Practice of Epidemiology

Ten Largest Racial and Ethnic Health Disparities in the United States based on Healthy People 2010 Objectives

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A consistent framework has been developed for measuring health disparities and making comparisons across indicators with regard to the public health goals of Healthy People 2010. Disparities are measured as the percent difference from the best group rate, with all indicators being expressed in terms of adverse events. The 10 largest health disparities for each of five US racial and ethnic groups are identified here. There are both similarities and differences in the largest health disparities. New cases of tuberculosis and drug-induced death rates are among the largest health disparities for four of the five racial and ethnic groups. However, drug-induced death is the only indicator among the 10 largest disparities that is shared by both Black and White non-Hispanic populations.

ethnic groups; health promotion; minority groups; public health

The second goal of Healthy People 2010 calls for eliminating health disparities among subgroups of the US population (1). Progress toward this goal is being evaluated for 498 population-based objectives. The data set compiled for Healthy People 2010 provides race- and ethnicity-specific data for indicators representing a very broad array of outcomes, behaviors, risk factors, and health services. These indicators are used to monitor progress toward meeting targets for the Healthy People 2010 objectives and eliminating disparities.

A consistent framework for measuring health disparities has been developed for Healthy People 2010 (2). These data provide an unprecedented opportunity to identify the largest health disparities for specific racial and ethnic groups in the United States.

MATERIALS AND METHODS

Healthy People 2010 includes more than 900 objectives and subobjectives, each of which is monitored by a specific health indicator (3). Approximately half of these indicators ($n = 498$) are based on the characteristics of persons in the population. The remaining objectives and indicators are based on measures that cannot be used to compare differences in risk between population groups, or on other units of analysis such as states or work sites. Race- and ethnicity-specific data are routinely published for most of these population-based indicators. However, the Healthy People 2010 database (http://wonder.cdc.gov/DATA2010) represents a unique compilation of information about racial and ethnic disparities for an extensive array of indicators. Operational definitions for the indicators used to measure the Healthy People 2010 objectives are available online (3). A detailed summary of progress toward the goals and objectives of Healthy People 2010 has been published in a midcourse review (4).

The analytic framework developed for Healthy People 2010 provides for the comparable measurement of health disparities among population groups, over time, and across indicators (2). Disparities are measured as the deviation from the "best" or most favorable group rate among the groups associated with a particular characteristic. Therefore, disparities for racial and ethnic groups are measured using the rate for the racial and ethnic group with the best rate as the reference point. In order to ensure that a reasonably

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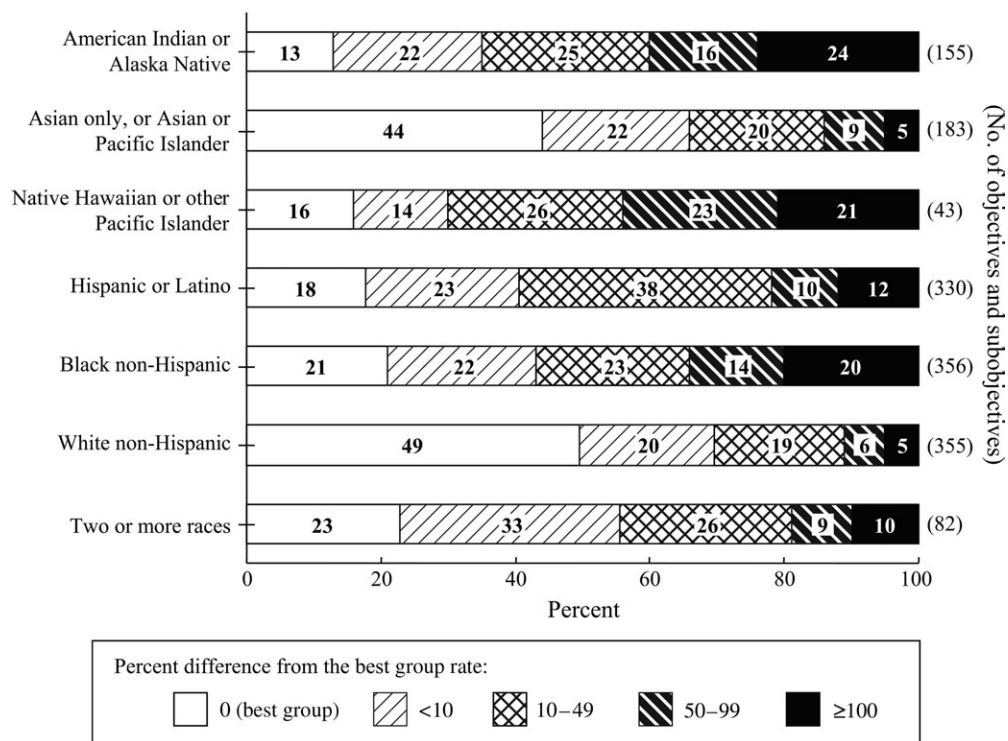
FIGURE 1. Percent distribution of Healthy People 2010 objectives and subobjectives, by size of the disparity, for various US racial and ethnic populations at the most recent data point (as of January 2005). Values for the Hispanic or Latino population, the White non-Hispanic population, and persons identifying with two or more races do not total 100% because of rounding.

