Japan has one of the highest suicide rates among developed count-
ries. The number of suicide deaths in Japan increased sharply
from 21,401 (18.8 per 100,000 people) in 1997 to 31,755 (25.4
per 100,000 people) in 1998, and it has not decreased since. This
dramatic increase from 1997 through 1998 is Japan's third peak of
suicide mortality since World War II, the first and the second
peaks being in 1958 and in 1986, respectively. However, it was
the first time that the number of suicide deaths exceeded 30,000.

The latest peak is characterized by suicide deaths of middle-aged
men and is due to Japan's prolonged economic recession since the
1990's. Suicide prevention is now a major public health chal-
lenge in Japan.

Standardized mortality ratios (SMRs) from suicide (the suicide
mortality rate in Japan from 1981 through 2000 being used as the
standard) in the 47 prefectures of Japan ranged from 0.82 to 1.53
in men and from 0.78 to 1.53 in women. Aihara and Iki con-
ducted an ecological study using prefectures of Japan as units of
analysis, and found that the proportion of elderly and economic

Received April 5, 2004, and accepted December 2, 2004.
This study was supported in part by the Grant-in-Aid for Psychiatric and Neurological Diseases and Mental Health (H14-008) from the Ministry of Health, Labour and Welfare and by a grant from the Iwate Ageing-Society Association (2002-2003).

1 Department of Hygiene and Preventive Medicine, Iwate Medical University, School of Medicine.
2 Department of Insurance, Ministry of Health, Labour and Welfare.
3 Department of Neuropsychiatry, Iwate Medical University, School of Medicine.
4 Department of Preventive Cardiology, National Cardiovascular Center.

Address for correspondence: Dr. Nobuo Nishi, Department of Epidemiology, Radiation Effects Research Foundation, 5-2 Hijiyama Park, Minami-Ku, Hiroshima 732-0815, Japan. (nnishi@rerf.or.jp)
variables such as job application rate are associated with suicide mortality. The SMRs of Iwate Prefecture, on which our study is based, were 1.45 in men and 1.39 in women. The mortality rate from suicide is particularly high in the northern part of Iwate Prefecture, and the reason for this has been examined by an ecological study using districts as units of analysis. Among various demographic and socioeconomic variables, it has been shown that unemployment rate for men, and number of hospital beds per 100,000 people and number of doctors per 100,000 people for women were significantly related to the SMR from suicide.

The risk of suicide is high in people with psychological disorders. Fujita and Kurisu conducted a study in Japan using the Vital Statistics of Japan and revealed that patients with mental disorders had a four- to five-times higher risk of suicide compared with the general population. Tamakoshi et al. found in a five-year follow-up study of Japanese middle-aged workers that depressive moods increased the risk of suicide. Takahashi et al. reported that about 60% of those hospitalized for attempting suicide had mood disorders such as major depression, bipolar depression, or dysthymia. Thus, epidemiologic studies in Japan have revealed an association between depression and suicide, but the extent of awareness among people regarding this association has not been fully investigated, especially in regions with a high suicide rate.

Public knowledge regarding depression and suicide is one of the components of mental health literacy, which is defined as "knowledge and beliefs about mental disorders which aid their recognition, management or prevention." In an Irish report in 1991, two-thirds of the nationally representative sample regarded the components of mental health literacy, which is defined as "knowledge and beliefs about mental disorders which aid their recognition, management or prevention." In the baseline study of the Defeat Depression Campaign in Great Britain, conducted from 1991 through 1997, the proportion of participants who considered antidepressants to be ineffective for depression was 54%, the number that was reduced to 40% after the six-year intervention. Although surveys on public attitudes regarding depression have been conducted in cross-sectional studies or in intervention studies, differences in public attitudes with respect to depression exist among areas with different suicide mortality rates.

The aim of this study was to investigate knowledge of and attitudes toward depression and suicide in a large community sample of residents among municipalities with high suicide rates in Japan and to examine relationships between these factors and suicide mortality.

