

# Trends in Suicide Ideation, Plans, Gestures, and Attempts in the United States, 1990-1992 to 2001-2003

Ronald C. Kessler, PhD

Patricia Berglund, MBA

Guilherme Borges, PhD

Matthew Nock, PhD

Philip S. Wang, MD, DrPH

**S**UICIDE IS ONE OF THE LEADING causes of death worldwide. As a result, the World Health Organization<sup>1</sup> and the US surgeon general<sup>2</sup> have highlighted the need for more comprehensive data on the occurrence of suicidal thoughts and attempts, according to the assumption that such data would be useful for planning national health care policy, as well as for evaluating efforts to reduce suicide and suicide-related behaviors. The latter are among the official national health objectives in the United States.<sup>3</sup> The assumption that information on suicide-related behaviors, including thoughts, plans, gestures, and nonfatal attempts, is important for understanding completed suicides can be called into question because only a small fraction of suicide attempters eventually complete suicide.<sup>4</sup> However, suicide attempts are significant predictors of subsequent completed suicide, as well as important in their own right as indicators of extreme psychological distress.

Although the National Center for Health Statistics maintains data on all suicide deaths in the United States according to death certificate records,<sup>5</sup> no

**See also Patient Page.**

**Context** Little is known about trends in suicidal ideation, plans, gestures, or attempts or about their treatment. Such data are needed to guide and evaluate policies to reduce suicide-related behaviors.

**Objective** To analyze nationally representative trend data on suicidal ideation, plans, gestures, attempts, and their treatment.

**Design, Setting, and Participants** Data came from the 1990-1992 National Comorbidity Survey and the 2001-2003 National Comorbidity Survey Replication. These surveys asked identical questions to 9708 people aged 18 to 54 years about the past year's occurrence of suicidal ideation, plans, gestures, attempts, and treatment. Trends were evaluated by using pooled logistic regression analysis. Face-to-face interviews were administered in the homes of respondents, who were nationally representative samples of US English-speaking residents.

**Main Outcome Measure** Self-reports about suicide-related behaviors and treatment in the year before interview.

**Results** No significant changes occurred between 1990-1992 and 2001-2003 in suicidal ideation (2.8% vs 3.3%;  $P=.43$ ), plans (0.7% vs 1.0%;  $P=.15$ ), gestures (0.3% vs 0.2%;  $P=.24$ ), or attempts (0.4%-0.6%;  $P=.45$ ), whereas conditional prevalence of plans among ideators increased significantly (from 19.6% to 28.6%;  $P=.04$ ), and conditional prevalence of gestures among planners decreased significantly (from 21.4% to 6.4%;  $P=.003$ ). Treatment increased dramatically among ideators who made a gesture (40.3% vs 92.8%) and among ideators who made an attempt (49.6% vs 79.0%).

**Conclusions** Despite a dramatic increase in treatment, no significant decrease occurred in suicidal thoughts, plans, gestures, or attempts in the United States during the 1990s. Continued efforts are needed to increase outreach to untreated individuals with suicidal ideation before the occurrence of attempts and to improve treatment effectiveness for such cases.

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national data are available on the 1-year prevalence of trends in suicidal thoughts or attempts. Current estimates of such outcomes in the United States are drawn from 2 main sources. First, several ongoing surveillance systems have been established to monitor suicide-related outcomes among nationally representative samples of

**Author Affiliations:** Department of Health Care Policy (Drs Kessler and Wang) and Division of Pharmacoepidemiology and Pharmacoeconomics, Brigham and Women's Hospital (Dr Wang), Harvard Medical School, Boston, Mass; Institute for Social Research, University of Michigan, Ann Arbor (Ms Berglund); Mexican Institute of Psychiatry, Mexico City, Mexico (Dr Borges); and Department of Psychology, Harvard University, Cambridge, Mass (Dr Nock).

**Corresponding Author:** Ronald C. Kessler, PhD, Department of Health Care Policy, Harvard Medical School, 180 Longwood Ave, Boston, MA 02115 (kessler@hcp.med.harvard.edu).

individuals in the United States. The Centers for Disease Control and Prevention maintains a national surveillance system of nonfatal injuries treated in US hospital emergency departments,<sup>6</sup> as well as a surveillance system of health-risk behaviors among high school students in the United States.<sup>7</sup> These systems provide valuable information, but they are limited because they focus on narrow groups (attempters who present at hospital emergency departments and youth who currently attend high school). Second, several epidemiologic surveys have reported population-based prevalence estimates for suicidal thoughts and suicide attempts.<sup>8-10</sup> It is unclear, though, whether these results accurately reflect current prevalence because of the considerable increase in recent years in the number of people in the United States who have received treatment for emotional problems.<sup>11-13</sup>

Substantial efforts have also been made to develop and implement suicide prevention and intervention programs during the past decade.<sup>14</sup> There has been a roughly 6% reduction in the period prevalence of suicide in the United States among people in the sample age range (18-54 years) during this period, from approximately 14.8 per year per 100 000 population in 1990-1992 to 13.9 per year per 100 000 population in 2000-2002.<sup>5</sup> It is possible that a significant change also occurred in the prevalence of suicide-related behaviors, including suicidal thoughts, plans, and attempts.

