Australia's rural localities face an increasing burden of death due to suicide. Those groups most vulnerable to suicide appear to be males, youth, farmers and Indigenous people. Data from the Queensland Suicide Register showed that, between 2005 and 2007, male suicide rates in remote areas were significantly higher than male suicide rates in non-remote areas.

While the gap is widest between metropolitan and remote suicide rates and the rates highest among rural males, regional suicide rates are still higher and metropolitan rates and the rural female suicide rate is higher than the urban female suicide rate.

Examining suicide in regional and remote Australia, this report aims to provide a better understanding how the rural cultural paradigm affects suicidal behaviours so we may develop and implement appropriate and effective suicide prevention strategies. In this way, those people most vulnerable can be protected from the tragedy of suicide.

Griffith UNIVERSITY

WHO Collaborating Centre for Research and Training in Suicide Prevention

Australian Institute for Suicide Research and Prevention

National Centre of Excellence in Suicide Prevention

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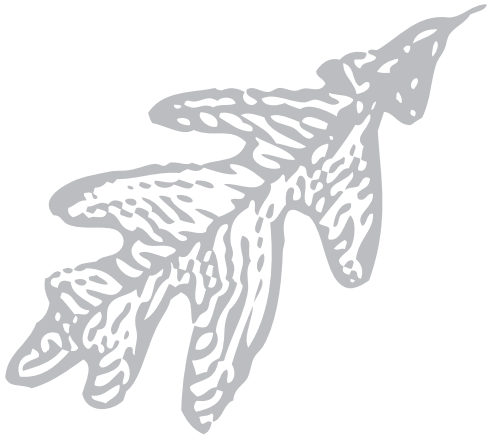

Contents

Executive Summary

The size of the problem and scope of the report

Australia's rural localities face an increasing burden of death due to suicide (Hirsch, 2006). Those groups most vulnerable to suicide appear to be males, youth, farmers and Indigenous people. Data from the Queensland Suicide Register showed that, between 2005 and 2007, male suicide rates in remote areas (36.32 per 100,000) were significantly higher than male suicide rates in non-remote areas (18.25 per 100,000). Further research has also shown that the relative rate of male suicide in rural Queensland was 1.99 compared to rates in metropolitan locations (Kõlves et al, 2009). While the gap is widest between metropolitan and remote suicide rates and the rates highest among rural males, regional suicide rates are still higher and metropolitan rates and the rural female suicide rate is higher than the urban female suicide rate.

The present report aimed to present a holistic examination of suicide in regional and remote Australia. It predominantly focused on the Queensland experience and has investigated a wide range of psychological, environmental and cultural factors, within this bound geographical context.

Key findings

Chapter One gives a detailed presentation of past research on at-risk groups, suicide methods, and risk and protective factors. Identified gaps include the lack of research on the risk of suicide within specific sub-groups, such as females and same-sex attracted youth. This review indicates the importance of: understanding rural cultural influences, providing appropriate treatment services, and encouraging help-seeking in rural contexts.

Chapter Two contains the results of an analysis on the contextual influences on suicide in metropolitan, regional and remote areas. These findings indicate that contextual stressors associated with the agricultural industry, relationship breakdown and Indigenous population were associated with greater risk of suicide in remote populations. Greater education, religiosity, and antidepressant use in rural populations were associated with lower suicide rates. The chapter highlights the importance of considering suicide as embedded within a larger framework of environmental risk and protective factors.

Some of the findings from the second Chapter receive further support in the psychological autopsy study reported in Chapter Three. Compared to suicides in urban localities, relationship conflict, income and work problems, and alcohol use disorder were significant in cases of rural suicides. The quality of available health services and possible stigma associated with help-seeking are also highlighted as influences on rural suicide.

Existing suicide prevention strategies in rural areas are examined in Chapter Four of this report. Few programs reported the results of their activities; even fewer have conducted (and published) an evaluation of the treatment on suicidal behaviours. A major problem was that most programs addressed the issue of suicide prevention indirectly. As a result, there were few activities specifically available for suicide in rural contexts.

Recommendations

Greater recognition of the potential stressors associated with living and working in rural contexts is needed by federal and state governments, health-service providers and the academic community. Some potential strategies to combat risks for suicide in rural contexts could be:

1. Providing greater social and economic support to persons experiencing difficult circumstances (e.g. drought, floods) in rural areas. This could help in alleviating financial stress;
2. To facilitate further education and training of persons in rural contexts. Expanding the skill-base of persons residing in rural areas can allow greater social mobility and increase employment opportunities;
3. Addressing the lifestyle risks associated with suicide in rural localities, including problems in balancing the competing demands of work and family, the inappropriate use of alcohol, and recognising and seeking help for mental or physical signs of stress;
4. Encouraging the development of culturally appropriate and flexible sources of support. This may include “upskilling” key members of the community to provide treatment and/or referral services. This strategy would also include encouraging persons in rural contexts to seek help for mental distress and suicidality.

What is clear from the findings of the present report is the importance of recognising the unique experience associated with suicide in rural Australia. Certainly, not all suicide risk and protective factors are unique to one region, locality or context; however, there were factors which appeared to impact more significantly in rural areas.

Although not examined in this report, there is a need for further research into the past and continuing impacts of natural disasters, such as droughts and floods. There is also a great need to better understand the relationship between access to appropriate and high-quality physical and mental healthcare within the rural help-seeking paradigm.

Given the myriad suicide prevention strategies currently in place in rural areas, there is no doubt that great effort is being made to help rural communities; however, there is a need for better evaluation of these strategies in order to ensure their efficacy and validity, as well as to ensure there are no regions or groups overlooked.

Better understanding how the rural cultural paradigm affects suicidal behaviours in these regions can lead to the development and implementation of appropriate and effective suicide prevention strategies. In this way, those people most vulnerable can be protected from the tragedy of suicide.

Introduction

The burden of suicide in rural areas

Similar to many other areas of the world, a large number of suicides in Australia occur in rural areas (Hirsch, 2006). Yet, there are marked cross-cultural differences between countries in the trends and groups at-risk of suicide in rural areas. In India and China, younger females appear to be more at-risk of suicide (Jiang et al, 2010, Gajalakshmi and Peto, 2007, Yip et al, 2000); while those who die by suicide in rural England and Australia tend to be young to middle-aged males (Judd et al, 2006, Middleton et al, 2003).

In the Australian context, suicide among males in rural areas is especially worrying when considered in relation to rates of suicide in non-rural areas (Judd et al, 2006, De Leo et al, 2006, AIHW, 2007). A report by the Australian Institute for Health and Welfare (2007) evidences that men in remotes areas were 2.6 times more likely to end their lives by suicide than those in metropolitan areas. More recently, 2005-2007 data from the Queensland Suicide Register (Figure 1) show significantly higher rates of male suicide in remote areas (36.32 per 100,000) compared to non-remote areas (18.25 per 100,000). The relative rate of suicide among males in rural areas was 1.99 compared to rates in metropolitan locations (Kõlves et al, 2009). Rates of male suicide were also higher in regional areas (21.81 per 100,000) than in non-regional areas (17.27 per 100,000). This suggests that increased remoteness is associated with a higher risk for male suicide. There were no significant risk differences for females, but rates tended to be higher in rural areas than either regional or metropolitan areas.

Evidence also suggests that suicide in remote areas of Australia has been increasing over time (AIHW, 2006). For example, past research by Page and colleagues (2007) indicates that male-all-age suicide in rural areas increased from 19.2 per 100,000 in 1979-1983 to a rate of 23.8 during the period 1999-2003. Those particularly at-risk of suicide in rural areas appear to be adolescents and young adult males (Caldwell et al, 2004, Wilkinson and Gunnell, 2000). It also likely that suicide in very remote areas is strongly influenced by the disproportionately high mortality rates of Indigenous men aged 15-44 years (AIHW, 2006).

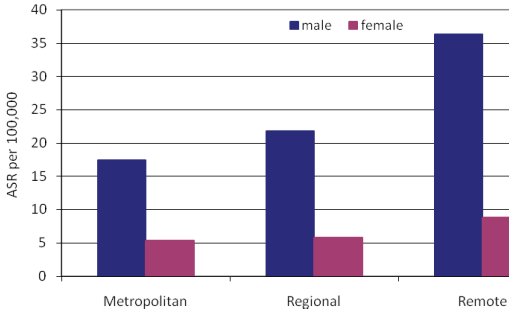

Figure 1. Age-standardised suicide rate in metropolitan, regional and rural areas of Queensland, 2005 to 2007 (Queensland Suicide Register)

The context of rural suicide

There are a number of factors put forth as possible explanations for the high rate of suicide in rural areas of Australia. Some of these explanations include social isolation, economic stressors, and a lack of available services in rural areas (Hirsch, 2006, Judd et al, 2006). Other explanations highlight occupational issues related to the farming industry, economic and financial problems, and stressors related to changing climatic conditions (Page and Fragar, 2002, Taylor et al, 2004, Alston, 2010). The problematic use of alcohol and drugs and access to lethal suicide methods, such as firearms, may also play a role in explaining the higher burden of suicide in rural areas (Miller et al, 2010, Klieve et al, 2009a). Cultural influences on suicide also need to be considered, particularly in areas with a high proportion of Indigenous persons (Proctor, 2005).

However, it is unlikely that there is only one explanation for the high rates of suicide in rural areas. Suicide is a multi-dynamic phenomenon, and is therefore driven by numerous contextual social, cultural and economic factors, as well as individual level factors (Neeleman, 2002). Understanding both individual and social contextual influences on suicide is particularly relevant considering the ongoing physical (e.g., environmental influences connected to climate change, service availability and accessibility), economic (e.g., rural socioeconomic decline) and social (e.g., outmigration) changes occurring in rural Australia (Morrissey and Reser, 2007, Judd et al, 2006).

The aim of the current research and structure of report

This report contains four main chapters. Chapter One presents a literature review on the topic of rural suicide in Australia. This review will include a detailed presentation of past research on at-risk groups, suicide methods, and risk and protective factors. Chapter Two contains the results of an analysis on the contextual influence on suicide in metropolitan, regional and remote areas; while Chapter Three shows results of an individual analysis from a case-control psychological autopsy study of suicide deaths compared to sudden death controls. This specifically focuses on key areas that are relevant to suicide mortality: access to health care and mental illness. This quantitative analysis is illustrated with four case studies from rural areas. We examine existing suicide prevention strategies in rural areas in Chapter Four of this report, and make suggestions for how suicide prevention strategies can be strengthened or improved.

As reflected in the chapters included in this report, our approach seeks to be as holistic as possible by considering the psychological, environmental, and cultural factors which impact on self-inflicted deaths occurring in rural Australia. We hope that progressing knowledge in these key areas can lead to the development of targeted and multi-dynamic prevention initiatives and the eventual reduction of suicide in the Australian population.

Chapter One

Suicidal behaviours in rural and remote areas in Australia: A review

Kathy McKay, Allison Milner, Kairi Kõlves, Diego De Leo

Australian social identity was traditionally grounded within its agricultural heritage. The 'farmer', be he primarily concerned with crops or livestock, not only provided the lynchpin of Australia's economy but his lifestyle also framed the ideals of masculinity which consequently became entrenched within Australia's culture. However, Australia's social identity has changed along with its economic reliance upon the farming industry and rural sector. The rural lifestyle, so idealised within Australian popular culture, is now increasingly marginalised in a country where the three-quarters of the population live in metropolitan areas (Australian Bureau of Statistics, 2006a), even though the majority of land is considered to be 'rural' (see also Alston, 2010). The once idealised rural lifestyle is also proving to be less ideal for those actually living it.

Definitions, Questions and Methodology

Within the scope of the present report, this literature review will focus on studies, reviews and other research on suicide conducted in Australia, as rural environments and their attached lived experiences differ between countries, even between states within the same country. Given that the analysis following is grounded within the Queensland experience, it is appropriate to frame the literature within similar bounds. All research included in this review was either conducted on a national-level or within a particular state, which will be mentioned where relevant. However, the caveat must be made that there is no one rural community or experience; consequently, there needs to be deeper understanding that some risk and protective factors may be more relevant to different communities and, as such, prevention strategies need to take this into account. For this literature review, the PubMed, Proquest and Scopus databases were searched. The search terms used included 'rural', 'remote', 'suicide', 'suicidal behaviours' and 'Australia'. Documents since 1990 were retrieved and only those which focused on suicide in rural Australia were incorporated; in excess of 45 articles, and related books and governmental reports, were included.

In recent years, substantial research has been conducted on the wellbeing of men and women living in rural areas; many studies have particularly focused on farmers. However, when reviewing these previously conducted studies, one needs to be aware that 'rural' is not a homogenous group (Cantor & Slater, 1997; Hirsch, 2006; Humphreys & Solarsh, 2008; Judd et al, 2006a; Miller & Burns, 2008). Different studies have made different distinctions between urban/rural regions and metropolitan/

regional/remote areas. When categorising Australian geography, some studies have used Australian Bureau of Statistics (ABS) data then divided by population (Dudley et al, 1998), other studies have used the Accessibility/Remoteness Index of Australia (ARIA) as their basis (Page et al, 2002), some have used the Rural Remote Metropolitan Classification (RRMA) (Page et al, 2007; Taylor et al, 2005a), and still others have determined regions by actual address (Judd et al, 2006b; Miller & Burns, 2008). In this way, while the differences in lifestyle between urban (metropolitan) and rural (regional and remote) areas is widely acknowledged (Hirsch, 2006; Weerasinghe et al, 2009), the differences between 'regional' and 'remote' areas tend to be less understood. 'Place effects' have only recently begun to be studied in the more specific terms of social and individual contexts and their subsequent impacts on access to different facilities, including healthcare (Macintyre et al, 2002). Even within the categories of 'regional' or 'remote', both of which can be included in the loose definition of 'rural', different experiences also need to be better understood, including those of Indigenous communities, coastal and inland communities, and crop- and livestock-based communities (see Judd et al, 2006a; Macintyre et al, 2002).

Further, the types of people who are examined within different studies also need to be clear. Living in a rural area does not necessarily make someone a farmer, although it is generally farmers who are most at risk (Hirsch, 2006; Miller & Burns, 2008). However, 'farmer' has also tended to be narrowly defined as someone who both actively works on a farm and predominantly derives their income from this activity (Judd et al, 2006b). This has meant people who are classified to be a "retired farmer", 'farmer's wife' or 'farm hand' may not always be included in studies despite the enormous stressors experienced by 'farmer's wives' (Judd et al, 2006b) or the vulnerability to suicide experienced by younger people in less stable farm work (Alston, 2010; Page & Fragar, 2002). These people, especially the more transient farm workers, are also more likely to fall through the gaps in terms of help-seeking and access to physical and mental healthcare. Qualitative studies have begun to fill this gap in knowledge (Alston, 2010; Judd et al, 2006b). However, a recent study of farm suicide in South Australia has argued that the number of people actually living on farms in Australia is uncertain and, as a consequence, the number of suicides of people living on farms is also uncertain (Miller & Burns, 2008).

Suicidal Behaviours in Rural Australia

Despite these definitional uncertainties, in general, rural men have always been found to have worse health than rural women or urban people (Alston, 2010; Alston & Kent, 2008; Barnes et al, 2004; Bourke, 2001; Malcher, 2006; Quine et al, 2003; Weerasinghe et al, 2009). Indeed, farming has consistently been found to be a dangerous job in terms of vulnerability to injuries, diseases (particularly cardio-vascular disease and those borne by animals), accidents, and, more recently, suicide (Alston & Kent, 2008; Bourke, 2001; Fraser et al, 2005; Page & Fragar, 2002; Piers et al, 2007; Weerasinghe et al, 2009). Within Australia, overall suicide rates have been higher in rural areas, when compared to urban areas (Cantor & Slater, 1997; Fraser et al, 2005b; Miller & Burns, 2008; Page et al, 2007; Page & Fragar, 2002; Phillips, 2009); specifically, suicide rates among farmers increased significantly during the 1990s (Fragar et al, 2008). Yet, suicide rates within rural areas have continued to increase, with youth, males and Indigenous people most at risk (Caldwell et al, 2004; Hirsch, 2006; Morrell et al, 1999; Phillips, 2009; Taylor et al, 2005b). One study found that suicide rates had "increased as much as 12-fold in towns with fewer than 4000 people" (Dudley et al, 1998, p. 77); males aged between 15-24 years have proven to be most at risk (Dudley et al, 1998; Page et al, 2007). Similarly, a more recent study indicated that "rural inland towns with populations of less than 4000 people have experienced the most significant increases in male youth suicide" (Judd et al, 2006a, p. 208; see also Alston, 2010). While not as high as the male suicide rate, between 1992 and 2003, suicide rates for women living in inner regional and remote areas of Australia increased (Phillips, 2009); however, when compared to women living in urban areas, rural female suicide rates may not be significantly higher (Taylor et al, 2005b). Vulnerability to suicide appears to increase with higher degrees of 'rurality'; Phillips found that "death rates due to injury are 1.3-1.5 times higher in regional areas and 1.8-3.2 times higher in remote areas than in major cities" (2009, p. 8). Most recently, data from the Queensland Suicide Register (QSR) indicates that suicide rates for both males and females are significantly higher in remote areas when compared to metropolitan and regional areas (Kõlves et al, 2009). From the QSR data, the total suicide rate in remote Queensland was 23.33 per 100,000 (males: 36.32 per 100,000; females: 8.79 per 100,000). The total suicide rates of metropolitan and regional Queensland were closer in numbers. In metropolitan Queensland, the total suicide rate was 11.22 per 100,000 (males: 17.41 per 100,000; females: 5.33 per 100,000). In regional Queensland, the total suicide rate was 13.85 per 100,000 (males: 21.81 per 100,000; females: 5.8 per 100,000). Further, an analysis of all suicides in Queensland, recorded between 1990 and 2006, showed that agricultural workers had a suicide rate of 24.1 per 100,000; this was significantly higher than the rate of 10.6 per 100,000 found among the employed population (Andersen et al, 2010). It should be noted that 'agricultural workers' included occupations like farmhands and shearers, as well as farmers.

These numbers reinforce other findings which have shown that, while suicide rates may have declined in metropolitan and rural (regional) areas, rates continued to increase in remote areas (Page et al, 2007). This study found that this difference was most significant in males; the female suicide rates in rural (regional) and remote areas were actually smaller than rates in metropolitan areas at the beginning of the time period under study but then increased to reach similar numbers. Some research has argued that there has been a decline in young male suicide overall (Morrell et al, 2007); however, this decrease may not have translated directly to rural areas.

Despite these higher rates, living in a rural area itself alone may not be a risk factor but, in combination with other risk factors, may lead to a higher vulnerability to suicide among its inhabitants (Taylor et al, 2005a). Like suicides in metropolitan areas, suicides that occur in rural areas (regional and remote) are multi-faceted (Alston, 2010; Macintyre et al, 2002); relationship breakdowns, legal issues, physical and mental illnesses, as well as issues more directly related to farming, such as the impact of drought, can all be connected to suicide in these areas (Thacore & Varma, 2000). High-risk alcohol consumption has been linked to an increased vulnerability to suicide, especially in rural areas, where there are corresponding high rates of alcohol consumption and suicide (Cantor & Slater, 1997; Miller et al, 2010). Further, a study investigating the impact of socio-economic status on suicide found stronger associations between rural residency, lower socio-economic status and suicide, especially with males (Page et al, 2002). The use of lethal methods may also contribute to the higher rates of suicide in rural areas with firearms being the most common method used, in part related to easier accessibility, especially among older men (Hirsch, 2006; Klieve et al, 2009a).

Suicidal Behaviours in Australian Farmers

Studies which have looked at the vulnerability of rural men to poorer health and wellbeing and their corresponding higher rates of risk-taking, self-harm and suicidal behaviours have begun to dissect the masculinist paradigm which frames the perceived and lived experiences of rural Australia – what rural Australia is presumed to be like and how rural Australia is in real life (Alston, 2010; Alston & Kent, 2008; Bourke, 2003; Dempsey, 1992; Fraser et al, 2005; Liepins, 2000). Traditional masculinity is so closely tied to the construction of the rural 'place' that agriculture is perceived to 'make' men in Australia (Liepins, 2000). Rural males are 'made' to be physically and emotionally tough and strong, able to solve any problem as no obstacle can beat them, where alcohol, sport and (some degree of) physical violence is naturally accepted (Alston & Kent 2008; Bourke, 2003; Dempsey, 1992; Liepins, 2000; Lockie & Bourke, 2001). This man is the hero of rural mythology. Even though he may be unreal, this construct is so normalised that it continues to impact on the ways in which 'rural' Australia is predominantly presented in the media. Traditionally, these strong masculine men were expected to take on leadership roles within their rural community; these men provided the foundation upon which rural communities thrived (Alston, 2010; Alston & Kent, 2008; Liepins, 2000; Lockie & Bourke, 2001). Consequently, femininity became what was 'not' masculine (Liepins, 2000). Women were constructed to be subordinate to and rely upon men, to become wives and mothers; women watched men drink alcohol or play sport, they were not expected to actively participate in these activities (Alston, 2010; Alston & Kent, 2008; Liepins, 2000). However, at times, this stark delineation between acceptable masculine and feminine behaviours has become problematic for those men and women who did not neatly fit within such bounds. Gay men, or men who simply chose recreational avenues outside sport such as the creative arts, can be marginalised and abused; women may struggle with education and employment opportunities which can conflict with traditional subordinate roles (Alston & Kent, 2008; Bourke, 2003).