**Table 1. Sample size, number of subjects, and response rate by sex and age group in study areas in Kuji District and Miyako District.**

| Age group (year) | Samples | Subjects | Response rate (%) |
|------------------|---------|----------|------------------|
|                  | n  | %    | n  | %    |                      |
| Study area in Kuji District |       |       |     |       |                      |
| 20-39            | 522 | 30.0 | 329 | 26.4 | 63.0                  |
| 40-59            | 712 | 40.9 | 515 | 41.3 | 72.3                  |
| 60-79            | 506 | 29.1 | 404 | 32.4 | 79.8                  |
| Total            | 1,740| 100.0| 1,248| 100.0| 71.7                  |
| Study area in Miyako District |       |       |     |       |                      |
| 20-39            | 381 | 22.3 | 250 | 18.5 | 65.6                  |
| 40-59            | 685 | 40.0 | 538 | 39.7 | 78.5                  |
| 60-79            | 646 | 37.7 | 566 | 41.8 | 87.6                  |
| Total            | 1,712| 100.0| 1,354| 100.0| 79.1                  |

|                  | Samples | Subjects | Response rate (%) |
|------------------|---------|----------|------------------|
|                  | n  | %    | n  | %    |                      |
| Study area in Kuji District |       |       |     |       |                      |
| 20-39            | 508 | 27.6 | 360 | 25.2 | 70.9                  |
| 40-59            | 702 | 38.1 | 559 | 39.2 | 79.6                  |
| 60-79            | 632 | 34.3 | 507 | 35.6 | 80.2                  |
| Total            | 1,842| 100.0| 1,426| 100.0| 77.4                  |
| Study area in Miyako District |       |       |     |       |                      |
| 20-39            | 397 | 21.6 | 305 | 20.1 | 76.8                  |
| 40-59            | 609 | 33.1 | 515 | 33.9 | 84.6                  |
| 60-79            | 836 | 45.4 | 699 | 46.0 | 83.6                  |
| Total            | 1,842| 100.0| 1,519| 100.0| 82.5                  |

**Questionnaire survey**

A questionnaire survey was carried out from February through June in 2002. For the survey, we selected four of six municipalities in the Kuji District, and three of seven municipalities in the Miyako District, which is located south of the Kuji District. Among the seven municipalities selected for the study, three (two in Kuji and one in Miyako) are in coastal areas and four (two in Kuji and two in Miyako) are located inland. A total of 7,136 people, aged 20 to 79 years, were randomly selected from the Basic Resident Register of each of the seven municipalities. Random sampling was done by city workers of the municipalities with the aid of our research members, and in one of the municipalities subjects were randomly selected from those aged 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 69, 74 and 79 years.
A questionnaire with a letter explaining the objective of the survey was sent to each potential subject. The questionnaire was used to obtain written informed consent for participation from the subjects. Reminder letters were sent to the subjects once or twice. Respondents were offered the choice of a 500-yen gift certificate, a highlighter pen set, or a magnifying glass as a reward for participating. Respondents were requested by mail or telephone to provide any information missing from the questionnaire. As a result of such efforts, we obtained responses from 5,676 subjects (response rate: 79.5%). Data of 5,547 (77.7%) subjects (2,602 men and 2,945 women) who had missing values in no more than two items of the Self-Rating Depression Scale (SDS) score were used for analyses. The numbers of samples, the numbers of subjects, and response rates (the numbers of subjects divided by the numbers of samples) by sex and age group (20 to 39, 40 to 59, and 60 to 79) are shown in Table 1. Response rates were higher in the older age groups both in men and in women, and were lower in the Kuji District study area than in the Miyako District study area in all sex and age groups.

The questionnaire items comprised psychosocial factors, lifestyles, knowledge of and attitudes toward suicide and depression, and the Japanese version of the SDS. For the analyses, prevalence of the following conditions was obtained from the

---

**Table 2. Populations in the 2000 census and the total number of deaths and standardized mortality ratios (SMRs) with 95% confidence intervals (CIs) from suicide, from 1982 through 2000 in municipalities of Iwate Prefecture.**