The aim of the current report is to shed some light on this issue by examining the only nationally representative general-population trend data available on the 12-month prevalence and treatment of these suicide-related behaviors. These data are based on the 1990-1992 National Comorbidity Survey (NCS)<sup>15</sup> and the 2001-2003 National Comorbidity Survey Replication (NCS-R).<sup>16</sup>

## METHODS

### Samples

The NCS is a nationally representative household survey of English-speaking

residents aged 15 to 54 years.<sup>15</sup> The response rate was 82.4%, according to the response rate 3 method of the American Association for Public Opinion Research.<sup>17</sup> The latter method includes the number of completed interviews in the numerator and the number of originally sampled households, excluding ineligible households (ie, vacant households and households in which the randomly sampled respondent was found to be ineligible after contact) in the denominator, with an adjustment for the estimated proportion of uncontacted households that contained an eligible respondent. A total of 8098 interviews were completed. The NCS-R is a nationally representative household survey of respondents aged 18 years and older. The response rate was 70.9%, with the same method of calculation as in the NCS. A total of 9282 interviews were completed.

Both surveys used a 2-part internal subsampling scheme in which all respondents received a part I interview that assessed mental disorders, whereas 100% of part I respondents who met criteria for a disorder and a probability subsample of part I respondents who did not meet criteria for a disorder were administered the part II interview. The part II interview assessed risk factors, treatment, and consequences of mental disorders. Nonrespondent screening data were used to weight the NCS for nonresponse bias. Other weights adjusted for differential probabilities of selection and residual discrepancies between sample and census demographic-geographic distributions. The part II samples were also weighted for the oversampling of part I respondents with disorders. More details about NCS and NCS-R samples and weights are presented elsewhere.<sup>16,18</sup> Suicidality was assessed in part I of the NCS and in part II of the NCS-R, whereas most of the correlates examined here were assessed in part II of both surveys. Data in the overlapping age range of the 2 surveys (18-54 years) were merged to analyze the trends reported here by using part II of the NCS (n=5388) and part II of the NCS-R (n=4320).

### Recruitment and Consent

Introductory letters and study fact brochures were mailed to sample households to explain the study. Interviewers then visited households to answer remaining questions before obtaining verbal informed consent and scheduling interviews. Consent was oral rather than written in the NCS because that was the standard method of obtaining consent when the survey was designed in the late 1980s. Oral consent was used in the NCS-R to maintain comparability with the NCS for trend comparison. Respondents received \$25 (NCS) or \$50 (NCS-R) for participation. A subsample of nonrespondents were offered a higher incentive of \$50 (NCS) or \$100 (NCS-R) to complete a screening interview. The human subjects committees of the University of Michigan and of Harvard Medical School approved these recruitment and consent procedures.

### Suicidal Behaviors

Respondents were asked whether they ever seriously thought about killing themselves and, if so, whether they had these thoughts in the past 12 months. Respondents who reported such suicidal ideation were then asked whether they ever made a plan for committing suicide and, if so, whether they made such a plan in the past 12 months. Regardless of the answer to the question about a plan, respondents who reported suicidal ideation were then asked whether they ever attempted suicide and, if so, whether they made such an attempt in the past 12 months. Respondents who reported making a 12-month attempt were then asked to describe the lethality intent of the attempt by indicating which of the following 3 statements best described their attempt: "I made a serious attempt to kill myself and it was only luck that I did not succeed." "I tried to kill myself, but knew the method was not foolproof." "My attempt was a cry for help. I did not intend to die." Respondents who endorsed either of the first 2 statements were considered in the analysis to have made a suicide attempt, whereas

respondents who endorsed the third statement were considered to have made a suicide gesture.

### Correlates

We examined associations of suicide-related behaviors with the mental disorders assessed in the 2 surveys. These disorders were assessed with the World Health Organization Composite International Diagnostic Interview (CIDI), a fully structured diagnostic interview designed to be used by trained lay interviewers.<sup>19</sup> The *Diagnostic and Statistical Manual of Mental Disorders, Revised Third Edition (DSM-III-R)* version of CIDI was used in the NCS<sup>20</sup> and the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)* version in the NCS-R.<sup>21</sup> We also examined associations of suicide-related behaviors with 7 sociodemographic variables: age, sex, race/ethnicity, education, marital status, employment status, and region of the country. Race/ethnicity was coded into the standard census codes of non-Hispanic black, non-Hispanic white, Hispanic, and other according to responses to 2 questions about Hispanic heritage and race. The following prespecified racial categories were used in the second question: American Indian, Alaskan Native, Asian, black or African American, Native Hawaiian, Pacific Islander, white, and other. Race/ethnicity was included in the analysis because of extensive previous research on the relationship between racial/ethnic minority status and mental disorder.<sup>22</sup> All part II respondents in both surveys were also asked about 12-month treatment for emotional problems. Responses were used to distinguish treatment across 5 sectors: psychiatrist, other mental health specialist (eg, psychologist, social worker in a mental health specialty setting), general medical practitioner (primary care physician, nurse); human services professional (religious or spiritual advisor, social worker in any setting other than a specialty mental health setting); and complementary-alternative medical treatment (CAM; treatment by a CAM pro-