Yet, in the wake of Australia's rural crisis and the aftermath of long-term drought, the delineation between masculine/dominant and feminine/subordinate roles have no longer been able to afford to be so stark. Research has shown that women are increasingly employed in off-farm work to keep the farm financially viable (Alston, 2010; Alston & Kent, 2008). Recently, Alston found that "…over 50% of farms run by families are now reliant on off-farm income to stay in farming and 80% of this work is done by women" (2010, p. 2). While employment structures have necessarily changed, other ideals have not. Women are still often expected to fulfil the duties attached to their traditional role of wife/mother, as well as any on-farm work such as financial management (Alston, 2010). Further, the reliance on an off-farm income, brought in by a woman, has arguably had negative impacts on the male sense of self – they are no longer the breadwinner, even if they are continuing to conform to all the ideals of the rural masculinist paradigm (Alston, 2010; Fraser et al, 2005; Liepins, 2000). In this way, "while this hegemonic position has benefited men in good times, it also locks them into fairly rigid subject positions, typified by a stoic resistance to adversity and a rugged individualism that prevents help-seeking behaviour" (Alston & Kent, 2008, p. 136). Men may shoulder the blame for any of these

perceived 'failures' where they turn their aggression and disappointment inwards, which may result in suicidal behaviours; however, they may also turn their blame and aggression outwards, which may result in violence towards a partner or others (Alston, 2010; Alston & Kent, 2008). Alcohol consumption may also be used as a self-medicating coping strategy (Alston, 2010). However, there is little understanding of how and whether the changed, and increased, feminine role has impacted on women, especially considering the added care-giving role some wives play when their husbands are obviously not coping (Alston, 2010). The potential conflicts between these different roles have been argued to, at the very least, increase levels of stress and fatigue (Fraser et al, 2005; Gallagher & Delworth, 2003). While female completed suicide rates may not be increasing, it is less certain whether rates of attempted suicide and self-harm have changed.

Additional to the suicidal vulnerabilities attached to the rural masculinist paradigm are suicide risk factors which research has more uniquely linked to farmers. Running a farm can be an unrelenting workload; stress is only further exacerbated when financial and living situations do not improve despite all these continual efforts (Alston, 2010; Hirsch, 2006). Further, a farmer's perceived lack of control over factors so intrinsically linked to his success or failure, such as the weather or government policy, can make him feel powerless during times of rural crisis, such as drought (Hirsch, 2006).

Under these circumstances, suicide may be perceived to be the necessary action to solve such negative emotions. In a qualitative study of young people living in a rural town, the idea of using suicide to solve one's problems tended to be "discussed in the past tense, as something that happened before and would not happen again…. young people spoke of it in terms of a response" (Bourke, 2003, p. 2363). The idea of suicide as a solution can manifest more strongly in an adult farmer who has spent his working life needing to make quick decisions by himself, based on changing environmental circumstances and accepting the consequences of these decisions, especially if he can envisage problems dissipating in his absence (Judd et al, 2006b). When combined with a lethal method being close-to-hand in the form of firearms, the suicidal process for farmers (from ideation to action) has been argued to be more direct where suicide is "an end point to a series of difficulties that accumulated over time, rather than a reaction to an immediate crisis" (Fraser et al, 2005, p. 344). In this way, there has traditionally been less focus on mental illness within the frames of the rural experience as suicide is constructed as a reaction to long-term, stressful lived experiences.

However, research conducted on the personalities of farmers has also indicated that they may have a greater sense of duty and less varied mood than other members of the population but that these hinder adjustment (Judd et al, 2006b). In this way, farmers may not be able to easily see other possible solutions to their problems once they have begun to consider suicide. This sense of 'tunnel vision' may also be exacerbated by the isolation experienced by many farmers. This is not just in terms of geography but also social support where the inability to easily confide in others may increase feelings of loneliness and social dislocation – there seems to be no one able to talk them around such a final decision (Hirsch, 2006).

It should also be noted that the impact of the drought, long experienced in Australia's rural areas, on self-harm and suicidal behaviours is also hard to gauge. Alston has argued that Australia's general population has an increased awareness on the effects of climate and weather on the emotional wellbeing of those living in rural areas (2010). It is also clear that the drought led to an increased workload for all those living on a farm, including those who also had to seek off-farm employment to contribute financially; "women are working for essential income and men are working but watching their dreams and productivity slip away" (Alston & Kent, 2008, p. 139; see also Sartore et al, 2007). The drought may negatively impact upon wellbeing and increase stress but there is no clear evidence that links the drought as a causal factor outside of this contextual foundation.

Other Vulnerable Populations in Rural Areas

However, farmers are not the only population within rural areas who face an increased risk of self-harm and suicidal behaviours. The higher rates of premature death due to external causes (which includes deaths attributed to suicide) experienced in Indigenous communities, many of which are located in remote areas of Australia, have been reported by different researchers (Hunter, 1991; Ollapallil et al, 2008; Phillips, 2009; Pridmore & Fujiyama, 2009; Procter, 2005). Indeed, Procter (2005) reports that between 1998 and 2001, 16% of Indigenous deaths were attributed to 'external causes', compared to 6% of general population deaths; more specifically, "premature death due to deliberate self-harm accounted for 33% of male deaths and 15% of female deaths" (Procter, 2005, p. 237). These communities also experience higher rates of hospital admissions related to harm and violence but it is uncertain how many admissions are directly related to self-harm or suicidal behaviours (Hunter, 2002; Ollapallil et al, 2008). However, as many remotely-located Indigenous communities do not have easy access to a hospital, there may be a significant under-reporting of these sorts of numbers. However, these self-harm and suicidal behaviours need to be understood within an Indigenous context. In this way, these performances can be read "as a drastic response to certain stressful experiences (risk factors) and violence in the broader social and emotional context of cultural meaning, cultural identity, historical and current socioeconomic conditions" (Procter, 2005, p. 238; for further reading on these issues please refer to Hunter et al, 2001 and Tatz, 2001). Self-harm can also have reasons deeply contextualised

within culture in terms of 'sorry cuts' or 'anger cuts'; here, there may be no intention to die but desires to cope with seemingly unbearable pain, relieve stress, express rage or seek attention (Ollapallil et al, 2008).

Migrants are another group that may prove vulnerable to self-harm and suicidal behaviours within a rural environment, especially young men. While research has indicated that suicide risk tends to be lower among migrants in Australia overall, a study undertaken in New South Wales indicated that migrants males had a higher suicide rate when they lived in 'non-metropolitan' areas (Morrell et al, 1999). However, the suicide rates of female migrants did not change significantly depending upon their geographical location. It can be argued that these higher suicide rates are connected to a lack of social connectedness and increased social dislocation felt by migrants in small communities, especially if they hail from non-English-speaking countries. Macintyre et al (2002) refers to the challenges faced by migrants in these rural geographical areas as 'incompatible status'.

Much has been written about the high rates of suicidal behaviours among Australian youth, especially high among those youth living in rural areas. Between 1999 and 2003, research indicated that the gap between the suicide rates of males aged 25-34 years living in metropolitan and remote areas increased significantly (Page et al, 2007). A significant increase in rural female suicide was also demonstrated (Ibid.). Bourke (2003) has conducted in-depth interviews with rural youth about suicide. She has found that youth are vulnerable when they are marginalised from their community; this may happen if they reject (either voluntarily or involuntarily) the prevailing community norms regarding un/acceptable attitudes and behaviours (Barnes et al, 2004; Bourke, 2003, 2001). These norms may be different for males and females but the negative consequences attached to non-conformity remains the same. Further, when faced with life stressors, there may have been few adults capable, competent or willing to provide assistance to a young person in crisis. Bourke found that: "For the most part, teachers did not want to be counsellors and indicated that it was problematic to know about a student's problems while also being a local resident and perhaps a friend of the young person's parents" (2003, p. 2361). Nor did young people appear to always discuss their suicidal ideation with their peers. Responses from Bourke's (2003) research appeared to indicate that some young people saw suicidal ideation as a 'one-off' experience which occurred in state of irrationality; in this way, they had no tools with which to more effectively combat any future ideation. Further, young men may be more prone to reacting aggressively to problems, including physical altercations with others, which "…was accepted as 'the way it is'. Is it any wonder, then, that when the problem is the self, resolution is via self-harm?" (Bourke, 2003, p. 2361; see also Quine et al, 2003).

In contrast, research concerning gay and lesbian youth remains limited and it is uncertain whether the generally high suicide rates among same-sex attracted youth (SSAY) translate to the rural environment. Further, prevention strategies contextualised within a metropolitan environment may not be relevant or appropriate to a regional or remote environment, especially in terms of access to facilities and services (Quinn, 2003). However, it has been argued that 'internalised homophobia', where negative perceptions of and attitudes towards non-heterosexuality are presumed, may increase an SSAY's vulnerability to depression and suicide as they do not fit into the predominant culture (Quinn, 2003). Further, even when facilities and services are available, help-seeking may be impeded by feelings of anxiety that there is little privacy in a small community: "An alarming finding from the study was that rural youth generally reported a need for a high level of privacy and confidentiality concerning sexual issues" (Quinn, 2003, p. 3).

Help-seeking

Significant literature has focused on help-seeking in rural areas. In rural culture, help-seeking can be seen as a sign of weakness by both men and women, although resistance to help-seeking may be more commonly articulated by men (Alston, 2010; Alston & Kent, 2008; Caldwell et al, 2004; Fraser et al, 2005; Fuller et al, 2009; Hirsch, 2006; Judd et al, 2006a; Judd et al, 2006b; Quine et al, 2003). Aversion to help-seeking is perceived to be related to several social factors. First, challenges to the frames of the traditional rural masculine paradigm not only adversely affects men, in that their normative behaviours no longer perform the same functions, but continues to limit their perceived ability to ask for help. Consequently, these men "blame themselves and see themselves as failures because they are not living up to traditional notions of successful rural masculinity. Thus many see no option but to end their lives because it is, for them, the end of their traditional lives as they know and understand them" (Alston, 2010, p. 6). Men may not be able to see that their problems could be caused by external factors; they only see their problems framed within self (Alston, 2010). It can become more important for a man to continue to be perceived as 'stoic' or 'managing' even when his problems are known within his community (Alston & Kent, 2008). The stigma that appears to subsequently attach to help-seeking can prove difficult to shake (Caldwell et al, 2004; Fuller et al, 2009; Fraser et al, 2005; Hirsch, 2006; Judd et al, 2006b; Malcolm, 2002; Quine et al, 2003).

Second, the precarious economic nature of modern farming means that heavy demands are made on those connected to the farm, which have been exacerbated in times of drought (Fuller et al, 2009; Judd et al, 2006b). To simply remain sustainable, farms may need full participation from everyone which can be a heavy responsibility to bear. Family members may feel they are a burden if they are not perceived to be pulling their own weight; those people who are not coping may suppress their emotional pain, which can leave them vulnerable to suicidal behaviour, or they may leave the farm altogether, which further exacerbates the drain on the rural population (Judd et al, 2006b).

Third, limited help-seeking may be more connected to the lack of access to health facilities and services. People can't seek help if it simply doesn't exist in their community (Barnes et al, 2004; Caldwell et al, 2004; Ellis & Philip, 2010; Judd et al, 2006b; Macintyre et al, 2002; Quine et al, 2003). When added to the heavy workload and responsibilities attached to rural and farming life, it may mean that people simply can't afford the time away to access suitable help. The traditional focus on practical solutions within rural culture, as opposed to seeking 'help', may also mean that this type of support may not be considered worthwhile enough to seek (Judd et al, 2006b). Further, even if there is accessible and available care, it may not be appropriate or relevant to the people most vulnerable in the community (Quine et al, 2003; Thacore & Varma, 2000). A study, including three district hospitals in rural Western Australia, found that nurses were uncertain as to how best to treat people who presented with deliberate self-harm; they felt uncertain, helpless and frustrated (Slaven & Kisely, 2002).

However, it must be noted that some research has found that limited help-seeking may not necessarily mean no help-seeking; people may seek help outside the mental health framework (Judd et al, 2006b; Taylor et al, 2005b; Taylor et al, 2004). Seeking help from a general practitioner may be more likely to occur within a rural community as they are accessible and the help available is perceived to be more 'medical' than 'mental' (Judd et al, 2006a). In this way, rural GPs become important gatekeepers in terms of recognising those people at-risk of suicide and providing prevention frameworks to protect them (Judd et al, 2006a; Malcolm, 2002, 2000). However, these responsibilities can also lead to high rates of GP burnout (Malcolm, 2000). One study also found that men may also confide in rural financial counsellors as their mental health status appears to be deeply entwined with the financial status of their farm (Fuller et al, 2009; Sartore et al, 2007). Further, support groups and programs have been started in several states where men are able to seek help from their peers in a safe and relevant environment. Examples of these include the 'Working with Warriors' program which is part of the Wheatbelt Men's Health Inc (http://nrha.ruralhealth.org.au/cms/uploads/factsheets/fact-sheet-14-suicide.pdf) and the Farm-Link Project, under the National Suicide Prevention Strategy (http://www.crrmh.com.au/Current-Projects/nsps.html). Women also play an important role in male help-seeking in that they are more likely to discuss problems with others, including healthcare professionals (Alston & Kent, 2008). However, a worrying consequence of this is that women may often blame themselves for the health status of the men in their lives; further, "women ignore their own health needs, placing themselves last in decisions about resource

allocations, delaying health check ups and generally focusing far more on family health matters than their own" (Alston, 2010, p. 4). It is clear that further examination of help-seeking behaviours in rural Australia, including the types of help sought and their appropriateness and quality, is important for future research.

Mental Illness

Arguably connected to the lack of help-seeking is the perception that there is less diagnosed mental illness connected to suicide in rural areas (Judd et al, 2006b); however, the accuracy of this perception is uncertain (Ellis & Philip, 2010; Judd et al, 2002; Taylor et al, 2005b). Connected to help-seeking, research has found a strong stigma attached to a diagnosis of mental illness in rural communities (Bourke, 2003; Caldwell et al, 2004; Hirsch, 2006; Judd et al, 2006b; Malcolm, 2002, 2000). A diagnosis can be shameful, a sign of weakness. Further, a diagnosis of mental illness, especially depression, is perceived to be strongly linked to suicide which only serves to compound the stigma, even among young people (Bourke, 2003). Just as women may be more likely to seek help, so they also tend to have better mental health literacy and so may be more articulate in their help-seeking (Caldwell et al, 2004). On the other hand, men may be more likely to articulate symptoms of depression in terms of physical ailments, such as sleeplessness (Alston, 2010; Sartore et al, 2007); some may admit to 'stress' but nothing more (Alston & Kent, 2008).

Conclusions

Consequently, suicide in rural communities cannot be considered without first understanding the rural culture in which it occurs (Alston, 2010; Taylor et al, 2004). While some risk factors attached to suicide may be similar irrespective of geographical location, it cannot be denied that there are risk factors unique to rural communities, including those attached to farmer and Indigenous males. Responses to suicide need to consider social and economic aspects as these heavily impact the lived experiences of people living in regional and remote areas (Taylor et al, 2004). Further understanding the different roles played by community members, especially GPs and financial counsellors, as gatekeepers to save those most vulnerable to suicidal behaviours is vital. Further, increasing knowledge about suicide can help to build community capacity and capability to effectively care for at-risk people (Fuller et al, 2009). Only by decreasing the stigmas attached to help-seeking, mental illness and suicide can real help and protection be achieved within rural communities.

Chapter Two

Contextual influences on suicide in the metropolitan, regional and remote areas of Queensland

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Understanding the role of contextual factors in suicide research and prevention

Human health and wellbeing is influenced by a range of contextual factors embedded in physical and social environments (Macintyre et al, 2002; Yen & Syme, 1999). These factors may include ethnic, regional or national identities, religious affiliations, political ideologies and practices, legal and fiscal systems, kinship systems, the domestic division of labour, gender and age (Macintyre et al, 2002). As is discussed later in this chapter, various contextual variables have been recognised as important determinants of suicide mortality, including marital and family bonds (Masocco et al, 2008), the stability of economic environments (Yang & Lester, 2001), and urban versus rural areas of residence (Hirsch, 2006).

Understanding the impact contextual factors have on suicide is important when considering the development of population-based suicide prevention initiatives. Population-based approaches aim to shift the distribution of "risk" within a group of persons by applying preventive strategies to specific or whole populations; subsequently, at any time, fewer people are over the "threshold" that leads to completed suicide (Rosenman, 1998). Compared to individual-based interventions, population-based health strategies have the potential to influence a large number of persons and therefore have a higher capability to produce greater reductions of any given factor (Yen & Syme, 1999).

In view of the points raised above, understanding the wider contextual environment in which suicide is embedded can be useful in understanding the possible explanations for differences in rates of suicide between geographical areas, as well as the development of targeted population-based suicide prevention strategies.

Rationale for a relationship between contextual factors and suicide in Australia

As documented in Chapter One, there are vast differences in the social, economic and cultural backgrounds of metropolitan and remote areas of Australia. Various researchers have argued that these differences may hold an influence on the patterns and trends of suicide (Judd et al, 2006a; Judd et al, 2006b; Alston, 2010; Alston & Kent, 2008; Hirsch, 2006). However, while the possible relevance of "place-based" factors (e.g. contextual economic, social, and cultural factors) on suicide in metropolitan and remote areas has been recognised, these have not been systematically investigated in Australia.

The premise for a possible relationship between contextual factors and suicide is based on a long history of research in suicidology (e.g., Durkheim, 1897/1951). Durkheim (1897/1951) argued that suicide in a society reflected the cultural, social and economic environments in which it was embedded. In the book Le Suicide (1897/1951), he suggested that suicide was dependent on two linked forces: social integration (the degree to which persons have shared beliefs and sentiments and a sense of devotion to common goals) and social regulation (the mechanisms through which society imposes restraints and limits on individual needs and thereby prevents variations in the suicide rate of a population) (Johnson, 1965; Morrison, 2006). Following on from this approach, researchers from the Chicago School of Sociology developed the concept of "social disorganization", as characterised by the breakdown of communal institutions (e.g., family, church, local government) and communal relationships (Jensen, 2003). "Social disorganization" has been used to explain a number of "deviant" behaviours and suicide (Jensen, 2003).

Subsequent studies have identified a number of population-level influences on suicide. Factors traditionally associated with higher suicide in a population include divorce, migration, and changes in employment (e.g., female labour force participation, unemployment, and type of employment) (Andersen et al, 2010; Blakely et al, 2003; Stack, 2000). An explanation for these relationships is that they represent the adverse influence (or disruption) of contextual factors on normative social roles and relationships in society, which subsequently increase the risk of suicide.

Suicide rates have also been related to trends in national economies (Yang & Lester, 2001), as well as to income and spending on health care (Milner et al, 2010; Neumayer, 2003; Zimmerman, 2002). Fertility and religion are usually associated with suicides rates, possibly because these reinforce social and community ties and rules (Lester & Yang, 1992; Stack, 2000). As already documented in the Australian context, remote and rural areas usually have higher suicide rates than urban areas (Page & Fragar, 2002; Phillips, 2009; Page et al, 2007). Factors explaining the higher rates of suicide in remote areas may include rural socioeconomic decline, limited service availability and accessibility, rural culture, community attitudes to mental illness and help seeking, and exposure to firearms (Judd et al, 2006a).

Hypothesis

Based on the research discussed above, it is hypothesised that there will be differences in the contextual influences on suicide in metropolitan, regional and remote areas.

The possible differences in the contextual variables related to suicide in metropolitan, regional and remote areas of Queensland were investigated using an ecological approach. As is discussed in detail below, age-standardised suicide rates (deaths per 100,000 persons) were the dependent variable, while independent variables represented a range of contextual social and economic variables. The time frame of analysis was the period 1998 to 2007.

Methodology

Sample area

The unit of observation for both the dependent variable and all independent variables was the small geographical unit called the Statistical Sub-Division (SSD), as defined by the Australian Bureau of Statistics (ABS) (Australian Bureau of Statistics, 2006b). The SSDs were then grouped into one of three geographical areas in Queensland: metropolitan, regional or remote (see Appendix A). The classification used for these distinctions was based on the Accessibility/Remoteness Index of Australia (ARIA) (Department of Health and Aged Care, 2001). Metropolitan locations were comprised of cities such as Brisbane, the Gold Coast, and other areas with high accessibility to services. Regional areas included cities such as Mackay, Townsville, Cairns, and Toowoomba. Remote areas included places such as Bowen, Carpentaria, Cloncurry, and Mount Isa, as well as some far-outer regional areas, such as Far North SD Bal and Thuringowa.

While this geographical approach provides a useful separation with respect to accessibility to services, caution is needed in interpreting these statistics in broader decision-making contexts (Australian Bureau of Statistics, 2001b). The current work uses the 1999 ARIA values of statistical local areas to separate mortality cases into regional groups, but in a rapidly growing and quite dispersed state such as Queensland, borders between metropolitan and regional places can be difficult to determine. Therefore, some of the categorised areas may have shifted slightly during the time frame under study.

Time period under study

Variables were separated into five-year time periods (1998 to 2002 and 2003 to 2007) for two reasons. First, the small incidence of suicide within SSDs in some years meant that suicide rates (deaths per 100,000) were sensitive to even small fluctuations in suicide numbers over time. Second, the majority of the independent variables used in this project originated from the census data produced in 2001 and 2006. Because of this, suicide data was aggregated around the two census periods.

Dependent variable

Suicide incidence for males and females were separated into relevant SSDs (see Appendix A for a list of the SSDs used in the analysis) for the two study periods. Crude suicide rates (deaths per 100,000) were calculated using the population data provided for each SSD in census 2001 (Australian Bureau of Statistics, 2001a) and census 2006 (Australian Bureau of Statistics, 2006c). Rates were age-standardised using the Australian population for the year 2001. Indirect, rather than direct, standardisation was used due to small sample sizes in some SSDs.

Independent variables

As discussed above, suicide within a population has been shown to be sensitive to a number of economic and social variables. The choice of independent variables selected for the present analysis was strongly influenced by this past research; however, decisions about the use of independent variables was also based on the availability of data over time and within the small geographical areas called SSDs.

The final list of variables selected for the analysis represented key demographic, social and economic indicators in metropolitan, regional and remote areas of Queensland. These included: income, unemployment, education, ethnic and religious composition, and the age distribution of the population. Selected variables also included population-level indicators of relationship stability such as divorce, couple families with a child, and mobility (e.g., resided overseas in the past year).

Variable relating to expenditure on antidepressants and other psychotropic medication were implemented in this analysis to provide indirect proxies of treatment for mental-health. Service access variables, such as GP and psychiatry services provided per 100 persons, were also included in the research.

