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Adult Suicide Mortality in the United States: Marital Status, Family Size, Socioeconomic Status, and Differences by Sex*

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Abstract

Objective—This paper addresses the relationship between suicide mortality and family structure and socioeconomic status for U.S. adult men and women.

Methods—We use Cox proportional hazard models and individual level, prospective data from the National Health Interview Survey Linked Mortality File (1986–2002) to examine adult suicide mortality.

Results—Larger families and employment are associated with lower risks of suicide for both men and women. Low levels of education or being divorced or separated, widowed, or never married are associated with increased risks of suicide among men, but not among women.

Conclusions—We find important sex differences in the relationship between suicide mortality and marital status and education. Future suicide research should use both aggregate and individual level data and recognize important sex differences in the relationship between risk factors and suicide mortality—a central cause of preventable death in the United States.

Suicide is shaped by social forces, and unlike many causes of death, it does not result directly from degenerative disease or old age. The risk of suicide increases as individuals reach a point of disillusion or disconnect from the world around them (Bearman, 1991; Durkheim, 1951[1897]; Gove, 1972). With some notable exceptions (see, for example, Kposowa, 2000; Kposowa, Breault, and Singh, 1995; Stack, 1990; and Stack and Wasserman, 1993), much of the social science literature on suicide focuses on aggregate level relationships. Prior research has established that geographic areas with less poverty, unemployment, and family disruption exhibit lower rates of suicide (Kubrin, Wadsworth, and DiPietro, 2006; Stafford and Gibbs, 1988; Stockard and O'Brien, 2002; Wadsworth and Kubrin, 2007). We extend prior research by using individual level data with links to prospective suicide mortality to examine whether family structure and socioeconomic status (SES) are associated with individuals' risks of suicide, and whether those relationships vary by sex. This approach offers insight into a central preventable cause of death in the United States and helps determine whether the relationships that have been documented with aggregate suicide rates are operating at the individual level.

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Suicide was the eleventh leading cause of death and the second leading external cause of mortality (behind accidents but ahead of homicides) in the U.S. in 2005, contributing to over 32,000 deaths. Death from suicide or "intentional self-harm" (World Health Organization, 2007) exhibits one of the largest sex differences of any of the major causes of death. Males accounted for 79 percent of the suicide deaths in the U.S. in 2005 (Kung et al., 2008). And suicide was ranked as the 8th leading cause of death for males but was ranked 16th for females in 2004 (Heron, 2007).

SOCIAL INTEGRATION AND SEX DIFFERENCES IN SUICIDE

Durkheim (1951 [1897]) suggested that even uniquely individual phenomena—such as ending one's own life—are substantially shaped by social factors. His work cemented the idea that social factors such as family structure, religion, military service, and changes in class position, provide important contexts that shape outcomes of social significance.

Social integration refers to the important relationships that connect individuals so that they are affected by and committed to the moral demands of the group (Bearman, 1991; Durkheim, 1951 [1897]). Integrated individuals "possess a 'common conscience' of shared beliefs and sentiments, interact with one another, and have a sense of devotion to common goals" (Johnson, 1965:186). Those who are well integrated into family and social life may have a stronger sense of belonging and derive greater purpose from the group. Belonging to a group can provide individuals with a sense of obligation to fulfill one's roles and continue living in spite of adversity. This sense of belonging and a strong connection to the collective moral life is likely to reduce the risk of suicide among otherwise vulnerable individuals.

Numerous scholars have examined aggregate measures of social disruption, such as rates of divorce, poverty, unemployment, or the concentration of poverty as predictors of suicide (Baller and Richardson, 2002; Kubrin, Wadsworth, and DiPietro, 2006; Stafford and Gibbs, 1988; Stockard and O'Brien, 2002; Wadsworth and Kubrin, 2007). These studies have consistently demonstrated that indicators of social disruption (or a lack of integration) are positively related to suicide rates. Although aggregate analyses capture the influence of broad patterns of social disruption on community outcomes, they cannot determine whether social disruption is associated with individual-level suicide risk. To assume that geographic patterns reflect individual processes is to fall victim to the ecological fallacy (van Poppel and Day, 1996). In the current research we use individual level data to examine relationships that have heretofore been tested primarily at the aggregate level.