**Table 1.** 12-Month Prevalence of Suicide-Related Behaviors Among NCS and NCS-R Respondents

	% (SE)		$\chi^2_{1^*}$	P Value
	NCS (n = 5388)	NCS-R (n = 4320)		
Total sample prevalence				
Ideation	2.8 (0.3)	3.3 (0.3)	0.6	.44
Plan	0.7 (0.1)	1.0 (0.1)	2.1	.15
Gesture	0.3 (0.1)	0.2 (0.0)	1.4	.24
Attempt	0.4 (0.1)	0.6 (0.1)	0.6	.44
Conditional prevalence				
Plan among ideators	19.6 (3.7)	28.6 (3.7)	4.4	.04
Gesture among planners	21.4 (8.0)	6.4 (2.9)	10.0	.002
Attempt among planners	28.1 (11.0)	32.8 (7.9)	0.4	.53
Gesture among ideators without a plan	1.9 (0.9)	3.1 (1.1)	0.2	.66
Attempt among ideators without a plan	7.3 (2.8)	9.7 (3.3)	0.1	.66

Abbreviations: NCS, 1990-1992 National Comorbidity Survey; NCS-R, 2001-2003 National Comorbidity Survey Replication.

\*Significance was evaluated in pooled multivariate logistic regression equations that adjusted for compositional differences between the 2 samples in sociodemographic characteristics.

fessional, such as a massage therapist, or participation in a self-help group).

### Analysis Methods

Trends were assessed with pooled logistic regression equations using the suicidal behaviors as dichotomous outcomes. Predictors included time (NCS-R=1, NCS=0), demographics, and interactions between time and demographics. Tests for sociodemographic variation in trends were made at  $P=.001$  (ie, .05/28) as an approximate adjustment for the fact that 28 comparisons (7 sociodemographic predictors of 4 outcomes) were being made. Standard errors were obtained using the Taylor series linearization method<sup>23</sup> in the SUDAAN<sup>24</sup> software system. Coefficients were exponentiated to generate odds ratios (ORs) with 95% confidence intervals (CIs). Significance of predictor sets was evaluated with Wald  $\chi^2$  tests using design-adjusted coefficient variance-covariance matrices.

## RESULTS

### Trends in Prevalence

No statistically significant differences were found between the NCS and the NCS-R in the 12-month prevalence of any of the 4 outcomes: suicidal ideation (2.8% vs 3.3%,  $\chi^2_1=0.6$ ,  $P=.44$ ), suicide plans (0.7% vs 1.0%,  $\chi^2_1=2.1$ ,  $P=.15$ ), suicide gestures (0.3% vs 0.2%,

$\chi^2_1=1.4$ ,  $P=.24$ ), or suicide attempts (0.4% vs 0.6%,  $\chi^2_1=0.6$ ,  $P=.44$ ) (TABLE 1). In subgroup analyses, though, there was a significant increase in the proportion of ideators who made a plan (19.6% vs 28.6%,  $\chi^2_1=4.4$ ,  $P=.04$ ) and a significant decrease in the proportion of planners who made a gesture (21.4% vs 6.4%,  $\chi^2_1=10.0$ ,  $P=.002$ ). This latter decrease (but not the former increase) is large enough to remain significant even when we use a  $P=.005$ -level test (ie, .05/9) as an approximate adjustment because 9 subsample tests were made to compare the results in Table 1. In comparison, there were no significant differences over time in the proportion of planners who made an attempt (28.1% vs 32.8%,  $\chi^2_1=0.4$ ,  $P=.53$ ), the proportion of ideators who had no plan but made a gesture (1.9% vs 3.1%,  $\chi^2_1=0.2$ ,  $P=.75$ ), or the proportion of ideators who had no plan but made an attempt (7.3% vs 9.7%,  $\chi^2_1=0.1$ ,  $P=.66$ ).

### Prevalence of Mental Disorders Among Respondents With Suicide-Related Behavior

Rigorous comparison of conditional prevalence estimates of disorders according to the *Diagnostic and Statistical Manual of Mental Disorders (DSM)* is impossible across the surveys because the diagnostic criteria differ (*DSM-III-R* in the NCS and *DSM-IV* in

the NCS-R). In both surveys, though, the majority of ideators (80%-82%) planners (89%-95%), gesturers (96%-80%), and attempters (89%-88%) met criteria for 1 or more of the 12-month DSM disorders (TABLE 2). Major depression was the most common individual disorder among people with suicide-related behaviors in both surveys (34%-42% in the NCS and 37% to 51% in the NCS-R), whereas anxiety disorders were the most common class of disorders (63%-78% in the NCS and 52%-81% in the NCS-R).

### Trends in Sociodemographic Correlates of Prevalence

Trends were examined in the associations of 7 sociodemographic variables with each of the 4 outcomes, even

though the overall trends were not significant. The rationale was that significant changes in subsample trends are possible even in the presence of no significant change at the population level if an increase in one segment of the population offsets a decrease in another segment. All but 1 of these 28 tests failed to exceed the critical value of the test statistic, whereas inspection of the data in the one case in which the test was significant suggested that this result was due to an outlier. These results indicate that suicide-related behaviors not only remained unchanged in the population as a whole but also in major subgroups of the population defined by sociodemographic variables.