Originally, the authors of this report planned to analyse data relating to the “Better Access to Psychiatrists, Psychologists and General Practitioners through the MBS” scheme in relation to suicide mortality. However, this data was difficult to examine as it was only available for a short period of time (the financial year 2006/2007). A related problem was the small number of observations able to be analysed for these variables. For these reasons, the data relating to the MBS scheme was excluded.

A complete list of the variables and the relevant sources of data can be seen in Table 1.

Table 1. Definition and sources for independent variables

Variable name	Explanation of variable	Data source
AB and TSI (% of pop)	Refers to the proportions of the male/female population in each SSD who identified themselves as either or both Aboriginal and Torres Strait Islander. The variable was calculated separately for males and females.	(ABS, 2001a; ABS, 2006b)
Divorced males/females (% of pop)	Refers to the proportions of male/female population in each SSD that were divorced. The variable was calculated separately for males and females.	(ABS, 2001a; ABS, 2006b)
Unemployed males/females (% of employed pop)	Refers to the proportions of male/female persons who were unemployed in each SSD, calculated as a ratio to the total employed workforce for males and females.	(ABS, 2001a; ABS, 2006b)
Agricultural employed (% of total employed pop)	Refers to the proportions of persons employed in the agricultural related industries (Agriculture, Forestry and Fishing) over the total employed workforce in each SSD. The classification of industry originated from the information collected from census 2001 and 2006. The variable was calculated separately for males and females.	(ABS, 2001a; ABS, 2006b)
Overseas born (% of pop)	The proportions of the population that were born overseas in each SSD. The variable was calculated separately for males and females.	(ABS, 2001a; ABS, 2006b)
Year 12 education (% of pop)	The proportions of the population that completed Year 12 in each SSD. The variable was calculated separately for males and females.	(ABS, 2001a; ABS, 2006b)
Overseas past year (% of pop)	The proportions of the population that had resided overseas in the past year in each SSD. The variable was calculated separately for males and females.	(ABS, 2001a; ABS, 2006b)
Hindu (% of pop)	The proportions of the population that described themselves as Hindu in each SSD. The variable was calculated separately for males and females.	(ABS, 2001a; ABS, 2006b)
Islam (% of total pop)	The proportions of the population that described themselves as Islamic in each SSD. The variable was calculated separately for males and females.	(ABS, 2001a; ABS, 2006b)
Christian (% of the total pop)	The proportions of the population that described themselves as Christian in each SSD. The variable was calculated separately for males and females.	(ABS, 2001a; ABS, 2006b)

Variable name	Explanation of variable	Data source
Buddhist (% of pop)	The proportion of the population that described themselves ascribing to being Buddhist in each SSD. The variable was calculated separately for males and females.	(ABS, 2001a; ABS, 2006b)
Catholic (% of pop)	The proportions of the population that described themselves as Catholic in each SSD. The variable was calculated separately for males and females.	(ABS, 2001a; ABS, 2006b)
Family with children (male/female in a couple with a child as % of pop)	Males/females who described themselves as being within a family with a partner and child in each SSD, calculated as a proportion of the total population. We used this variable to provide a proxy of families.	(ABS, 2001a; ABS, 2006b)
Income per capita	The average income in each SSD calculated separately for males and females. This was adjusted to constant prices using the implicit GDP price deflator for the years 2007-2008.	(ABS, 2001a; ABS, 2006b)
Expenditure on anti-depressants per capita	Average spending on antidepressants in term of Government Pharmaceutical Benefits Scheme (PBS) and Repatriation Pharmaceutical Benefits Scheme (RPBS) expenditure in Queensland. The variable was calculated in each SSD for males and females. This was adjusted to constant prices using the implicit GDP price deflator for the years 2007-2008.	(DoHA, 2010a)
Expenditure on other psychotropic medication per capita	Average spending on other psychotropic medication, including antipsychotics, anxiolytics, hypnotics, sedatives, and psychostimulants. The data stems from average PBS and RPBS expenditure on mental health drugs in Queensland. The variable was calculated in each SSD for males and females. This was adjusted to constant prices using the implicit GDP price deflator for the years 2007-2008.	(DoHA, 2010a)
Psychiatrist services per 100 persons	The number of services provided by psychiatrists per 100 persons in the population. The variable was calculated in each SSD for males and females.	(DoHA, 2010b)
GP services per 100 persons	The number of un-referred GP services per 100 persons in the population. The variable was calculated in each SSD for males and females.	(DoHA, 2010b)

Statistical approach

Descriptive information on the dependent variable and independent variables was examined.

Following this, a Poisson regression model was used to examine significant differences between suicide rates in regional and remote areas in comparison to suicide rates in metropolitan areas.

A Poisson regression model was also used to assess the influence of each independent variable on suicide. Possible time effects were controlled for using period indicator variables (1 = years 1998-2002 and 2 = years 2003-2007).

Results

A descriptive analysis of suicide

Table 2 shows the mean, minimum and maximum suicide rates in metropolitan, regional and remote areas for the time periods 1998 to 2002 and 2003 to 2007. The table also shows the standard deviation (SD). In both time periods, male suicide rates in remote areas were markedly above average suicide rates in regional and metropolitan areas. Male suicide rates in remote areas increased slightly from 33.55 per 100,000 (years 1998-2002) to 33.89 per 100,000 (years 2003-2007). The standard deviation of male rates decreased slightly in remote areas over time.

Regional male suicide rates were notably higher than those in metropolitan areas. The mean male suicide rate in regional areas declined over the time period (28.40 per 100,000 in the years 1998-2002 and 24.02 in the years 2003-2007).

Male suicide rates in metropolitan areas decreased from 24.99 per 100,000 in the first time period to 20.32 per 100,000 in the second time period.

The mean female suicide rates decreased in metropolitan, regional and remote areas over the period 1998 to 2007. In remote areas, female suicide fell from 10.46 (years 1998-2002) to 6.16 per 100,000 (years 2003-2007). There was a less noticeable reduction in female suicide within regional (7.87 to 6.61 per 100,000) and metropolitan areas (6.97 to 6.36 per 100,000) between the years 1998 and 2007.

Table 2. Descriptive statistics for the dependent variable, male and female suicide rates (death per 100,000), 1998 to 2002 and 2003 to 2007, Queensland

		Mean	SD	Min	Max
Males					
1998-2002	Remote	33.55	11.12	18.04	44.46
	Regional	28.40	7.97	14.06	40.93
	Metropolitan	24.99	6.51	17.37	40.35
2003-2007	Remote	33.89	8.07	22.28	40.18
	Regional	24.02	6.33	14.69	40.96
	Metropolitan	20.32	4.82	13.80	30.89
Females					
1998-2002	Remote	10.46	3.13	8.60	15.11
	Regional	7.87	3.87	3.27	17.37
	Metropolitan	6.97	2.09	4.31	11.50
2003-2007	Remote	6.16	3.98	1.63	11.03
	Regional	6.61	3.10	2.22	15.07
	Metropolitan	6.36	2.03	3.76	11.86

Notes: "SD" refers to standard deviation; "Min" refers to minimum score; "Max" refers to maximum score

The difference between suicide rates in metropolitan, regional and remote areas was tested in a Poisson regression analysis (Table 3). During the period 1998 to 2002, male suicide rates were significantly higher in remote areas than in metropolitan areas (IRR 1.34, $p<0.001$). While not significantly different, regional areas also had higher rates of male suicide than metropolitan areas. This distinction appears to strengthen over time, as both regional areas (IRR 1.18, $p<0.05$) and remote areas (IRR 1.67, $p<0.001$) had higher male suicide rates than the metropolitan areas of Queensland during the period 2003 to 2007.

Results also indicate that remote areas had higher female suicide rates than metropolitan areas (IRR 1.50, $p<0.05$) during the period 1998 to 2002. Regional areas also had higher rates, but these results did not reach statistical significance. There was no significant difference between female suicide rates in regional and remote areas compared to metropolitan areas during the period 2003 to 2007. This is the reverse of the temporal change for males.

Table 3. Geographical differences in suicide rates in QLD for males and females, by SSD

	Males			Females		
	IRR	Lower CI	Upper CI	IRR	Lower CI	Upper CI
1998 to 2002						
Remote	1.34**	1.10	1.63	1.50 **	1.05	2.15
Regional	1.13	0.99	1.30	1.13	0.86	1.47
Metropolitan	1			1		
2003 to 2007						
Remote	1.67 ***	1.36	2.04	0.97	0.62	1.51
Regional	1.18**	1.02	1.37	1.04	0.78	1.38
Metropolitan	1			1		

Notes: IRR refers to Incident rate ratio; * p <0.10 ** p <0.05 *** p <0.001; Lower CI refers to lower 95% confidence interval; Upper CI refers to upper 95% confidence interval. The reference category is metropolitan areas

Descriptive results for independent variables

Descriptive results for all independent variables in metropolitan, regional and remote SSDs for males and females, respectively, can be seen in Tables 4 to 6.

For both males and females, agricultural employment (16.4% for males and 3.5% for females) and the total Indigenous population (12.6% for males and 12.9% for females) were notably higher in remote localities than in either regional or metropolitan areas. The gender ratio of males to females employed in the agriculture industries was close to five-to-one in regional and remote areas. It is worth noting that these official employment records fail to take into account the possible informal contribution of females in supporting males in the daily running of a farm.

Remote SSDs had substantially lower average incomes for males ($535 per week) than regional ($546 per week) or metropolitan SSDs ($612 per week). The weekly income for females was close to one-third less the income of males in metropolitan ($398 per week), regional ($337 per week) and remote areas ($337 per week).

Unemployment (as a percentage of the employed population) was highest in regional areas (7.7% for males and 7.4% for females), followed by metropolitan and remote areas.

The proportion of the population born overseas (i.e., migrants) was highest in metropolitan areas (21.3% of the male population and 21.3% of the female population), which also showed greater mobility (residing overseas in the past year) than the other parts of Queensland (1.7% of the male population and 1.7% of the female population).

There was a slightly larger proportion of female migrants in regional and remote areas (12.5% and 10.8% respectively) than male migrants (11.4% and 9% respectively).

Metropolitan areas appeared to be more religiously-diverse than regional or remote areas, as seen in the greater proportion of the population being Hindi (0.4% for males and 0.4% for females), Islamic (0.7% for males and 0.6% for females) or Buddhist (1.33% for males and 1.42% for females). The highest proportions of Catholic (35.1% for males and 30% for females) and Christian populations (70.2% for males and 75% for females) were in remote areas.

Although there was a slightly larger proportion of divorced females (as a proportion of the population) compared to males in all three regions, this was particularly noticeable in metropolitan areas, where the proportion of divorced females was 8% (compared to 6.2% of the male population in metropolitan areas).

Metropolitan areas also had the largest proportion of persons completing Year 12 for both males and females (34.4% for males and 34.5% for females). The proportion of the population who were classified as in "a couple with a child" (i.e. families) was similar in all three regions.

Expenditure on antidepressants per capita was the highest in regional areas, followed by metropolitan areas. Expenditure on other psychotropic drugs was higher in metropolitan areas than either regional or remote areas. Compared to males, females had a higher expenditure on antidepressants in metropolitan (an average of $23.8 per capita), regional (an average of $24.3 per capita) and remote areas (an average of $17.2 per capita); while males had greater expenditure on other psychotropic medications (an average of $25.6 per capita in metropolitan, an average of $22.9 per capita in regional and an average of $15.1 per capita in remote areas).

Regional areas had higher rates of GP services provided to the population (542.1 services per 100 males and 789.9 services per 100 females) than either metropolitan (410.9 services per 100 males and 560.6 services per 100 females) or remote areas (332.1 services per 100 males and 452.9 services per 100 females). The largest rate of psychiatrist services was in metropolitan areas (9.4 per 100 males and 15.1 per 100 females), while remote areas had the lowest rate of services (1.1 per 100 males and 1.6 per 100 females). More females attended GPs and psychiatrists than males.

Table 4. Descriptive statistics for independent variables by gender in metropolitan areas

	Metropolitan areas							
	Males				Females			
Variables	Mean	Min	Max	SD	Mean	Min	Max	SD
AB and TSI (% of total pop)	1.6	0.9	3.3	0.6	1.6	0.9	3.4	0.7
Divorce (% of total pop)	6.2	4.0	9.6	1.3	8.0	5.7	11.2	1.3
Unemployment (% of employed pop)	7.5	3.1	14.4	3.4	7.1	3.4	11.7	2.4
Agricultural employed (% of total employed pop)	1.1	0.3	4.3	0.9	0.3	0.1	1.5	0.3
Overseas born (% of total pop)	21.3	14.9	29.6	4.1	21.3	14.7	29.6	4.2
Year 12 education (% of total pop)	34.4	20.9	56.3	10.0	34.5	21.7	58.2	10.0
Overseas in the past year (% of total pop)	1.7	0.4	5.4	1.1	1.7	0.5	6.0	1.2
Hindi (% of total pop)	0.4	0.1	1.4	0.3	0.4	0.1	1.2	0.3
Islam (% of total pop)	0.7	0.1	2.2	0.5	0.6	0.1	2.0	0.5
Christian (% of total pop)	64.7	46.4	71.3	5.1	69.7	52.8	76.4	4.8
Buddhist (% of total pop)	1.3	0.3	3.6	0.9	1.4	0.4	3.8	1.0
Catholic (% of total pop)	23.4	19.3	29.5	2.9	24.8	20.4	31.5	3.3
Family with children (couple with a child) (% of total pop)	48.6	8.7	16.4	63.0	49.2	48.7	50.5	0.4
Average income per capita ($ per week)	$611.9	$455.2	$858.5	$113.5	$398.3	$301.2	$616.6	$85.4
Expend. on antidepressants per capita ($ per year)	$15.0	$9.9	$23.5	$3.2	$23.8	$16.8	$33.4	$4.1
Expend. on other psychotropic drugs per capita ($ per year)	$25.6	$8.6	$61.6	$12.0	$14.8	$6.8	$28.3	$5.0
Psychiatrist services per 100 persons	9.4	1.0	22.5	5.6	15.1	1.9	35.6	9.9
GP services per 100 persons	410.9	116.8	597.1	122.9	560.6	151.6	825.1	165.8

Data sources: Australian Bureau of Statistics, 2001a; Australian Bureau of Statistics, 2006c; Department of Health and Ageing, 2010a, b.

Table 5. Descriptive statistics for independent variables by gender in regional areas

	Regional areas							
	Males				Females			
Variables	Mean	Min	Max	SD	Mean	Min	Max	SD
AB and TSI (% of total pop)	3.4	1.1	7.4	1.6	3.7	0.8	8.3	2.0
Divorce (% of total pop)	6.2	4.4	8.0	0.9	7.0	4.7	9.7	1.2
Unemployment (% of employed pop)	7.7	2.9	21.3	4.0	7.4	4.0	13.9	2.4
Agricultural employed (% of total employed pop)	10.0	0.7	31.3	8.4	2.2	0.2	6.9	2.0
Overseas born (% of total pop)	11.4	6.0	22.0	3.9	12.5	6.0	22.2	4.9
Year 12 education (% of total pop)	23.6	16.5	34.9	4.9	26.4	18.5	37.2	5.1
Overseas in the past year (% of total pop)	0.7	0.2	1.5	0.3	0.7	0.2	1.7	0.4
Hindi (% of total pop)	0.1	0.0	0.4	0.1	0.1	0.0	0.3	0.1
Islam (% of total pop)	0.2	0.1	0.4	0.1	0.2	0.1	0.3	0.1
Christian (% of total pop)	67.6	55.2	80.1	6.0	72.4	58.5	83.1	6.4
Buddhist (% of total pop)	0.5	0.2	1.1	0.2	0.6	0.2	1.6	0.4
Catholic (% of total pop)	22.1	15.1	30.0	4.1	23.3	16.0	31.3	4.9
Family with children (couple with a child) (% of total pop)	48.1	36.0	52.6	4.4	49.2	48.3	49.9	0.5
Average income per capita ($ per week)	$545.7	$385.5	$767.6	$108.8	$337.1	$297.8	$408.9	$31.5
Expend. on antidepressants per capita ($ per year)	$15.8	$9.6	$24.6	$3.6	$24.3	$14.4	$32.5	$4.3
Expend. on other psychotr. meds. per capita ($ per year)	$22.9	$7.4	$43.4	$10.9	$12.5	$6.9	$18.5	$3.0
Psychiatrist services per 100 persons	5.9	0.0	52.1	11.6	9.3	0.2	74.6	18.2
GP services per 100 persons	542.1	0.0	2999.9	588.5	789.9	6.5	4123.3	883.5

Data sources: Australian Bureau of Statistics, 2001a; Australian Bureau of Statistics, 2006c; Department of Health and Ageing, 2010a, b.

Table 6. Descriptive statistics for independent variables by gender in remote areas

	Remote areas							
	Males				Females			
Variable	Mean	Min	Max	SD	Mean	Min	Max	SD
AB and TSI (% of total pop)	12.6	5.5	21.1	5.7	12.9	5.1	22.3	6.9
Divorce (% of total pop)	5.4	3.8	6.9	0.9	5.5	4.2	6.7	0.8
Unemployment (% of employed pop)	5.5	3.3	8.7	1.9	5.8	3.6	8.6	1.5
Agricultural employed (% of total employed pop)	16.4	0.6	25.0	8.9	3.5	0.1	6.6	2.4
Overseas born (% of total pop)	9.0	6.4	11.8	1.7	10.8	6.3	18.7	3.7
Year 12 education (% of total pop)	21.6	18.4	26.9	2.4	24.9	21.1	29.9	2.9
Overseas in the past year (% of total pop)	0.5	0.3	0.7	0.2	0.5	0.3	0.8	0.2
Hindi (% of total pop)	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.0
Islam (% of total pop)	0.1	0.1	0.3	0.1	0.1	0.0	0.3	0.1
Christian (% of total pop)	70.2	63.5	76.5	4.2	75.0	68.4	80.9	4.7
Buddhist (% of total pop)	0.4	0.2	0.6	0.1	0.4	0.2	0.7	0.2
Catholic (% of total pop)	35.1	23.2	78.7	16.3	30.0	24.3	35.7	3.9
Family with children (couple with a child) (% of total pop)	48.6	39.5	58.9	5.7	49.1	48.4	50.2	0.6
Average income per capita ($ per week)	$535.4	$429.6	$615.8	$66.5	$336.9	$312.7	$363.5	$19.6
Expend. on antidepressants per capita ($ per year)	$12.0	$6.9	$18.9	$3.8	$17.2	$12.9	$23.0	$4.3
Expend. on other psychotr. meds. per capita ($ per year)	$15.1	$4.3	$32.3	$9.4	$8.9	$5.1	$13.1	$2.6
Psychiatrist services per 100 persons	1.1	0.7	1.5	0.3	1.6	0.8	2.1	0.5
GP services per 100 persons	332.1	254.0	377.4	43.2	452.9	368.4	529.1	60.8

Data sources: Australian Bureau of Statistics, 2001a; Australian Bureau of Statistics, 2006c; Department of Health and Ageing, 2010a, b.

The influence of contextual variables on suicide

The Poisson regression analysis in Table 7 shows the relationship between the independent variables and male suicide rates in metropolitan, regional and remote areas of Queensland. Results for female suicide can be seen in Table 8. The analysis controlled for the time period of death (e.g., 1998 to 2002, or 2003 to 2007).

Results for male suicide

As can be seen in Table 7, higher divorce was related to higher male suicide rates (IRR 1.10, $p<0.001$ in metropolitan, IRR 1.14, $p<0.001$ in regional, and IRR 1.30, $p<0.001$ in remote areas), while a higher proportion of Catholic persons in a population was related to a decrease in male suicide rates in metropolitan (IRR 0.51, $p<0.05$) and regional areas (IRR 0.57, $p<0.05$).

Aside from these common findings, the variables significantly related to male suicide differed between regions. For example, the higher proportion of Indigenous persons in the population (IRR 1.41, $p<0.05$) and higher employment in the agricultural workforce (IRR 1.21, $p<0.001$) were related to significantly higher suicide rates in remote areas; in contrast, higher education in a population was related to significantly lower rates (IRR 0.09, $p<0.001$). An increase in expenditure on anti-depressants was related to lower male suicide rates in remote areas (IRR 0.55, $p<0.05$). These variables had no significant effect in the other two regions.

In metropolitan areas, an increase in unemployment was related to a significant rise in male suicide rates (IRR 1.77, $p<0.001$), as was living overseas in the past year (IRR 1.08, $p<0.001$). Higher expenditure on 'other' psychiatric drugs was also related to a rise in male suicide (IRR 1.46, $p<0.001$). This variable had no significant effect in other areas. It appeared that a higher family composition (couple with a child) in the population was related to a significant decrease in male suicide rates (IRR 0.65, $p<0.001$), as was a higher proportion of males describing their religious affiliation as Christian (IRR 0.21, $p<0.001$).

In regional areas, an increase in the Hindi population was related to a decrease in suicides (IRR 0.86, $p<0.05$). As presented above, the proportion of the population which was divorced was associated with higher male suicide in regional areas; while the proportion of the population describing themselves as Catholic was related to a decrease in suicide rates.

Across all three areas, there was no significant relationship between GP or psychiatrist services per 100 persons and male suicide rates.

