>b</sup>	-0.177	<.0001	...	...	...	...	-0.160	<.0001	...	...	...	...
People with the disease got what they deserve <sup>c</sup>	-0.117	.0004	0.349	<.0001	...	...	-0.216	<.0001	0.208	<.0001	...	...
How worried about getting the disease <sup>d</sup>	-0.035	.290	0.170	<.0001	0.028	.402	0.027	.423	0.213	<.0001	0.039	.249
<b>Not at all worried about getting the disease</b>												
	AIDS (n = 669)						SARS (n = 498)					
Stigmatization scale <sup>b</sup>	-0.203	<.0001	...	...	...	...	-0.134	.003	...	...	...	...
People with the disease got what they deserve <sup>c</sup>	-0.141	.0003	0.375	<.0001	...	...	-0.191	<.0001	0.208	<.0001	...	...
<b>Somewhat worried about getting the disease</b>												
	AIDS (n = 199)						SARS (n = 318)					
Stigmatization scale <sup>b</sup>	-0.209	.003	...	...	...	...	-0.276	<.0001	...	...	...	...
People with the disease got what they deserve <sup>c</sup>	-0.096	.182	0.311	<.0001	...	...	-0.274	<.0001	0.216	.0001	...	...
<b>Very worried about getting the disease</b>												
	AIDS (n = 45)						SARS (n = 45)					
Stigmatization scale <sup>b</sup>	0.258	.091	...	...	...	...	0.155	.311	...	...	...	...
People with the disease got what they deserve <sup>c</sup>	-0.150	.332	0.197	.205	...	...	-0.086	.575	0.103	.502	...	...

Note. Ns do not fully add up because of missing data.

<sup>a</sup> Coded 2 (not much) to 4 (a great deal).

<sup>b</sup> Coded 6 (less stigmatization) to 24 (more stigmatization).

<sup>c</sup> Coded 1 (disagree strongly) to 4 (agree strongly).

<sup>d</sup> Coded 1 (not at all worried) to 3 (very worried).

**TABLE 4—Associations Between Depression and Worry About Getting AIDS or SARS: New York City Metropolitan Area, 2003**

How Worried	Worried About Getting AIDS				Worried About Getting SARS			
	Symptoms of Depression in Past Year		Symptoms of Depression in Past Month		Symptoms of Depression in Past Year		Symptoms of Depression in Past Month	
	No. (%)	P	No. (%)	P	No. (%)	P	No. (%)	P
Not at all	75 (8.6)	.0003	37 (4.5)	.039	54 (8.0)	.015	26 (3.8)	.054
Somewhat	52 (19.4)		22 (10.0)		58 (15.3)		27 (7.8)	
Very	13 (30.8)		6 (13.7)		12 (22.9)		5 (15.7)	

Note. "No." reflects the actual count of respondents in each cell; "%" is the percentage of people reporting different levels of depression symptoms within the categories of worry about the disease. This percentage is based on the weighting procedures described in Methods.

expressed negative reactions to and discomfort with people with HIV.

There have been some attempts to reduce fear and stigmatization of SARS, such as public

education campaigns.<sup>25,26</sup> There has also been a concerted attempt by health officials worldwide to keep the public informed of new developments regarding SARS, including the

occurrence of infections through laboratory accidents.<sup>27,28</sup> Determining whether these efforts have been effective will require additional research.

Our data indicate some potential effectiveness of providing accurate information to the public as a strategy to reduce stigmatization. For both AIDS and SARS, the more subjects had heard about the disease, the less likely they were to express stigmatizing attitudes. However, some limitations of this strategy were also indicated. For the subgroup who were "very worried" about contracting the diseases, having heard more about the diseases was not associated with less stigmatization. Additionally, being depressed was associated with being worried about the diseases, suggesting that there may be important nonrational linkages between a person's general emotional status and his or her reaction to emerging diseases.

Interestingly, there also appears to be a carryover in time of worry about these types of diseases. Our data were collected after SARS was officially declared contained by the World Health Organization, but many of our respondents were still worried about contracting the disease. Indeed, the level of worry about contracting SARS was equal to the level of worry about contracting AIDS.

### Limitations

There seems to be little doubt that both AIDS and SARS could evoke stigmatizing behaviors, which we were not able to directly assess. Actual enactment of stigmatizing behaviors may depend upon a variety of situational factors in addition to the possession of stigmatizing attitudes. Whether the patterns of stigmatizing behaviors would be similar for the 2 diseases remains to be addressed.

Our study was an exploratory effort added to an existing telephone survey. The time that we could add to the existing interview was limited, and some variables had to be measured with single questions. We did not have prior work from which to formulate hypotheses and, thus, did not attempt multivariate analyses for testing hypotheses. Most of the correlation coefficients we observed were in the range of 0.3 to 0.7. Although these were highly significant, given our sample size, these coefficients correspond to between 10% and 50% of variance explained in the dependent variable. We expect that in future research, it will be possible to develop formal multivariate models that will explain higher percentages of variance in the dependent variables.

### Conclusions

The data reported here concern AIDS and SARS, 2 “naturally occurring” infectious diseases. Whether the same stigmatization processes would occur in the context of a bioterrorist attack using infectious agents is an important issue for further investigation.

