Published in final edited form as:

J Epidemiol Community Health. 2015 October ; 69(10): 1006–1011. doi:10.1136/jech-2015-205623.

Pinpointing the Sources of the Asian Mortality Advantage in the United States

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Abstract

Background—Asian-Americans outlive whites by an average of nearly 8 years. By determining the sources of the Asian mortality advantage, we can pinpoint where there is the greatest potential for raising the life expectancy of whites and other groups in the United States.

Methods—Our analyses include all Asian and white deaths in the United States between 2006 and 2010, from the Center for Disease Control (CDC). Using the International Classification of Diseases (version 10), we code causes of deaths into 19 categories, based on the most common causes as well as causes particularly relevant to racial differences. We then create life tables and apply a newly-developed demographic method to determine whether Asians have longer life expectancy because they are less likely than whites to die of causes of death that strike at younger ages, or because they tend to outlive whites regardless of cause of death.

Results—Nearly 90% of the Asian-white life expectancy gap is attributable to the fact that Asians tend to outlive whites regardless of the cause of death. The causes that contribute the most to the gap are heart disease (24%) and cancers (18%). Men contribute somewhat more to the gap than women do (55% versus 45%), primarily because Asian-white differences in mortality are greater among men than among women with respect to suicide, traffic accidents, and accidental poisoning.

Conclusions—For almost all causes of death, Asian victims tend to be older than white victims. The greatest potential for raising the life expectancy of whites to that of Asians, then, resides in efforts that effectively increase whites' average age at death for the most common causes of death.

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Competing Interest: None to declare.

Contributorship Statement: Acciai and Noah had full access to all data in the study and take responsibility for the integrity of the data and the accuracy of the analysis. Acciai and Noah conducted all the analyses. Acciai, Noah and Firebaugh all contributed to the conception, interpretation and writing of the manuscript.

Keywords

Asian; Life Expectancy; Decomposition; Causes of death; Longevity

Introduction

Asians and Pacific Islanders (hereafter Asians) outlive all other racial and ethnic groups in the United States [1-6]. Because their life expectancy at birth is 86.3 years, they outlive non-Hispanic white Americans (hereafter whites) by an average of 7.8 years (authors' calculation from 2006-2010 CDC data).

Moreover, Asians are the fastest-growing racial group in the United States [7], with an increase of 45% from 2000 to 2010 [7, 8]. From approximately 18 million Asians in the United States in 2010, it is projected that there will be more than 40.6 million Asians by the year 2050, comprising 9.2 percent of the total population in the United States [8]. Despite their longevity and rapid population growth, Asians have received relatively little attention in the medical literature. The popular portrayal of Asians as the “model minority” (Asian Americans have higher levels of educational attainment and median family income than whites) has contributed to keeping Asians largely out of the public health policy discourse [9]. While there is a vast literature on health disparities between blacks and whites [10, 11] and between Hispanics and whites [12], few studies have focused on the health and mortality of Asians at the national level [13]. However, due to their rapid rate of growth and distinct sociodemographic profile, we must incorporate Asians to understand the current state and future trajectory of population health in the United States [14]. Focusing on Asians is also strategic because Asians provide a benchmark for other groups. By comparing the mortality patterns of Asians and whites in America, we can better pinpoint the differences that have a significant impact on longevity. Using Asian mortality as a benchmark, this study employs a new decomposition method that allows us to determine more precisely the location of the mechanisms that generate the Asian mortality advantage.

To identify the sources of group differences in life expectancy, researchers traditionally have used partitioning methods developed by demographers [15] to isolate the contribution of various causes to differences in longevity [16, 17]. However, this approach does not tell us how much of the life expectancy gap is due to difference in the average age at death (*age component*), and how much is due to difference in the probability of dying of disease specific cause (*incidence component*) for the two populations. In this study, we use the recently developed age-incidence method [18] to separate the age component from the incidence component for each cause of death. This distinction is important because it provides more specific information on where the Asian-white gap in life expectancy is generated; thus it helps to narrow the search for causes of the disparity. Understanding the age versus incidence mechanisms generating the Asian-white life expectancy gap can play a role in designing more effective public policies. For example, if the effect of, say, heart diseases on life expectancy disparities is due to different incidence rates (i.e., whites dying more from heart diseases), that suggests the potential for reducing mortality for the disadvantaged group by focusing on prevention strategies for that specific group. On the

other hand, if the effect of heart diseases on life expectancy disparities is due to different ages at death (i.e., white victims of heart disease dying younger), that might suggest renewed effort to provide the same quality of health care across racial groups.