Table 7. Social-economic factors related to male suicide rates in metropolitan, regional and remote areas of Qld, Poisson regression results

	Metropolitan			Regional			Remote		
	IRR	CI low	CI high	IRR	CI low	CI high	IRR	CI low	CI high
AB and TSI (% of total pop)	1.12	0.91	1.37	0.89	0.71	1.12	1.41 **	1.04	1.90
Divorce (% of total pop)	1.10 **	1.02	1.17	1.14 **	1.01	1.28	1.30 ***	1.11	1.51
Unemployment (% of employed pop)	1.77 ***	1.41	2.23	1.22	0.95	1.57	1.98	0.62	6.33
Agricultural employed (% of total employed pop)	0.97	0.85	1.11	1.01	0.94	1.08	1.21 ***	1.14	1.28
Overseas born (% of total pop)	1.44	0.93	2.23	1.29	0.97	1.72	0.64	0.33	1.21
Year 12 education (% of total pop)	1.07	0.71	1.61	0.90	0.50	1.62	0.09 ***	0.04	0.22
Overseas in the past year (% of total pop)	1.08 **	1.01	1.16	0.84	0.62	1.14	1.02	0.47	1.21
Hindi (% of total pop)	1.00	0.88	1.14	0.86 **	0.74	0.99	0.84	0.53	1.33
Islam (% of total pop)	1.04	0.94	1.16	0.89	0.77	1.02	1.16	0.88	1.53
Christian (% of total pop)	0.21 ***	0.11	0.39	0.39	0.11	1.39	1.02	0.98	1.06
Buddhist (% of total pop)	1.05	0.91	1.21	0.99	0.81	1.21	0.79	0.53	1.19
Catholic (% of total pop)	0.51 **	0.28	0.94	0.57 **	0.35	0.93	1.40	0.98	2.01
Family with children (couple with a child) (% of total pop)	0.65 ***	0.54	0.78	0.55	0.17	1.82	0.30	0.07	1.30
Average income per capita ($ per week)	0.92	0.49	1.74	0.75	0.52	1.09	0.64	0.18	2.30
Expend. on antidepressants per capita ($ per year)	1.23	0.90	1.69	0.92	0.58	1.47	0.55 **	0.38	0.80
Expend. on other psychotropic drugs per capita ($ per year)	1.46 ***	1.17	1.81	0.84	0.57	1.25	1.12	0.58	2.17
Psychiatrist services per 100 persons	1.02	0.85	1.22	1.05	0.95	1.16	0.64	0.35	1.16
GP services per 100 persons	1.00	0.75	1.34	1.01	0.97	1.05	0.43	0.14	1.33

Notes: IRR refers to Incident rate ratio, controlling for year; * p <0.10 ** p <0.05 *** p <0.001; Lower CI refers to lower 95% confidence interval; Upper CI refers to upper 95% confidence interval; All variables except divorce and travelled overseas log transformed.

Results for female suicide

Results for female suicide can be seen in Table 8. In metropolitan areas, higher divorce in a population (IRR 1.12, $p<0.05$) and expenditure on 'other' psychiatric medication (IRR 1.03, $p<0.05$) were related to higher suicide rates. The Christian population variable (IRR 0.96, $p<0.05$) and GP services per 100 persons (IRR 0.79, $p<0.05$) were related to lower suicide rates. A higher proportion of females describing themselves as Hindi was related to lower suicide rates in regional areas (IRR 0.68, $p<0.05$). Variables related to a reduction in female suicide in remote areas included a higher Hindi population (IRR 0.57, $p<0.05$), GP services per 100 persons (IRR 0.16, $p<0.05$), and a higher proportion of families (i.e. couple with a child) (IRR 0.47, $p<0.001$), all of which were related to lower suicide rates.

Table 8. Social-economic factors related to female suicide rates in metropolitan, regional and remote areas of Qld, Poisson regression results

	Metropolitan			Regional			Remote		
	IRR	CI low	CI high	IRR	CI low	CI high	IRR	CI low	CI high
AB and TSI (% of total pop)	0.90	0.62	1.31	0.91	0.72	1.16	1.12	0.73	1.72
Divorce (% of total pop)	1.12 **	1.11	1.25	0.97	0.85	1.11	0.81	0.55	1.19
Unemployment (% of employed pop)	1.37	0.79	2.41	0.85	0.47	1.54	0.65	0.19	2.15
Agricultural employed (% of total employed pop)	0.91	0.74	1.13	1.03	0.91	1.17	1.19	0.98	1.45
Overseas born (% of total pop)	1.63	0.80	3.32	1.30	0.90	1.88	1.49	0.59	3.72
Year 12 education (% of total pop)	1.01	0.99	1.02	0.99	0.96	1.02	0.90	0.80	1.02
Overseas in the past year (% of total pop)	1.26	0.99	1.60	1.03	0.76	1.39	0.90	0.35	2.37
Hindi (% of total pop)	0.94	0.76	1.17	0.68 **	0.50	0.91	0.57 **	0.38	0.85
Islam (% of total pop)	1.02	0.87	1.19	0.91	0.71	1.17	0.84	0.62	1.13
Christian (% of total pop)	0.96 **	0.93	0.98	0.99	0.96	1.01	1.06	1.00	1.13
Buddhist (% of total pop)	1.06	0.92	1.21	0.99	0.68	1.45	0.69	0.17	2.71
Catholic (% of total pop)	0.98	0.94	1.02	0.99	0.96	1.02	1.07	1.01	1.14
Family with children (couple with a child) (% of total pop)	1.27	0.89	1.81	1.08	0.78	1.48	0.47 **	0.24	0.92
Average income per capita ($ per week)	1.59	0.80	3.21	0.66	0.13	3.31	0.99	0.98	1.01
Expend. on antidepressants per capita ($ per year)	1.07	0.39	2.94	0.51	0.24	1.12	0.81	0.27	2.46
Expend. on other psychotr. meds. per capita ($ per year)	1.03 **	1.01	1.06	0.95	0.90	0.99	1.07	0.95	1.20
Psychiatrist services per 100 persons	0.99	0.80	1.24	1.10	0.88	1.36	0.56	0.21	1.48
GP services per 100 persons	0.79 **	0.66	0.94	1.11	0.85	1.46	0.16 **	0.04	0.67

Notes: IRR refers to Incident rate ratio, controlling for year; * p <0.10 ** p <0.05 *** p <0.001; Lower CI refers to lower 95% confidence interval; Upper CI refers to upper 95% confidence interval; All variables except divorce and travelled overseas log transformed.

Limitations

Before discussing the results of the ecological study, we should acknowledge some caveats. The findings discussed below concern the relationship between population-level factors and suicide rates in Queensland, and are therefore not representative of risk or protective factors for individual cases of suicide. Instead, results of the analysis presented above demonstrate the importance of wider social variables on suicide within an area, rather than attempting to explain factors underlying or explaining individual suicides.

The reliance on material arising from the census is problematic for three main reasons. First, the data are rather distal in nature, particularly for the variable acting as a proxy for family (measured as person in a couple with a child) and the measure of agriculture (which also included forestry and fishing). Second, the material collected through the census is relatively static, due to the data only being collected at five-year intervals. Third, there were also a number of changes to the information and variables collected between the census conducted in 2001 and 2006 that may also influence results. It should be noted that, working closely with staff at the Australian Bureau of Statistics, we made every possible effort to resolve problems associated with this issue.

There are also limitations in the proxy used to measure psychotropic medication, as this only refers to those medications funded under the PBS and RPBS schemes. A further problem is that the medication expenditure variables cannot actually provide information about the actual use of medications, and refer only to expenditure. Similarly, while we provided a measure of GP and psychiatrist visits in each SSD, there is no way of assessing how many of these consultations were in relation to suicide. However, perhaps a more serious problem is the fact we could not control for repeat presentations to GPs and psychiatrists.

The geographical boundaries for some SSDs and regional classifications may have shifted during the time period under study. The small sample sizes in some SSDs were another problem and meant that several areas had to be aggregated together (see Appendix A). The small sample sizes in some areas also affected the calculation of rates (particularly for females); this explains the use of indirect standardisation methods. A further implication of the small sample sizes is the inability to provide analysis within different age-group and on different methods of suicide within the SSDs. For further information on this readers should refer to the Queensland Suicide Register report (De Leo et al, 2006).

Last, we must acknowledge that our analysis did not control for a number of social and individual factors that may influence results. At the individual level, we were not able to provide an accurate measure of mental diagnoses, the number of presentations for suicide ideation and behaviours made to health care professionals, and the specific suicide methods. At the wider societal level, we were not able to control for confounders such as alcohol use or the number of mental disorders in the population. This is particularly problematic given that rural and regional areas are thought to have higher alcohol consumption and more injuries attributed to suicide than metropolitan areas. We did try to provide some account of contacts with mental health professionals and treatment of mental disorders, but acknowledge that these are relatively crude and indirect proxies. It is also necessary to acknowledge the possible influence of migration between metropolitan, regional and remote areas over the time period of

the study. This may have produced a compositional effect, where the characteristics of residents determined the burden of suicide within different localities, rather than external contextual factors. For these reasons, the interpretations we have provided for results would need to be substantiated with further research.

Discussion

Results of the Poisson regression suggest both unique and common contextual influences on male and female suicide in metropolitan, regional and remote areas of Queensland. Among those factors that were common for males, divorce appeared to be related to higher suicide rates across all areas. Divorce had a significant and direct effect on female suicide in metropolitan locations (these areas also had the highest proportion of divorced females) but no significant effect in other areas. The greater sensitivity of male suicide to relationship breakdown has been documented in past research (Ide et al, 2010; Kõlves et al, 2010; Kposowa, 2003), which cites shame and stressful circumstances associated with legal negotiations, finances, and child custody issues following separation as possible contributing factors for suicide. From a wider societal perspective, divorce may increase the risk of suicide by reducing the frequency of family-based social support and bringing about more "anomic" economic conditions, where income is split between two households instead of only one (Stack, 1990). Considering that males tend to rely on informal support from a wife or partner for suicidality or mental health problems, rather than professional treatment, the loss of family connections may also explain the adverse effect of divorce on suicide (Möller-Leimkühler, 2003; O'Brien et al, 2005; Stack, 1990).

Catholicism (measured as the proportion of Catholic persons in a population) was related to a decrease in male suicide rates in both metropolitan and regional areas, while the wider proxy variable "Christianity" (inclusive of Catholicism, Anglican, Lutheran, Orthodox, Presbyterian, Uniting Church, Protestant, and other Christian religions) was related to lower male and female suicide in metropolitan areas. The proportion of the population that described themselves as Hindi was associated with lower rates of female suicide in regional and remote areas of Queensland. According to traditional perspectives in suicidology, religion encourages greater social integration and regulation in society and is therefore related to a lower risk of suicide (Durkheim, 1897/1951; Stack, 1982, 2000). Religion may also constitute a protective influence for suicide by encouraging help-seeking and communication (e.g., clergy may act as "gate-keepers"), providing social resources and support structures, reinforcing functional coping behaviours, and encouraging positive attitudes, beliefs, emotional states and feelings (Chatters, 2000). This explanation suggests that religion reduces suicide rates by increasing the capacity to respond to life crises and increasing social and community support.

As was hypothesised, there were a number of unique contextual factors influencing male suicide rates in remote areas. Indigenous population (measured as the proportion of the population that described themselves as Aboriginal and/or Torres Strait Islander) and agricultural employment were related to higher rates; whereas education and expenditure on anti-depressants were related to lower suicide. The influence of the first of these findings (Indigenous population) is likely to reflect the greater number of Indigenous persons in remote areas, and the fact that this population has markedly higher suicide rates than the non-Indigenous population (Ollapallil et al, 2008; Proctor, 2005). The increase in rates associated with employment in agriculture may also reflect the larger proportion of the population in farm-related jobs in remote areas, and the fact that persons employed in these occupations generally have higher rates than either the general population or those employed in other occupations (Andersen et al, 2010; Page & Fragar, 2002). However, the detrimental influence of this occupational variable may also reflect the greater access to lethal means used to suicide, such as firearms. The acceptability of firearms for controlling pests (such as wild pigs, rabbits and foxes) means that males involved in, or connected with, the farming and agricultural industries have greater familiarity with this possible suicide method (Klieve et al, 2009a). Gender normative behaviour, such as stoicism and lack of emotional expressiveness, are also likely to exacerbate higher rates of suicide in males within remote areas (Judd et al, 2006b).

Results for males suggest that expenditure on antidepressants were related to lower suicide rates in remote areas. At first, this finding appears somewhat confusing, considering that remote areas had the lowest expenditure on antidepressant medication. If a linear relationship between antidepressants and reduced male suicide truly existed, you could also expect to see this in metropolitan areas; however, as can be seen in Table 7, no such relationship is evident. A possible explanation may be related to the sub-populations of persons actually taking antidepressants in remote areas; whom, as shown in a study by Page et al (2009), tended to be older than 30 years of age. In addition to the treatment of depression, antidepressants may be prescribed in the management of chronic pain and insomnia, both of which are more common in elderly age-groups.

This may suggest that younger persons – one of the main groups 'at risk' of suicide in remote areas – are also least likely to be taking antidepressants (De Leo et al, 2006). Therefore, the positive effects of antidepressants on suicide may be confined to persons in older age-groups, rather than influencing the population most at-risk of suicide: the youth population. Findings from past ecological research in Ireland lends some support to this conclusion, by reporting that antidepressant prescribing is related to lower rates in older age-group but had no effect on suicide among younger age-group (Kelly et al, 2003). Therefore, our seemingly paradoxical finding regarding antidepressant expenditure may be due to contextual differences and the sub-populations actually exposed to antidepressants. However, given the distal nature of the independent variable, we cannot provide a firm explanation of the significant relationship between expenditure on anti-depressant medication and suicide. Because of this difficulty, we acknowledge the need for further investigation into different age-groups of suicides occurring in remote areas, as well examination of individual-level psychiatric or situational influences on suicide.

Another significant finding in remote areas related to the protective effect of education on suicide rates. Education has often been considered to be an indicator of human capital (Rose, 2000). Considering this, the beneficial effect of education on suicide in remote areas may be explained by an increase in human capital. Human capital is mainly discussed in the context of activities that increase the economic output of individuals over a long period of time, including expenditures on education, training and medical care (Becker, 1993). Therefore, achieving education up until Year 12 may be seen as a way of furthering the economic and employment viability of young persons in remote areas and, thus, associated with a decline in male suicide.

In metropolitan locations, male suicide was adversely affected by unemployment. This result aligns with previous research on the relationship between suicide and social factors (Chuang & Huang, 2007; Milner et al, 2010). Aside from the loss of a job, unemployment may increase the risk of suicide by creating the feeling of role loss. This may be particularly detrimental to males, considering the emphasis males place on the role of "breadwinner" (Möller-Leimkühler, 2003). The adverse influence of mobility (measured as the proportion of person who lived overseas in the past year) on male suicide may be indicative of wider disruption in social and community networks. In the past, researchers have argued that mobility within a neighbourhood reduces social integration (bonds and relationships in society), leading to higher risk for suicide (Congdon, 1996; Middleton et al, 2006, Thorlindsson & Bernburg, 2009). This may provide some explanation for our results.

A higher number of GPs services (per 100 persons) was related to lower female suicide in metropolitan and remote areas, perhaps providing support for past research on the relationship between GPs and suicide rates in a population (Mann et al, 2005). However, further investigation would be needed into how many of these GP services concerned the identification and management of suicide before this explanation can be confirmed. Expenditure on psychotropic medication, such as antipsychotics, anxiolytics, hypnotics and sedatives, and psychostimulants, was associated with an increase in female and male suicide within metropolitan areas. This may be related to the higher suicide rates of persons taking these types of medications in metropolitan localities, who may already be at high risk due to mental illness (Hawton et al, 2005; Siris, 2001) or other conditions for which psychotropic medication is prescribed, such as chronic pain. It is also necessary to consider that, compared to remote areas, there are more hospitals in metropolitan areas, as well as out-patient facilities and other services for mental health treatment (Dixon and Welch, 2000; Fraser et al, 2002). Therefore, the adverse effect of these psychotropic medications on suicide may be due to the influence of a specific high-risk sample group residing in metropolitan areas. However, confirming this explanation would require further analysis controlling for rates of individual mental health contacts and actual number of deaths due to overdose of psychotropic medications.

The proportion of males/females with a family (e.g., partner and child) was associated with a decrease in male suicide in remote areas and with lower female suicide rates in remote areas. These apparent protective effects of having children have been noted in previous studies in suicide research (Qin et al, 2003; Stack, 1997; Stack; 1996-97). A possible explanation for these results is that they provide an indication of social support – or social integration – in society (Durkheim, 1897/1951).

As noted, there were substantially fewer significant associations between contextual variables and female suicide. Durkheim (1897/1951) explained that females were more likely to be immune from the harmful effects of contextual changes in the social environment because of their greater involvement in the domestic sphere, particularly with family life (Kushner & Sterk, 2005). Comparatively, male gender roles are more heavily orientated towards occupation and financial factors, which may explain their vulnerability to factors in the social environment (Möller-Leimkühler, 2003). As reported above, those variables which appeared to be related to a decrease in female suicide rates included family (in remote areas only), religion, and GP services. However, the effect of expenditure on psychotropic medication was related to an increase in female suicide rates in metropolitan areas, as was divorce. Both these results were similar to findings from males in metropolitan areas.

Conclusions

Results of this ecological analysis suggest marked differences in suicide occurring in remote areas, compared to regional and metropolitan areas. This is not only apparent in terms of the sheer numbers of suicides in remote areas, but also in terms of the contextual influences on suicide rates. In remote areas, male suicide was mostly often connected to agricultural employment and the ethnic distribution of the population, as well as spending on antidepressants and education. In comparison, an increase in suicide in metropolitan areas was connected to other kinds of psychotropic medications, unemployment and population mobility. Regardless of area of residence, divorce was found to have a universally negative influence on the male suicide rate. There were fewer significant associations between contextual factors and female suicide, which supports the idea that males are more sensitive to environmental influences on suicide than women. However, female suicide appeared to be more strongly related to treatment services provided by GPs than males.

The different contextual influences on suicide in metropolitan, regional and remote areas indicate the need for contextually-relevant suicide prevention strategies, rather than a single and uniform intervention applied across all groups in a population. Specifically, results suggest the importance of greater focus on detrimental circumstances or 'risks' within a population, such as stressors associated with agricultural employment in remote areas, and unemployment in metropolitan areas. The negative influence of divorce indicates the need for suicide intervention and prevention initiatives to be directed at males undergoing relationship breakdowns.

Our analysis also suggested a number of protective elements, such as GP services access and anti-depressants in rural areas, as well as family and religious social bonds. Suicide prevention initiatives could capitalise on these positive influences through actively promoting family and friend networks as factors that are protective against suicide, and by training GPs in how to identify and manage suicide in rural areas.

Chapter Three

Individual-level factors related to suicide in rural and remote areas of Queensland

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As examined previously, suicide in rural areas is affected by myriad factors, some of which are unique from the experience of suicide in urban areas. Chapter Two presented an analysis of contextual factors on an aggregated level. This is crucial when we assess suicide risk at an individual level, especially considering that suicide risk and protective factors differ depending on wider social, cultural and economic environments. Consequently, Chapter Three will continue with individual-level analyses, comparing risk factors in rural and urban areas of Queensland. It will also illustrate statistical analyses with four rural case studies.

The aims of the quantitative analyses were:

- To assess suicide predictors in rural and urban regions by comparing rural suicide to rural sudden-death, and urban suicide to urban sudden-death; and,
- To compare the differences between rural suicide and urban suicide.

Methodology

Background and design of the study

This chapter will use information collected within the frames of the Australian Research Council Linkage Project (LP0562078) "Preventing suicide: A psychological autopsy study of the last contact with a health professional before suicide". This study used a case-control psychological autopsy study approach. The Psychological Autopsy (PA) method was applied when investigating completed suicides (study group) and sudden deaths (control group), aged 35+ years in QLD and NSW. The sudden death group included heart attacks, road traffic accidents (RTA) and other accidents, but excluded accidental overdoses, homicides and single vehicle RTAs. The PA obtained information from interviews with next-of-kin (NOK) and healthcare professionals about the deceased for both suicides and sudden deaths.

PA is a valuable tool both for determining the manner or mode of equivocal deaths and eliciting information from important sources including medical and police reports, personal documents, interviews with NOK, and clinical opinions from health professionals (Pouliot & De Leo, 2006). This method has been used in numerous suicide studies and it has been proved to be reliable and valid (Pouliot & De Leo, 2006; Hawton et al, 1998). It has also been considered to be an appropriate method to study suicide and other death survivors. Several researchers have observed the therapeutic effect of PA interviews on survivors (Hawton et al, 1998; Henry & Greenfield, 2009). They have found that PA is helpful to interviewees in allowing them to find meaning in the suicide, obtain social support, experience connectedness with others, accept the loss as real, and gain insight into their functioning (Henry & Greenfield, 2009).

Initial information about the deceased was gathered from the Queensland Office of State Coroner, Queensland Police Service (Queensland) and Glebe Coroners Court (Sydney). Subsequently, a letter introducing the study to potential informants, along with the study information sheet and consent form, was sent to participants. On receipt of the consent form, or a NOK's signed authorisation form (given by Queensland Police Service), clinical interviewers followed-up with a phone call to invite the NOK to participate and arrange a time and place for the interview. Clinical interviewers then conducted semi-structured interviews with the NOK of the deceased which lasted 1 to 3 hours. These interviews aimed to establish the presence or absence of recognised predictive factors for suicide by following a semi-structured format and using validated scales/questionnaires. During the study period (2006-2008), information on 261 suicide victims and 182 sudden death victims from NOKs was collected.

Healthcare professionals (HCP) were identified through the interviews with the NOK and with other HCPs, from coroner's files, and medical files (Queensland Health). HCPs were first contacted via a formal letter and followed-up approximately 1 week later by a phone call, asking agreement for participation. HCPs were offered $100 for their professional time. The HCP interview was conducted with professionals (e.g., GPs, counsellors, social workers) with whom the deceased had contact during the six months before death. The HCP interview took approximately one hour to complete. Information gathered in the interview included: a description of the last contact, treatment compliance, functional capacity, and a history of self-harm and suicidal behaviours. Information from 211 healthcare professionals (152 suicide cases) and 92 healthcare professionals (81 sudden death cases) was gathered. However, HCPs were only interviewed if they had seen the deceased within six months. Considering the aims of the present report, only information gathered from NOKs has been analysed.

The PA Study included a question about the geographical location of the deceased at the time of their death; this was based on ARIA+ categories. Consequently, for the present analysis, both cases and controls were divided into two groups: living in urban regions (metropolitan and inner regional) and living in rural regions (outer regional, remote and very remote). All NSW cases were excluded from the analysis as these study subjects only lived in urban areas; this could have presented a possible bias in the analysis. In total, the study included 50 suicide cases and 26 sudden-death controls from rural regions, and 150 suicide cases and 108 sudden-death controls from urban regions; all were aged 35+ years, in Queensland, and died between 2006 and 2008 (Figure 2).

The study was approved by the Griffith University Human Research Ethics Committee and South Eastern Sydney Human Research Ethics Committee.