Family Relationships

The risk of suicide may increase with decreasing family integration. At the aggregate level, Breault (1986) used the divorce rate as a proxy for low family integration and found a positive association between divorce rates and suicide rates. Stockard and O'Brien's (2002) analysis of non-marital birth rates, and Stafford and Gibbs' (1988) examination of aggregate measures of marital status yield similar findings. Geographic areas and birth cohorts with higher levels of family formation and less family disruption demonstrate lower suicide rates. Researchers have consistently drawn on Durkheim's concept of integration to explain these findings. However, whether such findings result from community-level mechanisms (i.e. aggregate levels of family integration influence all community members) or individual-level processes (i.e. marriage protects individuals against the risk of suicide) cannot be discerned from aggregate analyses.

Individual level analyses of marital status and suicide have relied largely on bivariate models, but have produced consistent findings that support higher suicide risk among divorced compared to married persons (for a review, see Stack, 2000b). Familial

relationships may shape individuals' risks of suicide for several reasons. Being married may reduce the risk of suicide because spouses can provide social support in stressful situations, inhibit risky behaviors such as drinking and drug use, and confer a sense of meaning and obligation (Umberson, 1992; Waite, 2006). Larger families—typically marked by the presence of numerous children and other adult relatives—might also be associated with reduced risks of suicide mortality if they provide integration across generations and offer greater opportunities for connection to the outside world (Berkman and Glass, 2000; Rogers, Hummer, and Nam, 2000). The opportunity to talk about problems or the sense of responsibility toward a spouse or other family members should lower individuals' risks of suicide mortality.

The literature on individual sex-specific differences in suicide risk by marital status has produced some conflicting results. Stack (1990) reported that divorce increased suicide risk for males and females, while Kposowa (2000) found that divorce has a strong effect only on male suicide mortality. Notably, Kposowa (2000) does not find an increased risk of suicide for widowed or single persons of either sex. Other recent research efforts suffer from small sample sizes and can only compare married and not married individuals, although there may be important differences among those who are never married or widowed (Cutright, Stack, and Fernquist, 2007).

Some research suggests that marriage confers greater benefits to men than women. Women may spend more time caring for the physical and emotional health of other family members, which may increase their stress while lowering the stress of their husbands and any children (Gove, 1972; Hochschild and Machung, 1989; Umberson, 1992). Family relationships may be particularly important for the psychosocial wellbeing of men, because they average fewer social ties outside of the family than women (Berkman and Glass, 2000; Umberson et al., 1996). Thus, marital and family ties may lower the risks of suicide more for men than for women.

Socioeconomic Status (SES)

SES—including higher levels of educational attainment, employment, and higher income—is associated with better health and lower risks of all-cause mortality (Adler et al., 1994; Feinstein, 1993; Rogers, Hummer, and Nam, 2000). These factors are associated with suicide at the aggregate (Kubrin, Wadsworth, and DiPietro, 2006; Stockard and O'Brien, 2002; Wadsworth and Kubrin, 2007) and individual (Stack, 2000a) levels. Although education, employment, and income are clearly related to each other, it is important to investigate their separate relationships with the risk of suicide. For example, Kposowa and colleagues (1995) found a bivariate relationship between income and suicide that was explained away in multivariate models.

Higher SES may reduce suicide risk in several ways. Higher incomes may reduce suicide risk by allowing individuals to access help from mental health professionals or paying for goods or services that ease their lives. Employment provides income, but may also foster social integration by providing meaning and organization to the routines of daily life, offering opportunities to make friends, and encouraging responsibility to co-workers by fulfilling job requirements (Kasl and Jones, 2000; Theorell, 2000). Work is associated with lower risks of overall mortality (Rogers, Hummer, and Nam, 2000), and employed persons have lower risk of suicide mortality (Stack, 2000a), although there are some exceptions among specific occupational groups (Stack, 2001).