stable rate is selected as the best group rate, the relative standard error for the most favorable group rate must be less than 10 percent; otherwise, the next most favorable rate is evaluated for use as the reference point. When estimates of variability (standard errors) are not available, the most favorable group rate is employed as the reference point.

To compare disparities across such a diverse array of indicators, a relative measure of disparity was used here. Disparities were measured as the percent difference between each of the other group rates and the rate for the best group. The percent difference was calculated by dividing the difference between the rate for each group of interest and the best group rate by the best group rate, with the result being expressed as a percentage. Relative measures of disparity are required to make comparisons across indicators based on different units of measurement. However, it is important to recognize the limitations inherent in ranking disparities solely in relative terms. These limitations are described in the Discussion section below. In the interests of comparability, indicators are also expressed in terms of adverse events when disparities are measured (2, 5, 6). When estimates of variability were available, the statistical significance of the percent difference was evaluated, and only differences that were significant at the $p < 0.05$ level are shown. The statistical significance of measures of disparity based on many of the data sources used to monitor Healthy People 2010 objec-

tives cannot be assessed. This includes data from reporting systems for specific diseases, for which estimates of bias are not routinely available.

The largest health disparities were identified by ranking the percent difference from the best group rate for each of five racial and ethnic populations: American Indian or Alaska Native, Asian, Hispanic, Black non-Hispanic, and White non-Hispanic. The latest guidelines from the President's Office of Management and Budget call for collecting and reporting data for Asians separately from data for Native Hawaiians and other Pacific Islanders (7). Because these guidelines have not been fully implemented, indicators with data for Asians and those with data for the earlier category of "Asian or Pacific Islander" were combined. Information on Hispanic origin was not available from all data sources; thus, the categories "Black non-Hispanic" and "White non-Hispanic" contained some indicators with data for Black and White populations that included Hispanics. The number of indicators with data for Native Hawaiians and other Pacific Islanders or for persons who identified with two or more racial groups was very limited and therefore highly selective. Consequently, the largest health disparities were not ranked for these two groups. The results of this analysis were also limited by the lack of data on each indicator for all groups. The numbers of indicators on which the rankings were based are shown in figure 1.

RESULTS

Disparities by race and ethnicity

Figure 1 shows the distribution of the percent differences from the best group rate for each racial and ethnic group.

Data needed to assess disparities for the American Indian or Alaska Native population were available for 155 health indicators (figure 1). The American Indian or Alaska Native population had the best rate for 13 percent of these indicators. This population had a larger percentage of disparities greater than or equal to 100 percent than any of the other racial/ethnic populations. This group had rates at least 100 percent worse than (or at least twice as high as) the best group rate for 24 percent of these indicators.