According to the above result, we were able to pool the data in the 2

samples to examine consistent sociodemographic correlates of suicide-related behaviors. A global test showed that the sociodemographics were significant overall in predicting all 4 outcomes ( $\chi^2_{18}=100.5-594.1, P<.001$ ), although the associations were fairly modest in substantive terms (contingency coefficients, 0.10-0.26) (TABLE 3). A consistent inverse association existed between age and all the outcomes, with the highest ORs in the youngest age group (15-24 years; OR=2.6-9.8) and the lowest in the oldest age group (45-54 years; with ORs fixed at 1.0). This association was significant in all 4 outcomes. Respondents with less than college education had consistently elevated ORs compared with college graduates (1.8-

**Table 2.** Prevalence of 12-Month Mental Disorders Among Respondents With 12-Month Suicide-Related Behaviors\*

No.	DSM-III-R Disorders in NCS, % (SE)				DSM-IV Disorders in NCS-R, % (SE)			
	Ideation	Plan	Gesture	Attempt	Ideation	Plan	Gesture	Attempt
	210	50	17	37	205	63	12	47
<b>Anxiety disorders</b>								
Panic disorder	11.3 (3.3)	14.6 (6.5)	11.1 (7.0)	18.2 (7.2)	19.7 (3.1)	31.8 (6.3)	16.4 (9.6)	35.1 (7.3)
Generalized anxiety disorder	12.4 (2.8)	10.8 (4.0)	1.5 (1.4)	8.2 (4.2)	12.1 (2.9)	11.5 (4.6)	0.0 (0.0)	15.5 (5.5)
Specific phobia	25.7 (3.9)	24.7 (9.1)	36.8 (12.5)	33.7 (8.5)	28.1 (3.3)	38.1 (7.6)	36.2 (11.5)	42.2 (7.4)
Social phobia	24.4 (4.1)	23.2 (7.3)	21.7 (12.1)	27.8 (6.7)	33.7 (3.1)	54.4 (6.2)	18.3 (10.5)	41.5 (5.9)
Agoraphobia without panic	11.7 (3.1)	17.9 (9.5)	9.5 (6.1)	17.4 (8.7)	4.0 (1.3)	8.6 (4.3)	12.6 (12.2)	6.8 (3.9)
Posttraumatic stress disorder	29.0 (3.6)	40.2 (11.9)	23.2 (11.5)	21.6 (7.7)	20.1 (3.3)	31.7 (6.7)	23.6 (13.0)	30.0 (5.8)
Obsessive-compulsive disorder					8.0 (3.3)	16.3 (9.1)	17.5 (16.2)	27.8 (14.2)
Any anxiety disorder	62.8 (5.1)	77.7 (7.0)	70.3 (15.0)	70.9 (6.0)	60.6 (3.2)	80.9 (5.4)	52.2 (14.8)	70.4 (5.4)
<b>Mood disorders</b>								
Major depressive disorder	41.9 (4.3)	33.9 (7.4)	39.0 (17.4)	34.7 (10.0)	38.9 (3.0)	51.3 (6.8)	36.9 (12.2)	38.9 (5.6)
Dysthymia	4.4 (1.4)	8.7 (3.9)	4.1 (4.2)	6.1 (3.3)	8.0 (1.9)	12.1 (3.7)	7.3 (7.8)	7.4 (3.5)
Bipolar I-II disorders	10.6 (2.6)	25.4 (9.0)	20.5 (14.1)	18.8 (7.5)	22.1 (3.3)	31.8 (5.8)	9.8 (8.2)	31.0 (5.9)
Any mood disorder	55.0 (5.1)	62.2 (9.2)	62.4 (22.2)	54.6 (10.3)	61.0 (4.6)	83.1 (5.1)	46.7 (7.7)	69.9 (7.2)
<b>Impulse-control disorders†</b>								
Oppositional-defiant disorder					9.4 (2.5)	13.5 (4.9)	22.4 (18.1)	17.3 (6.3)
Conduct disorder					3.0 (1.3)	2.7 (2.6)	0.0 (0.0)	7.8 (3.9)
Attention-deficit/hyperactivity disorder					14.4 (3.2)	21.1 (6.0)	8.4 (9.3)	18.9 (5.7)
Intermittent explosive disorder					6.7 (1.8)	4.2 (2.3)	6.6 (5.7)	3.4 (2.4)
Any impulse-control disorder					28.5 (3.7)	32.4 (6.3)	38.6 (18.2)	33.1 (7.0)
<b>Substance use disorders</b>								
Alcohol abuse or dependence	24.6 (4.2)	32.2 (9.8)	40.7 (11.7)	44.9 (9.9)	16.2 (3.0)	18.7 (6.2)	21.1 (14.3)	18.9 (7.6)
Alcohol dependence	18.6 (3.4)	25.6 (9.2)	31.9 (13.3)	40.4 (9.5)	10.3 (2.6)	18.7 (6.2)	12.6 (12.2)	13.9 (6.7)
Drug abuse or dependence	18.8 (4.2)	22.7 (9.7)	12.1 (8.6)	28.2 (12.2)	7.3 (2.0)	7.4 (3.4)	18.8 (17.4)	14.8 (6.2)
Drug dependence	16.8 (4.3)	22.7 (9.7)	10.6 (8.3)	21.2 (10.0)	4.8 (1.6)	6.4 (3.3)	0	8.9 (4.5)
Any substance use disorder	30.3 (4.6)	41.7 (10.7)	48.7 (11.6)	49.5 (10.2)	19.4 (3.6)	20.6 (6.6)	40.0 (20.5)	26.1 (9.1)
Any disorder	80.5 (4.3)	88.7 (5.9)	95.7 (4.3)	88.7 (5.8)	82.0 (3.0)	94.5 (3.5)	79.6 (13.2)	88.2 (4.7)

Abbreviations: NCS, 1990-1992 National Comorbidity Survey; NCS-R, 2001-2003 National Comorbidity Survey Replication.