| Population in the 2000 census | Suicide deaths 1982-2000 | SMR (95% CI)* | SMR group² |
|-------------------------------|------------------------|--------------|-----------|
| **Men**                      |                        |              |           |
| Iwate Prefecture              |                        |              |           |
| Kuji District                 |                        |              |           |
| All (6 municipalities)        | 681,238                | 4,967        | 1.44 (1.40 - 1.48) |
| Study area (4 municipalities) |                        |              |           |
| A                             | 32,758                 | 374          | 2.24 (2.01 - 2.46) |
| B                             | 28,566                 | 338          | 2.31 (2.07 - 2.56) |
| C                             | 17,311                 | 196          | 2.30 (1.98 - 2.62) |
| D                             | 6,666                  | 58           | 1.62 (1.20 - 2.03) |
| G                             | 1,654                  | 38           | 3.72 (2.53 - 4.90) |
| E                             | 2,935                  | 46           | 3.13 (2.23 - 4.03) |
| **Miyako District**           |                        |              |           |
| All (7 municipalities)        | 50,137                 | 448          | 1.57 (1.43 - 1.72) |
| Study area (3 municipalities) | 10,284                 | 149          | 2.36 (1.98 - 2.74) |
| E                             | 2,313                  | 27           | 2.06 (1.28 - 2.83) |
| F                             | 6,153                  | 89           | 2.30 (1.82 - 2.78) |
| G                             | 1,818                  | 33           | 2.91 (1.92 - 3.91) |
| **Women**                    |                        |              |           |
| Iwate Prefecture              | 734,942                | 2,604        | 1.35 (1.30 - 1.40) |
| Kuji District                 |                        |              |           |
| All (6 municipalities)        | 36,663                 | 197          | 2.02 (1.74 - 2.30) |
| Study area (4 municipalities) | 32,077                 | 173          | 2.04 (1.74 - 2.35) |
| A                             | 19,485                 | 97           | 1.97 (1.58 - 2.37) |
| B                             | 7,511                  | 30           | 1.43 (0.92 - 1.94) |
| C                             | 1,728                  | 20           | 3.49 (1.96 - 5.02) |
| D                             | 3,353                  | 26           | 2.93 (1.80 - 4.06) |
| **Miyako District**           |                        |              |           |
| All (7 municipalities)        | 55,437                 | 193          | 1.19 (1.02 - 1.36) |
| Study area (3 municipalities) | 11,146                 | 58           | 1.60 (1.19 - 2.01) |
| E                             | 2,487                  | 13           | 1.75 (0.80 - 2.70) |
| F                             | 6,692                  | 35           | 1.56 (1.04 - 2.08) |
| G                             | 1,967                  | 10           | 1.55 (0.59 - 2.51) |

* : SMR is based on suicide mortality of Japanese men and women between 1982 and 2000.

² : All seven municipalities in study areas were categorized into three groups according to the SMR for men and women.
responses to the questionnaire. Psychosocial factors included not married (single, divorced, or widowed), education of nine years or less, very dissatisfied with financial situation, living alone, lacking the chance to visit friends or relatives, having no confidants among friends or relatives when depressed, and never participating in community activities. Lifestyles included currently smoke, drink once a week or more, and sedentary (no regular exercise). Knowledge of suicide and depression included no awareness of suicide mortality rates being higher in the region, no knowledge of depressive states being treatable by medication, no knowledge of the location of a psychiatric hospital, and no awareness of mental health activities by local governments. Attitudes toward suicide and depression included a view of suicide as being permissible ("permissible" or "permissible in certain situations"), unwillingness to see a psychiatrist when depressed, and a view of suicide as being unpreventable by community efforts.

**SMRs of the municipalities**

We calculated the SMRs (95% confidence intervals) from suicide over a period of 19 years (1982 through 2000) in the Kuji District (all six municipalities, including the four municipalities in the study) and the Miyako District (all seven municipalities, including the three municipalities in the study), Iwate Prefecture (Table 2). The following materials were used to calculate the SMRs, with Japan serving as the standard population: (1) sex- and age-specific populations in each municipality were from the population census data for 1980, 1985, 1990, 1995 and 2000; (2) sex- and age-specific death rates from suicide in Japan from 1982 to 2000 were from the Vital Statistics, and (3) the numbers of suicide deaths in each municipality from 1982 through 2000 were from the Health and Welfare Statistical Annual of Iwate Prefecture. The SMRs of all municipalities in the Kuji District were higher than those of all municipalities in the Miyako District, both in men and in women. Based on the SMRs of each municipality, we classified the seven municipalities for the study into three groups: low SMR group, middle SMR group, and high SMR group. We adopted different classifications for men and women.