Data needed to assess disparities for the Asian population (the Asian-only population, which excludes Native Hawaiians and other Pacific Islanders, or the "Asian or Pacific Islander" population, which includes Native Hawaiians) were available for 183 indicators (figure 1). The Asian population had the best group rate for 44 percent of these indicators.

Data for the Native Hawaiian or other Pacific Islander population were available for 43 indicators. This group had a smaller percentage of best group rates (16 percent) and a greater percentage of large disparities (21 percent) than the Asian population.

Data for the Hispanic population were available for 330 indicators. The Hispanic population had the best group rate for 18 percent of these indicators. This population had rates at least 100 percent worse than (or at least twice as high as) the best group rate for 12 percent of the indicators.

Data for the Black non-Hispanic population were available for 356 indicators. The Black non-Hispanic population had the best rate for 21 percent of these indicators. This group had rates at least 100 percent worse than the best group rate for 20 percent of the indicators.

The White non-Hispanic population had the best rate for 49 percent of the indicators with the data needed to assess disparity for this group. White non-Hispanics had rates at least 100 percent worse than the best group rate for 5 percent of these indicators.

Data needed to assess disparities for persons who identified with two or more racial groups were available for 82 indicators. This group had the best group rate for 23 percent of these indicators and rates at least 100 percent worse than the best group rate for 10 percent of these indicators.

Largest disparities for specific racial and ethnic populations

Table 1 shows the Healthy People 2010 indicators with the 10 largest percent differences from the best group rate for five racial and ethnic groups. The indicators are identified in terms of the Healthy People 2010 objective or subobjective to which they correspond, and the data year is shown in parentheses. The data year is the most recent data point in the Healthy People 2010 data system, DATA2010 (http://wonder.cdc.gov/DATA2010), as of January 2005. The 10 indicators with the largest disparities for the Black non-Hispanic population are shown in the first section. The

rate of new cases of gonorrhea per 100,000 population was 2,757 percent higher in the Black non-Hispanic population than in the Asian and Pacific Islander populations combined. The rate for Asians was the best group rate. In the Black non-Hispanic population, the largest disparities included six indicators related to high rates of sexually transmitted diseases, including human immunodeficiency virus infection, as well as four other indicators: nonfatal firearm-related injuries, new cases of tuberculosis, homicides, and drug-induced deaths.

The 10 largest disparities for the Hispanic population are shown in the second section. Four of the 10 largest disparities for the Black non-Hispanic population were shared by the Hispanic population. Congenital syphilis, new cases of tuberculosis, new cases of acquired immunodeficiency syndrome, and drug-induced deaths were the first-, second-, third-, and seventh-largest disparities, respectively, among Hispanics. The indicators with the next-largest disparities for the Hispanic population are added to the list of indicators in table 1. These indicators included exposure to air pollution (particulate matter and carbon monoxide), cirrhosis deaths, and deaths from poisoning. Lacking a source of ongoing health care was the sixth-largest disparity for the Hispanic population, and a low rate of high school completion was the eighth-largest disparity.

The American Indian or Alaska Native population shared four of its largest disparities with the Black non-Hispanic population: high rates of gonorrhea (new cases and cases among females aged 15–44 years), new tuberculosis cases, and drug-induced deaths. This group also shared four of its largest disparities with the Hispanic population: new tuberculosis cases, drug-induced deaths, cirrhosis deaths, and deaths from poisoning. In addition, the American Indian or Alaska Native population had the highest rates of fetal alcohol syndrome, smoking by pregnant women, alcohol-related motor vehicle deaths, and physical assault.

The Asian population shared its first- and second-largest disparities with both the Hispanic and Black non-Hispanic populations: congenital syphilis and new tuberculosis cases. The Asian population shared its fourth-, fifth-, and eighth-largest disparities with the Hispanic population: exposure to particulate matter, carbon monoxide, and no source of ongoing care, respectively. The 10 largest disparities for the Asian population included low rates of Papanicolaou testing in women and human immunodeficiency virus testing in tuberculosis patients, greater exposure to ozone, greater lack of knowledge of stroke symptoms, and lower rates of self-monitoring of blood glucose levels among persons with diabetes.

