Suicide by Self-Immolation in Australia: Characteristics, Contributing Factors & Comparisons with other Suicide Methods

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Abstract

This study aims to describe the characteristics of those who suicide by self-immolation with a focus on sex differences, compare rates of self-immolation to rates of other suicide methods and to compare the characteristics of Australian males who suicide by other methods. The research is based on 144 coroner's files of suicide by self-immolation for 1997 to 2008 in the Australian states of Victoria, New South Wales, and Queensland.

Coroners' files were examined for a range of relevant variables and contributing factors and frequency statistics presented. Comparisons of rates of self-immolation were made with Large and Nielssen's (2010) annual rates of suicide by others methods. Characteristics of males who suicided by self-immolation were compared to the study by De Leo, Evens and Neulinger (2002) presenting selected characteristics for males who chose other methods.

One hundred and forty two cases of self-immolation were related to mental health, substance abuse and/or relationship issues which is consistent with other studies of suicide by self-immolation in Western, European countries. Females were less likely to choose this method, with less than a third of cases being female. Seventy-five percent of the cases had a psychiatric illness, with depression being the most common diagnoses which is found to be associated with other suicide methods.

Comparisons of rates of self-immolation with Large and Nielssen's (2010) annual rates of suicide by other methods show self-immolation to be rare in Australia. Characteristics of males who suicided by self-immolation when compared to De Leo et al. study showed male self-immolators were less likely to leave a suicide note than men choosing other methods of suicide and more likely to suicide at their residence than those choosing hanging, shooting and poisoning by non-domestic gas. Given that self-immolation is likely to require less planning and preparation and suicide notes were less likely to be left by self-immolators than other methods – the current data suggests a possible relationship between

impulsive traits and self-immolation. This research provides an important first step to further understand key factors associated with those who have chosen suicide by self-immolation in Australia.

Doctor of Psychology Declaration

"I, Stephen Gray, declare that the Doctor of Psychology (Clinical Psychology) thesis entitled Suicide by Self-Immolation in Australia: Characteristics, Contributing Factors & Comparisons with other Suicide Methods is no more than 40,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work".

Signature:  Date:15/03/2014

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List of Abbreviations

ABS	Australian Bureau of Statistics
BAC	Blood Alcohol Content
Chi sq	Chi-Squared
COB	Country of Birth
Df	Degrees of freedom
DSM-IV-TR	Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision
F	Female
ISH	Intended Self-Harm
ICD-10	International Classification of Diseases
M	Male
M	Mean
mg/dL	Milligrams per decilitre
MHP	Mental Health Professionals
n	Sample Size
N	Total Population Size
NCSRS	National Committee for Standardised Reporting of Suicide
NCIS	National Coroners' Information System
NDRI	National Drug Research Institute
NSMHWB	National Survey of Mental Health and Wellbeing, 2007
QSR	Queensland Suicide Register
SD	Standard Deviations

The Database	Suicide by Fire Coronial Database
WPR	Western Pacific Region

Chapter 1

Introduction and Literature Review

> "*Self-immolation is an act not often committed, not casually arrived at, and most assuredly, not easily forgotten. As an act of suicide, it is more than just an anguished cry for help- it is a searing demand to be remembered"*
>
> *(Bostic, 1973, p.73).*

1.1 Historical Perspectives of Suicide in Western Culture

The act of suicide has been viewed differently by western culture over time. The Oxford English Dictionary first recorded the occurrence of the word suicide in 1651 (Paterson, 2001). Before then phrases such as 'self-murder', self-killing' and 'self-slaughter' were used to convey the view that suicide was a wrongful act of murder onto oneself (Paterson, 2001). Suicide had been a widespread occurrence in antiquity. Indeed suicide was a discussion point in all the philosophical schools of the Greek and Roman world with many eventually considering suicide (in some circumstances) a heroic act (Minois, 1999). The Christian church throughout Europe adopted the position that suicide should be viewed as an act of sin, a view that was briefly challenged during the Reformation with philosophical arguments such as idealism and liberalism positioning suicide as one's basic right, *'to be or not to be'* (Minois, 1999). The early 19th century saw the development of new approaches to better understand suicidal behaviour. Around that time many European countries decriminalised suicide (still criminalised in many Asian countries) (Hjelmeland, 2010) and different definitions and theories (e.g. Baechler, 1979; Durkheim, 1951; Freud, 1920; Menninger, 1938) about suicide behaviour were proposed (Mishara & Weisstub, 2005).