\*Diagnostic and Statistical Manual of Mental Disorders, Revised Third Edition (DSM-III-R) and Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) disorders were diagnosed by using diagnostic hierarchy rules and organic exclusions.

†Impulse-control disorders were not assessed in the NCS.

50.6), although overall education differences were significant in only 2 of the 4 outcomes. Previously married respondents had elevated ORs compared with the married respondents (1.5-4.4) significant in 3 outcomes. Unemployed or disabled respondents had generally elevated ORs compared with the employed respondents (3.8-4.3) significant in 3 outcomes. Somewhat weaker ORs were found for being female (1.0-2.9, significant for 1 outcome) and for being a homemaker (1.2-2.9, significant in only 1 outcome). The never married had elevated ORs for gestures (3.9 and significant) but decreased ORs for ideation, plans, and attempts (0.4-0.8, significant only for attempts). Race/ethnicity and region of the country were not significantly related to any of the outcomes.

### Trends in Treatment

Respondents who reported 12-month suicidal ideation were divided into 3 mutually exclusive subgroups defined by the presence of an attempt, a gesture, or neither. Respondents in each of these 3 subgroups were then distinguished by whether or not they had a suicide plan, thus creating 6 subgroups. The proportion of respondents who reported receiving treatment for emotional problems in the past 12 months increased over time in each of these 6 subgroups, 2 of them significantly so at the .05 level (TABLE 4). The increases were confined to treatment in the psychiatrist sector and the general medical sector. No significant increases were found in the other mental health, human services, or CAM sectors (results available on request). Although treatment in the mental health specialty sectors (either psychiatrist or other mental health specialist) remained somewhat more common than treatment in the general medical sector in 5 of the 6 NCS-R subgroups, this difference was much more pronounced in the NCS than the NCS-R because of a greater increase in general medical than mental health specialty treatment in all subgroups. Even with these increases, sizable minori-

ties with evidence of suicide-related behaviors (21.0% of attempters, 7.2% of respondents who made a gesture, and 35.6% of ideators who made neither a gesture nor an attempt) received no treatment for emotional problems in the past 12 months in the NCS-R.

### Trends in Suicide Attempts Among Ideators, Stratified by Treatment Status

To explore how the temporal increase in treatment might have influenced suicide-related behaviors, and particularly the significant decrease in the

**Table 3.** Sociodemographic Correlates of 12-Month Suicide-Related Behaviors Among Pooled NCS (n = 5388) and NCS-R (n = 4320) Respondents\*

	Odds Ratio (95% CI)			
	Ideation	Plan	Gesture	Attempt
Age, y				
18-24	2.6 (1.8-3.6)†	3.9 (1.6-8.6)†	8.1 (1.9-34.7)†	9.8 (3.5-21.8)†
25-34	1.1 (0.8-1.5)	2.4 (1.0-5.7)	2.3 (0.5-10.7)	3.2 (0.9-11.5)
35-44	1.5 (1.0-2.2)	2.3 (1.1-4.9)†	4.0 (0.7-23.7)	3.1 (1.1-8.9)†
45-54	1.0	1.0	1.0	1.0
$\chi^2_3$	52.3†	11.0†	9.9†	21.2†
Sex				
Female	1.4 (1.0-1.9)	1.0 (0.6-1.7)	2.9 (0.9-9.4)	1.0 (0.5-1.9)
Male	1.0	1.0	1.0	1.0
$\chi^2_1$	4.8†	0.0	3.4	0.0
Race/ethnicity				
Non-Hispanic white	1.0	1.0	1.0	1.0
Non-Hispanic black	0.8 (0.5-1.1)	0.8 (0.4-1.8)	0.4 (0.1-2.8)	0.8 (0.3-1.8)
Hispanic	0.8 (0.5-1.4)	0.8 (0.4-1.7)	1.8 (0.4-8.3)	1.2 (0.5-2.8)
Other	0.9 (0.5-1.6)	1.0 (0.4-2.5)	0.4 (0.1-1.5)	1.6 (0.4-6.2)
$\chi^2_3$	2.2	0.4	2.9	1.7
Education				
Less than high school	1.8 (1.2-2.7)†	2.1 (1.0-4.9)	50.6 (5.6-454.6)†	2.8 (0.9-9.1)
High school	1.3 (0.9-1.9)	1.6 (0.8-3.2)	24.7 (3.1-194.5)†	2.9 (0.9-9.4)
Some post-high school	1.6 (1.1-2.3)†	1.8 (0.9-3.5)	10.8 (1.1-102.8)†	2.3 (0.8-6.7)
College graduate	1.0	1.0	1.0	1.0
$\chi^2_3$	8.9†	4.4	15.1†	3.8
Marital status				
Previously married	1.5 (1.0-2.1)	2.2 (1.3-3.9)†	4.4 (1.2-16.6)†	2.4 (1.1-5.3)†
Never married	0.8 (0.6-1.1)	0.7 (0.4-1.3)	3.9 (1.9-7.8)†	0.4 (0.2-0.9)†
Married/cohabitating	1.0	1.0	1.0	1.0
$\chi^2_2$	14.0†	12.3†	15.7†	19.6†
Employment status				
Employed	1.0	1.0	1.0	1.0
Student	1.2 (0.7-2.4)	0.6 (0.2-2.1)	0.6 (0.1-3.9)	0.6 (0.1-3.2)
Homemaker	2.4 (1.6-3.8)†	2.9 (1.0-8.1)	1.2 (0.2-7.0)	1.5 (0.3-6.7)
Unemployed or disabled	3.8 (2.7-5.6)†	4.1 (2.3-7.4)†	0.7 (0.1-4.1)	4.3 (2.4-7.8)†
$\chi^2_3$	53.2†	26.7†	0.5	27.3†
Region of the country				
Northeast	0.9 (0.5-1.5)	0.9 (0.4-2.1)	0.3 (0.0-2.3)	1.1 (0.3-3.6)
Midwest	1.0 (0.7-1.6)	0.7 (0.3-1.3)	0.7 (0.3-1.8)	0.6 (0.2-2.1)
South	1.0 (0.7-1.5)	0.8 (0.4-1.6)	0.3 (0.1-0.8)†	0.8 (0.3-2.5)
West	1.0	1.0	1.0	1.0
$\chi^2_3$	0.6	1.9	6.0	1.5
All sociodemographic correlates, $\chi^2_{15}$	253.1†	100.5†	594.1†	134.7†

