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# A Review of the Literature on Rural Suicide

## Risk and Protective Factors, Incidence, and Prevention

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**Abstract.** *Background.* Suicide is a major cause of mortality worldwide. Differences in rates of suicide exist between urban and rural areas; however, little rigorous research has examined the phenomena of rural suicide. *Objective.* This review examines the current body of literature on rural suicide and investigates differences between rural and urban suicide, including socioeconomic, psychological, and cultural variables. Prevention and intervention strategies specific to rural communities are discussed. *Description of studies.* All empirical and epidemiological studies of rural suicide were included in the review regardless of study design or methodology. *Results.* Although findings are mixed, research and epidemiological data indicate that suicide is a public health concern in rural areas, with suicide rates often greater than in urban areas. *Discussion.* Rural locale may create geographic, psychological, and sociocultural barriers to treatment of suicide. A better understanding of the role of rurality in the development and maintenance of suicidal thoughts and behaviors is needed and may inform prevention and intervention efforts.

**Keywords:** rural suicide, rural suicide prevention and intervention

### Introduction

Suicide is a major cause of mortality worldwide (WHO, 2003). Rates of suicide are often higher in rural than urban areas (Stack, 1982), although not all studies have come to this conclusion. In addition, much of the suicide research to date has utilized urban community participants and patients, resulting in an understanding of suicide that is of reduced application to rural individuals (Beeson, 2000). It is, therefore, important to examine the phenomenon of suicide as it relates to the unique geographic, socioeconomic and political, and cultural characteristics of rural areas.

### Method

#### Selection Criteria

All identified empirical studies were included in the review regardless of study design or methodology, including epidemiological and participant-based research studies.

### Search Strategy for Identification of Studies

All studies that focused on rural suicide, differences between rural and urban suicide, and individual-level studies focused on rural populations were eligible for inclusion. The search for eligible studies was completed through an electronic search of bibliographic databases. The following electronic databases were searched: MEDLINE (1966 – March 2006) and PsycInfo (1967 – March 2006). Recent abstracts, conferences, and cited references from retrieved articles were hand searched. Search strategies were developed using combinations of the following keywords/index terms: rural, frontier, urban, suicide, suicide ideation, suicide attempt, and completed suicide. There was no language restriction. Retrievals were reviewed by title and abstract to identify studies appearing to qualify for the review, and final decision for inclusion was based on the full report.

### Results

In the United States, rural suicide rates (17.9/100,000) have surpassed those of urban areas (14.9/100,000) over the last

two decades (Beeson, 2000; NCHS, 2001; Wagenfeld et al., 1993). According to national mortality data, increasing rurality and remoteness and living in agricultural communities are significantly associated with greater suicide rates for both adults and adolescents (Goldcamp, Hendricks, & Myers, 2004; Gunderson et al., 1993; Peek-Asa, Zwerling, & Stallones, 2004; Pratt, 1990; Saftlass, Blair, Cantor, Hanrahan, & Anderson, 1987; Singh & Siahpush, 2002; Stallones & Cook, 1992). Differences in urban and rural suicide rates have also been found at the state level, including Wyoming, a rural and frontier state, which had an average yearly suicide rate (18/100,000) significantly higher than the national rate (11/100,000), between 1960–1975 (Pasevark & Fler, 1993), as well as Alaska (NCHS, 2001), California (Bridges & Clark, 2004), New Mexico (Morgan & Morgan, 1997), New York (Mandelman, 1999), Virginia (Dembling & Merkel, 2003), and Vermont (Rogers et al., 2005). Several studies found rural rates to be lower than those in urban areas (Alexander, Gibbs, Massey, & Altekruze, 1982; Gausche et al., 1989; McAlpine, Panser, Swanson, O'Fallon, & Melton, 1990; Schorr, Crabtree, Wagner, & Wetterau, 1989).