High levels of education may reduce the risk of suicide by providing individuals with a greater sense of self-control and access to tightly knit pro-social groups that promote marriage, employment, and improved social capital (Kawachi and Berkman, 2000;

Mirowsky and Ross, 2003; Waite, 2006). Education may also facilitate strategies for managing stressful social environments (Krueger and Chang, 2008; Lantz et al., 2005).

Despite important sex differences in the relationship between SES and overall mortality (MacIntyre and Hunt, 1997; MacIntyre, Hunt, and Sweeting, 1996), prior research has not thoroughly examined sex differences in SES on the risk of suicide. Stack's (2000a) review of the literature finds consistent evidence that unemployment increases male but not female suicide risk. But Kposowa (2001) finds that unemployment is a stronger predictor of suicide mortality among females than among males. Earlier research suggests that women's labor force participation exposes them to dangerous work environments, leads to a greater uptake in smoking and drinking, and increases the stress of balancing work and family life (Bartley, Popay, and Plewis, 1992; Hochschild and Machung, 1989)—factors that might increase the risk of suicide. But more recent evidence suggests that women's increasing employment levels are associated with improvements in their health and wellbeing (Schnittker, 2007), which may partially result from improved social integration. These findings suggest a similar protective effect of employment on suicide.

Only limited research investigates the impact of educational attainment on suicide risk at the individual level. In an analysis reviewed by Stack (2000b), individual level data revealed that each year of education for non-Hispanic white males significantly reduced their risk of suicide. But there is little to no information on how the influence of education affects female risk in the United States. Recent cohorts of women are surpassing men in educational attainment. Education is especially important for women because it reduces the odds of divorce, unemployment, and falling into poverty (DiPrete and Buchman, 2006)—outcomes that might diminish social integration and increase the risks of suicide. But the relationship between SES and overall mortality is generally weaker for women than for men (MacIntyre and Hunt, 1997; Mustard and Etches, 2003).

RESEARCH QUESTIONS

Two research questions guide our analyses of the family and socioeconomic correlates of individuals' risks of suicide mortality. First, after controlling for other relevant factors, do marital status, family size, employment, education, and family income shape individual suicide risk? We draw on the social integration perspective to examine whether the forces that connect individuals to society are associated with the risk of suicide. Divorce has been shown to increase suicide risk at the individual level (Stack, 1990), but less work has examined the relationships between suicide and other marital statuses, family size, employment status, education, or income, and no research to date has examined all of these integrative forces in one conceptual and empirical model. Second, are the risk factors for suicide the same for men and women? Although we know that proportionately more males than females commit suicide (Kung et al., 2008), we know very little about the potential differences in the causal process that drive such disparities.

DATA AND METHODS

The National Center for Health Statistics (NCHS) recently released the National Health Interview Survey Linked Mortality File (NHIS-LMF), which is based on data from the 1986 to 2000 waves of the NHIS and prospective mortality data through December of 2002. Thus, the NHIS-LMF allows us to examine the risk of death with a large, nationally representative sample of non-institutionalized adults aged 18 and older in the U.S. (NCHS, various years, 2007). NHIS asks all members of sampled families a common set of questions on sociodemographic factors throughout the years we use here, and the NHIS-LMF contains detailed causes of death, including suicide.

Our sample includes over one million adults—490,092 males and 565,851 females—aged 18 and older, which is large enough to make detailed comparisons on the risk of suicide mortality, a relatively rare event. We exclude respondents who are 17 years of age or younger because they cannot give consent to have their records linked to mortality. We also drop 6.8% of the cases because NCHS designates them as ineligible to be linked to prospective mortality or because they are missing data on our key variables; NCHS (2007) provides weights that adjust for the exclusion of ineligible records.

Suicide mortality is defined as death from intentional self-harm (codes X60-X84) in the 10th revision of *International Statistical Classification of Diseases, Injuries, and Causes of Death* (World Health Organization, 2007). Although the accuracy of suicide death certificate data rests on individuals with varying levels of medical knowledge and training (Timmermans 2005), Pescosolido and Mendelsohn (1986) demonstrated it is not misreported in a systematic way. Over the follow-up period, 1,275 suicides—980 for males and 295 for females—were identified. The remaining individuals survived the follow-up period or died from other causes.