Finally, the White non-Hispanic population shared one of its largest disparities, drug-induced deaths, with the Black non-Hispanic, Hispanic, and American Indian or Alaska Native populations. The White non-Hispanic population shared two of its largest disparities, cirrhosis deaths and deaths from poisoning, with the Hispanic and American Indian or Alaska Native populations, and two more of its largest disparities, smoking by pregnant women and physical assault, only with the American Indian or Alaska Native population. In addition, the largest disparities for the White non-Hispanic population included melanoma deaths, chronic lower respiratory

TABLE 1. Ten largest health disparities for five US racial and ethnic groups with regard to Healthy People 2010 objectives

Objective no.	Objective	Black non-Hispanic			Hispanic			American Indian or Alaska Native†			Asian†			White non-Hispanic		
		Rank	% difference‡	Rate	Rank	% difference‡	Rate	Rank	% difference‡	Rate	Rank	% difference‡	Rate	Rank	% difference‡	Rate
25-2a	New cases of gonorrhea (2003) (per 100,000 population)§	1	2,757	657		213	72	10	348	103		0	23#		44	33
25-2b	New cases of gonorrhea among females aged 15–44 years (2003) (per 100,000 female population)§	2	2,559	1,303		214	154	5	467	278		0	49#		92	94
25-9	Congenital syphilis (2003) (per 100,000 livebirths)§	3	2,207	34.6	1	1,160	18.9		240	5.1	2	353	6.8#		0	1.5
13-1	New cases of AIDS¶ (2003) (per 100,000 population aged ≥13 years)§	4	1,487	74.6	3	462	26.4		119	10.3		0	4.7#		53	7.2
13-14	Deaths due to HIV¶ infection (2002) (age-adjusted rate per 100,000 standard population)	5	995*	23.0		176*	5.8		5	2.2			0.8#,**		0	2.1
15-5	Nonfatal firearm-related injuries (2001) (per 100,000 population)§	6	869	83.3		154	21.8			DSU¶			DSU		0	8.6
14-11	New cases of tuberculosis (2003) (per 100,000 population)§	7	729	11.6	2	636	10.3	7	386	6.8	1	1,986	29.2		0	1.4
25-3	New cases of primary and secondary syphilis (2003) (per 100,000 population)§	8	680	7.8		200	3.0		180	2.8		0	1.0#		50	1.5
15-32	Homicides (2002) (age-adjusted rate per 100,000 standard population)	9	671*	21.6		161*	7.3		200*	8.4		4	2.9#		0	2.8
26-3	Drug-induced deaths (2002) (age-adjusted rate per 100,000 standard population)	10	525*	10.0	7	288*	6.2	6	388*	7.8		0	1.6#	2	519*	9.9
8-1b	Exposure to particulate matter ≤10 μm in diameter (2001) (%)§		0	6	4	400	30		133	14	4	283	23		33	8
26-2	Cirrhosis deaths (2002) (age-adjusted rate per 100,000 standard population)		169*	8.6	5	381*	15.4	4	613*	22.8		0	3.2#	7	181*	9.0
1-4b	No source of ongoing health care (all ages) (2003) (%)		110*	6.5	6	290*	12.1			DSU	8	129*	7.1		0	3.1
7-1	No completion of high school (persons aged 18–24 years) (2001) (%)		56*	14.0	8	281*	34.3			DNA¶			3.9#,**		0	9.0
8-1c	Carbon monoxide exposure (2001) (%)§		44	13	9	233	30		33	12	5	222	29		0	9
15-8	Deaths from poisoning (2002) (age-adjusted rate per 100,000 standard population)		394*	8.9	10	222*	5.8	8	383*	8.7		0	1.8#	3	472*	10.3