Methods

Our analyses are based on the Detailed Mortality files from the Center for Disease Control [19], a registry of all deaths occurring in the United States. In addition to age, gender, race, and ethnicity, the files include the underlying cause of death, defined as “the disease or injury that initiated the train of morbid events leading directly to death or the circumstances of the accident or violence that produced the injury.” [20] Population denominators are also from the Detailed Mortality files. Using the tenth version of the International Classification of Diseases (ICD-10) [21], we created multidecrement life tables for Asians and whites. Given the relatively small population size of Asians, we use pooled data from 2006-2010 for more robust cause-specific estimates. During this 5 year period, the total number of deaths was 9,779,338 for whites and 223,662 for Asians.

We classified the over 10,000 specific causes of death into 19 categories. We based our classification scheme on prior studies [16, 18, 22], which consider the most common causes of death, as well as those causes that are particularly relevant in terms of racial differences [16]. Our scheme further groups the common causes of death into five broad categories: three leading causes of death (heart disease, cancers, and cerebrovascular diseases), chronic diseases (lower respiratory, Alzheimer's, diabetes, and nephritis), communicable diseases (influenza and pneumonia, septicemia, and HIV/AIDS), external causes (homicide, suicide, traffic accidents, and accidental poisoning), and infant and child conditions (perinatal deaths and congenital anomalies). This classification includes the 10 overall leading causes of death in the United States [16], with “accidental poisoning” and “traffic accidents” separated out of one of those 10 causes (“accidents”) because of their relevance to racial health disparities [18, 22]. To that list we added two child and infant conditions [16]; although infant and child deaths are relatively rare nowadays in the United States, they have a large impact on life expectancy. We also added three causes of death that are products of social and economic environments – homicide, suicide, and HIV/AIDS – because of their relevance to racial health disparities [18]. Finally, to cover all causes of death, we added “other infectious diseases” and “other external causes” as well as residual categories containing causes not elsewhere classified.

Analytic Technique

This study uses the age-incidence method, a new decomposition technique for pinpointing more precisely the sources of group differences in life expectancy [18]. This method enables us to determine how much of the Asian-white life expectancy gap is due to differences in the age at death for Asians and whites who die of the same cause (age component), and how much is due to differences in the causes of death for Asians and whites, that is, how much is due to the fact that whites are more likely to die of causes that strike at younger ages (incidence component). Traditional demographic decomposition methods [15] do quantify the contribution to the gap in life expectancy of a single cause of death, but they are not able

to distinguish between these two underlying processes. The age-incidence method, by contrast, more precisely pinpoints the mechanisms that generate the life expectancy gap breaking down the gap *simultaneously* by cause of death *and* by age versus incidence.

When we consider multiple causes of death, life expectancy at birth (e_0) can be calculated as the sum of the cause-specific mean age at death weighted by the cause-specific probability of death: $e_0 = \sum_c p_c x_{c\bar{}}$, where c indicates the cause of death, $x_{c\bar{}}$ is the mean age at death for cause c , and p_c is the proportion of deaths due to cause c , or in other words, the probability of dying of cause c . Therefore, the difference in life expectancy between population A and population B can be written as $e_{0A} - e_{0B} = \sum_c p_{cA} x_{cA\bar{}} - \sum_c p_{cB} x_{cB\bar{}}$, and the contribution to the gap of a given cause c equals $p_{cA}(x_{cA\bar{}} - \bar{x}) - p_{cB}(x_{cB\bar{}} - \bar{x})$, where $\bar{x}$ is the average life expectancy for the two populations. The previous equation shows that the contribution of each cause to the gap in life expectancy depends on both the probability of dying of that cause and on the specific mean age at death. If the probability of dying of cause c were the same for both populations ($p_{cA} = p_{cB}$), then cause c would contribute to the gap only through differences in mean age at death across populations A and B. If, on the other hand, the mean age at death for cause c were the same for both populations ($x_{cA\bar{}} = x_{cB\bar{}}$), then cause c would contribute to the gap only through differences in the probability of dying. However, real data do not normally match either of these extreme situations; in fact, each cause usually contributes to the gap through both differences in mean age at death (age component) and differences in proportions (incidence component). The age-incidence method [18] allows us to disentangle these two components: The age component for cause c equals $p_{c\bar{}}(x_{cA\bar{}} - x_{cB\bar{}})$, where $p_{c\bar{}}$ is the (simple) average proportion for the two populations, and the incidence component for cause c equals $(x_{c\bar{}} - \bar{x})(p_{cA} - p_{cB})$. Summing up the two components over all causes of death, we determine what part of the overall gap is generated by differences in cause-specific mean age at death, and what part is generated by differences in the probability of dying of certain causes. In addition, the new method can also determine the contribution of specific subpopulations to the total gap. We use this extension in order to further quantify how much of the total gap is due to differences between Asian women versus white women, and how much is due to differences between Asian men versus white men. More detailed information on these equations is available elsewhere [18].

