

# Will Public Health's Response to Terrorism Be Fair? Racial/Ethnic Variations in Perceived Fairness During a Bioterrorist Event

DAVID P. EISENMAN, CHERYL WOLD, CLAUDE SETODJI, SCOT HICKEY, BEN LEE,  
BRADLEY D. STEIN, and ANNA LONG

## ABSTRACT

**Objectives:** Public health departments' effectiveness during catastrophic bioterrorism will require trust on the part of diverse communities. This study describes variations in perceptions that the public health system will respond fairly to one's needs in a bioterrorist event, regardless of race/ethnicity, income, or other characteristics.

**Methods:** Using the Los Angeles County Health Survey, a random-digit, population-based, telephone survey, we conducted multivariate logistic regression of race/ethnicity on perceived fairness, adjusting for demographic factors and perceived neighborhood safety. We performed similar analyses stratified by race/ethnicity subgroup.

**Results:** Overall, 72.7% of respondents perceived that the public health system will respond fairly in a bioterrorist event. African Americans (AA) and Asian/Pacific Islanders (API) reported the lowest perceived fairness (AA 63.0%, API 68.2%, Latino 73.1%, White 76.6%,  $p = 0.005$  for group differences). Adjusting for demographic factors and neighborhood safety, African Americans had lower perceived fairness compared to whites (adjusted odds ratio, aOR 0.45; 95% confidence intervals, CI 0.26–0.79;  $p < 0.005$ ). Other factors associated with lower perceived fairness included Asian-language compared to English-language interview (aOR 0.29; 95% CI 0.11–0.76;  $p < 0.05$ ) and lower compared to higher neighborhood safety (aOR 0.48; 95% CI 0.31–0.74;  $p < 0.005$ ). Among African Americans, participants aged 18–29 years were less likely to report perceived fairness (aOR 0.06; 95% CI 0.01–0.59) compared to participants older than 60 years of age. Among Asian/Pacific Islanders, Asian-language interview (aOR 0.07; 95% CI 0.01–0.48) and lower perceived neighborhood safety (aOR 0.01; 95% CI <0.01–0.13) were associated with perceived fairness.

**Conclusions:** To strengthen bioterrorism preparedness, public health officials must continue to improve perceived fairness among African American and Asian/Pacific Islander communities.

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David P. Eisenman, MD, MSHS, is Associate Natural Scientist, RAND Corporation, and Assistant Professor of Medicine, UCLA School of Medicine. Cheryl Wold, MPH, is Chief of the Health Assessment Unit, and Ben Lee, PhD, is a Research Analyst, Health Assessment Unit, Office of Health Assessment and Epidemiology, Los Angeles County Department of Health Services–Public Health. Claude Setodji, PhD, is Associate Statistician, and Scot Hickey, MA, is a Research Analyst, both at the RAND Corporation. Bradley D. Stein, MD, PhD, is Natural Scientist and Associate Director, Mental and Behavioral Health, Center for Domestic and International Health Security, RAND Corporation, and Assistant Professor of Psychiatry, University of Southern California. Anna Long, PhD, MPH, is Chief of Staff, Public Health, Los Angeles County Department of Health Services.

**T**HE ANTHRAX ATTACKS OF 2001, the SARS epidemic of 2002, and the recent concerns about West Nile virus and avian flu demonstrate the importance of preparedness for bioterrorism and emerging infectious diseases capable of inflicting mass morbidity and mortality.<sup>1-4</sup> In preparing for potential catastrophic bioterrorism and natural epidemics, the public health infrastructure now in place will continue to be the first line of defense in the detection, surveillance, and response phases of consequence management.<sup>5</sup>

Public health departments' effectiveness in the event of catastrophic bioterrorism or a natural epidemic will require that the public trust their institutions and actions, and it will require sustained cooperation on the part of diverse communities.<sup>6</sup> These public health events could require onerous or controversial prevention and control measures (e.g., isolation, quarantine, travel restrictions, targeted distribution of medications or vaccines) whose success will be influenced by the extent to which communities trust and cooperate with public health institutions. For instance, in the Dark Winter exercise, ensuring compliance with vaccination policies or travel restrictions meant gaining the general cooperation of large portions of the population; gaining that cooperation required persuading communities that there was fairness in the distribution of vaccine and other scarce resources.<sup>7</sup>