16-18	Fetal alcohol syndrome (1995–1997) (per 1,000 livebirths)§	450	1.1†	0	0.2	1	1,500	3.2			DSU		0	0.2
16-17c	Smoking by pregnant women (2002) (%)	487*	8.8	100*	3.0	2	1,213*	19.7		0	1.5	1	900*	15.0
26-1a	Alcohol-related motor vehicle deaths (1995) (per 100,000 population)§	167	6.4†		DNC¶	3	700	19.2		0	2.4#		150	6.0†
15-37	Physical assault among persons aged ≥12 years (2001) (per 1,000)§	193	24.3	211	25.8	9	372	39.2		0	8.3#	9	157	21.3
3-11a	No Papanicolaou test among females aged ≥18 years (2003) (age-adjusted %)	29*	7.1	158*	14.2			DSU	3	309*	22.5		0	5.5
13-11	No HIV testing among tuberculosis patients aged 25–44 years (2002) (%)§	11	21.0	142	46		0	19.0	6	211	59#		84	35.0
8-1a	Ozone exposure (2001) (%)§	88	45	154	61		0	24	7	192	70		50	36
12-8	No knowledge of stroke symptoms (2001) (%)	64*	30.0	122*	40.7		28*	23.4	9	112*	38.7		0	18.3
5-17	Self-monitoring of blood glucose concentration among diabetic persons aged ≥18 years (2003) (age-adjusted %)	0	36.5	26*	46.1		17	42.7	10	91*	69.8#		6	38.6
3-8	Deaths from melanoma (2002) (age-adjusted rate per 100,000 standard population)		0.4**	0	0.8			DSU			0.4#,**	4	288*	3.1
24-10	Deaths from chronic lower respiratory disease among persons aged ≥45 years (2002) (age-adjusted rate per 100,000 standard population)	99*	79.0	36*	54.3		103*	80.9		0	39.8#	5	225*	129.4
26-11a	Binge drinking among high school seniors (2004) (%)§	0	11.4†	128	26.0			DSU			DSU	6	185	32.5†
15-3	Firearm-related deaths (2002) (age-adjusted rate per 100,000 standard population)	519*	19.8	138*	7.6		178*	8.9		0	3.2#	7	181*	9.0
26-14b	Steroid use among 10th graders (2004) (%)§	0	0.7†	129	1.6			DSU			DSU	8	157	1.8†
3-7	Deaths from prostate cancer (2002) (age-adjusted rate per 100,000 standard population)	516*	62.8	112*	21.6		50*	15.3		0	10.2#	10	153*	25.8

* $p < 0.05$ (percent difference from the best group rate).

† Data include persons of Hispanic origin.

‡ Percent difference between the rate for the specified group and the rate for the racial or ethnic group with the best rate (the best rate for each indicator is underlined).

§ Measures of variability were not available; therefore, the variability of best group rates was not assessed, and the statistical significance of the percent difference was not tested.

¶ AIDS, acquired immunodeficiency syndrome; HIV, human immunodeficiency virus; DSU, data statistically unreliable (data did not meet criteria for statistical reliability, data quality, or confidentiality); DNA, data not analyzed (data had been collected but had not yet been analyzed); DNC, data not collected (data were not collected).

Data are for Asians and Pacific Islanders combined.

** The rate for this group was not sufficiently reliable to be used as the reference point for measuring disparity; no percent difference is shown.

disease deaths (formerly known as chronic obstructive pulmonary disease deaths), binge drinking among high school seniors, firearm-related deaths, steroid use among 10th graders, and prostate cancer deaths.

DISCUSSION

To this author's knowledge, this is the first time that the largest health disparities for specific racial and ethnic groups in the United States have been identified across such a broad array of health indicators. A number of general observations are warranted. First, the sizes of the largest disparities differ across racial and ethnic groups. The percent difference for the three largest disparities in the Black non-Hispanic population is larger than the percent difference for the largest disparities among the other racial or ethnic populations. For example, the rates for the Black non-Hispanic population are more than 20 times the best group rate for congenital syphilis and two indicators of gonorrhea. In addition, the percent difference for the 10th-largest disparity among Black non-Hispanics in drug-induced deaths is more than five times the percent difference for the 10th-largest disparity among Asians. Finally, even though firearm-related deaths and prostate cancer deaths were not among the 10 largest disparities for the Black non-Hispanic population, the size of the disparity from the best group rate is substantially greater for the Black non-Hispanic population than it is for the populations for which these indicators were among the 10 largest.