Results

Over the 2006-2010 period, life expectancy was 78.5 years for whites and 86.3 years for Asians. This difference of 7.8 years is more than twice the 3.8-year difference in life expectancy between blacks and whites in 2010 [23]. As shown by the first bar in Figure 1, the overall age component accounts for 6.9 years of the total gap (89%), while the incidence component accounts for slightly less than one year (11% of the gap). So the mortality advantage of Asians is primarily due to the fact that Asians tend to outlive whites regardless of the cause of death, and not because Asians are more likely to avoid causes that strike at younger ages.

Table 1 unpacks these findings by specific cause of death. Because Asian heart disease victims outlive white heart disease victims by 6.7 years on average, and heart disease is responsible for more than one-fourth of all deaths, the age component of heart disease alone

accounts for 1.8 years (24%) of the 7.8-year life expectancy advantage for Asians (Table 1). Cancer is also a large contributor to the age component of the Asian-white gap, accounting for 1.4 years (18%) of the advantage for Asians. Lower respiratory diseases and cerebrovascular diseases also contribute substantially to the age component. Although other causes make smaller contributions to the age component, the contribution is never negative – indicating that the Asian mortality advantage is spread across all causes of death. In fact, for all causes of death, with the one exception of perinatal deaths, Asians outlive whites, usually by at least 4-5 years (see Appendix Table).

The incidence component is responsible for nearly one year of the total Asian advantage. External causes of death account for most of the incidence component, as whites are more likely than Asians to die of traffic accidents, accidental poisoning, homicide, or suicide - all causes that disproportionately affect the young and middle-aged. The most striking difference is among the victims of accidental poisoning (mostly due to drug overdose [16]) for which whites are over seven times more likely to die (0.97% vs 0.13%) than Asians (Appendix Table).

Table 1 also shows that men account for slightly more of the Asian mortality advantage than women do, with differences in the mortality regime between Asian and white men accounting for 4.3 years (55%) of the 7.8 year racial gap in life expectancy. Looking across the main group categories, we see the sources of the sex difference. For communicable diseases, infant and child conditions, and most chronic diseases, the Asian mortality advantage is about the same for men and women. For heart diseases, cancers, and other causes not elsewhere classified, the Asian mortality advantage is slightly more pronounced for men than for women. The greatest sex difference is for external causes, however, where the advantage of Asian men over white men is more than twice the size of the advantage of Asian women over white women (0.76 versus 0.30 years). This is mostly due to greater Asian-white differences among men with regard to all the major external causes except homicide, for which the (small) Asian advantage is the same for men and women.

Concerns about Data Validity

The exceptional longevity of Asians in the United States has raised concerns about validity of the mortality data for Asians [6]. The misclassification of race, for example, may cause an underestimation of mortality rates for Asians [4, 6]. The problem arises because, though race is self-reported in the Census, funeral directors and medical examiners choose race on the death certificate, either through questioning the victim's relatives or through direct observation [5, 6]. When a misclassification occurs, it is more likely that a member of a minority group is classified as white, rather than vice versa [24, 25]. By counting a number of Asian deaths as white deaths, the mortality rate of the Asian population is downwardly biased [26]. Although quantifying this underestimation is not an easy task [6], a handful of studies have attempted to do so, with estimates of the overall underestimation rate varying from 11% [9] to 12% [27] to 13% [28]. Even after inflating their mortality rates by 13%, the most conservative choice, Asians have a much higher life expectancy than whites, consistent with previous studies [2, 28]. After adjustment, the life expectancy for Asians is 84.7 years, reducing the Asian-white gap in life expectancy from 7.8 years down to 6.2 years.