It is outside the scope of this thesis to explore theoretical perspectives of suicide in detail as the focus will be on methods of suicide, and self-immolation in particular. However

Durkheims' and Freuds' perspectives continue to influence the research field of suicidology, (the former from a sociological perspective and the latter from a psychological perspective) and therefore deserve a mention.

Durkheim argued that suicide was not just an individual choice but that society at large acted as a contributing factor (Pridmore, Ahmadi & Evenhuis, 2006). Durkheim (1897) hypothesised that the suicide rate is related to the level of social integration (the degree to which the people are bound together in social networks) and the level of social regulation (the degree to which people's desires and emotions are regulated by societal norms and customs). He described four causes; egoistic, altruistic, anomic and fatalistic. Egoistic suicide occurs when an individual is inadequately integrated into society (lonely and isolated). Altruistic suicide occurs when the individual is too tightly integrated into society and places the needs of society above his own (e.g. Kamikaze pilot). Anomic suicide occurs when social/and or moral norms become unclear (e.g. loss of traditional values through globalisation) (Pridmore et al. 2006). While fatalistic suicide occurs when society is overregulated (e.g. servant or slave commits suicide). Thus, according to Durkheim, egoistic and anomic suicides result from too little social integration and social regulation, respectively, while altruistic and fatalistic suicides result from too much social integration and social regulation, respectively (Durkheim, 1897).

Durkheim's sociological theory is supported by increases in suicide rates at times of social/ economic transition or crisis. For example, China has one of the highest suicide rates in the world – almost 300,000 people a year or 22.23 out of every 100,000, having risen from 13.9 per 100,000 in 1999 (World Health Organisation, 2000). This rise has been shown to have little connection to rates of diagnosable mental conditions such as depressive disorders, and has been strongly linked to socio-economic changes and acute financial pressures on individuals (mainly rural woman) (Yang et al. 2005). Several Asian countries such as Hong Kong, Japan, Taiwan and

Thailand experienced an increase in suicide rates during and after the Asian economic crisis of 1997 (Chen, Yip, Lee, Fan & Foo, 2010). Explanations of suicide trends, particularly in the

Western Pacific Region, have focused on the rapid economic and social transitions that many countries have witnessed in the last decades (Lower et al. 2005; Rubinstein, 2002). Consistent with this, Durkheim rejected pathological mental states as a sole determinate of suicide.

Interestingly, suicide is interpreted differently by society based on the motivation for committing suicide (Han, 2013). For example, altruistic suicide is when someone gives their life for a perceived greater cause - the act may enlist positive societal attitudes (Han, 2013). Whilst the person who suicides to escape his/her suffering (egoistic suicide) is likely to be judged more harshly and the act seen as wrong or shameful, (Han, 2013).

Sigmund Freud's ideas came from a very different point of view to Durkheims' sociological model. Freud introduced the world to the concept of psychosis and suggested that mental disorders were medical conditions (Pridmore et al, 2006). Freud classified suicide as a form of built up aggression or tension that causes inward animosity – we are angry at mother, but that is unacceptable, so we turn the anger on our self. This Freud viewed as a psychological conflict that could not be worked out due to the great force of melancholy and depression. The notion that in some cases emotional distress could be caused by natural physiological factors historically helped pave the way for changes in civil, criminal and religious laws concerning suicide (Pridmore, et al. 2006). Researchers during the 20th century have concentrated on linking suicide with mental illness utilising a biomedical model. Current research, though recognising mental illness as a factor for suicide, also considers philosophical, social, religious, moral and cultural factors (Minois, 1999).