Second, the nature of the indicators with the largest disparities differs across racial and ethnic groups. Among the 10 largest disparities for the Black non-Hispanic population, sexually transmitted diseases, acquired immunodeficiency syndrome, and tuberculosis account for seven of the 10 largest disparities. In the Asian population, the largest disparities include indicators reflecting a lack of appropriate monitoring and testing: Papanicolaou testing among females, human immunodeficiency virus testing among tuberculosis patients, and blood glucose monitoring among persons with diabetes. Only in the White non-Hispanic population do the effects of chronic conditions appear among the 10 largest disparities: deaths due to melanoma, chronic lower respiratory disease, and prostate cancer. As noted above, however, the size of the disparity for the Black non-Hispanic population was greater than that for the White non-Hispanic population for prostate cancer deaths.

Third, this perspective provides insight into the extent to which the largest disparities are shared by racial and ethnic groups. New cases of tuberculosis and drug-induced deaths are among the 10 largest disparities for four of these five racial and ethnic populations. Cirrhosis deaths and deaths from poisoning are among the largest disparities for three populations. These findings suggest opportunities for partnerships among community organizations and agencies focusing on these problems in different racial/ethnic populations in the same geographic area. Other shared disparities may be obscured by the lack of data on each indicator for all groups.

Fourth, in order to make comparisons across indicators based on different units of measurement, disparities were measured in relative terms. However, the relative perspective masks the size of the absolute difference between groups and the size of the public health impact. For example, the percent difference for deaths from poisoning among Hispanics (222 percent, the 10th-largest disparity for this population) is essentially the same as the percent difference for chronic lower respiratory disease deaths among White non-Hispanics aged 45 years or older (225 percent, the fifth-largest disparity for this group). In terms of the underlying rates, however, the poisoning death rate for Hispanics is 5.8 per 100,000 population and the chronic lower respiratory disease death rate for White non-Hispanics is 129.4 per 100,000 population. Additionally, in 2002, there were 2,031 poisoning deaths among Hispanics and 111,164 chronic lower respiratory disease deaths among White non-Hispanics aged 45 years or older (8, 9). Relative measures of disparity represent only one way to compare disparities across population groups.

These results are governed by limits on the completeness and validity of the data analyzed. This analysis was restricted to Healthy People 2010 indicators for which data were available. Estimates for American Indians or Alaska Natives, Asians, and Native Hawaiians or other Pacific Islanders are more likely to have been unavailable or unreliable. The accuracy of the racial and ethnic data on which these results are based varies from one data source to another (10). Reporting of sexually transmitted diseases has been more complete for publicly supported sources, such as sexually transmitted disease clinics. These data may not be equally representative of all racial and ethnic groups (11). The size of disparities in syphilis and gonorrhea for the minority populations may be exaggerated by biases in reporting.

These results also depend on the choice to measure disparities in terms of relative difference from the best group rate, with the indicators being consistently expressed in terms of adverse events. This choice represents a consistent framework for monitoring disparities in Healthy People 2010 (2).

The Healthy People 2010 database provides investigators with a unique opportunity to identify the largest health disparities in the United States across a broad array of indicators. However, disparities should not be viewed solely in terms of relative differences (4). Relative measures of disparity are required to compare disparities across indicators based on different units of measurement. Relative measures are also appropriate for monitoring changes in disparities over time (12). However, disparities among racial and ethnic groups should also be viewed in terms of absolute differences in group rates and in terms of the number of individuals affected in each group. All three of these perspectives contribute to an understanding of health disparities, and each perspective plays an important part in deciding where and how to intervene to eliminate such disparities.

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