Table 2 reports results of the decomposition of the Asian-white *adjusted* gap in life expectancy. By comparing Table 2 to Table 1, we see that correcting for the potential underestimation of mortality rates for Asians reduces the total gap in life expectancy by 20%, but does not affect our conclusions about the sources of the Asian mortality advantage in America. The age component still dominates, accounting for 88% of the overall gap. Men still account for somewhat more of the gap than women do (57% versus 43%). Importantly, the upward adjustment of Asian mortality rates has little effect on the estimated contributions of our 19 causes of death. For example, accidental poisoning – the specific cause of death *most affected* by the adjustment – changes by less than a single percentage point (from 4.5% of the Asian-white gap in life expectancy without adjustment to 5.4% with adjustment).

Discussion

Longevity in the United States varies greatly by race and ethnicity. Asians have by far the highest life expectancy, with nearly an 8-year advantage over whites, thus setting the standard for life expectancy in America.

Several explanations have been given for the surprisingly high life expectancy of Asians in the United States. One is the “healthy migrant” hypothesis [2, 4, 5], that Asians constitute a non-randomly selected population of unusually healthy individuals [14] as over two-thirds of Asian-Americans were foreign born, compared to less than 4% of non-Hispanic whites [29]. According to the healthy migrant hypothesis, Asian migrants should be healthier and experience longer longevity than their U.S.-born counterparts. Unfortunately, we are unable to compare the life expectancy of the two groups of Asians because nativity information is not available for our mortality data. Research on the subject has yielded mixed results. One study [13] found a small mortality advantage for foreign-born versus U.S.-born Asians; another study [30] found that U.S.-born Asians have higher life expectancy than their foreign-born counterparts; a third study [4] shows the same finding for women but not for men. Clearly, the debate on the healthy migrant hypothesis for Asians is still open. For instance, for three of the largest Asian groups (i.e., Chinese, Filipinos and Japanese), life expectancy is higher for U.S. born than for foreign born [4], which is contrary to the healthy migrant hypothesis. On the other hand, the life expectancy of Asians in the United States is higher than in any Asian country, which suggests that some health selection is likely at play.

A second possibility is based on the “salmon-bias effect” [5, 30], which occurs when foreign-born individuals go back to their home country when their health deteriorates, to spend the last years of their lives. This process would cause an underestimation of the deaths among the Asians, as deaths occurring abroad would not be accounted for. However, studies find little support for a significant salmon bias effect for Asians [9, 12]. One reason for this might be the distance involved. It is harder for an elderly Korean-American to move back to the homeland than an elderly Mexican-American, for example. An indirect test of the salmon-bias hypothesis can be performed at the state-level. We would expect that the Asian-white gap in life expectancy is larger in the Western states, as traveling back to Asia is easier, in terms of time and money, from those regions. Surprisingly, we observe the opposite. When we compare the two states with the largest Asian population, California and

New York, the gap is smaller in California (6.5 years versus 8.1 years). Moreover, in the other Western states (Oregon, Washington, and Arizona) the gap is lower than the national average, while in the other Northeastern states (New Jersey, Maryland, Pennsylvania, Massachusetts) the gap is larger than the national average [31], which provides no support for the salmon-bias hypothesis. In addition, per capita income for Asians in 2006-2010 is higher in California compared to New York (\$31,195 versus \$28,308) [32] – ruling out the possibility that Asians from Eastern states might be able to better afford the return migration back to their home countries.

Other explanations focus on the health behaviors and environments of Asian Americans. Cultural factors such as healthier traditional cooking may work as protective factors for Asians to buffer some negative health behaviors found in the United States [26]. Asians also have the lowest BMI, fasting plasma glucose, and smoking rate of all major racial or ethnic group in the United States [1]. Furthermore, the relatively high socioeconomic status of Asians may provide greater access to favorable health environments [26]. In addition to a longer life expectancy, Asian Americans also experience more favorable health outcomes, such as lower rates of heart disease, asthma, cancer – especially among the foreign born [33]. On the other hand, self-rated health is on average lower among Asians than for whites after adjusting for a series of control variables, but this might be due to lack of measurement invariance of the self-rated health scale across racial groups [33].