1.2 Historical Perspectives of Suicide in Eastern Culture

Current knowledge of suicidal behaviour in the Asian region is relatively limited when compared to the Western world, with the majority of literature on suicide coming from Western countries. A major hindrance to suicide research in Asia is the poor availability and quality of data. It is estimated that approximately 20% of the Asian population suicide data are not available (De Leo, Milner, & Xiangdong, 2009).

Furthermore, unlike Western culture which adopts a clear negative position on the act of suicide (through Judeo-Christian traditions and social institutions), there appears to be a more ambivalent position in Asian countries, with Han (2003) suggesting two main differences. Firstly, some suicides have been culturally sanctioned in some circumstances in Asia. Examples include Hara-kiri (belly cutting), and the "Suttee", (an often socially acceptable form of self-immolation by widows in India) (Chen, Wu, Yousuf, & Yip, 2011a). Unlike Western culture where *egoistic* suicides (escape his/her sufferings) bears stigma, in the Asian context some egoistic suicides such as honour-suicide, are accepted and viewed as appropriate behaviour to avoid disgrace to oneself or one's family (Han, 2013). Also some suicides, such as martyrdom, are interpreted as *altruistic* in nature because the suicidal act was seen to be 'other-regarding'. An example of altruistic suicide is self-immolation completed by Buddhist monks protesting human rights violations. Secondly, Han, (2013) argues that the role of religion and suicide in Asia is more complex than in Western culture. It has been suggested that the protective effect of religion against suicide may be mediated by the degree to which a given religion sanctions, or prohibits, suicide (Hendin et al. 2008). Generally countries that have a stronger religious identity tend to have lower suicide rates (Chen et al. 2011a). It is worth noting that the Asian region is characterised by a wide diversity of social, economic, cultural and religious aspects that do not permit any homogeneous reading of suicide phenomena.

Research from different countries shows fundamental differences in suicide in those countries in terms of age structure, gender distribution, the role of mental illness, as well as the suicide methods used (Booth, 1999).

1.3 Suicide and Rates

Recently suicide has emerged as one of the leading causes of death in the world (Wu, Chen, & Yip, 2012; Han, 2013) with approximately one million people committing suicide each year (greater than the mortality rate due to war and homicide combined) (Kessler, Berglund, Borges, Nock, & Wang, 2005). As many as 60% of completed suicides occur in Asia (World Health Organisation, 2011a). Indeed, these figures are considered to underestimate the true suicide rate with social, cultural and religious elements affecting the reporting of suicide. These complexities are compounded by poor population estimates and data recording methods in many Asian countries (Wu, et al. 2012).

What we do know is that world suicide rates have increased by 60% in the last 45 years and represented 1.8% of the total global burden of diseases in 1998, a figure expected to rise to 2.4% by 2020 (World Health Organisation, 2011a). Suicidology research suggests the heart of the problem of suicide mortality has shifted from Western Europe to Eastern Europe and now seems to be shifting to Asia. China and India are the biggest contributors to the absolute number of suicides in the world (Varnik, 2012).

Australia is geographically located in the Western Pacific Region (WPR) as defined by the World Health Organisation (WHO), who suggests WPR suicide trends differ from overall global trends (Mathers & Loncar, 2006). In particular the WPR appears to have higher rates of suicide than other areas of the world, with signs of worsening rates in the next two decades (De Leo et al.

2009). The WPR is characterised by a wide diversity of social, economic, and cultural aspects that do not permit any homogeneous reading of suicide behaviour.

The majority of suicide research in the WPR region comes from wealthier countries, with large variations in the completeness and coverage of suicide mortality data in poorer countries. Research has demonstrated that suicide is a leading cause of death in Korea (Kim, Song Yi, Chung, & Nam, 2004); Hong Kong (Yip, Law, & law, 2003), Japan (Ojim, Nakamura, & Detels, 2004), as well as New Zealand and Australia (Page et al. 2006).