Response rates of the questionnaire survey, calculated for this classification, were 75.6% (646/854) in the low SMR group, 77.3% (1,064/1,377) in the middle SMR group, and 73.1% (892/1,221) in the high SMR group in men, and 82.4% (1,504/1,825) in the low SMR group, 80.1% (867/1,082) in the middle SMR group, and 73.9% (574/777) in the high SMR group in women.

In Table 3, we compared mean age, age-adjusted SDS score, and age-adjusted prevalence of psychosocial factors and lifestyles among the three groups of municipalities classified on the basis of the SMRs from suicide. The difference in mean ages was marginally significant in men (p=0.066) and significant in women (p<0.001). Mean age was the highest in the low SMR group in women. The difference in mean SDS score was not significant in men but was significant in women (p=0.001). The score was the lowest in the low SMR group and the highest in the high SMR group in women.

Among psychosocial factors, the percentage of those with an education of nine years or less was the highest in the high SMR group both in men and in women. The percentage of those who lived alone was the highest in the high SMR group in women, although no significant difference was observed in men. The percentages of those who were very dissatisfied with their financial situation and those who never participated in community activities were also significantly different in men, but the percentage was the highest in the low SMR group. For lifestyles, the percentage of those who drank alcohol once a week or more was the highest in the high SMR group in men, although no significant difference was observed in women. The percentage of those who were current smokers was the highest in the middle SMR group in women. These results were not materially changed when district was taken into account in the analyses.

In Table 4, we compared age-adjusted prevalence of knowledge of and attitudes toward suicide and depression among the three groups. As for knowledge of suicide and depression, the percentages of those unaware that the suicide mortality rate is higher in the region were significantly different both in men and in women and the associations were negative: the percentage was higher in the low SMR group and lower in the high SMR group. The percentages of those unaware of the location of a psychiatric hospital were significantly different both in men and in women, but the percentage was the highest in the low SMR group in men and in the high SMR group in women. The percentages of those unaware of mental health activities by local governments were significantly different in men, and the percentage was the highest in the middle SMR group. Apart from the comparison among the three groups, the percentages of men and women who had no knowledge were higher than 75% in terms of both "no awareness that the suicide mortality rate is higher in the region (88.1% in men and 84.5% in women)" and "no knowledge of depressive states being treatable by medication (79.5% in men and 76.3% in women)."

As for attitudes toward suicide and depression, the percentage of those with the view that suicide is permissible was the highest in the high SMR group in women, although no significant difference was observed in men. The percentages of those unwilling to see a psychiatrist when depressed and those with the view that suicide is preventable by community efforts were significantly different in men, but the percentage was the highest in the low SMR group. Apart from the comparison among the three groups, the percentages of men and women unwilling to see a psychiatrist when depressed were as high as 60% in men and 50% in women. These results were not materially changed when district was taken into account in the analyses.
### Table 3. A sex-based comparison of mean age and age-adjusted Self-Rating Depression Scale (SDS) score, and age-adjusted prevalence (%) of psychosocial factors and lifestyles by three groups of municipalities according to the standardized mortality ratio (SMR) from suicide.