In Canada, epidemiological data indicates that as community size decreases the suicide rate increases (Agbayewa, 1993; Pickett, King, Faelker, & Bienefeld, 1999; Thompson, 1987). Rural and frontier areas of Canada have a suicide rate of 41 per 100,000 compared to Canada's overall rate of 13 per 100,000 (Statistics Canada, 2002). Gender differences are also important; elderly males in rural Canada have higher rates of suicide than elderly females (Quan & Arboleda-Florez, 1999). Suicide rates in rural farming communities are also higher than the national average (Morrison, Semenciw, Morison, & Mao, 1995; Pickett et al., 1999), and residents of Canadian Indian Reserves and registered Indians living in rural areas are at increased risk for suicide (Mao, Moloughney, Semenciw, & Morrison, 1992). In the Western Arctic, the suicide rate for males is 32 per 100,000 and 17 per 100,000 for females, and when largely Aboriginal regions are included suicide rates increase dramatically to 69 per 100,000 (Nunavut) and 99 per 100,000 (Nunavik) (Allard, Wilkins, & Berthelot, 2004; Royal Commission on Aboriginal Peoples, 1996; Statistics Canada, 2002).

In Australia and New Zealand, several studies indicate rural-urban differences in suicide rates (Dudley, Waters, Kelk, & Howard, 1992; Ferguson, Blakely, Allan, & Collings, 2004; Page & Fragar, 2002; Taylor, Page, Morrell, Harrison, & Carter, 2005), with few exceptions (Cantor & Coory, 1993; Hassan, 1995). In Australia, there were no significant increases in metropolitan suicide rates over a 20-year period, while rates in rural communities doubled and rates for youths in rural municipalities/shires increased five-fold (Dudley et al., 1992). Age and male gender are significant risk factors in both countries (Dudley, Kelk, Florio, Howard, & Waters, 1998; Morrell, Taylor, Slaytor, & Ford, 1999; Yip, Callanan, & Yuen, 2000); both young (15–24 years old) and older (55+) rural people are 30–50%

more likely to commit suicide than their urban counterparts (Baume & Clinton, 1997; Patton & Burns, 1997). In Australia, in 1995, the suicide rate for rural youth was 33.9 per 100,000 compared to 23.6 per 100,000 for urban adolescents (Dudley & Florio, 2002). Indigenous individuals are also often at increased risk for suicide. In New Zealand, the 2001 suicide rates for Māori males (20.7/100,000) and females (6.8/100,000) were higher than those of non-Māori males (17.7/100,000) and females (4.9/100,000) (Beautrais, 2003; New Zealand Health Information Service, 2001). Rates of suicide for Australian aboriginals were also higher than national averages between 1981 and 1988 (Clayer & Czechowicz, 1991).

In Asia, rural adolescents, older adults, and females are at increased risk for suicide (Lester, 1990; Liu, Tein, Zhao, & Sandler, 2005; Phillips, Li, & Zhang, 2002; Pritchard, 1996; Yang, Zhou, Huang, & Chen, 2004; Yip, 2001), although recent data (1991–2000) suggests that the suicide rate for rural females has decreased (Yip, Liu, Hu, & Song, 2005). Some studies have also found urban rates of suicide to be higher than rural rates (Hu, Liu, Huo, & Zhang, 1992). Rural suicide rates in Japan increased in the 1970's and 1980's with some tapering off after 1985 (Araki & Murata, 1986; Goto, Nakamura, & Miyoshi, 1994; Watanabe, Hasegawa, & Yoshinaga, 2005). In Japan's rural Akita prefecture, suicide rates (42 per 100,000) are nearly double that of the general population (23.8 per 100,000) (Motohashi, Kaneko, & Sasaki, 2005), and older adults in rural Higashikubiki and Hyogo had higher rates than urban counterparts (Ajiki, Fukunaga, Saijoh, & Sumino, 1991; Kurosu, 1991; Watanabe et al., 2005). In China, suicide is the leading cause of death in rural areas, with rates 2 to 5 times greater than urban areas (Cao, Wu, An, & Li, 2000; Ji, Kleinman, & Becker, 2001; Phillips, Li, et al., 2002; Qin & Mortensen, 2001; Yan et al., 2000; Yang et al., 2004; Zhao, Qu, Peng, & Peng, 1994).