Abbreviation: CI, confidence interval.

\*Based on pooled multivariate logistic regression analysis controlling for years (NCS = 1, NCS-R = 0) with sociodemographic variables treated as predictors of dichotomously coded suicidal behaviors.

†Significant at the .05 level, 2-sided test.

**Table 4.** 12-Month Treatment of NCS and NCS-R Respondents With Suicide-Related Behaviors

	Sector of Treatment, % (SE)*											
	Psychiatrist			Any Mental Health			General Medical			Any Treatment		
	NCS	NCS-R	$\chi^2$	NCS	NCS-R	$\chi^2$	NCS	NCS-R	$\chi^2$	NCS	NCS-R	$\chi^2$
Ideator without gesture or attempt												
No plan	10.1 (3.5)	29.4 (4.7)	11.5†	35.8 (4.6)	41.4 (4.5)	0.8	17.7 (3.4)	30.0 (4.1)	5.0†	47.4 (4.6)	61.1 (4.4)	4.4†
Plan	50.5 (13.3)	48.8 (10.6)	0	64.4 (9.6)	53.0 (10.6)	0.6	7.2 (4.6)	38.6 (10.6)	5.9†	73.0 (8.7)	76.5 (8.0)	0.1
Total	14.4 (4.0)	33.5 (4.5)	9.4†	38.8 (4.7)	43.9 (4.1)	0.6	16.6 (3.1)	31.8 (3.2)	11.1†	50.2 (4.5)	64.4 (3.6)	5.6†
Gesturer												
No plan	3.3 (3.5)	23.6 (17.2)	1.3	17.1 (11.4)	67.4 (21.6)	2.6	9.7 (7.8)	67.8 (70.5)	5.1†	28.6 (16.5)	88.6 (10.4)	5.0†
Plan	22.2 (14.0)	75.0 (10.1)	6.0†	50.3 (21.9)	82.4 (10.9)	1.9	40.2 (22.1)	69.9 (12.6)	1.6	50.3 (21.9)	100.0 (0)	3.3
Total	13.4 (7.6)	42.8 (12.5)	3.4	34.9 (15.7)	73.0 (13.5)	2.6	26.0 (15.1)	68.6 (13.6)	4.0†	40.3 (16.6)	92.8 (6.8)	5.6†
Attempter												
No plan	25.4 (15.8)	36.7 (11.8)	0.3	33.2 (19.0)	62.3 (15.9)	1.2	11.1 (9.5)	37.8 (13.4)	2.1	33.2 (19.0)	77.8 (12.6)	3.0
Plan	65.7 (20.3)	53.5 (9.8)	0.3	65.7 (20.3)	60.6 (9.3)	0.1	2.2 (2.3)	37.8 (12.2)	4.6†	65.7 (20.3)	80.0 (8.3)	0.4
Total	45.7 (15.7)	46.3 (6.6)	0.0	49.6 (17.2)	61.3 (7.0)	0.4	6.6 (4.6)	37.8 (9.3)	6.0†	49.6 (17.2)	79.0 (6.5)	2.4

Abbreviations: NCS, 1990-1992 National Comorbidity Survey; NCS-R, 2001-2003 National Comorbidity Survey Replication.

\*Any mental health treatment includes treatment by a psychiatrist, as well as by a nonphysician mental health specialist (eg, psychologist, social worker in a mental health specialty setting). General medical treatment includes treatment by any nonpsychiatrist physician or a worker in a general medical setting (eg, nurse in a primary care setting). In addition to including mental health and general medical treatment, the category of any treatment includes treatment by a human services professional (eg, religious or spiritual advisor, social worker) and complementary-alternative medical treatment (treatment by a professional, such as a massage therapist, or participation in a self-help group).

†Significant difference between NCS and NCS-R at the .05 level, 2-sided test.

**Table 5.** Conditional Prevalence of 12-Month Suicide Gestures and Attempts Among NCS and NCS-R Ideators by Treatment\*

	Gesture, % (SE)			Attempt, % (SE)		
	NCS	NCS-R	$\chi^2$	NCS	NCS-R	$\chi^2$
Ideators with a plan						
Treatment	20.3 (11.4)	8.5 (3.9)	1.3	29.6 (14.7)	34.6 (8.3)	0
No treatment	35.3 (15.8)	0	2.1	32.0 (14.7)	33.1 (14.0)	0
Ideators without a plan						
Treatment	3.3 (1.8)	4.9 (1.6)	0.3	3.9 (2.6)	11.6 (4.2)	2.3
No treatment	0.6 (0.6)	0	1.2	10.2 (4.8)	6.4 (4.5)	0.7

Abbreviations: NCS, 1990-1992 National Comorbidity Survey; NCS-R, 2001-2003 National Comorbidity Survey Replication.