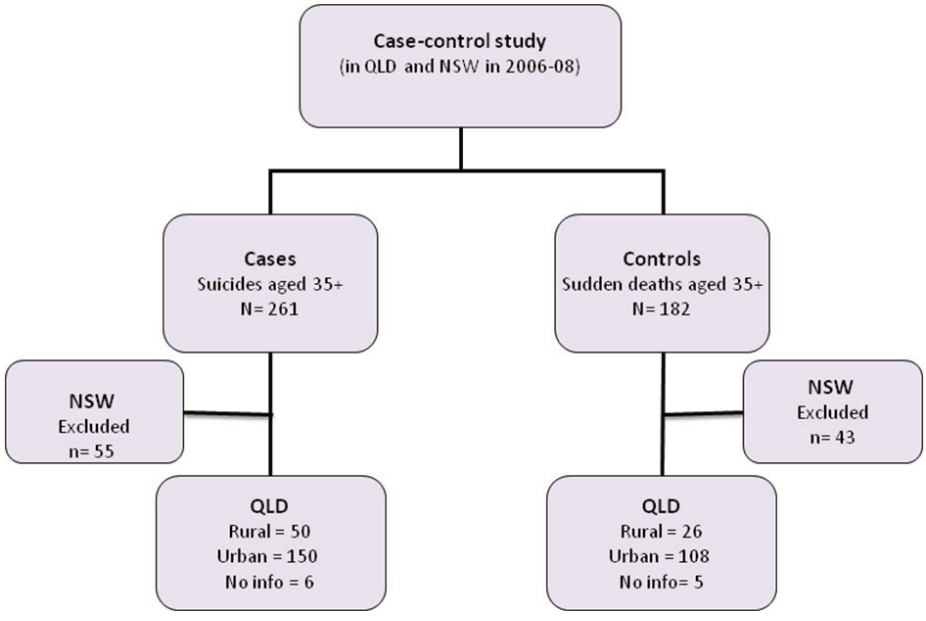


Figure 2. PA Study design

Dependent variable

The main outcome variable was suicide compared to sudden death, separately for rural and urban regions.

Independent variables

Predicting variables (independent variables) included different types of information gathered within the frames of the PA questionnaire. The questionnaire started with Demographic information which included gender, age, marital status, children, living arrangements, education level, employment status, residency status, ethnicity, religious affiliation.

Past suicidal behaviour and mental health was assessed via the history of previous suicidal behaviour/ ideation, suicidal behaviour in family members and/ or friends, interest of suicide in the media, history of mental health problems and hospitalisation, visits to healthcare professionals, and psychiatric diagnoses. Psychiatric disorders at the time of death were determined by the Structured Clinical Interview for DSM-IV (SCID-1; Spitzer, Gibbon & Williams, 1994). Consensus diagnoses were obtained between two psychiatrists.

Life events in the 12-months preceding the death included work, finances, relationships, family, health, legal events and bereavement.

Tests:

Considering that interactions between people are a complex phenomenon, the present study used the Bille-Brahe Social Support Scale, which brings out different dimensions of these interactions, such as receiving and giving practical and moral support to and from family and friends (Bille-Brahe & Jensen, 2004).

To measure personality, the NEO Five-Factor Inventory (NEO-FFI) was applied. The NEO-FFI is a shortened version of the NEO PI-R, designed to give quick, reliable and valid measures of the five domains of the adult personality (Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness; Costa & McCrae, 1992). The 60 items are rated on a five-point scale (0 to 4).

Overt Aggression Scale was applied to assess aggression (higher scores indicate to greater level of aggression; Yudofsky et al, 1986).

Information on Physical Health Status was obtained using standardised scales: The Cumulative Illness Rating Scale (higher scores indicate greater impairment; Linn et al, 1968); Instrumental Activities of Daily Living Scale (higher scores indicate greater impairment; this scale is applicable to elderly patients; Lawton & Brody, 1969) and Physical Self Maintenance Scale (higher scores indicate greater impairment; Lawton & Brody, 1969).

Statistical approach

To analyse the predicting variables of suicide, compared to sudden-death controls, separately for rural and urban regions, odds ratios (OR) with 95% confidence interval (CI) were used for categorical variables. To compare continuous variables in two groups, t-tests were applied. To compare the differences between the urban and rural suicide groups, Chi-square tests (χ^2) were applied for categorical variables. When calculating OR's or χ^2 in sub-groups with small numbers (fewer than 4), Fisher's exact test was used. A probability level of 0.05 was employed for all statistical tests. SPSS version 17.0 was used for data analyses.

Results

Background information

In PA studies, the information source and its reliability is very important. Table 9 shows that there were no significant differences between the informant's relationship to the deceased in cases of suicide and sudden-death, in either rural or urban areas. Furthermore, there were no significant differences between the rural and urban suicide groups (χ^2=0.33; df=3; p=0.955).

Table 9. Informant's relationship to the deceased

	Rural				Urban			
	Suicide		Sudden death		Suicide		Sudden death	
	N	%	N	%	N	%	N	%
Spouse/*de facto*	21	42.0	10	38.5	57	38.0	48	44.4
Parent	6	12.0	3	11.5	20	13.3	16	14.6
Child	10	20.0	6	23.1	34	22.7	25	23.1
Other relatives/friends	13	26.0	7	26.9	39	26.0	19	17.6
	χ^2=0.14		df=3	p=0.987	χ^2=2.72		df=3	p=0.437

No significant differences were found between the urban and rural suicide cases and their sudden-death controls by gender, age group, residency status, ethnicity and language background (Table 10). This might be considered to be frequency matching in a case-control study which makes the results from further analysis more comparable. This is especially pertinent in the present study which has a relatively limited sample size that does not enable adjustment within the analyses.

Table 11 presents marital status and presence of children, living arrangements, education, employment status and religion affiliation in suicide cases and their sudden-death controls. In both regions, people who committed suicide were less frequently married or single compared to the sudden-death controls, but this was not significant. Suicide cases were more frequently separated but this only reached significance in urban areas. Living alone was more prevalent among people who committed suicide while living with a partner and children was more prevalent in the sudden-death controls; again, this result only reached significance in urban areas. Compared to the sudden-death controls, both suicide groups were less likely to report Grade 12, and more frequently report TAFE, as their highest level of education. People who committed suicides were more often unemployed, and less often 'retired/pensioner or home duties', compared to the sudden-death controls in both areas, but significance was reached only in urban areas. Neither the presence of children nor religious affiliation was significantly different between the suicide cases and sudden-death controls. In urban and rural suicides, there were no significant differences with marital status, presence of children, living arrangements, education, employment status, and religious affiliation.

Table 10. Background information about the cases and controls by region

	Rural							Urban						
	Suicide		Sudden death		OR	95%CI		Suicide		Sudden death		OR	95%CI	
	N	%	N	%		L	U	N	%	N	%		L	U
Gender														
Male	38	76.0	21	80.8	0.75	0.23	2.43	113	75.3	77	71.3	1.2	0.70	2.15
Female	12	24.0	5	19.2	1			37	24.7	31	28.7	1		
Age group														
35-59 years	38	76.0	18	69.2	1.41	0.49	4.05	106	70.7	64	59.3	1.66	0.98	2.79
60+ years	12	24.0	8	30.8	1			44	29.3	44	40.7	1		
Residency Status														
Citizen	48	96.0	24	92.3	Fisher's ex test=0.603			141	94.0	96	88.9	1		
Permanent Resident	2	4.0	2	7.7				8	5.3	12	11.1	0.45	0.18	1.15
Illegal immigrant	0	0	0	0	-			1	1	0	0	-		
From a Non-English Speaking Background														
Yes	5	10.0	2	8.0	1.28	0.23	7.10	19	12.7	10	9.3	1.42	0.63	3.19
No	45	90.0	23	92.0	1			131	87.3	98	90.7	1		
Ethnicity														
Caucasian	46	92.0	23	88.5	1			141	94.0	104	96.3	1		
Indigenous	3	6.0	2	7.7	0.75	0.12	4.81	2	1.3	1	0.9	-		
Other	1	2.0	1	3.8	-			7	4.7	3	2.8	1.72	0.44	6.81

Table 11. Marital status, living arrangement, education and employment status

	Rural							Urban						
	Suicide		Sudden death		OR	95%CI		Suicide		Sudden death		OR	95%CI	
	N	%	N	%		L	U	N	%	N	%		L	U
Marital Status														
Single/never married	8	16.0	7	26.9	0.52	0.16	1.63	26	17.4	22	20.4	0.83	0.44	1.55
Married/De facto	24	48.0	14	53.8	0.79	0.31	2.05	68	45.6	55	50.9	0.81	0.49	1.33
Separated/divorced/widowed	9	18.0	1	3.8	Fisher's ex test=0.150			26	17.4	6	5.6	**3.59**	**1.42**	**9.07**
Divorced	7	14.0	3	11.5	Fisher's ex test=1.000			21	14.1	12	11.1	1.31	0.62	2.80
Widowed	2	4.0	1	3.8	Fisher's ex test=1.000			8	5.4	13	12.0	0.42	0.17	1.04
Having children (yes answers)	44	88.0	19	73.1	2.70	0.80	9.11	117	78.0	78	72.8	1.36	0.77	6.81
Living arrangements														
Alone	15	30.0	6	23.1	1.43	0.48	4.27	56	37.6	24	22.2	**2.11**	**1.20**	**3.70**
Alone with children	1	2.0	1	3.8	Fisher's ex test=1.000			4	2.7	4	3.7	0.72	0.18	2.93
With spouse/partner	15	30.0	10	38.5	0.69	0.25	1.86	40	26.8	28	25.9	1.05	0.60	1.84
With spouse/partner and children	6	12.0	4	15.4	0.75	0.19	2.94	20	13.4	26	24.1	**0.49**	**0.26**	**0.93**
With parents	3	6.0	0	0	Fisher's ex test=0.547			11	7.4	5	4.6	1.63	0.55	4.87
With friends/relatives	9	18.0	3	11.5	Fisher's ex test=0.529			13	8.7	13	12.0	0.70	0.31	1.57
Other	1	2.0	2	7.7	Fisher's ex test=0.268			5	3.4	8	7.4	0.43	0.14	1.37
Highest level of education														
Less than grade 10	11	22.9	5	20.8	1.13	0.34	3.73	31	22.1	31	29.2	0.69	0.39	1.23
Grade 10	18	33.3	9	37.5	1.00	0.36	2.75	51	32.9	31	29.2	1.39	0.81	2.38
Grade 12	7	14.6	6	25.0	0.51	0.15	1.74	17	12.1	27	25.5	**0.40**	**0.21**	**0.79**
TAFE	5	10.4	1	4.2	Fisher's ex test=0.656			21	15.0	8	7.5	2.16	0.92	5.09
University	7	14.6	3	12.5	Fisher's ex test=1.000			20	14.3	9	8.5	1.80	0.78	4.12
Employment status														
Employed (FT, PT or Casual)	19	38.8	11	42.3	0.86	0.33	2.72	60	40.0	45	41.7	0.93	0.56	1.54
Unemployed	10	20.4	3	11.5	Fisher's ex test=0.523			36	24.0	7	6.5	**4.56**	**1.94**	**10.69**
Retired, pensioner or home duties	17	34.7	11	42.3	0.72	0.27	1.92	42	28.0	52	48.1	**0.42**	**0.25**	**0.70**
Temporary, sick leave or other leave	2	4.1	1	3.8	Fisher's ex test=1.000			8	5.3	3	2.8	1.97	0.51	7.61
Other	1	2.0	0	0	Fisher's ex test=1.000			4	2.7	1	0.9	Fisher's ex test=0.403		
Followed a(ny) religion (yes answers)	14	28.0	6	24.0	1.23	0.41	3.72	55	36.7	45	41.7	0.81	0.49	1.35

History of suicidal behaviour and mental health

Previous suicide attempt(s) came out as a significant suicide predictor in both urban and rural regions (Table 12). Comparisons between rural and urban suicide cases showed that, while this was more frequent in rural (60%) than in urban cases (49.3%), it was not significant. A suicide in the family and/or friends was significant in urban areas but, despite considerable differences between suicide (46.9%) and sudden-death control (26.9%) groups, did not reach significance in rural areas probably due to the limited sample size. In both urban and rural areas, being interested in something regarding suicide in the media, stockpiling pills, making statements of hopelessness, and saying or doing something else to indicate the presence of suicidality were all significant predictors for suicide. However, these factors were not significantly different between rural and urban suicide cases.

Having at least one psychiatric disorder at the time of death (as determined by the SCID-I) was an important risk factor for suicide compared to sudden death in both regions. However, the risk was higher in rural areas in terms of odds ratios (OR; Table 13). Consequently, compared to the urban suicide cases (70%), there was a significantly higher prevalence of psychiatric diagnoses in rural suicide cases (84%) (χ^2=3.77, df=1, p=0.05). In rural and urban regions, mood (54% in rural and 51.3% in urban suicide cases), anxiety (40% in rural and 20% in urban suicide cases, a statistically significant difference: χ^2=8.00, df=1, p=0.005) and substance abuse disorders (38% in rural and 26.7% in urban suicide cases) were most prevalent. Mood and anxiety disorders were significant predictors of suicide in both areas; however, substance abuse disorders were only significant in urban areas (Table 13). Substance abuse disorders were similarly high in suicide and sudden-death control groups in rural areas (38% in suicide cases and 30.8% in sudden deaths).

Table 12. Suicidal behaviours and possible signs of suicide

	Rural							Urban						
	Suicide		Sudden death		OR	95%CI		Suicide		Sudden death		OR	95%CI	
	N	%	N	%		L	U	N	%	N	%		L	U
A suicide attempt in the family/friends	10	20.4	4	15.4	1.41	0.40	5.03	19	13.1	11	10.4	1.30	0.59	2.87
A suicide in family/friends	23	46.9	7	26.9	2.40	0.86	6.74	52	36.4	17	16.2	**2.96**	**1.59**	**5.5**
Something regarding suicide in the media interested the deceased before his/her death	9	19.6	0	0	**Fisher's ex test=0.022**			19	13.8	1	1.0	**Fisher's ex test<0.001**		
Interested in euthanasia	21	44.7	6	27.3	2.15	0.72	6.47	43	32.1	37	38.9	0.74	0.43	1.28
A member of an euthanasia group	2	4.0	0	0.0	Fisher's ex test=0.550			4	2.7	0	0	Fisher's ex test=0.140		
In the last 12mths, the deceased														
changed a will/express the intent	10	20.4	4	16.0	1.35	0.38	4.82	31	20.9	17	16.0	1.39	0.72	2.66
disposed personal possessions	9	18.4	2	7.7	2.7	0.54	13.57	35	23.8	8	7.5	**3.82**	**1.70**	**8.64**
stockpiled pills	8	16.7	0	0	**Fisher's ex test=0.047**			32	22.2	4	3.8	**7.14**	**2.44**	**20.90**
acquired a firearm	1	2.1	2	7.7	Fisher's ex test=0.281			6	4.1	0	0	**Fisher's ex test=0.040**		
made statements of hopelessness	33	70.2	3	11.5	**Fisher's ex test<0.001**			97	65.5	19	17.6	**8.91**	**4.89**	**16.24**
said or did anything else that indicated he/her was suicidal	36	75.0	4	15.4	**16.50**	**4.73**	**57.58**	94	63.1	5	4.8	**33.84**	**12.98**	**88.21**
Previous suicide attempt(s)	30	60.0	0	0	**Fisher's ex test<0.001**			70	49.3	7	6.5	**14.03**	**6.09**	**32.29**

Bolded results indicate significance level of 0.05

Table 13. Psychiatric diagnoses (determined by SCID-I) at death (multiple diagnoses allowed)

	Rural							Urban						
	Suicide		Sudden death		OR	95%CI		Suicide		Sudden death		OR	95%CI	
	N	%	N	%		L	U	N	%	N	%		L	U
Any diagnosis at death	42	84.0	11	42.3	**7.16**	**2.42**	**21.18**	105	70.0	35	32.4	**4.87**	**2.86**	**8.30**
Mood disorders	27	54.0	2	7.7	**Fisher's ex test<0.0001**			77	51.3	20	18.5	**4.64**	**2.59**	**8.30**
Major depression	8	16.0	1	3.8	Fisher's ex test=0.153			31	20.7	10	9.3	**2.55**	**1.19**	**5.47**
Melancholic depression	12	24.0	1	3.8	**Fisher's ex test=0.028**			34	22.7	4	3.7	**7.62**	**2.62**	**22.20**
Psychotic depression	0	0	0	0	-			1	0.7	0	0	Fisher's ex test=1.000		
Other depression	6	12.0	0	0	Fisher's ex test=0.089			8	5.3	4	3.7	1.47	0.43	4.99
Mood disorder due to GMC	0	0	0	0	-			0	0	1	0.9	Fisher's ex test=0.419		
Mood disorder due to substance use	1	2.0	0	0	Fisher's ex test=1.000			3	2.0	0	0	Fisher's ex test=0.267		
Manic disorder/bipolar	0	0	0	0	-			4	2.7	1	0.9	Fisher's ex test=0.403		
Psychotic disorders	5	10.0	0	0	Fisher's ex test=0.159			6	4.0	0	0	Fisher's ex test=0.244		
Schizophrenia	5	10.0	0	0	Fisher's ex test=0.159			5	3.3	1	0.9	Fisher's ex test=0.406		
Other non-affective psychotic disorders	0	0	0	0	-			1	0.7	0	0	Fisher's ex test=1.000		
Substance related disorders	19	38.0	8	30.8	1.38	0.50	3.79	40	26.7	12	11.1	**2.90**	**1.44**	**5.86**
Alcohol abuse disorder	15	30.0	5	19.2	1.80	0.57	5.67	28	18.7	9	8.3	**2.53**	**1.14**	**5.60**
Substance abuse disorder	6	12.0	3	11.5	Fisher's ex test=1.000			22	14.7	3	2.8	**Fisher's ex test=0.001**		
Anxiety disorders	10	40.0	2	7.7	**Fisher's ex test=0.003**			30	20.0	11	10.2	**2.21**	**1.05**	**4.63**
Dementia & other cognitive disorders	0	0	1	3.8	Fisher's ex test=0.342			0	0	2	1.9	Fisher's ex test=0.174		
Adjustment Disorder	4	8.0	0	0	Fisher's ex test=0.292			4	2.7	0	0	Fisher's ex test=0.142		

Bolded results indicate significance level of 0.05

Table 14 presents information concerning visits to healthcare professionals in the 3 months prior to death. In sudden-death controls, visiting a GP in the previous three months was slightly, but not significantly, more frequent, compared to suicide victims. Comparisons between the two suicide groups showed that this was more frequent in urban areas (77%), compared to rural areas (68.8%); however, this was not significant. Compared to the sudden-death control group, suicide group was more likely to visit a psychiatrist in the three months prior to death; however, there were no significant differences between rural and urban suicide cases (31.3% in rural and 28.4% in urban suicide victims). Multiple contacts were more frequent in suicide group compared to sudden-death control group in both areas, without any significant difference between rural and urban suicide cases (42.9% in rural suicide and 48% in urban suicide). According to the NOK, suicide victims had a higher risk of being diagnosed with a mental illness during their life, compared to their sudden-death control group, in both regions. Considering the previous analysis on psychiatric disorders at the time of death (SCID-I), this might indicate a considerable under-diagnosis of mental illnesses, not only in the suicide group but also among sudden-death controls.

Life events

The most frequent life events were related to family, relationships, work and finances. As presented in Table 15, work and financial events in the year prior to death predicted suicide in rural and urban areas (all specific life events are presented in Appendix B). However, relationship and legal events predicted suicide in urban areas; they did not reach significance in rural areas.

Table 14. Visits to MHC and medical history

	Rural							Urban						
	Suicide		Sudden death		OR	95%CI		Suicide		Sudden death		OR	95%CI	
	N	%	N	%		L	U	N	%	N	%		L	U
In the 3 months prior to death visited a														
GP	33	68.8	19	73.1	0.81	0.28	2.34	114	77.0	86	81.9	0.74	0.40	1.39
Psychiatrist	15	31.3	1	3.8	**Fisher's ex test=0.007**			42	28.4	5	4.6	**8.16**	**3.11**	**21.45**
Psychologist	3	6.1	2	7.7	Fisher's ex test=1.000			11	7.5	4	3.7	Fisher's ex test=0.283		
MH case manager	6	12.2	0	0.0	Fisher's ex test=0.087			13	8.8	1	0.9	**Fisher's ex test=0.005**		
Counsellor	2	4.2	1	3.8	Fisher's ex test=1.000			9	6.1	0	0	**Fisher's ex test=0.011**		
Social Worker	3	6.1	0	0	Fisher's ex test=0.547			2	1.4	0	0	Fisher's ex test=0.510		
Medical Specialist	2	4.1	3	11.5	Fisher's ex test=0.334			16	10.8	20	18.5	0.53	0.26	1.09
Hospital Doctor	12	24.5	2	7.7	Fisher's ex test=0.119			26	17.6	12	11.1	1.71	0.82	3.55
Other	5	10.2	1	3.8	Fisher's ex test=0.658			18	12.1	6	5.6	2.34	0.90	6.10
Known medical history	35	72.9	23	88.5	0.35	0.09	1.37	108	73.5	95	88.8	0.35	0.17	0.71
On medication at the time of death	30	63.8	19	79.2	0.46	0.15	1.47	107	73.3	86	81.9	0.61	0.33	1.12
Diagnosed with a mental illness	26	59.1	4	16.7	**7.22**	**2.11**	**24.72**	70	49.0	18	17.0	**4.69**	**2.56**	**8.58**
Number of health care professional contacts in 3 months prior death														
None	6	12.2	5	19.2	1			16	10.8	14	13.0	1		
One contact	22	44.9	16	61.5	1.15	0.24	5.34	61	41.2	62	57.4	0.86	0.36	2.06
Multiple (2+) contacts	21	42.9	5	19.2	3.50	0.60	21.74	71	48.0	32	25.9	1.94	0.78	4.82

Bolded results indicate significance level of 0.05

Table 15. Recent life events – 12 months prior to death (including chronic, ongoing)

	Rural							Urban						
	Suicide		Sudden death		OR	95%CI		Suicide		Sudden death		OR	95%CI	
	N	%	N	%		L	U	N	%	N	%		L	U
Work	23	46.0	5	19.2	**3.58**	**1.16**	**11.00**	63	42.0	23	21.3	**2.68**	**1.52**	**4.70**
Financial	23	46.0	4	15.4	**4.69**	**1.41**	**15.58**	56	37.3	18	16.7	**2.98**	**1.63**	**5.45**
Health	11	22.0	3	11.5	2.16	0.55	8.57	22	14.7	23	21.3	0.64	0.33	1.21
Relationship	27	54.0	9	34.6	2.22	0.83	5.91	68	45.3	16	14.8	**4.77**	**2.56**	**8.87**
Family	34	68.0	15	57.7	1.56	0.59	4.15	77	51.3	43	39.8	1.59	0.97	2.63
Legal	13	26.0	3	11.5	2.69	0.69	10.48	36	24.0	9	8.3	**3.47**	**1.60**	**7.57**
Bereavement	16	32.0	10	38.5	0.75	0.28	2.02	39	26.0	28	25.9	1.00	0.57	1.77

Bolded results indicate significance level of 0.05

Social support

Analyses using the Bille-Brahe Social Support Scale showed that, compared to the sudden-death controls, suicide victims received less moral support than they needed from family and friends in both regions (Table 16). In urban areas, giving less moral support than needed to family and friends came out as a significant predictor of suicide. However, there were no significant differences in receiving and giving practical support. The analyses did not show significant differences between urban and rural suicide victims.