In the United Kingdom, rural males, females between the ages of 15 and 24 or over 45 years old, and farmers are at-risk for increased suicide (Ashford & Lawrence, 1976; Hawton et al., 1999; Hill, Pritchard, Laugharne, & Gunnell, 2005; Kelly, Charlton, & Jenkins, 1995; Klaber, 2006; Levin & Leyland, 2005; Middleton, Gunnell, Frankel, Whitley, & Dorling, 2003; Saunderson, Haynes, & Langford, 1998; Stark et al., 2004). Rural males in Scotland had a greater rate of suicide (16.4/100,000) than urban counterparts (11.3/100,000) (Crombie, 1991; Obafunwa & Busuttil, 1994). In Northern Ireland, rates of rural suicide increased between 1976 and 1996 (Kelly, Weir, Rafferty, & Galloway, 2000), and between 1982 and 1994 suicide rates for agricultural sectors of this country were higher than the national rate (Daeid, 1997). There have been some dissenting findings, however (Bancroft, Skrimshire, Reynolds, Simkin, & Smith, 1975).

Higher rates of rural suicide have also been documented elsewhere in Europe, including Belarus (Kondrichin & Lester, 1991), Estonia (Varnik & Wasserman, 1992), Germany (Otto & Spate, 1975), Hungary (Jegesy, Harsanyi, &

Angyal, 1995), Latvia (Rancans, Salander Renberg, & Jacobsson, 2001), Lithuania (Gailiene, 2004; Kalediene & Petrauskiene, 2004; Kalediene, Starkuviene, & Petrauskiene, 2004; Petrauskiene, Kalediene, & Starkuviene, 2004), Sweden (Lindqvist & Johansson, 2000), and the Ukraine (Kryzhanovskaya & Pilyagina, 1999; Mokhovikov & Donets, 1996). In Finland, rural suicide rates for men increased in the 1980's and 1990's (Pesonen, Tacke, Karkola, Hintikka, & Lehtonen, 2004); age adjusted suicide rates for males were between 65–67 per 100,000 (Pesonen et al., 2001). Men in rural areas of Poland and Greece have higher suicide rates than women (Beratis, 1986; Vougiouklakis, Boumba, Mitselou, Peschos, & Gerontopoulos, 2005), and older males in rural Greece had higher suicide rates than urban males (Pecyna, 1993). In the Republic of Ireland, urban-rural differences in suicide rates exist (Clarke, Bannon, & Denihan, 2003; Kirwan, 1991) and, between 1980 and 1990, rural male suicide rates rose by 50% with no corresponding increase for urban counterparts. Suicide rates for rural females in the Republic of Ireland and Norway have also risen steadily (Kelleher, Corcoran, & Keeley, 1997; Kelleher, Taylor, & Rickert, 1992; Rynestad, 1992).

Worldwide, several other countries have increased rates of suicide for rural individuals, although some conflicting results have been found (Batt, Tron, Depoivre, & Trehony, 1919; Bopp & Gutzwiller, 1999; Gutierrez Garcia, 1998; Micciolo, Williams, Zimmermann-Tansella, & Tansella, 1991). Rural women in Bangladesh have higher rates than urban counterparts (Ahmed, van Ginneken, Razzaque, & Alam, 2004), older men and younger women are at greater risk in rural India (Aaron et al., 2004; Joseph et al., 2003), and rates of suicide are rising in rural Spain and South Africa (Garenne, Kahn, Tollman, & Gear, 2000; Roca De Togoies, Rubio, Sanchez, Rodriguez, & Villar, 2002).

### Suicide Risk Factors for Rural Residents

There are numerous aspects of rural life, such as cultural ideals, geographic and interpersonal isolation, and economic and sociopolitical distress that may contribute to increased rates of suicide. The following section reviews the literature on potential risk factors for suicide in rural areas.

#### Rural Life and Culture

The agricultural communities that comprise many rural areas often necessitate a challenging and strenuous lifestyle (e.g., caring for crops and animals, working long days and nights, and weather concerns) that can contribute to rural suicides (Dyer, 1997; Gunderson et al., 1993; Thu et al., 1989). Psychological difficulties, including suicidal thoughts and behaviors, may be neglected because of the requirements of rural existence (e.g., the need to continue working) (Crawford & Brown, 2002).