Our contribution in this study is to show that the Asian mortality advantage does not arise because Asian Americans are more likely than whites to avoid specific causes of death that disproportionately affect the young and middle-aged. To be sure, Asians in fact are less likely than whites to die of accidental poisoning, suicide, and traffic accidents, but our decompositions show that this difference accounts for relatively little of the Asian mortality advantage. Rather, Asians die at about the same rate as whites for the major causes of death, but they tend to succumb to those causes later in life, significantly outliving whites for every cause of death except perinatal deaths. This pattern holds for both men and women, and it accounts for nearly 90% of the Asian mortality advantage. These results narrow the research question from “Why do Asians outlive whites?” to the more precise question “For virtually all causes of death, why do Asians tend to outlive whites?”

Conclusion

To increase life expectancy in America, it is helpful to focus on the life expectancy of Asians since they outlive all other racial and ethnic groups. Research on the Asian mortality advantage suggests, one, that the advantage is not an artifact – it is not attributable either to the underreporting of Asian deaths or to the misclassification of race on death certificates – and two, that Asian mortality rates constitute a realistic standard for other Americans to strive to achieve, since U.S.-born Asians enjoy the same longevity as their foreign-born counterparts. By using the new age-incidence method to decompose the difference in life expectancy between Asians and whites, this study identifies the causes of death where disparities are the greatest and through which mechanisms (age versus incidence). For all common causes of death, whites tend to succumb at younger ages than Asians; for instance, roughly the same proportion of Asians and whites die of heart disease, but white victims on

average are 6.7 years younger than Asian victims (Appendix Table). This within-cause age difference accounts for most of the Asian mortality advantage.

By demonstrating that the mortality advantage of Asians is due largely to an age effect, this study provides an agenda for subsequent research on the life expectancy gap between Asian Americans and other Americans. Because Asians and whites generally succumb to the same causes of death, researchers can focus on why Asian victims tend to outlive white victims. Is the onset of disease delayed for Asians, or do they live longer while in poor health? Studies of mortality gaps, then, need to be juxtaposed with studies of morbidity gaps. In addition, nativity data should be routinely transferred from death certificates to data archives to permit the comparison of U.S.- and foreign-born Asians. The best studies will compare those data with data from countries of origin to test more directly the salmon bias and healthy migrant hypotheses. In short, future research should make use of the heterogeneity of Asian Americans themselves (their country of origin, generation, length of time in the U.S., and so on) as leverage for understanding the exceptional life expectancy of Asian-Americans.

Acknowledgments

Funding Statement: This work was supported by the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) (R24 HD041025-11) and the NICHD Predoctoral Training Program (T-32HD007514).

Appendix Table

Distribution of deaths, and average age at death, by cause: Whites versus Asians, total and sex-specific, United States 2006-2010.

		TOTAL				MALE				FEMALE			
		Proportion		Mean Age		Proportion		Mean Age		Proportion		Mean Age	
		White	Asian	White	Asian	White	Asian	White	Asian	White	Asian	White	Asian
<u>Leading Causes of Death</u>													
1	Heart diseases	0.266	0.276	81.98	88.69	0.126	0.127	78.77	86.59	0.139	0.149	84.90	90.47
2	Cancers	0.225	0.208	75.42	81.55	0.116	0.107	74.82	81.35	0.109	0.101	76.06	81.76
3	Cerebrovascular diseases	0.058	0.088	83.51	87.99	0.021	0.035	80.86	86.43	0.036	0.053	85.07	89.03
	Total proportion, leading causes	0.549	0.571			0.264	0.268			0.284	0.303		
<u>Chronic diseases</u>													
4	Chronic lower respiratory diseases	0.062	0.039	79.88	89.20	0.029	0.023	79.07	88.74	0.033	0.016	80.58	89.83
5	Alzheimer's	0.041	0.034	87.70	93.02	0.012	0.011	86.39	92.61	0.029	0.024	88.24	93.20
6	Diabetes	0.024	0.037	77.47	86.11	0.012	0.016	75.17	84.30	0.012	0.021	79.73	87.54
7	Nephritis	0.019	0.023	82.28	87.82	0.009	0.011	81.08	86.88	0.010	0.012	83.41	88.64
	Total proportion, chronic diseases	0.147	0.133			0.062	0.060			0.085	0.073		
<u>Communicable diseases</u>													
8	Influenza and pneumonia	0.024	0.045	83.83	90.88	0.011	0.022	82.09	90.21	0.013	0.023	85.20	91.52
9	Septicemia	0.013	0.012	79.11	86.35	0.006	0.006	77.32	85.42	0.007	0.006	80.53	87.18