Variables and Measurement

The demographic variables include sex and race/ethnicity. Sex is coded dichotomously as male and female (the referent). Race is a dummy variable that compares non-Hispanic whites (the referent) to all others. Although there are important racial and ethnic differences in suicide rates (Kubrin, Wadsworth and DiPietro, 2006; Wadsworth and Kubrin, 2007), small numbers of deaths in some race/ethnic groups prohibit more detailed analyses here.

Family relationships include marital status and family size. Marital status is coded categorically as married or living with a partner (referent), divorced or separated, never married, and widowed. Cohabiters were included with married persons because they contributed only 11 deaths and our results were not sensitive to their inclusion. Family size is a continuous variable and is top coded at four or more family members.

Socioeconomic variables include income, employment status, and education. The reference person for each family reports the total family income in categories defined by NCHS. We take the midpoint of each category to approximate a continuous measure, estimate a median value for the open-ended category (see Parker and Fenwick, 1983), adjust the value for the purchasing power of different sized families (see Van der Gaag and Smolensky, 1982), and use the consumer price index to adjust for changes in purchasing power over time. About 17% of the family income data were missing. We use a less detailed income measure that asked whether family income was above or at or below $20,000, and additional covariates in our data, to estimate values for the missing income variable. We incorporated stochastic variation into the predicted values to better represent the variability in the actual income data (Gelman and Hill, 2007). Finally, we took the log of the family income variable to account for its skewed distribution, and include that in our analyses. Separate analyses (not shown) included a dummy variable for missing income values but we found no difference compared to the imputed incomes.

Education is coded categorically as those with 0–11 years of school, high school graduates, and those with more than a high school education (referent). Employment status is coded as employed (referent) and not employed or looking for work at time of interview. We combined those who were not in the labor force and those who were unemployed because they were not significantly different (results not shown).

There are important geographic differences in suicide that might result from differences in social integration or imitation (Baller and Richardson, 2002). We code census region

categorically as Northeast (referent), South, Midwest, and West; more detailed geographic location is not available in the NHIS public-use data. We also adjust for self-rated health, as measured on a five-point scale that ranges from 0 (poor health) to 4 (excellent health). Although the core NHIS data do not provide information on mental health, individuals consider many dimensions of their mental and physical health when rating their own health (Idler, Hudson, and Leventhol, 1999).

Statistical Analyses

We employ Cox proportional hazard models to examine the risk of suicide mortality (Allison, 1984). Age in quarter year intervals is used to identify the hazard of death in the survival models, which adjusts all results for age (see Korn, Graubard, and Midthune, 1997). Cox proportional hazard models are ideal because they do not impose a particular hazard function (or distribution of suicide across age) on the data and because the overall utility of the model is strong when based on large nationally representative samples (Therneau and Grambsch, 2000). We report all results in the form of hazard ratios, and use Stata 9.0 software to incorporate sample weights and to estimate robust standard errors that account for the stratified and clustered sampling design of the NHIS (NCHS, various years; StataCorp, 2006).

RESULTS

Table 1 presents hazard ratios of suicide mortality risk for each of the covariates. Model 1 shows that males have nearly 4.0 times the risk of death from suicide as females, controlling for race/ethnicity. Models 2 through 6 reveal that the risk of suicide mortality for men increases to almost 4.5 times the risk for females after adjusting for family relationships, SES, geographic region, and self-rated health.

Marital status and family size are associated with the risk of suicide. Model 2 shows that compared to married individuals, those who are divorced or separated have 83% higher, never married individuals have 48% higher, and widowed persons have 41% higher risks of suicide over the follow-up period. Model 3 demonstrates that larger family sizes partially account for the relationship between marital status and suicide mortality. Larger families also reduce the risk of suicide; each additional family member is associated with a 15% lower risk of suicide mortality.