In Australia, 1,727 males (15.3 per 100,000) and 546 females (4.8 per 100,000) died by suicide in 2011, a total of 2,273 deaths (10.0 per 100,000). This equates to an average of six deaths each day. Suicide was ranked 15th in common causes of death in the Australian population, and is the 10th leading cause of death for males (ABS, 2013). Suicide deaths are significantly higher for Indigenous Australians accounting for 4% of all Indigenous deaths in 2009 (97 deaths) compared to 1.5% for the total population (ABS, 2011). Suicidal behaviour always occurs and is embedded within a cultural context and no suicidal act is conducted without reference to the prevailing normative standards and attitudes of a cultural community (Renberg & Jacobsson, 2003). Thus it is instructive to consider different views on suicide and suicide methods as a function of a range of variables, including demographics, culture and religion.

1.4 Age distribution and suicide

Suicide rates are higher among older age groups in most parts of the world (Wu et al. 2012). Worldwide, suicide is one of the three leading causes of death among those in the most economically productive age group (15-44 years), and the second leading cause of death in the 15-19 years age group (Patton et al, 2009). Interestingly, discernible patterns in age distribution of suicides in countries in the Western Pacific Region differ from the global trend.

Firstly, Asian countries tend to have high rates of suicide both in the elderly and young. In particular, suicide rates in persons over the age of 75 are higher than global rates in urban and

rural China, Hong Kong (Chiu, Lam, Pang, Leung, & Wong, 1996) and Singapore (Ko & Kua, 1995). High rates of youth suicide have also been recorded in these countries as well as in Pacific Island countries such as Fiji, Micronesia, Guam and Western Samoa (Booth, 1999; Hexel, 2004). Interestingly, Australia and New Zealand demonstrate similar (although less pronounced) age range patterns of distribution. In 2009, the medium age of suicide deaths in Australia was 43.4 years for males and 44.9 for females, while suicide was the leading cause of death for young people aged 15-24 with almost a quarter (22 %) of all deaths within this age group being suicide. The highest age-specific Australian suicide rate was observed for males aged 85 years and over (28.2 per 100 000) even though the actual number of deaths is quite small (36 deaths in 2009) (ABS, 2011).

Differences and similarities in observable patterns in age distributions suicide rates in populations between countries are suggested by some researchers to arise from cultural/contextual differences and similarities (De Leo et al. 2009). Others have hypothesised that differences in suicide age distribution may be related to recent relative changes to societal structures, such as industrialisation reforms and globalisation (Lower et al. 2005).

1.5 Gender and suicide

Literature indicates that men are more likely to complete suicide than women, whereas women are more prone to make suicidal attempts (Roy, 2000). Global trends (Australia included) demonstrate a male-to-female suicide rate of approximately 4 to 1 (ABS, 2013). Generally, the gap between male and female suicide rates in many Asian countries is smaller (De Leo et al. 2009). For example, recent data shows that even though Australia and Hong Kong have similar suicide rates, the gender ratio is about 4 to 2, respectively (Chen et al. 2011a). The highest rates of suicide for women are in countries with Asian cultural heritage, such as China, the Republic of Korea, and Japan (Chen et al. 2011a). In China the suicide rate for women has been estimated as 25% higher than for men (Phillips, et al. 2002). India, too is notable for its near-equal suicide rates for young

men and women (Mayer & Ziaian, 2002). Several Pacific Island countries also appear to have elevated female over male suicide rates, suggesting females constitute a high-risk group in the region (De Leo et al. 2009).

The higher suicide rates among women in these countries are related to the adoption of highly lethal suicide methods (Wu et al. 2012; Chen et al.2011a). Asian females tended to adopt lethal/ violent methods of suicide, such as jumping (Ajdacic-Gross et al. 2008), drowning (Kamizato et al. 2009), hanging (Wu et al. 2012), pesticide poisoning (Wu et al. 2012), and self-immolation (Suhrabi, Delpisheh, & Taghinejad, 2012; Ramim, Mobayen, Shoar, Naderan, & Shoar, 2013). In contrast, in Western countries women tend to use less lethal/violent suicide methods (Denning, Conwell, King, Cox, 2000).