Personality

Compared to sudden-death controls, suicide victims had significantly higher neuroticism and significantly lower agreeableness in both areas (Table 17). Extraversion was significantly lower in suicide cases, compared to sudden-death controls, in urban areas but not in rural areas. The only significant difference between rural and urban suicide cases was in the neuroticism score, which was higher in rural suicide cases compared to urban suicide cases (mean score 31.6 in rural suicide cases and 28.3 in rural controls; t-test=2.30, p=0.023).

The Overt Aggression Scale showed significantly higher aggression scores in suicide cases, compared to sudden-death controls, in both regions (Table 17). The general aggression score was significantly higher in rural suicide victims compared to urban suicide victims (mean score 7.6 in rural suicide cases and 5.8 in urban suicide cases; t-test=3.50, p=0.001).

Physical health

Using the Instrumental Activities of Daily Living Scale, the analyses did not find differences between the physical health of the suicide and sudden-death control groups in either region (Table 17). The Cumulative Illness Rating Scale (CIRS) and the Physical Self Maintenance Scale showed higher impairments in the sudden-death controls within urban regions. However, there were no differences in rural regions.

Table 16. Social Support using Bille-Brahe Social Support Scale

Social Support	Rural							Urban						
	Suicide		Sudden death		OR	95%CI		Suicide		Sudden death		OR	95%CI	
	N	%	N	%		L	U	N	%	N	%		L	U
Family - practical														
Receiving less than needed	8	16.0	1	3.8	Fisher's ex test = 0.153			18	12.0	8	7.4	1.71	0.71	4.08
Giving less than needed	5	10.4	0	0	Fisher's ex test = 0.155			12	8.0	5	4.6	1.79	0.61	5.24
Family - moral														
Receiving less than needed	21	42.0	4	15.4	**3.98**	**1.19**	**13.28**	62	41.9	18	17.1	**3.48**	**1.91**	**6.37**
Giving less than needed	9	18.4	1	3.8	Fisher's ex test = 0.150			21	14.4	4	3.8	**4.28**	**1.43**	**12.88**
Friends - practical														
Receiving less than needed	5	10.6	1	3.8	Fisher's ex test = 0.412			19	12.9	11	10.4	1.28	0.58	2.82
Giving less than needed	2	4.3	0	0.0	Fisher's ex test = 0.535			9	6.4	4	3.8	1.72	0.52	5.75
Friends - moral														
Receiving less than needed	19	38.8	3	11.5	**Fisher's ex test = 0.017**			52	35.6	14	14.0	3.40	1.76	6.57
Giving less than needed	3	6.4	0	0	Fisher's ex test = 0.548			13	9.2	2	2.0	**Fisher's ex test = 0.028**		

*compared to enough or more than needed

Bolded results indicate significance level of 0.05

Table 17. Physical health and personality based on scales used in the study

	Rural						Urban					
	Suicide		Sudden death				Suicide		Sudden death			
	m	SD	m	SD	t	p-value	m	SD	m	SD	t	p-value
Instrumental activities of daily living (scores 8-31)	9.9	2.9	9.8	5.8	0.12	0.903	9.5	3.4	9.3	4.0	0.47	0.642
Physical Self Maintainance Scale (scores 6-30)	6.2	0.6	6.5	1.8	-0.81	0.426	6.3	1.1	7.2	3.1	-3.14	**0.002**
Cumulative illness rating scale (scores 13-65)	20.0	5.2	19.0	3.4	0.91	0.364	18.8	4.1	20.1	5.5	-2.01	**0.041**
Aggression Scale (scores 0-16)												
Total	13.2	5.9	10.8	4.4	1.85	0.069	11.6	5.3	9.0	2.3	4.71	**<0.001**
General	7.6	3.8	5.9	2.8	2.04	**0.045**	5.8	3.0	4.8	2.0	3.04	**0.003**
Last Month	6.2	3.2	4.9	2.1	2.01	**0.048**	5.8	3.0	4.4	1.0	4.81	**<0.001**
Personality (NEO-FFI scores)												
Neuroticism (N)	31.6	8.5	18.5	8.1	6.58	**<0.001**	28.3	9.0	18.8	8.5	8.60	**<0.001**
Extraversion (E)	26.0	7.2	28.8	7.6	-1.54	0.130	24.9	7.8	28.0	6.9	-3.35	**0.001**
Openness (O)	25.4	5.5	24.7	5.6	0.50	0.620	24.5	6.7	23.8	6.0	0.89	0.376
Agreeableness (A)	26.6	8.2	30.3	7.3	-2.02	**0.048**	28.4	8.1	32.4	7.6	-3.96	**<0.001**
Conscientiousness (C)	31.7	8.5	34.2	6.9	-1.29	0.202	33.1	8.2	34.3	7.0	-1.20	0.231

Bolded results indicate significance level of 0.05

Methodological considerations and limitations

The methodological limitations of PA studies include their retrospective nature which is related to recall bias (Pouliot & De Leo, 2006 ; Kõlves et al, 2006). Further, recall bias and meaning reconstruction dictated the choice of deceased control subjects, over living subjects, as it has been observed that the bereavement process impacts the quality of information (Phillips et al, 2002; Pouliot & De Leo, 2006). There may also be limitations with factors such as levels of physical illness or stress with the use of sudden-deaths as controls. Additionally, it should be noted that the present study only analysed suicides and sudden-deaths which occurred in Queensland and where the deceased was aged 35+ years.

Furthermore, another limitation of the statistical analyses was the low sample size, especially in the rural group. This reduced the statistical power, and multinomial modelling was not applicable.

As indicated in Chapter One, various studies have made different distinctions between urban/rural areas and metropolitan/regional/remote areas (Dudley et al, 1998; Page et al, 2007; Taylor et al, 2005a; Miller & Burns, 2008). In the present study, ARIA+ categories were used to locate the deceased. However, due to limited numbers, the deceased were divided into two groups: urban (metropolitan and inner regional) and rural (outer regional, remote and very remote).

Individual case studies taken from the psychological autopsy study in Queensland

Four case studies from the Psychological Autopsy Study are presented below. These case studies illustrate the ways in which the different risk factors, examined within the quantitative data analyses, tangibly impacted on the suicidal processes of people living in rural and remote Queensland. Case studies were chosen based on the quality of information received from the NOK and HCP interviews to ensure that a full picture was provided. Furthermore, the case studies were also chosen to illustrate a range of risk factors experienced by people with different ethnic backgrounds, occupations and life experiences.

Case Study 1: Male Farmer

The deceased was close to 60 years old when he hung himself. At the time of his death, he was living with his son and the son's girlfriend. He had a Year 12 education and had been a farmer for 35 years. A psychological autopsy interview was conducted with his son.

Previously, he had made "an excellent living" from farming and his son was able to leave the farm to start an apprenticeship. However, after a natural disaster, "everything went downhill". There was a lot of work involved in the clean-up and the deceased lost two sheds and had to plough his crops into the ground. He was no longer able to make a living from his own farm, which he found very difficult, and which was also a source of depression. Consequently, the deceased had to start working for "a mate up the road". However, he was so "highly recommended by everyone around the district" that there were "about 10 other farmers chasing him to work for them". Yet, the change from running his own farm negatively impacted on his income and the deceased worried about paying bills.

Another consequence was that the deceased's wife started off-farm work to help ease the financial problems. However, during this time, she met another man and began "secretly seeing him behind his back". The deceased's wife left him two weeks before he died. This was a potential trigger. While the deceased had strong support from his friends in terms of farming, it did not appear that he talked to many people about his marital separation.

While the deceased had no diagnosis of mental illness, he lost interest in things he would normally like to do after his wife left. He stopped cooking and, if the son and his girlfriend hadn't been there, "he'd go crazy or starve to death". His son was away for periods and wasn't able to take care of him all the time, although his sister and girlfriend both provided support. The deceased's behaviour also changed somewhat. He would usually only have "a beer a month"; however, after his wife left, the deceased got very drunk three times, and once fell and cut his head. The son felt that this wouldn't have happened if he'd been there and so took time off work to care for his father. The deceased made several statements of hopelessness during this period: "I'm useless. She thinks I'm shit". He was also very worried during this time. He was restless, unable to sit still, and at the end of the day "he was just buggered, ended up falling asleep on the couch". He also started having panic attacks; he would be talking to his son, panic would seem to build up, and his son would calm him down again. The last panic attack happened two nights before he died. The deceased did not appear to suffer from anxiety or panic attacks before his wife left him. When the son suggested seeing a psychiatrist, the deceased initially stated he "didn't want no part of it". The son was eventually able to convince his father to see someone but he died before an appointment was made. The deceased had no prior history of self-harm or any suicide attempts. The night before he died, the deceased "wasn't very communicative, playing records". Early next morning, the son found him still alive but he died in hospital the next day. The deceased left a note "saying he loved us all".

The son felt that there was a lack of support in the area he lived. Lots of farmers were experiencing similar difficulties after the natural disaster and many were "too proud to ask for help... think you can handle it by yourself". After the death of his father, the son found that "lots of people" who were suicidal spoke to him to seek advice rather than see a GP or psychiatrist.

Case 2: Male Artist

The deceased was close to sixty years old, when he was found dead in his car having been overwhelmed by carbon monoxide fumes. At the time of his death, he was living with his daughter and her family as he had sold his house. He had a Year 12 education and had been on a disability pension for 15 years; however, he also had worked in the previous 18 months. Psychological autopsy interviews were conducted with his daughter and the mental health nurse involved in his psychological care.

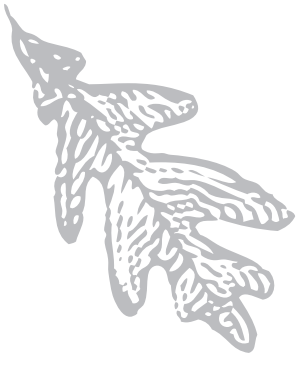
At the time of his death, the deceased "was very poor. He couldn't afford to eat" and, consequently, relied on his daughter for meals and financial support. The deceased was "extremely skinny" but was too proud to ask for help from other people. It upset him that he had to rely on his daughter so much. However, they had a very close relationship. The deceased had divorced his wife several years earlier but it had been very "messy" and he started going "downhill" soon after this. The daughter felt that he had still not recovered. In fact, in the months before his death, the deceased was upset as his daughter was planning to move away and he felt abandoned. The deceased only had meaningful contact with one daughter and her family; he was very lonely. His mental illness affected his relationships with other people at times and his manic episodes had made him the subject of gossip.

Due to external circumstances, the deceased was unable to finish building his house which was an enormous stressor in his life. His daughter felt that he was "living like an animal" as he had no running water, shower, toilet or kitchen. The daughter's husband had put in walls and a floor but the deceased was essentially living in a "shell of a house". He spent a lot of time in the bush around his house; he loved using a metal detector which meant that his house was "like walking into a museum". However, the sale of his house was perceived to be positive thing by both his daughter and mental health nurse but it required a lot of work. The deceased had to "pack up 20 years of his life", including horses, as it was a rural property. However, his daughter felt that this was an opportunity to change his material circumstances significantly.

The deceased had a long history of depression. His depressive episodes impacted significantly on his life where he would cry, wasn't able to do anything. He was very talented but often cancelled work opportunities because he was too depressed. However, in the months before his death, the deceased could become "very manic, very aggressive" at times. This was different from other times; his daughter felt that "she didn't know who he was... [he had] turned into a crazy man". He was diagnosed with affective bipolar disorder but the daughter was not convinced of this diagnosis as she claimed the hospital "threw that name around...gave him that label". She knew that he was not well as he had been institutionalised previously. However, she felt that he wasn't receiving enough help. Doctors thought he was more "eccentric" than ill and would give him medication, like valium, but no counselling. The deceased also suffered from panic attacks but he was able to hide these from his daughter; she only discovered the fact. For last 10 years, he had suffered from panic attacks, but when he saw doctors then they told him he was wasting their time. Panic attacks appeared to happen quite often; the deceased would even have them during "normal" situations, like having dinner. The deceased would "start thinking about things and then the panic

would start". His daughter reported that sometimes he would just jump into the pool and do 15 laps to get rid of the anxiety, or if he was angry as well, would drive away fast in his car until those feelings dissipated. He would cry a lot, especially in the last months, but always apologised afterwards. During this time, the deceased also made many statements of hopelessness: "didn't want to live, he'd had enough". However, the mental health nurse reported that the deceased was always compliant with his medications, especially in the last months.

The deceased had made at least three known suicide attempts. Both his daughter and mental health nurse knew about these attempts. His daughter said that 10 years ago, he had run into a wall as an attempt to break his neck, while the mental health nurse thought he had taken an overdose. In that same year, he had slit his wrists. However, his daughter believed it to be an episode of self-harm rather than a suicide attempt. In the same month he died, the deceased had attempted suicide twice. He took "a fairly large" overdose and then another the following week. His daughter felt that the deceased was "screaming for help" but the hospitals "just didn't do anything, they just passed him off". He was in a coma after the last suicide attempt, and was admitted for two nights, but the hospital made the daughter take the deceased home a few hours after he woke up. The day after the deceased and his daughter had a meeting with the mental health nurse to discuss his care and to ensure his safety. It was decided that his daughter would be in charge of his medication. The mental health nurse felt that the meeting was positive and their rapport was good. However, the next day, the deceased drove to his property and was found dead that evening; there was no note. The mental health nurse was surprised as he "thought he was going to be OK". The daughter was less surprised as the deceased had talked about death a lot in the recent weeks and had been trying to get his affairs in order; she felt that he had "got everything out". However, she was angry with the hospital's lack of care as "I've always known that one day he was going to do it but we could've got more time".



Case Study 3: Male Agricultural Worker

The deceased was in his forties at the time of his death. He died from an overdose in his car. He had been living with his mother. He had a Year 10 education and had been employed as an agricultural worker for a few months before his death. Psychological autopsy interviews were conducted with his mother, psychiatrist and mental health case manager, a psychiatric nurse.

He was divorced; his ex-wife had custody of his two children. They had ongoing arguments which greatly upset the deceased. He worried that his children would "think he was a loser"; however, while his daughter did not want much to do with him, his son had visited happily during the holidays. The deceased would often get into depressed moods after talking with his ex-wife; his mental health case manager felt that the divorce was "the backbone of his problems". His ex-wife gave him "mixed messages" about the status of their relationship and there were ongoing maintenance and custody issues. Every time he had contact with her, his self-harm and suicidal ideation would become more acute; these negative thoughts were "so damn hard to shift".

In the past, the deceased had issues with alcohol and drugs. When he met his case manager, he was seriously abusing alcohol, taking amphetamines and "taking whatever he could get his hands on". After crashing his mother's car, he moved to another town and "sorted himself out". When he moved back to his mother's house, he started drinking again but did not seem to take drugs anymore. The deceased was trying to get his life back on track. He was in contact with a former mentor which seemed to be a positive relationship. However, in the six months prior to his death, the deceased appeared in court as a result of his car accident as he was driving while intoxicated.

The deceased's mental health affected his employment. He could find work easily but could only manage a few days at a time before he'd become paranoid and "get quite stressed" and have to leave the job. It was felt that while the deceased "was a nice bloke... [he] would get himself into all sorts of dramas before he knew it". However, at the time of his death, he'd started working out in a gym, trying to become fitter so he could get a job in the mines.

The deceased was diagnosed with: bipolar disorder, according to his mother; chronic dysthymia, major depressive disorder, borderline personality disorder, alcohol dependency and amphetamine abuse, according to his psychiatrist; and, depression and chronic impulsive suicidality, according to his mental health case manager. The case manager did not agree with the borderline diagnosis as the deceased "had a lot of warmth about him...did have a lot to offer". The deceased saw many GPs and psychiatrists over the years and his medications were always changing; he was admitted to different hospitals and mental health units over the years. However, both the deceased and his mother liked his mental health case manager; the deceased would always attend his scheduled appointments and was always there for home visits. However, the case manager reported that he had to chase up the hospital for different reports or information whenever the deceased was admitted to hospital. The psychiatrist believed the deceased was not always compliant with his pharmacological treatment and, a few days before his death, stopped taking all his prescription medication and began self-medicating with alcohol and non-prescription drugs. The case

manager thought the deceased generally took his medication but prior to his death, "he just threw everything out the window... nothing was working, he just wanted to kill himself".

The deceased had previously attempted suicide more than three times. He had used different methods for these attempts including motor-vehicle accident, firearm and hanging. The deceased also threatened suicide once a week; when he was drunk, he would call his mother threatening to hang himself. He also kept a diary where he talked about his suicidal thoughts and expressed what he wanted done with his money after his death. His suicidal ideation often led to self-harm. On the day he died, the deceased returned from a GP's appointment concerning an unrelated health enquiry. He took the car and told his mother he was going to the beach. The deceased's psychiatrist "was always uneasy about him" and was not surprised at his suicide. His mother felt "he was finally at peace".

Case Study 4: Indigenous Male

The deceased was an Indigenous man who was in his thirties when he hung himself near his home. At the time of his death, he was living with his *de facto* partner; he had two biological children and one stepchild. He had not completed a Year 10-level of education; while he had worked as a seasonal fruit-picker, the deceased was unemployed at the time of his death. He had spent time in a correctional centre for unpaid debts. Psychological autopsy interviews were conducted with his *de facto* partner and the manager of the rehabilitation centre.

The deceased significantly abused alcohol. He would start drinking at four in the morning and continue until midnight; in the last five months of his life, he stopped doing any other activities. He had problems with his liver, a rash over parts of his body as he had stopped bathing, and problems with his memory; all of which were alcohol-related. He had stopped sleeping and "lost a lot of weight". As well as suffering many minor injuries, the deceased was hospitalised after suffering two alcohol-related seizures but "discharged himself" as soon as possible. His alcohol abuse also affected his employment; he had been unemployed for five months at the time of his death and would miss interviews. As a result, he was placed in a personal support program. The deceased had tried to stop drinking before but had never been successful for more than a year. When the deceased wasn't drinking, his "mood got better... [he was] very well". Yet, he "didn't drink much on the day of his death".

The deceased's children, and other family members, mentioned his alcohol use to his partner; however, it appeared that some "people would think he was OK but she knew differently". The deceased's alcoholism negatively impacted on his relationship

with his partner and caused many arguments. In the five months before his death, the deceased would do anything for a drink; he even stole money from his partner to buy alcohol. He had also cheated on her in the three months before his death. During this time, their relationship was turbulent and they had ongoing separations due to discord. However, the deceased appeared to be more upset about the injuries his son sustained after being severely beaten. The deceased seemed to have little contact with his daughter.

It appears that the deceased was never diagnosed with a mental illness. However, he was convinced that people were talking about him which was a source of worry. The deceased also often felt that "there were people outside talking but no one was there", but this would only happen after a night of drinking. In these states, he could also feel "itchy like something crawling on him".

The deceased had made many statements of hopelessness; he couldn't adequately provide for his family financially and he was unable to control his drinking. Most days before his death, he talked about "how bad" he felt about this. However, he generally wouldn't tell people about his problems or how he was feeling; the deceased "didn't communicate his thoughts".

The mother of the deceased's children died by suicide; the deceased had always said he would never leave his children in the same way. He knew about 20 people who had killed themselves over a few years. The deceased did not leave a note and had not given any statements that indicated that he had intentions of taking his own life. On the day of his death, he was shaking, "fidgety" and "craving a drink". Some of his friends were drinking together at the back of his house, just near the creek. Approximately half an hour after being seen by his stepson and a friend, he was found deceased. The deceased's case manager "was quite upset about this patient's death for several weeks".

Discussion

Using sudden-deaths as controls, the present chapter analysed the predictors of urban and rural suicide victims in order to assess risk and protective factors. Additionally, people who died by suicide in rural areas were compared with suicide cases in urban areas to examine differences in their experiences. Four case studies were subsequently presented to illustrate the quantitative analysis and demonstrate the ways in which risk and protect factors tangibly impacted upon the suicidal process of people living in rural areas.

Previous research has indicated that, while geographical location alone may not be a risk factor, life events that are more likely to occur in rural environments may increase vulnerability to suicide (Taylor et al, 2005a). General life events can include relationship breakdowns, financial problems, legal issues and physical illnesses; however, an event more unique to the rural context may be the impact of drought (Thacore & Varma, 2000). In the present study, when compared to sudden-deaths in rural areas, the significant life events which predicted suicide were reduction in income and those related to work. Furthermore, the questionnaire did not include life events specific for rural areas; events such as the effects of climate and weather (e.g., drought) may be influencing suicides in these areas. As illustrated in Case Study One, a significant stressor in the farmer's life was the loss of his farm in the aftermath of a natural disaster.