\*There were no significant differences between NCS and NCS-R at the .05 level, 2-sided test.

prevalence of gestures among ideators, we stratified respondents with suicidal ideation by treatment and estimated the conditional prevalence of gestures and attempts. The prevalence of gestures was found not to decrease between the 2 surveys more among respondents who received treatment than among those who did not (TABLE 5). Furthermore, the prevalence of attempts was found not to increase between the surveys more among respondents who did not receive treatment than among those who did.

## COMMENT

These results should be interpreted with 5 limitations in mind. First, the outcomes are sufficiently rare that mean-

ingful changes could have occurred that were not detected as statistically significant with samples of the size considered here. Also, a number of the ORs in the prediction equation have wide CIs. Second, suicide-related behaviors are likely to be underreported because of stigmas that might change and vary at a point in time across sociodemographic segments of society. Third, although the survey methods were kept as comparable as possible in the 2 surveys, even subtle differences in interview procedures, sample nonresponse, or respondent reluctance to admit suicidal thoughts or behaviors could have led to changes in the internal validity of responses over time. Fourth, external validity is reduced by

the fact that the response rate was less than perfect, coupled with the fact that the sampling frame excluded people older than 54 years, individuals living in institutions, the homeless, and individuals who had completed suicide. Fifth, we did not assess whether treatments began before or after onset of suicidality, nor did we assess the adequacy or effectiveness of treatment, which might have changed over time.

With these limitations in mind, the analysis documented 3 noteworthy results. First, we found no significant changes in the 12-month prevalence of suicidal ideation, plans, gestures, or attempts, which is consistent with an earlier analysis that found no evidence of change in the overall 12-month prevalence of DSM-IV mental disorders in the 2 surveys.<sup>25</sup> The lack of trends in suicide-related behaviors does not follow logically from the failure to find a trend in disorder prevalence for 2 reasons: a meaningful minority of respondents with suicide-related behaviors did not meet 12-month criteria for any of the DSM disorders assessed in the 2 surveys (eg, 18%-20% of ideators and 11%-12% of attempters), and the remaining respondents with suicidal behaviors had a much higher concentration of severe and comorbid 12-month DSM dis-

orders than cases in the general population.

Second, we found that risk of suicide-related behaviors is consistently elevated in several vulnerable subgroups, including the young, women, individuals with low education, and individuals lacking stable relationships or employment. These patterns did not change significantly, which means that the lack of a significant time trend in the prevalence of suicide-related behaviors in the total sample does not mask opposite-direction significant trends in major sociodemographic segments of the population. It also means that the enormous increase in treatment of emotional problems in the decade between the 2 surveys did not reduce the disparities in risk of suicide-related behaviors associated with these disadvantaged social statuses.

Third, we found that treatment increased substantially among people with suicide-related behaviors, which is consistent with a number of earlier studies that documented increased treatment of mental health problems throughout the decade,<sup>11-13</sup> presumably linked to the introduction of direct-to-consumer marketing of new psychotropic drugs; new community programs to promote awareness, screening, and help-seeking for mental disorders; expansion of “carve-out” systems to deliver mental health services; and new policies to reduce barriers to service use.<sup>26-34</sup>

It is not clear how to interpret the finding that suicide-related behaviors did not decrease when treatment increased dramatically. Completed suicides decreased by about 6% during this period. The increase in treatment might have played a part in this trend, although county-level analysis shows no overall association between amount of treatment, as indicated by per-capita number of antidepressant prescriptions, and the suicide rate.<sup>35</sup> If increased treatment did play a part in the decrease in the suicide rate, then why did we not see a comparable decrease in suicide-related behaviors?

One way to begin addressing this question is to recognize that suicide-

related behaviors are distinct from completed suicides, if for no other reason than their numbers. There are approximately 3000 suicide ideators per 100 000 population and 500 suicide attempters per 100 000 population in the United States each year compared with only 14 suicide completers per 100 000 population. It is possible that processes affecting the comparatively small number of suicide completers had no effect on the much larger number of ideators or attempters.

We cannot rule out the possibility that methodologic factors played a role in suicide-related behaviors not being less prevalent in the NCS-R than the NCS. Such factors could include differences between the surveys either in sample bias or in willingness to admit suicide-related behaviors to interviewers. Arguing against these possibilities are our adjusting for sample selection bias with nonresponse adjustment weights and our finding no evidence in responses to questions about stigma that willingness to admit emotional problems increased over time.

In light of these results, 3 substantive possibilities appear to be more plausible than methodologic ones in accounting for the finding that suicide-related behaviors remained unchanged in the NCS and NCS-R when treatment increased dramatically. One is that the prevalence of suicide-related behaviors would have increased, were it not for the increase in treatment. A second is that attempters typically obtained treatment only after making attempts. A third is that the increase in treatment was of such low intensity or quality that it had no effect on suicide-related behaviors.