1.6. Culture and suicide

More than 150 definitions of culture exist (Ingstad, 2007). Some define culture as 'shared practices' (what people do) and others as 'shared meanings' (Triandis, 2007). Simply put, culture can be defined as the *process* of interaction between the person and his/her surroundings (Hjelmeland, 2010). For this to happen, culture provides a set of rules and standards that are shared by members of a society (Lester, 2008). These rules and standards shape, and ultimately determine, what a society considers to be normal (norms) and appropriate behaviour. Culture influences the behaviour of nationalities, ethnic groups, and subgroups within a nation. Given this, suicidal behaviour is differently determined and has different meanings in different cultures (Lester, 2008).

For example, Hendin's (1964) study of suicide found cultural influences on the motives for suicidal behaviour in Scandinavian countries. Hendin identified Danish mothers' tendency to use guilt arousal in their sons as a discipline technique often created strong dependency needs in their

sons. According to Hendin, this marked dependency was often the root of depression and suicidality after Danish adult males' experience of loss or separation in their lives. Comparatively, in Sweden, where a strong emphasis is often placed by parents on performance and success, Hendin found male suicide typically followed perceived failure in performance and success (e.g. occupation, education).

Other studies report different suicide rates of different cultural groups living in the same country (Pridmore & Fujiyama, 2009). This is often the case when a minority indigenous people are co-located with a dominant group of people. In such cases the indigenous people usually have a high suicide rate. Examples of countries where research supports this are: Australia (Pridmore & Fujiyama, 2009); Canada (Kirmayer, Malus, & Boothroyd, 1996); and United States of America (Olson & Wahab, 2006). These studies indicate that when different cultures encounter each other, the problems associated with acculturation, loss and conflict can result in stress and its consequences, including increased rates of suicidal behaviour, especially in the less dominant cultural group.

1.7 Suicide Method

International studies on suicide indicate that suicidal behaviour and, in particular the preferred suicide method, varies between countries. While different factors contribute to the choice of a suicide method, the social acceptability of the method (i.e. cultural and tradition) and its availability (i.e. opportunity) are known to be key contributors (Chen et al. 2011a; Ajdacic-Gross et al. 2008).

1.7.1 Age and suicide method

Age characteristics also appear to influence suicidal method of choice. For example, in India, elderly females are more likely to choose drowning while younger females are more likely to choose hanging (Kanchan, Menon, & Menezes, 2009). In Hong Kong, charcoal burning (carbon monoxide poisoning by burning charcoal in a closed space) accounted for 18.3% of suicide, with

88.4% of these cases in their middle age (Law & Yip, 2011). It has also been found that suicide completers who jump from residential buildings in Hong Kong (Chen et al. 2011), South Korea (Choi, Hong, Seo, Park, & Hong 2010), and Taiwan (Lin, Chang, & Lu, 2010) are commonly young people.

Lin et al. (2010) assessed the changes in distribution of the leading methods of suicide by sex and age group at city/country level in Taiwan between 2002 and 2008. They found large variations in the distribution of leading methods of suicide across geographical regions and cities/counties in Taiwan were partially due to the different physical availability of particular methods such as pesticides and high buildings (availability of the means and suicide discussed in depth below). However, they found the younger the age of the deceased, the more likely the leading method of suicide changes over time. Charcoal burning was the most often used method in most cities/counties among those aged 15-44. Conversely, hanging was found to be the most frequent method of choice for those aged 45 or above. The researchers concluded that the changes seen in the leading method of suicide seen in variation of age group was due primarily to changes in socio-cultural acceptability of the use of charcoal burning as a method by younger age groups.

Past suicidal research in Australia (ABS, 1997) shows that the four main suicide methods for males (hanging, carbon monoxide poisoning, firearms, poisoning) are consistent across age groups, however the distribution changes with age. For Australian males aged 15 to 34, hanging constituted almost half (47%) of all of the deaths, while in the 65+ age group, less than 30% of suicides chose hanging as their suicide method. Firearms demonstrate the reverse pattern, with 10% of suicides in 15 to 34 year-olds being by firearms, while 25% of males aged 65+ chose this method (ABS, 1997). For Australian females, suicide methods (hanging, poisoning solid/liquids, carbon monoxide poisoning, jumping) are fairly consistent across the 15-64 year age span (ABS, 1997). However, drowning becomes much more predominant for the elderly group. While just

over 1% of 15 to 34 year old female suicides were by drowning, for the elderly this number increase to over 11 per cent (ABS, 1997). An increase in drowning, although not to the same extent, is also seen in older males, with an increase from 1% (aged 15 to 34) to 6% (aged 65+) (ABS, 1997).