Rural ideology often promotes a strong work ethic, independence or rugged individualism, religiosity and patriotism, and a focus on family and community-oriented life (Buckwalter, Smith, & Castor, 1994; Eckersley, 2002; Hefernan, 1999; Scott, Ciarrochi, & Deane, 2003). From such a perspective, mental disorders are often stigmatized (Hoyt, Conger, Valde, & Weihs, 1997; Humes-Noyes, 1980), deterring rural persons from seeking treatment (Ciarlo, Wackwitz, Wagenfeld, Mohatt, & Selarney, 1996; Crawford & Brown, 2002). Even when mental health services are available, rural individuals have lower rates of service utilization than their urban counterparts and may turn to physicians or religious leaders instead (Holzer & Ciarlo, 2000; Meystadt, 1984). Cultural differences may also influence reporting practices (Dudley et al., 1998); deaths are less likely to be classified as a suicide in rural areas (Beeson, 2000; Saunderson et al., 1998).

Commonplace and culturally accepted rural elements, such as firearms and pesticides, may contribute to suicide through increased lethality. In the United States and Canada, the risk of suicide by firearm is greater in rural than urban areas (Branas, Nance, Elliott, Richmond, & Schwab, 2004; CFC, 1999; Dembling & Merkel, 2003; Dresang, 2001; Pasewark & Fleer, 1993; Pickett et al., 1999; Sadowski & Munoz, 1996; Svenson, Spurlock, & Nypaver, 1996). For instance, 91% of firearm fatalities in rural Wisconsin, U.S., were suicides, whereas only 20% of urban firearm fatalities were suicides (Hargarten, Karlson, O'Brien, Hancock, & Quebbeman, 1996). Thirty-six percent of rural residents and farmers in England and Wales used firearms to commit suicide, compared to only 5% of the general population (Klaber, 2006; Malmberg, Hawton, & Simkin, 1997). In Australia, 75% of male suicides in rural cities, municipalities, and shires involved a firearm, and rates of suicide by firearm increased five-fold for rural dwellers with no corresponding increase for urban dwellers (Burnley, 1995; Dudley et al., 1992; Snowdon & Harris, 1992).

Pesticide self-poisoning is a largely rural phenomenon and the most common method of rural suicide (WHO in collaboration with UNEP, 1990). Approximately 2/3 of all acute pesticide poisonings in rural areas are suicidal acts (Jeyaratnam, 1990), resulting in an estimated 2,000,000 cases of intentional pesticide poisoning and over 220,000 deaths annually (WHO, 2003). Rural suicides involving pesticides are documented in Australia, Brazil, Canada, China, Fiji, Greece, Hungary, India, Japan, Malaysia, Mexico, Nepal, South Africa, Sri Lanka, Thailand, and Trinidad (Desapriya, Joshi, Han, & Rajabali, 2004; Duran-Nah & Colli-Quintal, 2000; Eddleston, 2000; Garenne et al., 2000; Hatzitolios et al., 2001; Hutchinson et al., 1999; Karki, Hansdak, Bhandari, Shukla, & Koirala, 2001; Li, Chen, Zhou, & Wu, 2004; Lotrakul, 2005; Morris & Maniam, 2000; Nagami et al., 2005; Page & Fragar, 2002; Paldy, Puskas, & Farkas, 1988; Phillips, Yang, et al., 2002; Pickett et al., 1998; Pires, Caldas, & Recena, 2005; van der Hoek & Konradson, 2005). Further, chronic exposure to pesticides may also affect serotonin levels, increasing proclivity

toward depression and suicide (Beeson, 2000); workers exposed to organophosphate pesticides or DDT have higher levels of tension, anger, depression, and anxiety (de Joode et al., 2001; Levin, Rodnitzky, & Mick, 1976; London, Flisher, Wesseling, Mergler, & Kromhout, 2005; Steenland et al., 1994; Stokes, Stark, Marshall, & Narang, 1995).