Understanding differences in perceived fairness may be especially important given reports that in the 2001 anthrax attacks, African Americans and other vulnerable groups felt betrayed by the United States Postal Service, public health authorities in the District of Columbia, and the Centers for Disease Control and Prevention (CDC).<sup>8,9</sup> In fact, public health agencies have had a history of enacting discriminatory policies during epidemics. In 1900, a federal court ruled that the quarantine in the Chinatown community of San Francisco in response to a cluster of plague cases was unfair and that public health officials had acted with ethnic bias.<sup>10</sup> The fair distribution of health resources was a problem during the 1918 Spanish flu pandemic.<sup>11</sup> Baltimore hospitals, under Jim Crow segregation, were closed to African Americans, and the city's high mortality rates and poor public health record were attributed to the number of African American residents. More recently, government-sanctioned discrimination in health services has threatened to deprive immigrants of care. Although it was ultimately struck down as unconstitutional, California's Proposition 187 prohibited publicly funded health care for undocumented immigrants. The 1996 Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) similarly restricts immigrants' receipt of public health services and mandates reporting of undocumented immigrants who

seek medical assistance,<sup>12</sup> although generally it has not been followed by state and local health authorities.<sup>13</sup>

In a November 2002 national survey, Blendon and colleagues reported that 72% of respondents believed that, if it were not possible to vaccinate everyone quickly during a smallpox outbreak, wealthy and influential people would be vaccinated first.<sup>14</sup> Twenty-two percent thought that African Americans would experience discrimination in such an outbreak.<sup>14</sup>

We report on a contemporaneous survey, in which we examined racial/ethnic and other demographic and neighborhood factors associated with variations in the perception that public health will respond fairly to people's needs in a bioterrorist event, regardless of race/ethnicity, income, or other personal characteristics. First, we examined whether race/ethnicity was associated with perceived fairness. Second, within racial/ethnic groups, we examined the correlates of perceived fairness. Identifying such variations could lead to policies and interventions to improve trust in and cooperation with public health institutions among racial/ethnic minority groups and other vulnerable populations during catastrophic public health events.

## METHODS

### *Study design and population*

We analyzed data from a subsample of the Los Angeles County Health Survey, a periodic, random-digit-dialed telephone survey of the noninstitutionalized population in Los Angeles County.<sup>15</sup> Adults aged 18 years and older were surveyed during October 2002 through February 2003 in two stages. One adult from each randomly selected household was eligible for inclusion in the survey. In households with multiple adults, one adult was randomly selected for participation.

Of 15,262 households contacted, 8,167 interviews were completed for a cooperation rate of 58%, using CASRO (Council of American Survey Research Organizations) standards. This cooperation rate is comparable to the cooperation rates of other studies,<sup>16</sup> including the California-wide response rate (50.8%) in the 2001 Behavioral Risk Factor Surveillance System (BRFSS).<sup>17</sup> All respondents answered 120 core questions. A random subsample of 1,041 participants answered 12 additional items regarding terrorism. Telephone interviews, conducted by trained staff using a standardized questionnaire, offered participants the option of answering the survey items in English, Spanish, or one of four Asian languages: Mandarin, Cantonese, Korean, or Vietnamese. The survey was conducted for

the Los Angeles County Department of Health Services by contract with the Field Research Corporation (San Francisco, California).

### *Study variables*

The main independent variable was the participants' self-reported race or ethnicity. Race/ethnicity was defined as non-Latino white (white), non-Latino African American (African American), Latino, and Asian/Pacific Islander. Participants who self-identified as American Indian/Alaska Native ( $n = 8$ ) or other race/ethnicity ( $n = 6$ ) or whose response was coded as "don't know" or "refused" ( $n = 9$ ) were excluded from analyses. The outcome variable (perceived fairness) was measured by a single item: "If there is a bioterrorist attack in LA, do you think the County's public health system will respond fairly to your health needs regardless of race, ethnicity, income or other personal characteristics?" Allowed responses were "yes," "no," "don't know," and "refused." Perceived fairness was defined as a "yes" response to this item.

The additional independent variables we chose to explore were age, gender, education, income, interview language, health insurance, and perceived neighborhood safety. The variables were selected because they were predictors of perceived fairness in previous studies<sup>18</sup> or because of a priori reasoning. Educational attainment was collapsed into three categories: less than high school, high school graduation, and some college/trade school or more. Income is reported based on 2002 federal poverty levels (FPL), which takes into account both income and household size. (For example, in 2002, FPL was an annual income of \$18,244 for a family of two adults and two dependents.) We collapsed incomes into four categories: poor (<100% poverty level), near poor (100–199% poverty level), middle income (200–299% poverty level), and higher income ( $\geq 300\%$  poverty level). Perceived neighborhood safety was assessed with an item that asked, "How safe from crime do you consider your neighborhood to be?" Allowed response categories were: "not safe at all," "somewhat unsafe," "somewhat safe," and "very safe." For this analysis, we collapsed perceived neighborhood safety into "not safe at all or somewhat unsafe" versus "somewhat safe and very safe."