As indicated in the review presented in Chapter One, rural masculinity within Australia has been constructed in the frames of physical and mental strength, where problems are resolved quickly and physical violence may be normalised (Alston & Kent 2008; Bourke, 2003; Dempsey, 1992; Liepins, 2000; Lockie & Bourke, 2001). When rural men perceive themselves to be a 'failure', they might turn their aggression and disappointment inwards (Alston, 2010; Alston & Kent, 2008). This analysis found that scores of aggression and neuroticism were higher in rural suicide victims. Further, they were significant predictors in both urban and rural suicides, compared to the sudden-death controls. Interviews with NOK and HCP indicated a sense of failure negatively affected the men described in Case Study One, Case Study Three and Case Study Four.

Substantial literature has focused on help-seeking in rural areas. Resistance to help-seeking in rural areas has been related to the traditional rural masculine paradigm, stigma, lack of time (e.g., heavy farm work), and the lack of access to health facilities and services. However, a person living in a rural area may be more likely to seek help from general practitioners, as they are accessible and the help they provide is less stigmatised (Judd et al, 2006a). In the present study, when compared to those in the suicide group, visiting a GP in the three months prior to death was slightly, but not significantly, more frequent among the sudden-death controls. Comparisons between the two suicide groups showed that consulting a GP was more frequent in urban areas (77%), compared to rural areas (68.8%), but this was also not statistically significant. Further, visiting a psychiatrist in the three months prior to death was significantly more prevalent among to those in the suicide group, compared to sudden-death controls; however, there

were no significant differences between rural and urban suicide groups (31.3% in rural and 28.4% in urban suicide cases). Multiple contacts were more frequently made by the suicide groups in both areas. Case Study Two and Case Study Three both sought help from different healthcare professionals. However, the quality of help they received was questionable as the informants for both case studies mentioned various aspects with which they were dissatisfied.

While the help provided from experts is important, support from family and friends is also vital. Lack of social support and increased social isolation have been found to be important suicide risk factors in psychological autopsy studies from rural China (Zhang et al, 2004) and rural South India (Manoranjitham et al, 2010). The present study analysed the receiving and giving of moral and practical support from family and friends (Bille-Brahe & Jensen, 2004). Receiving less moral support then needed from family and friends was found to be a significant suicide predictor in rural and urban areas.

Previous research has indicated that reluctance to seek help may also be related to the perception that there is less diagnosed mental illness connected to suicide in rural areas (Judd et al, 2006b). Our findings showed that, according to the NOK, those in the suicide group in both urban and rural areas had a higher risk of being diagnosed with a mental illness during their life, compared to their sudden-death controls. However, the post-mortem psychiatric disorders determined by the SCID-I analysis indicated a considerable under-diagnosis of mental illnesses for those in the suicide and sudden-death control groups in both urban and rural areas. In Case Study One, the male was not formally diagnosed with depression or anxiety, although the NOK informant believed he suffered from both these disorders. However, SCID-I indicated a diagnosis of anxiety disorder.

In the present study, the prevalence of mental health disorders was higher in rural suicide (84%) compared to urban suicide group (70%), and more closer to the mean proportion found by previous systematic reviews of PA studies (close to 90%; Conner et al, 2001; Arsenault-Lapierre et al, 2004). Further, a recent meta-analysis has indicated a strong association between suicide, substance abuse and mood disorders (Yoshimasu et al, 2008). High-risk alcohol consumption in rural areas has been linked to increased vulnerability to suicide (Cantor & Slater, 1997; Miller et al, 2010). However, alcohol abuse disorder was not a predictor of suicide in rural areas, considering the similarly high rate of alcohol abuse disorder also found among the sudden-death controls. Case Study Four demonstrates the significant vulnerability that alcohol dependency can create where many of the deceased's stressors were directly caused by his addiction. It should also be noted that self-medication with alcohol may be used as a coping strategy in rural areas (Alston, 2010). Certainly, this was indicated in Case Study Three where, after unsuccessful pharmacological treatments, the deceased started drinking to replace antidepressants and other medication.

However, in both urban and rural regions, the presence of a mood disorders was a significant predictor for suicide, compared to sudden-death controls. There were no differences in the prevalence of the mood disorders between urban and rural regions. These results are similar to those from a Finnish psychological autopsy study which compared urban and rural suicides (Isometsä et al, 1997). Further, our analysis showed that anxiety

disorders were significantly more frequent in rural suicides (40%) compared to urban suicides (20%).

Similar to other psychological autopsy studies (Yoshimasu et al, 2008), our results indicated that previous suicide attempts were strong predictors for suicide, compared to sudden-death controls, in both urban and rural areas. In the same way, suicidal behaviours in the family and finding suicide of interest in the media were also strong predictors of suicide.

In the present study, no remarkable differences in physical health were found between those suicide and sudden-death control groups in urban and rural areas. However, this may be more indicative of the number of physical health problems connected to the sudden-death controls, as opposed to a lower prevalence of somatic problems in the suicide group.

Chapter 4

Suicide prevention initiatives in rural and remote areas of Australia

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As noted in previous chapters and the Living Is for Everyone (LIFE) Framework (2007), people living in regional and remote areas of Australia appear to be more vulnerable to suicide than people living in metropolitan areas.

The aim of this chapter was to provide an overview of the suicide prevention initiatives that target rural communities. We will first discuss suicide prevention initiatives for rural population in general, and then focus on two sub-populations within the rural environment that are at particularly high risk of suicide: farmers and Indigenous persons.

Methodology

A review of literature was conducted utilising the databases PubMed and Scopus. The key search words were suicide AND prevention AND intervention AND remote OR rural AND Australia. Additionally, we also reviewed web-sites that could provide information about suicide prevention interventions in rural areas of Australia. These web-sites were:

- Living Is for Everyone (LIFE) Framework;
- Suicide Prevention Australia; and,
- Centre for Rural and Remote Mental Health.

We also used search engines such as Google to search for rural prevention strategies. Our search method holds the possibility of finding a large number of rural suicide interventions currently implemented. However, we acknowledge the caveat that a number of interventions may have been missed due to a lack of available information at the time the electronic search was carried out. The review methodology focused on articles published in the past 15 years (1996-2010).

Results

The search methodology described above produced approximately 40 rural suicide prevention interventions. In this section we provide first an overview of identified suicide prevention programs and services for rural populations (see Table below), classified by their target population group into:

- Initiatives for rural population in general;
- Initiatives for farmers; or,
- Initiatives for Indigenous.

However, we found no evaluation studies of the rural suicide prevention services displayed in Table 18.

Second, we describe the aims, methods and outcomes of those interventions which have been evaluated in regards to suicide prevention in rural areas.

1. Overview of suicide prevention programs, services and activities in rural areas

Table 18 below lists 24 suicide prevention programs and services in rural areas of Australia: 11 programs target rural population in general; 5 target specifically farmers; and 8 target the Indigenous population. The Table shows the name of each intervention, a brief description of the services offered, and the mode of the intervention. The majority of interventions offer face-to-face or telephone counselling (n= 13), while a smaller amount offer online resources (n= 4) or training and community capacity building (n= 7).

2. Evidenced suicide prevention interventions in rural areas

Our search results indicate that few suicide prevention interventions for populations living in rural areas of Australia provided an evaluation of their outcomes. The activities and interventions with published evaluations of their outcomes are:

- Restricting access to means (e.g., firearms);
- The primary mental health-care model in rural Tasmania;
- Rural Mental Health Support line;
- Community Connections Program;
- The Sustainable Farm Families (SFF) project (although this was more focused on mental illness, rather than suicidal behaviours);
- The Shoalhaven Aboriginal Suicide Prevention Program (SASPP);
- The Family WellBeing program (FWB) (although this was more focused on community empowerment and connectedness than suicidal behaviours); and,
- Building Bridges: Learning from the Experts (Building Bridges).

The main characteristics of these interventions, including the results of their evaluation, will be discussed below. First, we present studies which have analysed the effects of controlling access to means, which is considered to be one of the most effective universal strategies to reduce suicide rates (Mann et al, 2005). Second, we will then move to other strategies specifically designed for suicide prevention in rural areas.

Table 18. Suicide prevention programs, services and activities available for rural populations

Name	Description	Mode of intervention
Initiatives for rural population in general		
Australians Creating Rural Online Support Systems (ACROSSnet)	An online resource which aims to help members of rural and remote communities access information, education and support regarding suicide and its prevention	Internet
CRANA Bush Crisis Line and Support Services	Confidential 24-hour Support Line Phone offering psychological support for rural health practitioners and their families.	Telephone
Beyondblue	Provides self-help tools, information and resources about depression (available via the internet and "don't beat around the bush" buses visiting rural areas) and telephone counselling.	Internet Telephone Face-to-face
Lifeline Australia	24-hour crisis counselling for those in rural areas, staffed by psychologists with rural and remote experience.	Telephone
Centrelink	Provides financial and support services that enhance the well-being of farming families and rural communities.	Telephone Face-to-face
Mensline Australia	24 hour professional counselling service for men in rural areas.	Telephone
Mensheds Australia	Support group specialising in the needs of men, their health and well being, and their communities in rural areas.	Face-to-face
Rural Alive & Well	Provides counselling and support groups. Aims to reduce the stigma associated with mental illness, and suicidal behaviours for men and families seeking help.	Face-to-face
Eheadspace	Online counselling for young people aged 12 and 25 years as part of Drought Reform Measures in Western Australia	Internet
E-hub: e-mental Health Research & Development	Development and evaluation of websites that deliver psycho-education and psychological interventions for common mental health problems, as well as clinical and consumer networking. Provides links to mental health resources available for persons in rural areas.	Internet

Name	Description	Mode of intervention
Royal Flying Doctor Service, Drop the Rock project	Provides clinical counselling services; promotes mental health and social and emotional wellbeing (MH/SEWB), prevention and early intervention activities; Consultation to range of Primary Health Care and other Service providers regarding MH/SEWB; Development of Indigenous capacity to address MH/SEWB issues across Cape York.	Face-to-face
Initiatives for farmers		
NSW Farmers Association Mental Health Network	A group of agencies and individuals working together to improve the mental health and wellbeing of farming communities.	Internet
Salvation Army	12 Rural Chaplains cover most of NSW, ACT and QLD. Rural Chaplains conduct regular visits to farmers and rural workers offering pastoral care, emotional support and practical assistance.	Telephone Face-to-face
SANE Helpline	Offers a wide range of information on mental illness and suicide prevention. Recent research indicates that a large number of consumers come from rural areas.	Telephone Internet
Farm-Link Project	Offers new types of service delivery for rural mental health services. There are three critical components attached to the project: 1) the provision of Mental Health First Aid to frontline agricultural workers; 2) the linking of services related to farmers and mental health and the development of a networked knowledge about services for people in rural areas; and, 3) mapping pathways to care.	Face-to-face
Working with Warriors	A DVD to assist farmers and their families to understand rural men's mental health, including the issues created by excessive stress and depression, and the need to seek professional help if under pressure.	DVD
Initiatives for Indigenous persons		
Alive and Kicking Goals	A suicide-prevention peer-education program aimed at Indigenous youth in the Kimberley region, WA. It is positively framed and centred on enhancing protective factors by esteem building, leadership training, and empowerment.	Face-to-face

Name	Description	Mode of intervention
Hope, Opportunity, Purpose, Education and Employment or (H.O.P.E)	Provision of psychological and coordination services to young Aboriginal and Torres Strait Islander students at risk of suicide and self harm in the Mildura area.	Face-to-face
Koori Kids Wellbeing Project	Provides mental health promotion programs and intensive counselling and psychological support for Aboriginal children. Also provides a parent education program and training about mental health and the wellbeing of Aboriginal children for local services.	Face-to-face
Map of Loss	Provide workshops that help individuals develop self coping and resilience skills with a focus on Aboriginal communities and Aboriginal Health Workers. The project also provides professional development on mental health issues for Aboriginal Health Workers.	Face-to-face
Something Better, Queensland Police Citizens Youth Club (PCYC)	Supports youth, improves communities through partnerships and programs, and promotes physical, and mental and social welfare of Indigenous youth.	Face-to-face
Suicide Story Training Project, Mental Health Association of Central Australia	Suicide Story is a training resource developed with Indigenous people that uses film, animation and music on DVD, in conjunction with interactive learning to contribute to an increased level of understanding about suicide and the skills necessary to intervene when someone is at-risk.	DVD
Sustainable Personal Development for Aboriginal Men, Centacare Catholic Family Services – Port Pirie Diocese	Equips Indigenous men aged 15-45 years to more effectively manage challenging life situations and also provides guidance counselling services internally and to other agencies.	Face-to-face
Yiriman Project, Kimberley Aboriginal Law and Culture Centre	Develop a culturally-appropriate suicide prevention program for Indigenous people in the Fitzroy Valley; foster networks and working relationships with community groups, service providers and government agencies with a focus on mental health and alcohol and drug issues. Undertakes a positive town-based activity that relates to young people's interests, promoting strong positive messages and role models in a safe, healthy space.	Face-to-face

Availability of means

Worldwide, restricting access to means has been observed to reduce suicide rates, especially with gun control legislation (Hawton et al, 1998; Kapusta et al, 2007; Lampert & Silva, 1998; Mann et al, 2005). This may be particularly important in the rural Australian context, as up to 75% of rural male suicides in Australia used firearms (National Rural Health Alliance, 2009). There are several studies on the effects of firearm restrictions on suicide. These are not interventions per se, as observations are based on changes in suicide rates post-hoc and can therefore only been viewed at the aggregated level as a type of "natural" experiment.

Past research has found that the group most likely to use firearms in Queensland were older males from rural areas (Klieve et al, 2009a). Relatively easy access to lethal methods, such as firearms, in rural communities may contribute to a higher rate of suicide. However, it should be noted that research regarding the relationship between the accessibility of firearms and total suicide rates have not been consistent.

For example, between 1988 and 1997, suicide rates in Australian non-metropolitan areas, among the age-group 15-24 years and 25-34 years, remained higher despite the decline in firearm suicide following the imposition of access restrictions (Willkinson & Gunnell, 2000). Of concern, rates of hanging among both sexes and age-group (15-24 and 25-34) have approximately doubled in metropolitan and non-metropolitan areas over the analysed time (1988-1997). These trends suggest that, although legislation can reduce method-specific suicide, the potential for method-substitution means that overall rates may not fall (Willkinson & Gunnell, 2000). However, later articles have questioned the substitution theory (De Leo et al, 2003).

Two other studies, both conducted in Queensland, question the ability of method restriction to reduce suicide rates (Cantor & Slater, 1995; Klieve et al, 2009b). Cantor et al reports that firearm suicide rates declined significantly in metropolitan and provincial city (regional) areas post-legislation; however, while suicide rates in rural areas (remote) actually slightly increased (from 7.2 to 8.2 per 100,000).

Another Queensland study, compared suicide trends pre-National Firearms Agreement (NFA) (1988-1996) with those post-NFA (1997-2004) (Klieve et al, 2009b). The results showed that declines were actually occurring before the implementation of the NFA. While this study did not provide data on the effect of rurality, it emphasised that the implemented restrictions may not be responsible for any observed reductions in suicide.

The primary mental health-care model in rural Tasmania

In the late-1990s, the primary mental health-care model in rural Tasmania, a project which lasted three years, was implemented in a geographically-isolated area of north-east Tasmania (Malcolm, 2002). The project addressed the high rate of suicide in this particular region of Tasmania by employing a mental health worker (MHW) to work locally with GPs, patients, and the community. His service was widely advertised as a free counselling service; patients could self-refer or be referred by doctors, other health workers or their family. The MHW aimed to achieve several objectives, which included: improving the counselling skills of GPs and the skills of other primary health-care workers in identifying, referring and counselling suicidal people; educating community groups and individuals about mental illness and the help available; educating and liaising with other counselling services; providing one-to-one counselling for patients; and undertaking research into the prevalence of mental illness in the area. Over the course of the project, it appeared that awareness in the community about mental illness and the availability of treatment improved, stigma connected to such a diagnosis decreased, and the isolation felt by doctors in rural areas was alleviated by increasing interactions between various counselling services. During the project, there were two suicides, both of which occurred in the first year, whereas in three years prior, there were eight suicides in the project area. However, due to the limitations of the project (small numbers and a lack of control for other possible influences), this reduction cannot be attributed to the project itself.

Rural Mental Health Support line

The Rural Mental Health Support line is a 24-hour 7-day-a-week support service funded by the New South Wales Health Office of Mental Health and Drug and Alcohol. It was implemented in late 2004 to provide telephone counselling for persons experiencing prolonged drought and locust plagues. It aims to provide farmers and other members of rural communities with quick assistance with mental health problems through the provision of basic triage, referral, self-care advice and brief supportive counselling to callers (Crockett et al, 2009). The evaluation of the support line was conducted in regard to the telephone counsellors self-rated alignment with the key goals and aims of the support line. Staff working on the phone-line indicated their main tasks involved providing referral to drought support, counselling and mental health services, and supporting callers who felt that they had exhausted all other resources and had been encouraged to ring by other service providers. Staff also reported that they perceived the consumers' needs were being met, but that further evaluation needed to be undertaken to confirm that view.

While this evaluation study provides some indication of the issues raised by the consumers of support lines in rural areas, more detailed assessment is necessary, particularly in regard to suicidal thoughts and behaviours.

Community Connections Program

Developed in 2007, the Community Connections Project, auspiced by The Older Men's Network (TOMNET), addressed several suicide risk factors that impacted older men in rural areas, such as social isolation, mental illness, and reluctance to seek help. The main aim of the project was to develop and implement more effective and innovative suicide prevention strategies in the regional and remote locations surrounding Toowoomba in South-West Queensland (Macgowan et al, 2009). Importantly this program was framed within the perceptions and experiences of older men in this region (Ferrier at al, 2009).

The program's outcomes were externally evaluated with questionnaires and focus groups with different people including clients, volunteers, key stakeholders and rural men's groups; client assessment data was also compared (Ferrier at al, 2009). The evaluation found that more than 50 at-risk older men had received individual outreach peer support and they had predominantly been highly satisfied with the volunteer peer support program. Men's help-seeking behaviour improved and they felt better able to self-express; however, their feelings of isolation improved only slightly (Ferrier at al, 2009). This was supported by some direct evidence and much indirect evidence, such as increasing social inclusion, creating supportive environments for self expression and help seeking behaviour. The evaluation allowed the Community Connections Project to be improved and it remains an active program within the region.

The Sustainable Farm Families (SFF) project

Even if help is available, people in rural communities may not seek it due to their attitudes towards their physical and mental health (Welch, 2000). Consequently, the Sustainable Farm Families (SFF) project, which commenced in 2003, focused on changing farmers' attitudes to health in regional and remote areas of Victoria (Brumbly et al, 2009). The SFF project particularly focused on occupational injuries, which may include a number of unrecognised or "hidden" suicides (Brumbly et al, 2009). Using an inter-sectoral collaboration, involving health services, universities, agricultural agencies, training organisations and farming communities, the project sample consisted of 321 families within broadacre- and dairy-farms. Health information and education was delivered to men and women from these families, aged 18-75 years, using a workshop format over three years. In year one, participants completed a structured two-day workshop; in years two and three, they completed a one-day workshop. The topics covered were linked to relevant health issues predominant in farming and rural populations but also included stress and stress management.

The results from this project showed that health issues, such as high-risk alcohol consumption, mental health problems and sub-standard levels of occupational health and safety, were often underreported by family members. Following the workshops, participants began to put into practice their new knowledge about farm safety and family

connectedness. An evaluation of the SFF program showed that 30% of participants specifically acted to improve their health while 54% were concerned with improving their health in terms of farm safety (Brumbly et al, 2009). In addition, 24% focused on improving their health and wellbeing by taking holidays or spending more time with their family. During the course of the project, SFF was considered to have: empowered farmers' knowledge and skills; collected physical assessment data; strengthened community action and planning; used inter-sectoral collaboration; provided an evidence-base to improve the health of farming families; and, increased knowledge–sharing between other health professionals. Additionally, it demonstrated the importance of engaging farmers with health professionals in relevant ways (Brumbly et al, 2009). While suicide was not evaluated as an outcome, the workshops may have indirectly contributed to suicide prevention by encouraging awareness about physical activity, stress, anxiety and depression. More specifically, they address the following LIFE Areas for Action: Action Area 2 - Building individual resilience and the capacity for self-help; Action Area 4 - Taking a coordinated approach to suicide prevention; and, Action Area 5 - Providing targeted suicide prevention activities (Living Is for Everyone Framework, 2007).

The Shoalhaven Aboriginal Suicide Prevention Program (SASPP)

The SASPP is one of the few evaluated programs that focused on suicide. The project used a pre-/post-workshop evaluation (Capp et al, 2001) as well as a 2-year follow-up evaluation (Deane et al, 2006). Conducted in 1999 in a few Indigenous communities along the south-east coast of NSW, the SASPP primarily used community gate-keeper training. Eight free, one-day workshops were held which aimed to strengthen the capacity of the local Aboriginal community to identify individuals at-risk of suicide, mobilise local networks and, where necessary, facilitate help-seeking. The structure and content of the workshops was developed following community consultation; 11 discussion groups were helped which included 110 participants (97 of whom were Indigenous). The workshops also sought to identify factors associated with suicide in the local area, barriers to help-seeking, and how suicide prevention information could be disseminated within the Indigenous community. Fifty-seven people attended the workshops (84% of whom were Indigenous); 44 (92%) of the 48 Indigenous participants were included in the evaluation. While a significant increase in the participants' knowledge about suicide was indicated in the pre-/post-evaluation results, there was no increase in the participants' intention to help someone displaying suicidal behaviours (Capp et al, 2001). However, this may reflect a sample bias, as the participants

reported an extremely high intention to help prior to the gate-keeper training. Further, as participation was voluntary, the high levels are probably a function of a highly-motivated sample. Indeed, attitudes and barriers were found to be significant predictors of an intention to help: positive attitudes towards seeking help were positively-related while barriers were negatively related.