Model 4 reveals that family income initially has a protective effect on suicide risk, but adjusting for educational attainment and employment status in Model 5 attenuates that relationship. Model 5 also shows that, compared to those who have more than a high school degree, those who have a high school degree have 36% higher and those who have less than a high school degree have 43% higher risks of death from suicide over the follow-up period. And those who are not currently working have a 70% increased risk of death compared to those who are currently employed. Adjusting for socioeconomic factors also reduces the relationship between marital status and suicide risk, but the protective effect of larger families remains stable.

Model 5 demonstrates that men are nearly 4.5 times as likely as women to die from suicide after adjusting for all family and socioeconomic factors. Men’s increased risks of suicide are largely unchanged after adjusting for geographic region and self-rated health (Model 6). Consistent with Baller and Richardson (2002), we find that the West is associated with increased suicide risk. Self-rated health is also related to suicide risk. A one unit increase in self-rated health is associated with a 21% reduction in the risk of suicide. Adjusting for region and self-rated health have little impact on the relationships between suicide risk and

marital status and family size, but these factors do partially account for the relationships between suicide mortality and education and employment (compare Models 5and 6).

Table 2 estimates separate models for men and women. Race shows a similar relationship with suicide mortality among men and women; compared to non-Hispanic whites, nonwhites experience between 39% and 48% reduced risk of suicide. But marital status has a different relationship with the risk of suicide among men and women (χ^2=36.0). Without adjusting for other covariates (Model 1), divorced or separated males and females have increased risks to suicide, relative to those who are married. But the relationship between marital status and the risk of death is reduced among males and is explained entirely among females after adjusting for family size and socioeconomic status (Models 2 and 3). Indeed, Model 3 shows that compared to married males, divorced or separated males have 39% higher, never married males have 22% higher, and widowed males have 60% higher risks of suicide mortality over the follow-up period. Although the hazard ratios are similar in magnitude (with the exception of widowhood), the marital status variables are not significantly associated with suicide risk among females in Model 3. Widowhood, in particular, is associated with much higher risks of suicide mortality among males than among females. In contrast, family size is similarly protective for both men and women.

Education also has a significantly different relationship with the risk of suicide by sex (χ^2=286). Compared to men who have more than a high school degree, men who have a high school degree have 40% higher, and men who have less than a high school degree have 47% higher risks of suicide mortality over the follow-up period (Model 3). Education is not significantly associated with the risk of suicide among women. Both men and women who are not currently working have increased risks of suicide; although the hazard ratio is larger among women, that difference in magnitude is not statistically significant (Model 3). Model 2 shows that higher incomes are associated with lower risks of suicide among males, but not among females. Consistent with the results in Table 1, family income is not associated with the risk of suicide among men or women after adjusting for other covariates (Model 3).

CONCLUSION

Our results extend prior research that relies on aggregate level data, by revealing that individual level indicators of social integration are strongly associated with the risk of suicide. Further, we find that some indicators of social integration are sex specific. Following Kposowa (2000), our results suggest that analyses of suicide that combine men and women may be misleading.

In our large, nationally representative sample of U.S. adults, marital status, family size, educational attainment, and employment status are all associated with the risk of suicide. Consistent with aggregate level research, compared to those who are married, those who are divorced or separated, or never married, are more likely to commit suicide. Prior aggregate level studies (Stafford and Gibbs, 1988; Stockard and O'Brien, 2002), have found that higher rates of marriage are associated with lower suicide mortality rates. Marriage typically implies a spouse who can encourage healthy behaviors, provide social support in times of need, and provide a sense of social integration (Waite, 2006).

But the relationship between marital status and suicide is different by sex. Marital status—particularly widowhood—is significantly associated with the risk of suicide among males but not among females. These findings are compatible with prior research that suggests that marriage confers greater health benefits for men than for women, potentially because women invest more time and energy than other household members caring for the health and wellbeing of children, husbands, and older family members (Gove, 1972; Hochschild and

Machung, 1989; Umberson, 1992; Waite, 2006). In turn, men are especially vulnerable to the risk of suicide when they lose that social support due to widowhood. We extend previous research by showing that divorce is initially related to suicide for women but that relationship is attenuated after adjusting for other relevant variables. This is an important finding, given that aggregate studies seldom explore sex differences in the relationship between marital status and suicide, and individual level studies often rely on overly simplistic models (see Stack, 2000b).