|                  | Men                  | Women                |
|------------------|----------------------|----------------------|
|                  | Total | Low SMR | Middle SMR | High SMR | p \( ^* \) | Total | Low SMR | Middle SMR | High SMR | p \( ^* \) |
| Age (mean ± standard deviation, year) | 51.9 ± 16.0 | 50.9 ± 15.7 | 52.7 ± 16.0 | 51.7 ± 16.0 | 0.066 | 52.8 ± 16.1 | 54.2 ± 16.1 | 50.5 ± 15.8 | 52.7 ± 16.1 | <0.001 |
| Self-Rating Depression Scale score (mean ± standard error) | 38.2 ± 7.6 | 37.9 ± 0.3 | 38.6 ± 0.2 | 38.1 ± 0.3 | 0.166 | 40.3 ± 7.9 | 39.8 ± 0.2 | 40.6 ± 0.3 | 41.2 ± 0.3 | 0.001 |
| Psychosocial factors |       |         |           |           |       |       |         |           |           |       |
| Not married (n=5,399) | 26.6  | 25.2   | 28.4   | 25.1   | 0.182 | 29.1  | 29.7   | 27.6   | 30.6   | 0.359 |
| Education of 9 years or less (n=5,493) | 46.4  | 48.2   | 43.3   | 48.9   | 0.015 | 51.9  | 51.1   | 49.9   | 57.7   | <0.001 |
| Very dissatisfied with financial situation (n=5,505) | 20.2  | 23.8   | 19.3   | 18.3   | 0.020 | 15.9  | 15.1   | 16.4   | 16.4   | 0.548 |
| Living alone (n=5,514) | 8.9   | 8.8    | 9.8    | 7.9    | 0.378 | 9.6   | 10.1   | 7.3    | 11.8   | 0.004 |
| Lacking the chance to visit friends or relatives (n=5,518) | 22.3  | 20.0   | 24.0   | 21.9   | 0.159 | 15.8  | 15.5   | 16.1   | 16.9   | 0.668 |
| Having no confidant among friends or relatives when depressed (n=5,518) | 14.6  | 14.1   | 14.9   | 14.7   | 0.879 | 8.5   | 8.5    | 8.1    | 9.2    | 0.756 |
| Lacking participation in community activities (n=5,525) | 16.1  | 20.6   | 16.3   | 13.0   | <0.001 | 16.3  | 15.5   | 17.0   | 16.8   | 0.497 |
| Lifestyles |       |         |           |           |       |       |         |           |           |       |
| Currently smoke (n=5,523) | 48.8  | 47.9   | 49.2   | 48.2   | 0.850 | 8.7   | 8.2    | 10.9   | 6.3    | 0.004 |
| Drink alcohol once a week or more (n=5,504) | 58.8  | 59.5   | 55.0   | 62.8   | 0.002 | 13.5  | 13.1   | 13.2   | 14.0   | 0.913 |
| Sedentary (n=5,483) | 57.7  | 58.0   | 56.9   | 58.1   | 0.843 | 60.5  | 59.9   | 60.9   | 61.1   | 0.757 |

* : P-values for continuous data are by analysis of (co-)variance and those for categorical data are by likelihood ratio test using logistic regression analysis.

### Table 4. A sex-based comparison of age-adjusted prevalence (%) of knowledge of and attitudes toward suicide and depression by three groups of municipalities according to the standardized mortality ratio (SMR) from suicide.

|                  | Men                  | Women                |
|------------------|----------------------|----------------------|
|                  | Total | Low SMR | Middle SMR | High SMR | p \( ^* \) | Total | Low SMR | Middle SMR | High SMR | p \( ^* \) |
| Knowledge |       |         |           |           |       |       |         |           |           |       |
| No awareness that the suicide mortality rate is higher in the region (n=5,434) | 88.1  | 92.3   | 87.2   | 84.5   | <0.001 | 84.5  | 86.2   | 85.3   | 79.2   | <0.001 |
| No knowledge of depressive states being treatable by medication (n=5,479) | 79.5  | 81.5   | 79.0   | 79.0   | 0.354 | 76.3  | 77.3   | 74.1   | 77.4   | 0.195 |
| No knowledge of the location of a psychiatric hospital (n=5,513) | 18.2  | 21.8   | 17.9   | 16.2   | 0.021 | 17.3  | 21.1   | 6.3    | 24.3   | <0.001 |
| No awareness of mental health activities by local governments (n=5,470) | 70.4  | 69.3   | 73.6   | 66.8   | 0.004 | 66.8  | 67.1   | 65.9   | 66.6   | 0.913 |
| Attitudes |       |         |           |           |       |       |         |           |           |       |
| A view of suicide as being permissible (n=5,520) | 16.2  | 15.2   | 16.1   | 17.0   | 0.589 | 13.0  | 13.6   | 9.8    | 15.8   | 0.004 |
| Unwillingness to see a psychiatrist when depressed (n=5,515) | 59.8  | 63.8   | 59.4   | 57.1   | 0.019 | 49.4  | 50.8   | 48.6   | 46.5   | 0.203 |
| A view of suicide as being unpreventable by community efforts (n=5,547) | 63.8  | 67.3   | 64.8   | 60.3   | 0.017 | 64.3  | 63.8   | 65.7   | 63.5   | 0.684 |