### *Study sample and data analysis*

We examined the distribution of the covariates both overall ( $N = 1,018$ ) and by race/ethnicity. We then determined the proportion of participants who reported perceived fairness by each covariate. We used the Mantel-Haenszel chi-square test with two-sided  $p$ -values to

examine group differences in these proportions. We used logistic regression to examine which factors were associated with perceived fairness. We conducted multivariate logistic regression of race/ethnicity on perceived fairness, adjusting for the covariates. Finally, we conducted stratified multivariate logistic regressions within each race/ethnicity subgroup separately. All multivariate logistic regression models generated adjusted odds ratios (aOR) and 95% confidence intervals (95% CI) that measured the independent relationship of each covariate to perceived fairness, adjusting for confounding by the other covariates. Each model contained all the covariates. For the logistic regressions, we eliminated 93 participants whose response to the outcome measure was coded "don't know" or "refused," because we sought to assess factors associated with the belief that there will be a fair response.

As a test of sensitivity of the results to the inclusion or exclusion of participants who responded "don't know" or "refused," we repeated the multivariate logistic analyses, adding those 93 participants into the group who responded "no" to the outcome item (resulting in 749 "yes" and 269 "no" responses). Results of the multivariate analyses and the basic pattern of results did not change substantively. We also repeated the multivariate logistic analyses using models limited to covariates that were independently associated with perceived fairness at an  $\alpha = 0.05$  significance level. Results of the multivariate analyses were substantively similar between the full and limited models. Results using the reduced sample and the full models are reported here.

We constructed an analytical weight for each participant composed of two component weight fields. The first weight field is a sampling weight to adjust for the number of telephone lines in the household and the probability of selection of an individual within a household. To reduce the bias derived from excluding county residents currently without telephone service from the sample, the responses of those who reported being without telephone service for a time in the past year were given a somewhat greater weight. The second weight field is a population-level adjustment and converts the random subsample data to projections of the overall population of all adults in the county (gender, age, education, race/ethnicity, and geographical location of households based on 2002 projections from 2000 U.S. Census data). A comparison of the weighted study sample to the population revealed that the study results can be used to generate population estimates of Los Angeles County. Weighted data are therefore presented here as a reasonable approximation of the opinions of adult residents of Los Angeles County. Data were analyzed using SAS software version 8.2 (SAS Institute, Inc., Cary, NC).

## RESULTS

Table 1 shows the distribution of demographic characteristics and perceived neighborhood safety in relation to the study sample and the race/ethnicity subgroups. Seventy-three percent of the study sample conducted the interview in English, 76% reported having health insurance, and 80% perceived their neighborhood to be very safe or somewhat safe. Socioeconomic deprivation was most concentrated among the African American and Latino subgroups. Significant group differences within the race/ethnicity subgroups occurred in the distribution of all the covariates except gender.

Overall 72.2% believed that the public health system will respond fairly in the event of a bioterrorism attack (Table 2). Racial/ethnic subgroups differed significantly

in their patterns of response. African Americans and Asian/Pacific Islanders were the least likely groups to report perceived fairness (African American, 63.0%; Asian/Pacific Islander, 68.2%; Latino, 73.1%; white, 76.6%;  $p < 0.005$  for group differences). Other variables associated with lower endorsement of perceived fairness were younger age (18–29 years, 68.9%; 30–44 years, 74.1%; 44–59 years, 77.6%; 60 and older, 70.2%;  $p < 0.005$ ), Asian-language interview (English, 73.8%; Spanish, 75.2%; Asian languages, 43.3%;  $p < 0.005$ ), income/poverty (<99% FPL, 74.3%; 100–199% FPL, 68.4%; 200–299% FPL, 69.7%;  $\geq 300\%$  FPL, 76.4%;  $p < 0.005$ ), and perception that one's neighborhood was not safe (very/somewhat unsafe, 64.9%; very/somewhat safe, 74.6%;  $p = 0.03$ ).