		TOTAL				MALE				FEMALE			
		Proportion		Mean Age		Proportion		Mean Age		Proportion		Mean Age	
		White	Asian	White	Asian	White	Asian	White	Asian	White	Asian	White	Asian
10	HIV/AIDS	0.001	0.000	49.68	54.60	0.001	0.000	50.09	52.84	0.000	0.000	47.65	59.63
11	Other infectious diseases	0.008	0.010	75.77	81.57	0.004	0.005	71.90	79.52	0.004	0.005	79.16	83.47
	Total proportion, communicable diseases	0.047	0.067			0.021	0.033			0.025	0.034		
<u>External causes</u>													
12	Homicide	0.002	0.002	40.09	44.04	0.001	0.001	38.82	40.33	0.001	0.001	42.47	51.02
13	Suicide	0.011	0.006	50.18	57.64	0.009	0.004	50.50	56.94	0.002	0.002	48.96	59.10
14	Traffic accident	0.011	0.007	46.77	61.82	0.008	0.004	45.48	58.47	0.004	0.003	49.60	66.14
15	Accidental poisoning	0.010	0.001	42.11	51.92	0.006	0.001	40.28	48.43	0.004	0.000	45.32	57.95
16	Other external causes	0.022	0.019	74.24	84.07	0.011	0.010	68.94	81.34	0.010	0.009	80.06	86.99
	Total proportion, external causes	0.056	0.035			0.036	0.020			0.020	0.015		
<u>Infant mortality causes</u>													
17	Perinatal deaths	0.003	0.002	0.28	0.23	0.001	0.001	0.32	0.28	0.001	0.001	0.24	0.17
18	Congenital anomalies	0.003	0.002	26.66	28.07	0.001	0.001	24.89	25.57	0.001	0.001	28.57	30.52
	Total proportion, infant mortality causes	0.005	0.004			0.003	0.002			0.002	0.002		
<u>Other causes</u>													
19	Causes not elsewhere classified	0.197	0.189	80.60	88.48	0.082	0.080	77.02	86.83	0.115	0.109	83.17	89.67
Grand Totals		1.000	1.000	78.49	86.26	0.468	0.463	75.34	84.52	0.532	0.537	81.26	87.76

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What is already known on this subject

Asians outlive whites by eight years in the United States. While prior studies pinpoint the causes of death that contribute to the exceptional longevity of Asian Americans, they do not tell us how much of the life expectancy gap is due to difference in the average age at death (age component), and how much is due to difference in the probability of dying of disease specific cause (incidence component).

What this study adds

This study uses a newly developed method to separate the age and incidence components for causes of death. We find that Asian Americans outlive whites because they have a higher average age at death for almost all causes of death.

Figure 1. Age versus incidence components of the Asian-white disparity in life expectancy in the US, 2006-2010.

Table 1

Components of the Asian-white racial gap in life expectancy, 2006-2010.