* : P-values are by likelihood ratio test using logistic regression analysis.
The characteristics of our study involve the subjects; they make up a large random sample of residents in municipalities with high suicide rates in Japan. We examined psychosocial factors, lifestyles, and knowledge of and attitudes toward suicide and depression. Although a significant difference in SDS score was observed in women, most of the psychosocial factors or knowledge of and attitudes toward suicide and depression were not adversely associated with SMR group. The results shown by Nohara et al. could explain why SDS scores were significantly different among the three SMR groups only in women. Because women are more affected by factors related to medical services than those related to socioeconomic disadvantage, it seems that depression and suicide are more directly associated in women than in men. Qin et al. showed similar findings in a time-matched nested case-control study in Denmark, namely that a history of psychiatric hospitalization made the increased suicide risk higher in females than in males, and that socioeconomic variables such as unemployment, retirement, and single marital status were significant risk factors for men after controlling for psychiatric admission. Our survey was cross-sectional, however, and it is therefore possible that higher suicide mortality in a certain area affected the emotions of women more than did lower suicide mortality.

There are three possible reasons for the lack of adverse associations. Firstly, as Nohara et al. reported, higher rates of suicide in the three SMR groups in men. Because women are more affected by factors related to medical services than those related to socioeconomic disadvantage, it seems that depression and suicide are more directly associated in women than in men. Qin et al. showed similar findings in a time-matched nested case-control study in Denmark, namely that a history of psychiatric hospitalization made the increased suicide risk higher in females than in males, and that socioeconomic variables such as unemployment, retirement, and single marital status were significant risk factors for men after controlling for psychiatric admission. Our survey was cross-sectional, however, and it is therefore possible that higher suicide mortality in a certain area affected the emotions of women more than did lower suicide mortality.

There are three possible reasons for the lack of adverse associations. Firstly, as Nohara et al. reported, higher rates of suicide in the three SMR groups in men. Because women are more affected by factors related to medical services than those related to socioeconomic disadvantage, it seems that depression and suicide are more directly associated in women than in men. Qin et al. showed similar findings in a time-matched nested case-control study in Denmark, namely that a history of psychiatric hospitalization made the increased suicide risk higher in females than in males, and that socioeconomic variables such as unemployment, retirement, and single marital status were significant risk factors for men after controlling for psychiatric admission. Our survey was cross-sectional, however, and it is therefore possible that higher suicide mortality in a certain area affected the emotions of women more than did lower suicide mortality.

There are three possible reasons for the lack of adverse associations. Firstly, as Nohara et al. reported, higher rates of suicide in the three SMR groups in men. Because women are more affected by factors related to medical services than those related to socioeconomic disadvantage, it seems that depression and suicide are more directly associated in women than in men. Qin et al. showed similar findings in a time-matched nested case-control study in Denmark, namely that a history of psychiatric hospitalization made the increased suicide risk higher in females than in males, and that socioeconomic variables such as unemployment, retirement, and single marital status were significant risk factors for men after controlling for psychiatric admission. Our survey was cross-sectional, however, and it is therefore possible that higher suicide mortality in a certain area affected the emotions of women more than did lower suicide mortality.

There are three possible reasons for the lack of adverse associations. Firstly, as Nohara et al. reported, higher rates of suicide in the three SMR groups in men. Because women are more affected by factors related to medical services than those related to socioeconomic disadvantage, it seems that depression and suicide are more directly associated in women than in men. Qin et al. showed similar findings in a time-matched nested case-control study in Denmark, namely that a history of psychiatric hospitalization made the increased suicide risk higher in females than in males, and that socioeconomic variables such as unemployment, retirement, and single marital status were significant risk factors for men after controlling for psychiatric admission. Our survey was cross-sectional, however, and it is therefore possible that higher suicide mortality in a certain area affected the emotions of women more than did lower suicide mortality.

There are three possible reasons for the lack of adverse associations. Firstly, as Nohara et al. reported, higher rates of suicide in the three SMR groups in men. Because women are more affected by factors related to medical services than those related to socioeconomic disadvantage, it seems that depression and suicide are more directly associated in women than in men. Qin et al. showed similar findings in a time-matched nested case-control study in Denmark, namely that a history of psychiatric hospitalization made the increased suicide risk higher in females than in males, and that socioeconomic variables such as unemployment, retirement, and single marital status were significant risk factors for men after controlling for psychiatric admission. Our survey was cross-sectional, however, and it is therefore possible that higher suicide mortality in a certain area affected the emotions of women more than did lower suicide mortality.