Table 3 shows the adjusted odds ratios for perceived

TABLE 1. CHARACTERISTICS OF STUDY PARTICIPANTS BY TOTAL AND RACE/ETHNICITY SUBGROUPS<sup>†</sup>

<i>Characteristics</i>	<i>Total</i> ( <i>N</i> = 1,018)	<i>African</i> <i>American</i> ( <i>n</i> = 104)	<i>Asian/Pacific</i> <i>Islander</i> ( <i>n</i> = 98)	<i>Latino</i> ( <i>n</i> = 404)	<i>White</i> ( <i>n</i> = 412)
<b>Gender</b>					
Male	48.6% (434)	44.7% (43)	46.9% (47)	49.7% (156)	49.0% (188)
Female	51.5% (584)	55.4% (61)	53.1% (51)	50.3% (248)	51.0% (224)
<b>Age (years)*</b>					
18–29	24.5% (217)	21.6% (24)	24.8% (24)	34.2% (131)	13.8% (38)
30–44	32.2% (365)	39.1% (40)	28.5% (33)	37.6% (167)	25.5% (125)
45–59	23.5% (259)	18.6% (21)	31.0% (29)	16.7% (68)	29.5% (141)
$\geq 60$	19.9% (177)	20.7% (19)	15.7% (12)	11.5% (38)	31.2% (108)
<b>Language*</b>					
English	73.0% (777)	100.0% (104)	67.4% (68)	45.8% (196)	99.4% (409)
Spanish	22.3% (211)	0% (0)	0% (0)	54.2% (208)	0.6% (3)
Asian	4.7% (30)	0% (0)	32.6% (30)	0% (0)	0% (0)
<b>Education*</b>					
$\leq$ High School	47.4% (428)	43.0% (38)	28.4% (23)	71.5% (273)	28.3% (94)
Some College	24.2% (250)	29.3% (38)	23.4% (21)	16.4% (73)	32.0% (118)
College Degree	28.5% (336)	27.7% (28)	48.2% (51)	12.1% (57)	39.7% (200)
<b>Income/poverty*</b>					
<100% (poor)	22.5% (216)	20.6% (24)	13.3% (11)	38.9% (151)	7.8% (30)
100–199% (near poor)	24.6% (228)	22.9% (20)	24.3% (23)	31.3% (129)	17.4% (56)
200–299% (middle income)	19.3% (185)	17.8% (19)	29.0% (30)	13.0% (52)	23.0% (84)
$\geq 300\%$ (higher income)	33.7% (389)	38.7% (41)	33.4% (34)	16.9% (72)	51.8% (242)
<b>Health Insurance*</b>					
Yes	75.8% (781)	81.5% (88)	80.8% (77)	59.3% (242)	91.2% (374)
No	24.2% (233)	18.5% (16)	19.2% (19)	40.7% (160)	8.8% (38)
<b>Perceived neighborhood safety*</b>					
Very/somewhat safe	80.2% (827)	80.8% (83)	89.3% (88)	69.5% (282)	88.8% (374)
Very/somewhat unsafe	19.8% (191)	19.2% (21)	10.7% (10)	30.5% (122)	11.3% (38)

\* $p \leq .001$  for chi-square test of group differences among race/ethnicity subgroups.

<sup>†</sup>Data are given as weighted percentage (unweighted number) of participants. Numbers of participants vary because of unanswered questions. Some percentages do not sum to 100 because of rounding.

TABLE 2. PROPORTION OF PARTICIPANTS WHO REPORTED PERCEIVED FAIRNESS, BY DEMOGRAPHIC CHARACTERISTICS

		<i>Unadjusted Rate*</i>	<i>p value</i> <sup>†</sup>
Total		72.7 (740)	
Race	White	76.6 (280)	<0.005
	African American	63.0 (63)	
	Latino	73.1 (309)	
	Asian/Pacific Islander	68.2 (102)	
Age	60 and Plus	70.2 (128)	<0.005
	18 to 29	68.9 (152)	
	30 to 44	74.1 (272)	
	44 to 59	77.6 (209)	
Income/poverty	Less than 99	74.3 (161)	<0.005
	100 to 199	68.4 (161)	
	200 to 299	69.7 (130)	
	300 and plus	76.4 (309)	
Gender	Female	71.2 (437)	0.06
	Male	74.2 (324)	
Education	≤High School	74.0 (322)	0.68
	Some College	73.0 (186)	
	College/Grad	71.3 (252)	
Insurance	No	71.6 (170)	0.30
	Yes	73.4 (590)	
Language	English	73.8 (588)	<0.005
	Spanish	75.2 (160)	
	Asian	43.3 (13)	
Neighborhood Safety	Very/Somewhat safe	74.6 (623)	0.03
	Very/Somewhat unsafe	64.9 (126)	

\**N* = 1,018. Data are given as weighted percentage (unweighted number) of participants in each row. Numbers of participants vary because of unanswered questions.