### Geographic and Interpersonal Isolation

By definition, rural areas have decreased population density and encompass wide geographic areas, resulting in expanses of land that are sparsely populated and potentially isolating (United States Department of Agriculture, 2003). Further, the gradual depopulation of rural areas has resulted in a loss of primary relationships, culture, and sense of community, as well as loneliness, for many rural residents (Gerrard, 2003), which are, in turn, associated with suicide (Dorling & Gunnell, 2003; Renwick, Olsen, & Tyrrell, 1982; Shajahan & Cavanagh, 1998). Geographic and social isolation may also limit availability of social support in times of crisis (Quevillon & Trenerry, 1983; Wilkinson & Israel, 1984). For instance, rural suicides are more likely to have lacked a close intimate relationship than urban suicides (Isometsa et al., 1997; Turvey, Stromquist, Kelly, Zwerling, & Merchant, 2002).

Due to geographic constraints, rural areas often suffer from a shortage of clinics, hospitals, and professionals and have difficulty recruiting new service providers (Gibbons, Hur, Bhaumik, & Mann, 2005; Hartley, Bird, & Dempsey, 1999; Jianlin, 2000; Lambert & Agger, 1995; Rowley, 1995; Wagenfeld, 2000). Mental health organizations that do exist are often under-funded and staffed with less qualified personnel than comparable urban organizations (Bogal-Allbritten & Daughaday, 1990), contributing to poor identification and treatment of rural individuals who are suicidal (Kessler et al., 1994).

### Economic and Sociopolitical Distress

Rural areas often suffer from social fragmentation, which may contribute to their higher rates of suicide (Durkheim, 1952; Kurosu, 1991; Lingren, 1995; Middleton et al., 2004). Work force migration, an aging population, and economic decline have eroded the infrastructure of rural communities, resulting in a loss of land and livelihood, political power and status, and personal control for many rural residents (Beeson, 2000; Center for Suicide Prevention, 2002; Klaber, 2006; Kreitman, Carstairs, & Duffy, 1991; Malmberg et al., 1997; McLoone, 1996; Pesonen et al., 2001; Saunderson & Langford, 1996; Turvey et al., 2002). Shortages of low-cost housing and public transportation, economic crises, and the reduction of community interactions also contribute to community deterioration and stress (Malmberg et al., 1997; Whitley, Gunnell, Dorling, & Smith, 1999). Of particular concern are the economic

downturns that are common sequelae of farming crises and which may be a more serious indicator of suicide than general levels of poverty (Turvey et al., 2002).

## Discussion

A growing body of research indicates that suicide is a public health concern in rural areas. Culturally based external (e.g., geographic isolation, demands of rural life, economic and political factors) and internal (e.g., adoption of rural ideals, subjectivity of interpersonal isolation) risk factors may moderate the relationship between traditional risk factors (e.g., gender, alcohol/substance abuse, depression) and suicidal thoughts and behaviors in vulnerable individuals (Judd, Cooper, Fraser, & Davis, 2006; Wilkinson & Israel, 1984; Zhang, Conwell, Zhou, & Jiang, 2004). This may also be an intergenerational process, involving meaningful personal relationships (Hirsch et al., 2006).

Economic, geographic, and cultural barriers in rural areas may preclude successful suicide prevention and intervention efforts. A lack of available services, excess driving time to keep appointments, nonexistent long-distance public transportation, and the requirements and culture of rural life may make it difficult or undesirable to seek out assistance in rural or frontier areas (Ciarlo et al., 1996). Frequent appointments for therapy and access to crisis intervention services may be both inconvenient and impractical (Kelleher et al., 1992); the outpatient therapeutic model effective in urban areas (e.g., a weekly, hour-long appointment) may not be appropriate for a rural area (Mulder & Chang, 1997). Further, a lack of awareness, negative attitudes toward help-seeking, and social stigma may contribute to reduced access of mental health services (Barry, Doherty, Hope, Sixsmith, & Kelleher, 2000; Roberts, Battaglia, & Epstein, 1999).