There are three possible reasons for the lack of adverse associations. Firstly, as Nohara et al. reported, higher rates of suicide in the three SMR groups in men. Because women are more affected by factors related to medical services than those related to socioeconomic disadvantage, it seems that depression and suicide are more directly associated in women than in men. Qin et al. showed similar findings in a time-matched nested case-control study in Denmark, namely that a history of psychiatric hospitalization made the increased suicide risk higher in females than in males, and that socioeconomic variables such as unemployment, retirement, and single marital status were significant risk factors for men after controlling for psychiatric admission. Our survey was cross-sectional, however, and it is therefore possible that higher suicide mortality in a certain area affected the emotions of women more than did lower suicide mortality.
through 1997, the proportion of participants who considered antidepressants to be ineffective for depression was 54%, a number that was reduced to 40% after the six-year intervention.\textsuperscript{13} In a 1991 Irish report, 27% of the nationally representative sample regarded antidepressants as ineffective.\textsuperscript{12} In our study, more than 70% of the subjects did not know that depressive states are treatable by medication. In addition, half of our sample answered that they were not willing to see a psychiatrist when depressed (59.8% of men and 49.4% of women). Patients in Japan with depressive symptoms tend to visit primary care physicians who are less likely to diagnose depression or prescribe antidepressants.\textsuperscript{27,28} Efforts should therefore be made to encourage residents to visit psychiatrists. Providing residents with sufficient information on depression might result in an increase in consultations with psychiatrists for depression, since in our study the subjects who knew that depressive states are treatable by medication were significantly more likely to visit a psychiatrist when depressed than those who did not know (25.1% vs. 13.9%).

Psychiatric care is restricted in the region. The municipality with the largest population in each of the two districts, the Kuji District and the Miyako District, has psychiatric hospitals or clinics, but the other municipalities lack even the smaller psychiatric clinics. Knowledge of the location of a psychiatric hospital seems to have been largely affected by the location of subject residence. Provision of psychiatric care cannot be expected to increase immediately, but mental health literacy of the residents could be improved in the short term. We will conduct the first community intervention trial for suicide prevention with a control group in Japan. Our sample was randomly drawn from the intervention and control areas, and the sample size was large enough to detect changes in knowledge about whether depressive states are treatable by medication. The evaluation questionnaire survey is scheduled for 2004, only two years after the baseline survey, due to budget constraints. However, we plan to monitor changes in suicide rates for at least five years both in the intervention area and in the control area.

There may be three limitations in our study. The first limitation is the lower response rate in the younger age groups. We sent reminder letters twice to non-respondents. We sent respondents a gift certificate or gift worth 500 yen. We also asked respondents for missing information. We thus expended considerable effort to improve response rates. The second limitation is that subjects were drawn from discrete age strata in one of the municipalities. This might have affected the age distribution of the subjects. However, we only compared the prevalence of the variables by three age groups, and it is unlikely that the discrete sampling in the one municipality distorted the results. The third limitation is that the municipality with the largest population in the Miyako District was not included in the study. The municipality was characterized by rather low SMRs from suicide: 1.27 in men and 1.12 in women. If knowledge of and attitudes toward suicide and depression in this municipality had been surveyed, a clear contrast between urban and rural areas might have become apparent.

In conclusion, although a significant difference of SDS score was observed in women, most of the psychosocial factors or knowledge of and attitudes toward suicide and depression were not adversely associated with SMR group. It was evident that levels of knowledge about suicide and depression were rather low both in men and in women. Based on the results, we will intervene in these municipalities for suicide prevention.