<sup>†</sup>Chi-square test.

fairness both overall and stratified by race/ethnicity subgroup. Even after adjusting for other covariates, the difference between African Americans and whites persisted, with African Americans less often reporting perceived fairness compared to whites (aOR 0.45; 95% CI 0.26–0.79). Factors associated with perceived fairness in the total sample included ages 18–29 compared to aged older than 60 years (aOR 0.50; 95% CI 0.28–0.89), Asian-language interview compared to English-language interview (aOR 0.29; 95% CI 0.11–0.76), and lower perceived neighborhood safety compared to higher perceived neighborhood safety (aOR 0.48; 95% CI 0.31–0.74).

For the multivariate logistic models stratified by race/ethnicity subgroups, young age (18–29 years) was the only factor associated with perceived fairness among African Americans; compared to African American participants older than 60 years, African Americans aged 18–29 years were less likely to report perceived fairness (aOR 0.06; 95% CI 0.01–0.59). Characteristics associated with perceived fairness among Latinos were ages

45–59 (aOR 3.09; 95% CI 1.05–9.05) and Spanish-language interview (aOR 2.15; 95% CI 1.12–4.14). Among Asian/Pacific Islanders, Asian-language interview (aOR 0.07; 95% CI 0.01–0.48) and lower perceived neighborhood safety (aOR 0.01; 95% CI <0.01–0.13) were strongly associated with perceived fairness.

## DISCUSSION

In this population-based study of residents of Los Angeles County, African Americans, Asian-language groups, younger age groups, and participants who viewed their neighborhoods as unsafe were less likely to believe that the public health system will respond fairly to a bioterrorism attack. Among African Americans, only the youngest age group was less likely to report perceived fairness. Among Asian/Pacific Islanders, Asian-language interview and perceiving one's neighborhood as unsafe or somewhat unsafe were strongly associated

TABLE 3. RESULTS OF MULTIVARIATE LOGISTIC REGRESSION OF PERCEIVED FAIRNESS, ODDS RATIOS (95% CI)

<i>Characteristic</i>	<i>Overall</i> ( <i>N</i> = 917)*	<i>African</i> <i>American</i> ( <i>n</i> = 94)	<i>Latino</i> ( <i>n</i> = 363)	<i>Asian/PI</i> ( <i>n</i> = 85)	<i>White</i> ( <i>n</i> = 375)
<b>Race/ethnicity</b>					
White	1.0	—	—	—	—
African American	0.45 (0.26,0.79) <sup>‡</sup>	—	—	—	—
Latino	0.73 (0.44,1.21)	—	—	—	—
Asian/PI	1.06 (0.56,2.01)	—	—	—	—
<b>Sex</b>					
Female	1.0	1.0	1.0	1.0	1.0
Male	0.85 (0.61,1.20)	0.51 (0.15,1.67)	0.98 (0.57,1.68)	0.62 (1.19, 2.02)	0.88 (0.46,1.71)
<b>Age (years)</b>					
≥60	1.0	1.0	1.0	1.0	1.0
18–29	0.5 (0.28,0.89) <sup>†</sup>	0.06 (0.01,0.59) <sup>†</sup>	1.69 (0.70,4.08)	0.1 (0.01,1.21)	0.26 (0.09,0.74) <sup>†</sup>
30–44	0.73 (0.42, 1.27)	0.33 (0.05,2.15)	1.9 (0.80,4.52)	0.13 (0.01,1.29)	0.72 (0.26,1.98)
45–59	0.9 (0.50,1.61)	0.33 (0.04,2.69)	3.09 (1.05,9.05) <sup>†</sup>	1.17 (0.11,12.82)	0.47 (0.18,1.19)
<b>Language</b>					
English	1.0	1.0	1.0	1.0	1.0
Spanish	1.69 (0.94,3.05)	—	2.15 (1.12,4.14) <sup>†</sup>	—	—
Asian	0.29 (0.11,0.76) <sup>†</sup>	—	—	0.07 (0.01,0.48) <sup>†</sup>	—
<b>Education</b>					
≤HS	1.0	1.0	1.0	1.0	1.0
Some Coll/Trade	0.97 (0.60,1.57)	0.68 (0.16,2.80)	1.87 (0.81,4.33)	0.3 (0.04,2.16)	0.36 (0.14,0.97) <sup>†</sup>
≥College Degree	0.71 (0.43,1.15)	0.28 (0.06,1.21)	2.46 (0.86,6.99)	0.23 (0.04,1.22)	0.34 (0.12,0.94) <sup>†</sup>
<b>Income/poverty</b>					
≤99%	1.0	1.0	1.0	1.0	1.0
100–199% (near poor)	0.94 (0.56,1.59)	0.23 (0.03,2.07)	0.96 (0.50,1.85)	1.22 (0.16,9.26)	0.48 (0.11,2.18)
200–299% (middle income)	0.78 (0.44,1.39)	0.25 (0.03,1.76)	0.77 (0.33,1.79)	1.94 (0.32,11.85)	0.23 (0.05,1.03)
≥300% (higher income)	1.03 (0.57,1.86)	0.19 (0.03,1.48)	1.22 (0.47,3.18)	2.3 (0.31,17.24)	0.32 (0.07,1.42)
<b>Health Insurance</b>					
No	1.0	1.0	1.0	1.0	1.0
Yes	0.82 (0.52,1.29)	0.27 (0.04,1.86)	0.63 (0.34,1.6)	0.09 (0.01,1.09)	6.57 (2.25,19.21) <sup>‡</sup>
<b>Neighborhood Safety</b>					
Safe	1.0	1.0	1.0	1.0	1.0
Unsafe	0.48 (0.31,0.74) <sup>‡</sup>	0.31 (0.08,1.16)	0.66 (0.36,1.16)	0.01 (<0.01,0.13) <sup>‡</sup>	0.22 (0.08,0.59) <sup>‡</sup>