Living with more family members is protective against the risk of suicide for both men and women. Our results suggest the need for future analyses to untangle the relationship between suicide and household composition, including the presence of minor children or older dependents in the household, a neglected area of suicide research (Stack, 2000b). Indeed, if children are similarly protective against the risk of suicide for both men and women, it might clarify the sex differences in marriage, but not family size, that we found for the risk of suicide.

Aggregate measures of SES, such as employment and education rates, are often correlated with aggregate suicide rates (Almgren et al., 1998; Burr, Hartman, and Matteson, 1999; Kubrin, Wadsworth, and DiPietro, 2006; Wadsworth and Kubrin, 2007). Our results demonstrate that the relationships between the risk of suicide and education and employment persist predicting individuals' risks of suicide, but income is not associated with the risk of suicide after adjusting for other markers of socioeconomic status. Although poverty may be important for predicting aggregate suicide rates, it may be less capable of predicting individuals' risks of suicide. Future research could use both individual and aggregate level data to examine whether neighborhoods that are marked by high levels of poverty—an indicator of sparse community resources and high levels of disorganization—are associated with the risk of suicide independently of individual level indicators of education and employment.

Our findings are consistent with prior research that has found that both higher education and employment are associated with lower risks of overall and suicide mortality (Rogers, Hummer, and Nam, 2000; Stack, 2000a). Having a job or high levels of education may increase the number and strength of connections and responsibilities to other people. In turn, those social ties may provide meaning to individuals' lives and might result in reduced risks of suicide.

But education has a stronger relationship with the risk of suicide among men than among women. This is concordant with findings that the relationship between SES and health are weaker for women than for men (MacIntyre and Hunt, 1997; MacIntyre, Hunt, and Sweeting, 1996). The same level of education offers women fewer benefits than men, including a strong attachment to the labor force over the life course, deeper ties to social and community organizations, and, ultimately, greater social integration (DiPrete and Buchman, 2006). Current employment offers similar advantages to men and women, perhaps because it offers immediate ties to co-workers and the work place. In contrast, the benefits of education depend, in part, on the promise of future occupational success—a promise that may be fulfilled for men more often than women.

With basic controls for race, males are four times as likely as females to commit suicide. This sex gap increases with controls for social relationships and SES, and persists after adjusting for geographic region and health status. Our results demonstrate that some of this disparity may result from sex differences in the impact of marital status and education on the risk of suicide. As such, public health researchers and policy makers might use our findings to identify populations who are at greatest risk and design interventions accordingly. Suicide

remains especially high among males, and interventions might specifically target men who are recently widowed or divorced, and who live alone or in very small families. In turn, job loss may be a particularly risky event for both men and women.

Future research into sex differences in suicide could further explore cultural, structural, and behavioral factors. For example, drug and alcohol abuse may partially account for sex differences in the risk of suicide (Pridemore, 2006; Stack and Wasserman, 1993). Concomitantly, beginning with Shaw and McKay's (1942) classic study of neighborhoods and crime, and continuing with Wilson's (1987) examination of urban poverty, researchers have been interested in neighborhood effects on the health and behavior of residents. Following Baller and Richardson (2002) and others, future research could examine individual and contextual factors simultaneously, to further clarify sex differences in suicide mortality. In addition, research is needed to illuminate sex differences in suicide by lethality of the method. Although detail on the method of suicide is unavailable in the public-use NHIS-LMF data, males die much more often from firearms than females (Boor, 1981), a pattern that warrants further study.