Additional new infectious diseases are likely to emerge in the coming years, some of which will arise in foreign countries and spread through international air travel. Some will also have high fatality rates. Many different strategies will be needed to control these new diseases, from improved laboratory facilities to better communication networks among

health authorities in different countries. Better methods for ameliorating the fear and stigmatization associated with these diseases are also needed, and we suggest that this be considered an urgent matter for additional research. ■

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### Contributors

D.C. Des Jarlais and S. Galea planned the study, analyzed the data, and wrote the article. M. Tracy analyzed the data and contributed to the writing of this article. S. Tross and D. Vlahov contributed to the writing of this article.

### Acknowledgments

This work was supported in part by the National Institutes of Health (grants DA017642, MH066391, and DA003574).

### Human Participants Protection

The institutional review board of the New York Academy of Medicine reviewed and approved this study.

### References

- Goffman E. *Stigma: Notes on the Management of a Spoiled Identity*. New York, NY: Simon & Schuster; 1963.
- Snyder M, Omoto AM, Crain AL. Punished for their good deeds: stigmatization of AIDS volunteers. *Am Behav Sci*. 1999;42:1193–1211.
- Brandt AM. *No Magic Bullet: A Social History of Venereal Disease in the United States Since 1880*. Expanded ed. New York, NY: Oxford University Press; 1987.
- Brandt AM, Rozin P. *Morality and Health*. New York, NY: Routledge; 1997.
- Herek G, Capitano J, Widaman K. HIV-related stigma and knowledge in the United States: prevalence and trends 1991–1999. *Am J Public Health*. 2002;92:371–377.
- Parker R, Aggleton P. HIV and AIDS-related stigma and discrimination: a conceptual framework and implications for action. *Soc Sci Med*. 2003;57:13–24.
- Shilts R. *And the Band Played On: Politics, People, and the AIDS Epidemic*. New York, NY: St Martin's Press; 1987.
- Arnold W. In travel to Singapore, suspicion is a form of defense. *New York Times*. April 21, 2003: A31.
- Chang I. Fear of SARS, fear of strangers. *New York Times*. March 21, 2003: A1.
- Bradsher K. Outbreak of disease brings big drop-off in China's economy. *New York Times*. April 28, 2003:A1, A14.
- Bradsher K. Economies sickened by a virus, and fear. *New York Times*. April 21, 2003:A1, A8.
- Person B, Sy F, Holton K, Govert B, Liang A, National Center for Infectious Disease/SARS Community Outreach Team. Fear and stigma: the epidemic within the SARS outbreak. *Emerg Infect Dis*. 2004;1:358–363.
- Chang H-J, Huang N, Lee C-H, Hsu Y-J, Hsieh C-J, Chou Y-J. The impact of the SARS epidemic on the utilization of medical services: SARS and the fear of SARS. *Am J Public Health*. 2004;94:562–564.
- Pryor JB, Reeder GD, Landau S. A social-psychological analysis of HIV-related stigma: a two-factor theory. *Am Behav Sci*. 1999;42:1212–1228.
- Galea S, Vlahov D, Tracy M, Hoover DR, Resnick H, Kilpatrick D. Hispanic ethnicity and post-traumatic stress disorder after a disaster: evidence from a general populations survey after September 11. *Ann Epidemiol*. 2004;14:520–531.
- Spitzer RL, Williams JB, Gibbon M. *Structured Clinical Interview for DSM-III-R–Non-Patient Version*. New York, NY: Biometrics Research Department, New York State Psychiatric Institute; 1987.
- Boscarino JA, Galea S, Adams R, Ahern J, Resnick H, Vlahov D. Mental health service and medication use in New York City after the September 11, 2001, terrorist attack. *Psychiatr Serv*. 2004;55:274–283.
- Galea S, Ahern J, Resnick H, et al. Psychological sequelae of the September 11 terrorist attacks in New York City. *N Engl J Med*. 2002;346:982–987.
- Boscarino JA, Galea S, Ahern J, Resnick H, Vlahov D. Utilization of mental health services following the September 11th terrorist attacks in Manhattan, New York City. *Int J Emerg Ment Health*. 2002;4(3):143–155.
- Centers for Disease Control and Prevention. *HIV/AIDS Surveillance Report*. 2001;13(1). Available at: <http://www.cdc.gov/hiv/stats/hasr1301.htm>. Accessed December 10, 2005.
- New York City Department of Health and Mental Hygiene. HIV Epidemiology Program 3rd Quarter Report. July 2004. Available at: [http://www.nyc.gov/html/doh/html/dires/epi\\_reports.shtml](http://www.nyc.gov/html/doh/html/dires/epi_reports.shtml). Accessed December 10, 2005.
- World Health Organization. China's latest SARS outbreak has been contained, but biosafety concerns remain—Update 7. May 18, 2004. Available at: [http://www.who.int/csr/don/2004\\_05\\_18a/en](http://www.who.int/csr/don/2004_05_18a/en). Accessed December 10, 2005.
- Zajonc RB. On the primacy of affect. *Am Psychol*. 1984;39:124–129.
- Cumulative number of reported probable cases of severe acute respiratory syndrome (SARS). Available at: <http://www.who.int/csr/sars/country/en>. Accessed December 10, 2005.
- Singapore begins SARS TV channel. *New York Times*. May 24, 2003:A1.
- Kahn J. Quarantine set in Beijing areas to fight SARS. *New York Times*. April 25, 2003:A1, A20.
- Normile D. Infectious diseases. Mounting lab accidents raise SARS fears. *Science*. 2004;304(5671):659–661.
- Walgate R. SARS escaped Beijing lab twice: laboratory safety at the Chinese Institute of Virology under close scrutiny. Available at: <http://www.the-scientist.com/news/20040426/05>. Accessed April 26, 2004.