Cause of Death	Component		Total	Differences due to		Total	
	Incidence	Age		Males	Females		
Leading causes of death							
1	Heart diseases	0.03 (0.4%)	1.82 (23.4%)	1.85 (23.8%)	0.99 (12.8%)	0.85 (11.0%)	1.85 (23.8%)
2	Cancers	0.07 (0.9%)	1.33 (17.1%)	1.40 (18.0%)	0.77 (9.9%)	0.62 (8.0%)	1.40 (18.0%)
3	Cerebrovascular diseases	0.10 (1.3%)	0.33 (4.2%)	0.43 (5.5%)	0.17 (2.2%)	0.25 (3.3%)	0.43 (5.5%)
Totals for leading causes		0.20 (2.5%)	3.47 (44.7%)	3.67 (47.2%)	1.94 (24.9%)	1.73 (22.3%)	3.67 (47.2%)
Chronic diseases							
4	Chronic lower respiratory diseases	-0.05 (-0.7%)	0.47 (6.0%)	0.42 (5.4%)	0.24 (3.1%)	0.18 (2.3%)	0.42 (5.4%)
5	Alzheimer's	-0.06 (-0.7%)	0.20 (2.6%)	0.15 (1.9%)	0.06 (0.8%)	0.08 (1.1%)	0.15 (1.9%)
6	Diabetes	-0.01 (-0.1%)	0.27 (3.4%)	0.26 (3.3%)	0.12 (1.5%)	0.14 (1.8%)	0.26 (3.3%)
7	Nephritis	0.01 (0.1%)	0.12 (1.5%)	0.13 (1.6%)	0.06 (0.8%)	0.07 (0.9%)	0.13 (1.6%)
Totals for chronic diseases		-0.10 (-1.3%)	1.05 (13.5%)	0.95 (12.2%)	0.48 (6.2%)	0.47 (6.1%)	0.95 (12.2%)
Communicable diseases							
8	Influenza and pneumonia	0.10 (1.3%)	0.24 (3.1%)	0.34 (4.4%)	0.18 (2.3%)	0.17 (2.2%)	0.34 (4.4%)
9	Septicemia	0.00 (0.0%)	0.09 (1.2%)	0.09 (1.2%)	0.05 (0.6%)	0.04 (0.6%)	0.09 (1.2%)
10	HIV/AIDS	0.02 (0.2%)	0.00 (0.0%)	0.02 (0.3%)	0.02 (0.2%)	0.00 (0.0%)	0.02 (0.3%)
11	Other infectious diseases	-0.01 (-0.1%)	0.05 (0.7%)	0.04 (0.6%)	0.03 (0.3%)	0.02 (0.3%)	0.04 (0.6%)
Totals for communicable diseases		0.11 (1.4%)	0.39 (5.0%)	0.50 (6.5%)	0.27 (3.4%)	0.24 (3.0%)	0.50 (6.5%)
External causes							
12	Homicide	0.01 (0.1%)	0.01 (0.1%)	0.02 (0.2%)	0.01 (0.1%)	0.01 (0.1%)	0.02 (0.2%)
13	Suicide	0.16 (2.0%)	0.06 (0.8%)	0.22 (2.8%)	0.19 (2.4%)	0.03 (0.4%)	0.22 (2.8%)
14	Traffic accident	0.13 (1.6%)	0.14 (1.8%)	0.26 (3.4%)	0.19 (2.5%)	0.07 (0.9%)	0.26 (3.4%)
15	Accidental poisoning	0.30 (3.8%)	0.05 (0.7%)	0.35 (4.5%)	0.23 (3.0%)	0.12 (1.5%)	0.35 (4.5%)
16	Other external causes	0.01 (0.1%)	0.20 (2.6%)	0.21 (2.7%)	0.14 (1.8%)	0.07 (0.9%)	0.21 (2.7%)
Totals for external causes		0.60 (7.7%)	0.46 (6.0%)	1.06 (13.7%)	0.76 (9.8%)	0.30 (3.8%)	1.06 (13.7%)
Infant and child conditions							
17	Perinatal deaths	0.04 (0.5%)	0.00 (0.0%)	0.04 (0.5%)	0.02 (0.3%)	0.02 (0.2%)	0.04 (0.5%)
18	Congenital anomalies	0.04 (0.6%)	0.00 (0.0%)	0.05 (0.6%)	0.03 (0.3%)	0.02 (0.3%)	0.05 (0.6%)

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Cause of Death	Component		Differences due to		Total
	Incidence	Age	Males	Females	
Totals for infant and child conditions	0.08 (1.1%)	0.00 (0.0%)	0.05 (0.6%)	0.04 (0.5%)	0.09 (1.1%)
Other causes					
19 Causes not elsewhere classified	-0.02 (-0.2%)	1.52 (19.6%)	0.80 (10.3%)	0.71 (9.1%)	1.50 (19.3%)
Grand Total	0.9 (11.2%)	6.9 (88.8%)	4.3 (55.2%)	3.5 (44.8%)	7.8 (100%)

Table 2

Sensitivity analyses for components of the Asian-white racial gap in life expectancy, 2006-2010.