We add to the rich history of suicide research, with its empirical and theoretical insights, by focusing on the risk of suicide in a large, nationally representative sample of U.S. adults. Suicide is a major cause of preventable death in the United States that is shaped by sources of social integration including family relationships and socioeconomic status. We find evidence of substantial sex differences in the risk factors for suicide. Some, but not all of our findings mirror trends that have been previously established with aggregate data, and we identify several areas where individual, family-level, and community data might be used in tandem to refine our empirical and theoretical understanding of suicide mortality. The current research extends prior theoretical and methodological work on suicide, aiding efforts to reduce suicide mortality in the U.S. and illuminating how social factors may shape broader patterns in health and mortality.

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Table 1

Hazard Ratios of Suicide Mortality Risk, U.S. Adults, 1986–2002 (N=1,055,943)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Sociodemographic						
Sex (Female)						
Male	3.97 **	4.14**	4.09 **	4.18 **	4.46 **	4.43 **
Race/Ethnicity (non-Hispanic white)						
Nonwhite	0.63 **	0.60**	0.63 **	0.59 **	0.58 **	0.54 **
Family Relationships						
Marital status (married)						
Divorced or separated		1.83**	1.50 **	1.44 **	1.40 **	1.36 *
Never married		1.48**	1.26 **	1.22 *	1.18 *	1.20 **
Widowed		1.41**	1.23	1.18	1.14	1.17
Family size			0.85 **	0.86 **	0.83 **	0.84 **
Socioeconomic Status						
Education (More than high school)						
High school					1.36 **	1.32 *
Less than high school					1.43 **	1.29 *
Employment (employed)						
Not currently working					1.70 **	1.53 **
Logged Adjusted Family Income				0.85 **	0.98	1.04
Geographic Area						
Region (Northeast)						
Midwest						1.18
South						1.37 **
West						1.63 **
Health Status						
Self rated health						0.79 **
Log likelihood	−14546.63	−14517.55	−14504.52	−14494.05	−14454.02	−14400.98

* $p \leq .05$

** $p \leq .01$.

Note: Reference category listed in parentheses.

Source: 1986–2002 NHIS Linked Mortality Files.

Table 2

Hazard Ratios of Suicide Mortality Risk by Sex, U.S. Adults, 1986–2002.

	Males			Females			
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**	**Test: Males vs. Females[a]**
Sociodemographic							
Race/Ethnicity (non-Hispanic white)							
Nonwhite	0.60 **	0.57 **	0.52 **	0.61 *	0.65 *	0.61 *	(χ^2=0.5; df=1; p=0.50)
Family Relationships							
Marital status (married)							(χ^2=36.0; df=3; p≤0.01)
Divorced or separated	1.94 **	1.53 **	1.39 *	1.59 *	1.30	1.42	
Never married	1.52 **	1.26 **	1.22 **	1.50	1.19	1.34	
Widowed	1.97 **	1.68 **	1.60 **	1.33	1.10	1.18	
Family size		0.87 **	0.85 **		0.81 **	0.77 **	(χ^2=1.14; df=1; p=0.29)
Socioeconomic Status							
Education (More than high school)							(χ^2=286; df=2; p≤0.01)
High school			1.40 **			1.13	
Less than high school			1.47 **			0.77	
Employment (employed)							
Not currently working			1.38 **			1.95 **	(χ^2=0.72; df=1; p=0.39)
Logged Adjusted Family Income		0.81 **	0.99		0.97	1.21	(χ^2=2.82; df=1; p=0.09)
Geographic Area							
Region (Northeast)							(χ^2=7306; df=3; p≤0.01)
Midwest			1.13			1.37 **	
South			1.40 **			1.25	
West			1.57 **			1.85 **	
Health Status							
Self rated health			0.82 **			0.71 **	(χ^2=0.05; df=1; p=0.82)
Log likelihood	−10387.43	−10366.14	−10305.47	−3224.44	−3218.81	−3178.65	

* p ≤ .05

** p ≤ .01.

Note: Reference category listed in parentheses.

[a] These tests come from a model based on Model 3 that pools men and women and tests the significance of interactions between sex and the covariate of interest. Source: 1986–2002 NHIS Linked Mortality Files.