\*An additional eight observations were deleted because of missing values for one or more of the model covariates.

† $p < 0.05$ .‡ $p < 0.005$ .

with perceived fairness. Among Latinos, those who spoke Spanish in the interview were more likely to report perceived fairness. While focus groups of African American postal workers from Washington, DC, reported perceived bias in the public health responses to the 2001 anthrax attacks,<sup>8,9</sup> population level racial/ethnic perceptions of a potentially biased response to a bioterrorist event have not previously been reported.

The negative consequences that this perceived bias could have in a bioterrorist event are illustrated by past public health interventions where bias and the resulting distrust influenced the success or failure of the intervention. During a smallpox outbreak in 1894 in Milwaukee, dual quarantine policies were enacted: Middle-class people were allowed to be quarantined in their homes because of the belief that they would abide by the quarantine, but the poorer, immigrant populations were taken away to an isolation hospital. The policies led to criticisms, resistance to recommendations, and eventually riots.<sup>19</sup> More recently, fear in the African American community of experimentation and genocide led to African American opposition to needle exchange programs for HIV/AIDS prevention in New York City.<sup>20</sup> If people view the public health response to bioterrorism as being unfairly influenced by considerations of race, income, or other characteristics, opposition to controversial programs such as quarantine or travel restriction might be exacerbated, and efforts to control disease spread and morbidity will falter.<sup>7,10,19</sup>

To the extent a community already expects a biased public health response, public health officials will face an even greater challenge to conveying messages and promoting interventions and policies.<sup>6</sup> For instance, distrust is already an important barrier to disenfranchised populations' acceptance of standard vaccines such as hepatitis B<sup>21</sup> and influenza<sup>22</sup> and is likely to influence vaccine acceptance in a bioterror attack.<sup>23</sup> Minority groups less willing to obtain smallpox vaccination could suffer higher morbidity and mortality rates in a smallpox attack, and this could even jeopardize the broader success of a smallpox vaccination program.<sup>23</sup> Recognizing that the willingness to be vaccinated may vary by race/ethnicity, public health agencies should prepare to tailor vaccination strategies to minority populations.

Our finding that Asian language was strongly associated with perceived bias has unique implications for public health agencies in a bioterrorist event. Recent immigrants, some of whom may have spoken an Asian language in the interview, may be undocumented immigrants or family of undocumented immigrants and may fear that health service provision will lead to deportation.<sup>24,25</sup> Fear of detection and deportation may force undocumented immigrants to obtain medical treatment through underground networks, leading to inadequate

treatment (as has been reported with tuberculosis care in the U.S.<sup>12</sup>) and making it difficult to estimate how many infected immigrants are refusing to seek available treatments.<sup>12,26,27</sup> Contact tracing would be hampered, since it might uncover undocumented families and friends who could be deported. (German and Polish immigrants in the Milwaukee smallpox outbreak, afraid of having their children taken away to isolation hospitals which were said to treat children badly, stopped reporting cases of smallpox and hid them from the health department when they came knocking at their doors.<sup>19</sup>) Lastly, case reporting to track the spread of the disease would be impaired, and public health officials, lacking accurate incidence and concentration data, would have difficulty planning effective measures to stop the spread of the disease. These concerns provide added support to those seeking to repeal provisions of the 1996 PRWORA.<sup>12,13</sup>