Policy guidelines and model programs for rural school and community-based service delivery and prevention efforts have been only minimally successful (Farie, Cowen, & Smith, 1986; Petti & Leviton, 1986). The most successful rural models appear to be community-based integrative prevention services and wrap-around services that incorporate the larger rural community (Monsey, Owen, Zieman, Lambert, & Hyman, 1995), suggesting that recruitment, engagement, and education of rural communities may result in better identification, prevention, and treatment of suicidal individuals (Mulder & Chang, 1997). For instance, in Japan, psycho-educational efforts about depression and reduction of stigma increased contact between suicidal individuals and health providers (Sakamoto, Tanaka, Neichi, & Ono, 2004) and reduced overall rates of suicide mortality (Oyama, Koida, Sakashita, & Kudo, 2004). In Australia, rural suicide is associated with a lack of service utilization, suggesting that efforts to educate rural residents about the benefits of mental health care may be an important prevention strategy (Aoun, 1999; Caldwell, Jorm, & Dear, 2004; Taylor et al., 2005). Improv-

ing accessibility and availability of mental health services in rural areas and encouraging collaboration between general practitioners and mental health professionals are also important goals (Center for Suicide Prevention, 2002), since many rural suicides visit their primary care physician in the week preceding death (Finkel & Rosman, 1995). As an example of the potential impact of such programs, a community-based intervention program implemented in a primary care setting in rural Japan was effective in reducing the suicide rate for females by 70% (Oyama, Goto, Fujita, Shibuya, & Sakashita, 2006).

The communal nature of rural communities is often overlooked as an intervention mechanism. Collectivistic family structures and strong community coalitions should be emphasized as potential protective factors (Gerrard, 2003), as well as nontraditional liaisons (e.g., establishing clergy and physicians as gate-keepers) (Lipschitz, 1995; Marshfield Clinic, 2003; Mulder & Chang, 1997). Establishment of both traditional and nontraditional health service delivery mechanisms is also important, including: telephone follow-ups, tele-mental health, crisis lines, computer-based telecommunications, traveling counselors, and social clubs and self-help groups (Agee, Blank, Fox, Burkett, & Pezzoli, 1997; Jong, 2004; LaMendola, 1997; Mishara & Daigle, 1997; Oyama et al., 2005; Ratnayake, 1998; Strawn, Hester, & Brown, 1998).

This review has revealed numerous limitations in the rural suicide literature. Many countries remain unrepresented in the literature; future research on rural suicide should incorporate these geographic locales. Operationalization of what constitutes "rural" and "urban" geographic areas often differs between studies (Kay & Hazell, 1999), and a more standardized approach to categorization is needed (e.g., US Department of Agriculture rural-urban categorization; Singh & Siahpush, 2002). Clarification of traditional risk factors for rural residents is also important; risk profiles for suicide and the manifestation of psychopathology differ between rural and urban areas (Mainous & Kohrs, 1995; Paykel, Abbott, Jenkins, Brugha, & Meltzer, 2000; Roberts et al., 1999) and cross-culturally (e.g., women have a higher rate of suicide in rural China; African Americans living in rural areas have lower rates of suicide) (Phillips, Yang, et al., 2002; Willis, Coombs, Drentea, & Cockerham, 2003). Certain subgroups within rural areas are at higher risk for suicide and require further investigation, including females, the elderly, indigenous peoples and ethnic and racial minorities, and unemployed and impoverished individuals (Braden & Beauregard, 1994; Kane & Ennis, 1996; Mansfield, Preson, & Crawford, 1988; Morgan & Morgan, 1997; NCHS, 1993; Wagenfeld et al., 1993). Such inconsistencies in classification, paired with the somewhat disparate findings both between rural and urban areas and within rural areas, suggests the need for further empirical investigation of how the person (individual and interpersonal characteristics) versus the place (elements of the rural community and culture) contribute to risk for suicide (Judd et al., 2006).

## Conclusion

Findings from this review of the literature indicate that, in many cases, rates of rural suicide are greater than rates in urban areas. Studies from around the world suggest that there are characteristics specific to rural locales and individuals, which may increase the risk for suicide. Future research is needed to determine the contribution of the rural context versus that of characteristics of individuals vulnerable to suicide. A better understanding of the relationships between rural life and culture, geographic and interpersonal isolation, economic and sociopolitical distress, and suicide may inform improved treatments for rural individuals.

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