Cause of Death	Component		Total	Differences due to		Total
	Incidence	Age		Males	Females	
Leading causes of death						
1 Heart diseases	0.02 (0.3%)	1.42 (22.9%)	1.44 (23.2%)	0.80 (12.9%)	0.64 (10.3%)	1.44 (23.2%)
2 Cancers	0.04 (0.6%)	1.04 (16.8%)	1.08 (17.4%)	0.61 (9.8%)	0.47 (7.6%)	1.08 (17.4%)
3 Cerebrovascular diseases	0.10 (1.6%)	0.22 (3.6%)	0.32 (5.2%)	0.13 (2.2%)	0.19 (3.0%)	0.32 (5.2%)
Totals for leading causes	0.16 (2.6%)	2.69 (43.2%)	2.85 (45.8%)	1.54 (24.9%)	1.30 (21.0%)	2.85 (45.8%)
Chronic diseases						
4 Chronic lower respiratory diseases	-0.05 (-0.9%)	0.40 (6.5%)	0.35 (5.6%)	0.20 (3.3%)	0.14 (2.3%)	0.35 (5.6%)
5 Alzheimer's	-0.07 (-1.1%)	0.15 (2.5%)	0.09 (1.4%)	0.04 (0.7%)	0.04 (0.7%)	0.09 (1.4%)
6 Diabetes	-0.01 (-0.1%)	0.22 (3.6%)	0.22 (3.5%)	0.10 (1.6%)	0.12 (1.9%)	0.22 (3.5%)
7 Nephritis	0.01 (0.2%)	0.09 (1.4%)	0.10 (1.6%)	0.05 (0.8%)	0.05 (0.9%)	0.10 (1.6%)
Totals for chronic diseases	-0.12 (-1.9%)	0.87 (14.0%)	0.75 (12.1%)	0.39 (6.3%)	0.36 (5.8%)	0.75 (12.1%)
Communicable diseases						
8 Influenza and pneumonia	0.10 (1.6%)	0.19 (3.1%)	0.29 (4.7%)	0.15 (2.4%)	0.14 (2.3%)	0.29 (4.7%)
9 Septicemia	0.00 (0.0%)	0.07 (1.2%)	0.07 (1.2%)	0.04 (0.6%)	0.03 (0.6%)	0.07 (1.2%)
10 HIV/AIDS	0.02 (0.3%)	0.00 (0.1%)	0.02 (0.3%)	0.02 (0.3%)	0.00 (0.1%)	0.02 (0.3%)
11 Other infectious diseases	-0.01 (-0.2%)	0.04 (0.6%)	0.03 (0.5%)	0.02 (0.3%)	0.01 (0.2%)	0.03 (0.5%)
Totals for communicable diseases	0.10 (1.7%)	0.31 (5.0%)	0.41 (6.7%)	0.22 (3.6%)	0.19 (3.1%)	0.41 (6.7%)
External causes						
12 Homicide	0.00 (0.0%)	0.01 (0.1%)	0.01 (0.1%)	0.00 (0.1%)	0.01 (0.1%)	0.01 (0.1%)
13 Suicide	0.14 (2.3%)	0.05 (0.9%)	0.20 (3.2%)	0.17 (2.7%)	0.03 (0.5%)	0.20 (3.2%)
14 Traffic accident	0.11 (1.8%)	0.13 (2.0%)	0.24 (3.8%)	0.18 (2.8%)	0.06 (1.0%)	0.24 (3.8%)
15 Accidental poisoning	0.29 (4.7%)	0.05 (0.8%)	0.34 (5.4%)	0.22 (3.6%)	0.11 (1.8%)	0.34 (5.4%)
16 Other external causes	0.01 (0.1%)	0.16 (2.6%)	0.17 (2.8%)	0.12 (1.9%)	0.05 (0.8%)	0.17 (2.8%)
Totals for external causes	0.55 (8.9%)	0.40 (6.4%)	0.95 (15.3%)	0.69 (11.1%)	0.26 (4.2%)	0.95 (15.3%)
Infant and child conditions						
17 Perinatal deaths	0.01 (0.2%)	0.00 (0.0%)	0.01 (0.2%)	0.01 (0.1%)	0.01 (0.1%)	0.01 (0.2%)
18 Congenital anomalies	0.03 (0.6%)	0.00 (0.0%)	0.03 (0.5%)	0.02 (0.3%)	0.01 (0.2%)	0.03 (0.5%)

Cause of Death	Component		Differences due to		Total
	Incidence	Age	Males	Females	
Totals for infant and child conditions	0.05 (0.8%)	0.00 (0.0%)	0.03 (0.4%)	0.02 (0.3%)	0.05 (0.8%)
Other causes					
19 Causes not elsewhere classified	-0.02 (-0.4%)	1.22 (19.7%)	0.67 (10.7%)	0.53 (8.6%)	1.20 (19.3%)
Grand Total	0.7 (11.7%)	5.5 (88.3%)	3.5 (57.1%)	2.7 (42.9%)	6.2 (100%)