That African Americans were less likely to perceive fairness is consistent with studies showing greater distrust of physicians, researchers, and the health care system generally in African Americans compared to whites.<sup>18,28</sup> Perceived unfairness may be due in part to the history of racial discrimination and exploitation by the medical profession, which dates back to the antebellum period and the use of freed and enslaved African Americans for brutal and nonconsensual medical experimentation.<sup>20</sup> The Public Health Service Tuskegee Syphilis Study on Untreated Syphilis in the Negro Male, in which federally funded investigators observed African Americans through the natural course of syphilis and withheld available treatment, is the most frequently recalled example of this history.<sup>20</sup> Research has demonstrated that African Americans' knowledge of the history of racial discrimination is associated with their reluctance to participate in medical research<sup>18</sup> and may be associated with low rates of trust in clinicians.<sup>29</sup> African Americans report believing that they would receive better medical care if they belonged to a different race or ethnic group.<sup>30</sup> These studies have concentrated on the interpersonal trust likely to arise from direct personal experiences with other individuals (for example, one's personal physician), whereas our study is concerned with one aspect of institutional trust. Here, people may develop perceptions of institutions on the basis of personal and secondhand experiences and social cues, including conversations in the community and media portrayals.<sup>29</sup> Finally, our findings that the youngest age group was more likely to anticipate an unfair response is consistent with prior studies that found less trust in physicians among younger compared to older African Americans.<sup>18,29</sup> We are currently conducting qualitative studies (focus groups) with African Americans stratified by age that will help us understand why the youngest age group perceived more bias than the older age group and how agencies can address these differences.

Among Asian/Pacific Islanders, several factors that were associated with perceived fairness may guide public health officials in identifying more specifically the sources of perceived bias and working with those communities to reduce it. Public health officials may find that specific Asian-language groups are of particular concern. Recent Asian immigrants may not believe that public health responses will be available to people without documented status, in addition to the aforementioned fear that service provision will lead to deportation.<sup>24,25</sup> Completing the interview in an Asian language was probably correlated with the level of acculturation, but we found no literature to guide us on the relationship between acculturation and perceived bias or trust among Asian/Pacific Islanders. An additional interpretation is that Korean Americans, who may recall law enforcement's insufficient response in Koreatown during the 1992 riots following the verdict in the Rodney King trial and the inadequate state and federal assistance after the riots, may distrust municipal services, including public health and safety workers.<sup>31</sup> Unfortunately, our study had too few participants in each Asian language subgroup to analyze trust by Asian language subgroups. Lastly, Asian/Pacific Islanders report more adverse health experiences with health care than do whites, including not being treated with respect by physicians.<sup>32</sup> They also are more likely to report being treated unfairly by a physician or medical staff based on race/ethnicity, and this perceived bias is associated with lower trust in physicians and satisfaction with care.<sup>30</sup> Such adverse experiences and perceived bias in medical offices may influence perceived fairness in public health, like the effect that reduced interpersonal trust in physicians has on institutional trust in hospitals or health plans affiliated with the physicians.<sup>33</sup> Future research should aim to better understand the reasons why Asian/Pacific Islanders believe public health's response will be unfair.

In contrast, Spanish language was associated with higher perceived fairness in the Latino subgroup. As with the Asian/Pacific Islanders, Spanish language was correlated with acculturation in this study, but acculturation appears to be inversely related to perceived fairness. In fact, one study reported that Latinos of Mexican descent became more cynical about American government as they integrated into American society and as they became more aware of racism and discrimination.<sup>34</sup>

The importance in our analysis of the perception of one's neighborhood as being unsafe suggests one avenue of exploration and intervention for improving perceived fairness. Lower perceived neighborhood safety was strongly associated with lower perceived fairness in both the Asian/Pacific Islander and white groups. Prior research on disparities may illuminate potential mecha-

nisms for this association in the Asian/Pacific Islander group. Studies have described racial/ethnic disparities in how emergency response services and resources for recovery and reconstruction are allocated after catastrophic disasters.<sup>25</sup> Research has also demonstrated racial differences in perceptions of the "quality and responsiveness of community services" (e.g., police, fire, and public school services).<sup>35</sup> Participants may have generalized from their experience with these services, such as the police, to form a broader view of other municipal authorities and services.<sup>36,37</sup>

Although our study's results are strong, we acknowledge its limitations. First, as with all telephone surveys, the sampling frame in this survey excluded the estimated 3% of Los Angeles County residents who live in households without telephones. To reduce this potential source of bias, respondents were asked if they had been without telephone service in the previous 12 months, and the data were weighted accordingly.<sup>15</sup>

Second, the 58% cooperation rate is a potential source of bias due to nonresponse, but we do not have any information from nonresponders to estimate or adjust for this potential bias. However, this rate compares favorably with the median national and California state response rates achieved in the Center for Disease Control and Prevention's 2000 Behavior Risk Factor Surveillance System survey.<sup>17</sup> Additionally, we cannot estimate the direction and magnitude of the selection bias that may have occurred if perceived fairness influenced the decision to participate in the study.