A two-year follow-up evaluation of the SASPP project revealed a significant relationship between the intention to help prior to the workshop and whether participants had actually helped a person at-risk of suicide (Deane et al, 2006). However, when the post-workshop evaluation was compared to the two-year follow-up, some concerns were raised. There appeared to be a relatively weak relationship between post-workshop intentions and a participant's confidence to actually help; there was also a distinct decrease in participants' intentions to make a mental health referral. Additionally, evidence as to whether this program was effective in its goal of reducing suicide rates was lacking (Deane et al, 2006).

The Family WellBeing program (FWB)

The Family WellBeing program (FWB) was developed by survivors of the Stolen Generation based in Adelaide and it specifically addresses the impacts of colonisation on the emotional health and well-being of Indigenous Australians. It seeks to empower people to take greater control over the conditions affecting their lives and places a particular emphasis on quality parenting and relationship skills. The evaluation methods have included: literature reviews; participant observation, where the principal evaluator participated in the course; analyses of the FWB course evaluation sheets which were completed by participants; and, narrative analyses, which examined graduates' reflections on the specific ways they had used the skills and knowledge learnt during FWB. The evaluation found that FWB positively impacted on resilience, problem-solving, social skills and the creation of positive role models (Tsey et al, 2005). It also showed that 'outsider status', a potential barrier experienced by non-Indigenous researchers, can be alleviated using the participant observation approach (Tsey, 2000). Participating in this way made others feel comfortable enough to share highly sensitive, and often traumatic, experiences with the evaluator. However, it should be noted that these evaluations may be influenced by self-report bias and the utilisation of participant feedback as the prevailing assessment measure (Tsey, 2000).

Building Bridges: Learning from the Experts (Building Bridges)

The Building Bridges Project, a suicide prevention strategy implemented across four communities, was also recently evaluated. These communities were Yarrabah, Hope Vale and Kowanyama in Far North Queensland (ex-Deed of Grant in Trust communities), and Dalby, a mixed rural community in South-West Queensland (McKay et al, 2009). The Building Bridges Project built on, and extended, responses to self-harming and suicidal behaviours developed in Yarrabah during the 1990s. Yarrabah's prevention activities were designed to protect at-risk individuals by strengthening and empowering both the individual and the community in which they lived. However, Building Bridges was innovative in that it utilised horizontal knowledge-sharing within and across communities to increase awareness of suicide risk and protective factors. Experiences, skills and knowledge from each community were shared via Men's Groups, FWB and HITnet (interactive information kiosks). Participatory Action Research (PAR) methodology ensured the research team worked collaboratively within the communities, learning from experiences specific to each community, and adjusting activities accordingly, to better implement and disseminate suicide prevention activities (McKay et al, 2009).

The evaluation process incorporated focus groups and one-on-one interviews with project officers, participants, service providers and members of the community in all four communities. Information gathered from these focus groups and interviews made clear that the activities strengthened community connectedness, increased community capacity and strengthened empowerment. Further, community participants perceived the project to be successful based on (seemingly small) changes that directly affected them. However, the short-term nature of Building Bridges, and the myriad other interventions also occurring in these communities, made it difficult to assess the impact of activities on any changes in the self-harm and suicidal behaviours that occurred in each community.

Discussion

In this chapter, we conducted a literature review of the suicide prevention initiatives for rural communities in Australia. This included a search of appropriate databases for any relevant publications, as well as a search of relevant web-sites for suicide prevention programs and services implemented in rural areas. The main aim of the literature review was to identify existing suicide prevention initiatives (i.e., programs, services, and initiatives). The identified initiatives were classified into three groups:

1. Suicide prevention initiatives for rural population in general
2. Suicide prevention initiatives for farmers
3. Suicide prevention initiatives for Indigenous population

For all of these groups – the rural population as a whole and the two sub-populations (farmers and Indigenous population) – recommendations were provided and discussed.

Overall, we found that:

- More activities are based in the provision of recommendations than active interventions for suicide prevention for rural populations;
- The majority of programs address the issue of suicide prevention indirectly (e.g. via strengthening community networks);
- Indirect suicide prevention approaches in rural areas often address variables on a collective level, such as community attitudes towards help-seeking or farmers' attitudes towards health;
- Only few programs report about any results of their activities; and,
- There are very few programs where an evaluation of outcomes is available. Further, most evaluations were not conducted in parallel with a 'control group', which makes it difficult to account for other possible environmental or individual factors that brought about the noted changes.
- Due to these factors, it was difficult to assess whether interventions in rural areas actually made a difference in terms of a reduction in suicide.

Aside from this, another important consideration for the future of any suicide prevention program is whether it can be naturally sustained within a community after project completion. This is especially vital in rural areas given their already scarce resources. Indeed, sustainability can be considered an indirect measure of a program's effectiveness; the more positive community changes following the implementation of a program, the more likely these changes will enhance resilience to and reduce the risk of self-harm and suicidal behaviours in that community. However, it must be noted that sustainability and effectiveness are not necessarily positively-related concepts. This means that ongoing evaluation should remain a vital component of any effective suicide prevention program in Australia (LIFE, 2007). Additionally, it is equally important to monitor any negative or harmful effects that may occur as determining suicide prevention approaches that may reduce suicide rates.

Conclusions

As in any other part of Australia, suicide in rural areas is likely to be driven by complex individual and contextual factors. At the macro-level, these may include wider social, economic, cultural stressors and climate-related factors associated with, and impacting upon, the agricultural industry. It is also necessary to consider other factors such as mental and physical illnesses, access to treatment services, inappropriate use of alcohol and drugs, and the availability of lethal suicide methods as risks for suicide.

This report has presented a holistic analysis of suicide in rural Australia from a number of perspectives. Chapter One analysed the literature on Australian rural suicide which dissected risk and protective factors, suicide methods and the vulnerable groups examined in previous research. Chapter Two framed an analysis of the contextual facets of suicide within the bounds of metropolitan, regional and remote Queensland. Chapter Three examined individual-level facets of suicide within the frames of a psychological autopsy study by comparing suicide deaths with sudden-death controls, particularly focusing on access to healthcare and mental illness. Four case studies are incorporated to demonstrate the lived experiences of these factors. Finally, Chapter Four explored suicide prevention strategies which have been implemented in rural Australia to determine whether the current prevention framework could be strengthened or improved.

Given the findings from the literature and data analyses examined in the previous chapters, it appears that there are intertwined risk and protective factors which can potentially impact upon individuals and communities in rural Australia. While not all are unique to the rural experience, in combination they may create a locus of vulnerability around certain rural groups. Currently, there are myriad prevention strategies implemented in rural Australia which target different factors including mental health, help-seeking behaviours, or community capacity building. However, gaps remain in the currently existing rural suicide prevention framework. These gaps can be broadly divided into three categories: environmental, lifestyle, and help-seeking, especially in terms of mental illness.

Environmental factors in rural Australia may impact on suicide in a significant way. As shown in Chapter Two, a higher proportion of persons employed in the agricultural industry, and higher proportions of divorced and unemployed persons, were associated with a greater risk of male suicide in rural areas. Education and expenditure on antidepressant medications were related to lower suicide rates in rural areas. Aside from these variables examined in Chapter Two, other contextual elements for suicide in rural areas may include:

- Climate e.g., the occurrence of droughts, floods or cyclones;
- Politics e.g., regulations and policies which affect sale or trade within agricultural industries;
- Economy e.g., financial impact of droughts, floods or cyclones; and,
- The impact of mining e.g., the changes brought about by the placement of natural gas pipelines onto a farming property.

These contextual factors have the potential to devastate a viable farm and affect individual wellbeing; these areas deserve to be areas of research in the future. Past research suggests that many farmers find it difficult to detach their internal selves from these external situations (see Alston, 2010); they blame themselves for a situation wrought by factors

beyond their control. The relationship between the wider contextual environment and individual circumstances was demonstrated in Case Study One (see Chapter Three) where the consequences of a natural disaster left the deceased vulnerable to depression and suicidal behaviours. Consequently, suicidal behaviours become framed in terms of failure, and self-blame. This is supported by the evidence from the psychological autopsy study (see Chapter Three) which showed that hopelessness was a significant risk factor for suicide.

These factors may not be overcome easily; rather, it may take a seismic social shift to change such perceptions. However, this may be happening in some farming areas of Australia. Young farmers, such as the one interviewed for Case Study One, are gaining university degrees or traineeships which allow them wider off-farm employment opportunities. In this way, they may be less vulnerable if their farm becomes unviable; in a very basic way, there is a 'safety-net' against suicide in place. These young people need to be supported at a governmental level to ensure that the difficulties imposed by having to study off-farm do not lead to financial hardship. Further, older farmers seeking re-training after such environmental factors need to be supported both financially and emotionally.

While environmental factors occur at a more overarching social level, **lifestyle factors** can affect suicidal behaviours in a more contextual social and individual level. Throughout this report, it has been indicated that alcohol consumption occurs at higher and more risky levels in rural areas than urban areas (see also Cantor & Slater, 1997; Miller et al, 2010). Previous research has indicated that alcohol consumption is intrinsically linked to ideals and stereotypes of rural masculinity – a construct which also incorporates socially un/acceptable displays of aggression and violence (Alston & Kent 2008; Bourke, 2003; Dempsey, 1992; Liepins, 2000; Lockie & Bourke, 2001). While feelings of aggression may be vented in a socially-acceptable way on a sports field, they may also lead to violence towards others or the self. Supporting this idea is the evidence from Chapter Three that aggression was a significant suicide risk factor and more frequent in rural areas.

It is also necessary to consider the potentially harmful effects of alcohol on rural suicides. The AIHW (2008) reports that "risky" or high-risk alcohol consumption was 1.2- and 1.4-times more prevalent among men living outside major cities of Australia (Inner Regional and Other areas, respectively), compared with those living within Major Cities. The link between alcohol use and suicide has been well recognised in past research (Rossow & Amundsen 1995; Sher, 2006; Kolves et al, 2006). A large number of persons who die by suicide use alcohol prior to death (Hayward et al, 1992) and intoxicated people are more likely to attempt suicide using more lethal methods (Sher, 2006).

Alcohol abuse and aggressive behaviour flows through to a number of other areas of life, including relationships. Quantitative analyses conducted within Chapter Two of this report demonstrated that relationship breakdown can significantly impact upon rural male suicidality. At the individual level, analysis in Chapter Three also indicated that conflict with a partner was more frequent in suicide victims. Indeed, all four case studies had experienced relationship breakdown in their past with the deaths of two cases occurring close to a separation or conflict with their partner. However, the potential role of alcohol on any, or all, of these precipitating

events is not able to quantified due to a lack of available data on alcohol use within the Australian community. A suggestion for the future would be the development of systems which can better record the relationships between lifestyle risks, such as alcohol and drugs, with outcomes such as suicide.

Previous research is not consistent as to whether **mental illness** is less likely to be experienced by people living in rural areas or whether it is simply less diagnosed in these areas (Ellis & Philip, 2010; Judd et al, 2006b; Judd et al, 2002; Taylor et al, 2005b). However, it should be noted that in the data analyses presented in a previous chapter, rural suicide victims were significantly more likely to have been diagnosed with a mental illness. These differences appeared to be most apparent in diagnoses of substance-use and anxiety disorders, which were more frequent in rural suicide victims; there was no difference in mood disorders.

It cannot be denied that access to healthcare for the general population, both physical and mental, is increasingly limited the more remote one lives in Australia. However, our analyses on suicidal persons showed that the number of visits to GPs, psychiatrists, psychologists, or other health care professionals, was similar in rural and urban suicides in the three months prior to death. However, aside from access, it is also necessary to consider the cultural appropriateness of health care in rural areas. Inappropriate health care was listed as a problem in two of the case studies reported in Chapter Three. Additionally, the stoicism so entrenched in rural culture may make people reluctant to seek help, which was indicated in a case study as well.

Problems regarding the accessibility and appropriateness of health care have been addressed by a number of interventions, which have sought to up-skill GPs or financial counsellors to better recognise symptoms of depression, or other indicators of suicidality (Fuller et al, 2009; Sartore et al, 2007). Members of the police, priests, social workers and teachers may also be influential gatekeepers in regional and remote communities. Additionally, given the importance of moral support from family and friends, as evidenced in Chapter Three, it may also be important to implement similar types of training which is accessible to community members. Training these types of gatekeepers may also help to decrease the stigma attached to help-seeking as it broadens the understanding of suicide risk and protective factors within and across communities. Considering this, training gatekeepers may prove an effective strategy for addressing suicide in regional and remote areas of Australia.

It should be noted that, while the recommendations made above carry relevance for the rural Indigenous experience, any suicide prevention strategy needs to be made culturally-appropriate in collaboration with the community. Indeed, the most effective programs have been ones that have aimed to increase resilience and strengthen community connectedness and empowerment; in this way, protective factors against suicidal behaviours have been strengthened (see McKay et al, 2009; Tsey, 2000). The activities implemented during the Building Bridges project (FWB, Men's Groups and HitNET) have remained sustainable because they stimulated positive changes within the communities which are perceived to be building blocks in the journey towards suicide prevention. Further, suicide prevention programs which aim to decrease the stigma surrounding suicide are also important within Indigenous communities. Similar to non-Indigenous rural communities, gate-keeper training has the potential to better recognise vulnerable people

within a community and access help for them. The lessons learnt from the Shoalhaven Aboriginal Suicide Prevention Program can create a strong foundation upon which to build a more effective gate-keeper training strategy. Further, sport- or apprenticeship-based suicide prevention strategies may also be appropriate, relevant and accessible to Indigenous youth (see also Tatz, 2005). Programs such as Alive and Kicking Goals!, and those run through the PCYC in different communities, need to be evaluated in order to better assess their effectiveness.

Indeed, a multi-faceted phenomenon such as suicide necessarily requires multi-faceted solutions. Significant gaps in research still exist and, consequently, evidence-based research needs to be supported so as to better inform future policy and suicide prevention strategies. Further, rural-based suicide prevention strategies which are currently implemented need to be evaluated to ensure that they are effective in the face of the changing rural social environment. Australia has traditionally had strong ties to its rural culture and this historical importance needs to be remembered in order to protect these vulnerable communities from the tragedy of suicide.

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Appendix A.

Statistical sub-divisions (SSDs) in metropolitan, regional and remote areas

Region	SSD
Metropolitan	Northwest Outer Brisbane
	Southeast Outer Brisbane
	Pine Rivers Shire
	Redland Shire
	Gold Coast West
	Northwest Inner Brisbane
	Ipswich City
	Caboolture Shire
	Gold Coast East
	Redcliffe City
	Sunshine Coast
	Southeast Inner Brisbane
	Logan City
	Gold Coast North
	Inner Brisbane
Regional	Toowoomba
	Townsville City Part A
	Darling Downs SD Bal
	Sunshine Coast SD Bal
	Lower West Moreton
	Fitzroy SD Bal
	Mackay City Part A
	Mackay SD Bal
	Cairns City Part A
	Bundaberg
	Rockhampton
	Gladstone
	Wide Bay-Burnett SD Bal
	Upper West Moreton
	Hervey Bay City Part A
	Gold Coast SD Bal
Remote	Thuringowa City Part A
	Far North SD Bal
	Northern SD Bal
	South west, Central west and North west

Appendix B.

Recent Life Events – 12 months prior to death (including chronic, ongoing)

	Rural							Urban						
	Suicide		Sudden death		OR	95%CI		Suicide		Sudden death		OR	95%CI	
	N	%	N	%		L	U	N	%	N	%		L	U
Work	23	46.0	5	19.2	**3.58**	**1.16**	**11.00**	63	42.0	23	21.3	**2.68**	**1.52**	**4.70**
Business failing	2	4.0	0	0	Fisher's ex test=0.544			8	5.3	2	1.9	Fisher's ex test=0.200		
Fired	2	4.0	0	0.0	Fisher's ex test=0.544			7	4.7	0	0	**Fisher's ex test=0.044**		
Laid off/unemployed	17	34.0	4	15.4	2.83	0.84	9.55	50	33.3	13	12.0	**3.65**	**1.87**	**7.15**
Demoted	0	0	0	0	NA			4	2.7	0	0	Fisher's ex test=0.142		
Arguments at work	4	8.0	0	0	Fisher's ex test=0.292			26	17.3	8	7.4	**2.62**	**1.14**	**6.04**
Retired	2	4.0	1	3.8	Fisher's ex test=1.000			1	0.7	1	0.9	Fisher's ex test=1.000		
Financial	23	46.0	4	15.4	**4.69**	**1.41**	**15.58**	56	37.3	18	16.7	**2.98**	**1.63**	**5.45**
Decreased income	23	46.0	4	15.4	**4.69**	**1.41**	**15.58**	56	37.3	18	16.7	**2.98**	**1.63**	**5.45**
Health	11	22.0	3	11.5	2.16	0.55	8.57	22	14.7	23	21.3	0.64	0.33	1.21
Placed in nursing home	0	0	0	0	NA			0	0	2	1.9	Fisher's ex test=0.174		
In home assistance required	5	10.0	2	7.7	Fisher's ex test=1.000			15	10.0	20	18.5	0.49	0.24	1.01
Terminal illness	3	6.0	0	0	Fisher's ex test=0.547			9	6	5	4.6	1.32	0.43	4.04
She/spouse miscarriage/abortion	2	4.0	0	0	Fisher's ex test=0.544			0	0	0	0	NA		
She/spouse have a baby	3	6.0	0	0	Fisher's ex test=0.547			1	0.7	0	0	Fisher's ex test=1.000		
She/spouse fall pregnant	1	2.0	0	0	Fisher's ex test=1.000			1	0.7	1	0.9	Fisher's ex test=1.000		
Relationship	27	54.0	9	34.6	2.22	0.83	5.91	68	45.3	16	14.8	**4.77**	**2.56**	**8.87**
Married	0	0	1	3.8	Fisher's ex test=0.342			3	2.0	2	1.9	Fisher's ex test=1.000		
Legal divorce	0	0	0	0	NA			2	1.3	0	0	Fisher's ex test=0.511		
Spouse unfaithful	3	6.0	0	0	Fisher's ex test=0.547			10	6.7	1	0.9	**Fisher's ex test=0.028**		
Deceased unfaithful	5	10.0	1	3.8	Fisher's ex test=0.658			7	4.7	1	0.9	Fisher's ex test=0.144		
Separation	15	30.0	4	15.4	2.36	0.69	8.03	37	24.7	4	3.7	**8.51**	**2.93**	**24.71**
Living apart from partner	13	26.0	4	15.4	1.93	0.56	6.67	24	16.0	6	5.6	**3.24**	**1.28**	**8.22**

	Rural							Urban						
	Suicide		Sudden death		OR	95%CI		Suicide		Sudden death		OR	95%CI	
	N	%	N	%		L	U	N	%	N	%		L	U
Romantic relationship break up	7	14.0	3	11.5	Fisher's ex test=1.000			23	15.3	0	0	**Fisher's ex test<0.001**		
Serious argument with partner	17	34.0	5	19.2	2.16	0.69	6.75	49	32.7	9	8.3	**5.34**	**2.49**	**11.45**
Family	34	68.0	15	57.7	1.56	0.59	4.15	77	51.3	43	39.8	1.59	0.97	2.63
Serious argument with family	24	48.0	8	30.8	2.08	0.76	5.65	46	30.7	10	9.3	**4.33**	**2.07**	**9.06**
Children move out	3	6.0	3	11.5	0.49	0.09	2.62	7	4.7	3	2.8	1.71	0.43	6.78
Parents/children marry	3	6.0	3	11.5	0.49	0.09	2.62	3	2.0	5	4.6	0.42	0.10	1.80
Parents/children babies	4	8.0	4	15.4	0.48	0.11	2.09	12	8.0	11	10.2	0.77	0.33	1.81
Parents/children separation	3	6.0	2	7.7	Fisher's ex test=1.000			8	5.3	4	3.7	1.47	0.43	4.99
Partner retired	0	0	0	0	NA			1	0.7	0	0	Fisher's ex test=1.000		
Partner placed in nursing home	0	0	0	0	NA			2	1.3	2	1.9	Fisher's ex test=1.000		
Life threatening illness in family	10	20.0	4	15.4	1.38	0.39	4.90	31	20.7	18	16.7	1.30	0.69	2.48
Legal	13	26.0	3	11.5	2.69	0.69	10.48	36	24.0	9	8.3	**3.47**	**1.60**	**7.57**
Victim of crime	4	8.0	1	3.8	Fisher's ex test=0.655			9	6.0	7	6.5	0.92	0.33	2.56
Jail	1	2.0	0	0	Fisher's ex test=1.000			1	0.7	1	0.9	Fisher's ex test=1.000		
Appear in court	11	22.0	3	11.5	2.16	0.55	8.57	26	17.3	3	2.8	**7.34**	**2.16**	**24.93**
Sue someone/sued by someone	1	2.0	0	0	Fisher's ex test=1.000			5	3.3	1	0.9	Fisher's ex test=0.406		
Bereavement (without pet)	16	32.0	10	38.5	0.75	0.28	2.02	39	26.0	28	25.9	1.00	0.57	1.77
Child	0	0	0	0	NA			0	0	2	1.9	Fisher's ex test=0.174		
Parent	2	4.0	1	3.8	Fisher's ex test=1.000			9	6.0	2	1.9	Fisher's ex test=0.127		
Partner	0	0	1	3.8	Fisher's ex test=0.342			1	0.7	1	0.9	Fisher's ex test=1.000		
Sibling	2	4.0	0	0	Fisher's ex test=0.544			5	3.3	1	0.9	Fisher's ex test=0.406		
Close relative	7	14.0	2	7.7	Fisher's ex test=0.710			10	6.7	12	11.1	0.57	0.24	1.38
Close friend	6	12.0	7	26.9	0.77	0.41	1.47	18	12.0	13	12.0	1.00	0.47	2.13
Pet	8	16.0	2	7.7	Fisher's ex test=0.479			22	14.7	13	12.0	1.26	0.60	2.62
Accident														
Major home damage	3	6.0	1	3.8	Fisher's ex test=1.000			5	3.3	3	2.8	1.21	0.28	5.16
Motor vehicle accident/ threatening situation	7	14.0	2	7.7	Fisher's ex test=0.710			8	5.3	13	12.0	0.41	0.16	1.03