References

1. World Health Organization. World Health Statistics Annual 1997-99. WHO, Geneva, 2000.
2. Statistics and Information Department, Minister's Secretariat, Ministry of Health, Labour and Welfare. Vital Statistics of Japan. Health and Welfare Statistics Association. Tokyo (in Japanese).
3. Lamar J. Suicides in Japan reach a record high. BMJ 2000; 321: 528.
4. Fujita T, Tanihata T, Miura Y. Geographical characteristics of the steep increase of suicide deaths since 1998. Kosei No Shiyo 2003; 50(9): 27-34. (in Japanese)
5. Nohara M, Onoda T, Okayama A. Regional accumulation of suicide and its related factors. Kosei No Shiyo 2003; 50 (6): 17-23. (in Japanese)
6. Aihara H, Iki M. An ecological study of the relations between the recent high suicide rates and economic and demographic factors in Japan. J Epidemiol 2003; 13: 56-61.
7. Harris EC, Barracough B. Suicide as an outcome for mental disorders. A meta-analysis. Br J Psychiatry 1997; 170: 205-28.
8. Fujita T, Kurisu E. Suicide deaths among psychiatric patients--a study based on vital statistics. Nippon Koshu Eisei Zasshi 1992; 39: 858-64. (in Japanese)
9. Tamakoshi A, Ohno Y, Yamada T, Aoki K, Hamajima N, Wada M, et al. Depressive mood and suicide among middle-aged workers: findings from a prospective cohort study in Nagoya, Japan. J Epidemiol 2000; 10: 173-8.
10. Takahashi Y, Hirasawa H, Koyama K, Asakawa O, Kido M, Onose H, et al. Suicide and aging in Japan: an examination of treated elderly suicide attempters. Int Psychogeriatr 1995; 7: 239-51.
11. Jorm AF. Mental health literacy. Public knowledge and beliefs about mental disorders. Br J Psychiatry 2000; 177: 396-401.
12. McKeon P, Carrick S. Public attitudes to depression: a national survey. Ir J Psychol Med 1991; 8: 116-21.
13. Paykel ES, Hart D, Priest RG. Changes in public attitudes to depression during the Defeat Depression Campaign. Br J Psychiatry 1998; 173: 519-22.
14. Chida F, Okayama A, Nishi N, Sakai A. Factor analysis of Zung Scale scores in Japanese general population. Psychiatry Clin Neurosci 2004; 58: 420-426.
15. Zung WWK. A self-rating depression scale. Arch Gen
16. Kahn HA, Sembros CT, Statistical methods in epidemiology, Oxford University Press, New York, 98-102.1989.
17. Statistics Bureau. Population Census of Japan. Ministry of Public Management, Home Affairs, Posts and Telecommunications (formerly Management and Coordination Agency). 1980, 1985, 1990, 1995, and 2000. (in Japanese)
18. Department of Health and Welfare of Iwate Prefecture, Annual Health Statistics, Iwate. 1982-2000. (in Japanese)
19. Dupont WD, Statistical modeling for biomedical researchers: a simple introduction to the analysis of complex data, Cambridge University Press, Cambridge, 115-8.2002.
20. Qin P, Agerbo E, Westergard-Nielsen N, Eriksson T, Mortensen PB. Gender differences in risk factors for suicide in Denmark. Br J Psychiatry 2000; 177: 546-50.
21. Blakely TA, Collings SCD, Atkinson J. Unemployment and suicide: Evidence for a causal association? J Epidemiol Community Health 2003; 57: 594-600.
22. Hemenway D, Solnick SJ, Colditz GA. Smoking and suicide among nurses. Am J Public Health 1993; 83: 249-51.
23. Miller M, Hemenway D, Rimm E. Cigarettes and suicide: a prospective study of 50000 men. Am J Public Health 2000; 90: 768-73.
24. Caces F, Harford T. Time series analysis of alcohol consumption and suicide mortality in the United States, 1934-1987. J Stud Alcohol 1998; 59: 455-61.
25. Brown DR, Blanton CJ. Physical activity, sports participation, and suicidal behavior among college students. Med Sci Sports Exerc 2002;34;1087-96.
26. Sobue T, Yamamoto S, Watanabe S. Smoking and drinking habits among the JPHC Study participants at baseline survey. Japan Public Health Center-based Prospective Study on Cancer and Cardiovascular Diseases. J Epidemiol 2001; 11 (Suppl): S44-S56.
27. Mino Y, Aoyama H, Froom J. Depressive disorders in Japanese primary care patients. Fam Pract 1994; 11: 363-7.
28. Kageyama T, Kabuto M, Nitta H, Kurokawa Y, Taira K, Suzuki S, et al. Prevalence of use of medically prescribed hypnotics among adult Japanese women in urban residential areas. Psychiatry Clin Neurosci 1998; 52: 69-74.