Third, to date no scale exists to measure perceived fairness of public health institutions. Although the item measuring perceived fairness has face validity, a single item may not fully capture the intended construct. Also, this item may have different meanings for participants from the different racial/ethnic groups.<sup>38,39</sup> This could explain the differences in response between the Asian-language and Spanish-speaking participants.

Fourth, the analysis may have been underpowered to detect small group differences in the stratified sample analyses, especially within African Americans and Asian/Pacific Islanders. As an example, between the 18–29-year-old group and the greater than 60-years-old group of African Americans, the power to test the adjusted odds ratio 1 (of no difference) against the obtained 0.06 was about 60%.

Lastly, the cross-sectional nature of this study allows for only speculation about the causal relationship between factors, and our results cannot be generalized beyond Los Angeles County.

The onus is on public health agencies, mindful that minority groups already believe they will not be treated fairly in a crisis, to prepare and respond in a way that they

are consistently proving otherwise.<sup>6</sup> Improving perceptions can begin with strengthening current relationships between agencies and minority communities. In an analysis of California's local public health systems, and focusing on bioterrorism preparedness, fewer than 20% of participating public health agencies reported inclusion of underrepresented minority community groups in bioterrorism planning.<sup>40</sup> Only one of the seven communities involved in tabletop exercises was judged to have an adequate approach to reaching minority leadership in their community. There were a variety of reasons for this, including the notions that organizations representing minority communities didn't care about bioterrorism planning and that minority individuals within the health department staff could represent the concerns of minority communities.

Recommendations to improve minority presence in bioterrorism planning don't go far enough in improving relationships prior to an event. Public health agencies must assess their community relationships and, if they are found to need improvement, public health officials should begin now to improve their presence and services in the community. Partnering with a network of community-based organizations, such as churches and neighborhood associations that are trusted in their communities, and actively integrating this network into response plans could reduce the perception, or occurrence, of a biased response. During a bioterrorist event, the decision-making process must be transparent and accessible to minority communities that typically view themselves as disenfranchised. Community-based organizations could provide a community advisory board to the public health agency, thereby providing a transparent and accessible venue for public discourse.<sup>41</sup> The advisory board could provide culturally relevant knowledge, be involved in ethically challenging decision making (e.g., prioritizing recipients of limited resources such as respirators and antitoxin in a botulinum attack), and provide feedback from the community to the public health agency, allowing it to better adapt its interventions for success in the community. They could be invaluable in assisting in response activities (e.g., vaccination efforts, caring for individuals under quarantine). Culturally sensitive and multilingual messages and materials could be developed with and delivered by these locally respected community leaders.<sup>41</sup> Similar methods of community participation have been successfully employed in public health protection and promotion efforts.<sup>42,43</sup> Identifying this network of voluntary organizations should be done as part of the response planning process. Developing and fielding culturally tailored educational outreach activities on disaster and terrorism preparedness might improve relationships with minority communities.

Finally, media communications must be crafted with an appreciation that perceptions of bias will be influenced by the message and informal public opinion. Transparency in communications is essential and must clearly convey the medical rationale for public health actions. Decisions that differentially affect minority and majority neighborhoods, businesses, and populations should be analyzed ahead of time for the appearance—or fact—of bias. Using minority and culture-specific media outlets may help reach people who both don't trust public health and don't trust mainstream media.<sup>6</sup>

## CONCLUSION

The effectiveness of public health institutions during a bioterrorist event may be partially influenced by how they are viewed by vulnerable populations in the community. Historical perceptions of unfairness in the public health structure on the part of racial and ethnic minorities, undocumented immigrants, or other vulnerable and disenfranchised groups may be an obstacle to effective responses. Public health officials charged with preparing and responding to a bioterrorist event can address perceptions of unfairness by continuing to improve relationships with minority communities, including minority community representatives in bioterrorism planning, and employing proven methods for gaining community participation early in their preparedness activities and throughout the response. Addressing provisions of the current welfare and immigration laws may also be important for designing and implementing strategies to ensure an effective response to a bioterrorist attack. Improving perceptions that public health agencies will respond fairly to bioterrorism events will additionally enhance their capacity to deal with emerging natural disease outbreaks.

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Address reprint requests to:  
David P. Eisenman, MD, MSHS  
RAND Corporation  
P.O. Box 2138  
Santa Monica, CA 90407-2138

E-mail: David\_Eisenman@rand.org

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