Although all 3 substantive interpretations are equally consistent with the survey data, other information argues against the possibility that the increase in treatment prevented an increase that would otherwise have occurred in suicide-related behaviors. Specifically, randomized controlled trials find only modest effects of treatment in reducing suicidality, even with optimal regimens.<sup>36-40</sup> Community stud-

ies of treatment quality consistently find that the majority of patients currently in treatment for mental disorders receive care that fails to meet minimal evidence-based guidelines.<sup>41-44</sup> An added complication raised by the US Food and Drug Administration's recent analyses of pediatric antidepressant trials is that the benefit from treatment in terms of symptom improvement in some patients might be offset by adverse effects of medications in other patients.<sup>45</sup> Taken together, these results would lead us not to expect substantial effects of increased treatment on population trends in suicidality.

It is more difficult to determine the relative importance of the other 2 possibilities: that increased treatment either did not reach suicidal people quickly enough to prevent attempts or that this treatment, when it was delivered in time, was of such low intensity or quality that it was ineffective in preventing attempts. Both processes could have been at work, which suggests several important directions for future investigation. With regard to the timeliness of treatment, we know that a substantial minority of survey respondents with suicide-related behaviors received no treatment. In addition, we suspect that at least some who reported receiving treatment did so only after making a suicide gesture or attempt. These results mean that efforts are needed to increase access to and demand for treatment among people with suicidal ideation. The most serious cases—ideators who make attempts—experienced smaller increases in treatment throughout the decade than less serious cases. Programs that expand treatment resources<sup>32,46</sup> may be especially important in addressing this problem, as might initiatives that encourage timely treatment seeking specifically among people with suicidal ideation (eg, Substance Abuse and Mental Health Services Administration's National Suicide Prevention Lifeline program).<sup>47</sup> Because the dramatic increase in treatment in the last decade failed to reduce sociodemographic disparities in the suicidal behaviors con-

sidered here, programs specifically targeting high-risk populations are needed. Recent policies and National Institute of Mental Health initiatives encouraging treatment among traditionally underserved and high-risk groups may provide useful models.<sup>48-50</sup>

Increased treatment, though, will be of little value unless the quality of treatment is adequate. Efforts are needed to identify optimal interventions for primary and secondary prevention of suicidality. Although a growing literature has shed light on the optimal intensity, duration, and follow-up required to treat mental disorders,<sup>51-56</sup> comparable data on optimal treatments of suicidal thoughts and behaviors are just beginning to emerge.<sup>57</sup> A recognition is needed that effective prevention of suicide attempts might require substantially more intensive treatment than is currently provided to the majority of people in outpatient treatment for mental disorders. In light of the controversy about the role of antidepressants in suicidality among adolescents, identifying whether emerging treatments have the potential to ameliorate suicidality in some individuals while potentially worsening it in others will be important. The solution is likely to involve providing intensive monitoring and follow-up, as indicated in the US Food and Drug Administration's recent "black box" warning for all antidepressants.<sup>58</sup>

Efforts will also be needed to promote the uptake of effective treatments for suicidality, including those that already exist, as well as any new treatments that are developed and shown to be effective. Substantial barriers to uptake of effective interventions continue to exist, including competing clinical demands and distorted incentives for treating mental disorders and symptoms.<sup>31,59-61</sup> Failure to disseminate evidence-based treatments widely may, in fact, help explain why suicidality did not decline in response to the treatment increases during the 1990s. This means that expansion of disease management programs, treatment quality-assurance programs, and

"report cards" to improve the quality of care for suicidal patients may all be needed to reduce the burden of suicidality.<sup>62-66</sup>

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**Study concept and design:** Kessler, Borges, Wang.

**Acquisition of data:** Kessler.

**Analysis and interpretation of data:** Kessler, Berglund, Borges, Nock, Wang.

**Drafting of the manuscript:** Kessler, Berglund, Nock, Wang.

**Critical revision of the manuscript for important intellectual content:** Kessler, Borges, Nock.

**Statistical analysis:** Kessler, Berglund, Borges.

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**Collaborating NCS-R Investigators** include Ronald C. Kessler, PhD (principal investigator, Harvard Medical School, Boston, Mass), Kathleen Merikangas, PhD (coprincipal investigator, NIMH, Bethesda, Md), James Anthony, PhD (Michigan State University, East Lansing), William Eaton, PhD (Johns Hopkins University, Baltimore, Md), Meyer Glantz, PhD (NIDA, Bethesda, Md), Doreen Koretz, PhD (Harvard University, Cambridge, Mass), Jane McLeod, PhD (Indiana University, Bloomington), Mark Olfson, MD, MPH (New York State Psychiatric Institute, College of Physicians and Surgeons of Columbia University, New York City), Harold Pincus, MD (University of Pittsburgh, Pittsburgh, Pa), Greg Simon, MD, MPH, (Group Health Cooperative, Seattle, Wash), Michael Von Korff, ScD (Group Health Cooperative, Seattle), Philip Wang, MD, DrPH (Harvard Medical School, Boston), Kenneth Wells, MD, MPH (University of California, Los Angeles), Elaine Wethington, PhD (Cornell University, Ithaca, NY), and Hans-Ulrich Wittchen, PhD (Max Planck Institute of Psychiatry; Technical University of Dresden, Dresden, Germany).

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**Additional Information:** The full text of all NCS-R instruments can be found at <http://www.hcp.med.harvard.edu/ncs>. A complete list of WMH publications can be found at <http://www.hcp.med.harvard.edu/wmh>.

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