The latest Australian suicide data available (ABS, 2013) showed the median age at death for suicide was 43.8 years for both males and females. The age-specific suicide rate was higher for males than females across all age groups, with the 35-44 year age group having the highest suicide rate (27.6 deaths per 100,000) in 2010. Males aged 75-84 years had the next highest suicide rate (25.8 per 100,000). For females, the highest age-specific suicide death rate was in the 45-54 year age group, with 7.5 deaths per 100,000 while the lowest rate for female suicides was in the 65-74 year age group (3.8 deaths per 100,000).

1.7.2 Gender and suicide method

Well-known differences between the preferred suicide methods of men and women have been suggested as a primary reason for gender differences in suicide mortality rates (Denning et al. 2000; Spicer & Millar, 2000). In a large study by Ajdacic-Gross et al. (2008) in which international comparisons of suicide methods were made across 56 countries, violent and highly lethal methods such as firearm suicide and hanging were found to be more frequent among men. Their results found that women often chose less violent and lethal suicide methods such as poisoning or drowning. Similar results have been found in other studies (Denning et al. 2000, Spicer & Miller, 2000; Varnik et al. 2008). Ajdacic- Gross et al. analysis found that hanging was the main suicide method for both males and females, when no other method appeared readily available. Their data (using the WHO mortality database) showed that if the suicide method was popular in men, it was often popular in women as well and *vice versa.* They concluded that the

underlying suicide method patterns tell us more about the availability and acceptability of suicide methods than about gender disparity.

1.7.3 Culture and suicide method

Cantor and Baume (1998) suggest that socio-cultural acceptability and physical availability are two important determinants of the choice of method of suicide. Cultural and traditional factors can imbue meaning and/or popularity to a given method of suicide. This is one reason why the methods chosen for suicide can differ between cultures (Pridmore & Walter, 2013; Ajdacic-Gross et al. 2008). Particular suicide methods can be culturally and traditionally sanctioned. "Culture-bound" suicide methods include the Japanese custom of seppuku or hara-kiri (voluntary disembowelment) (Taki et al. 2010). This was performed in circumstances of disgrace, and as a means of expressing loyalty to a deceased leader. Japanese Kamikaze pilots of the mid-twentieth century and the current day Muslim suicide bombers employ suicide methods which are generally influenced by cultural factors (Taki et al. 2010). In India, self-immolation has a history in the Hindu practice of sutee (or sati), the suicide of the widow on the pyre of her husband. This was a sign of respect and justified by scripture.

Self-immolation will be discussed in detail below. Self-immolation in Iranian and Indian communities is predominantly a female practice, influenced by culture and associated with a host of disadvantage including lack of education, lack of employment, and the absence of human rights. In other countries (e.g. China, South Korea) self-immolation is a culturally sanctioned form of suicide which has been adopted mostly by males as a legitimate way to protest against loss of freedom and government control (Mills, 2013; Kim, 2012).

1.7.4 Accessibility to the means of suicide

When looking at cultural influences on suicide methods we need to be aware of the potential confounding influences of the availability of the technical means (method) of suicide. Where the method of suicide is readily available to members of a society, then that method is

likely to be more widely used as a means of suicide. Ajdacic-Gross et al. (2008) found that there were substantial differences in the pattern of suicide methods used between countries, and that these differences were primarily due to the availability of the suicide means. For example, poisoning by pesticides was common in agricultural regions in some Asian countries (e.g., 38% of all suicides in Korea) and in Latin America (e.g., 86% in El Salvador, 61% in Nicaragua and 55% in Peru); poisoning by drugs was common in both Nordic countries (e.g., 18% in Finland and 14% in Demark) and the United Kingdom (15%); jumping from a high place in cities and urban societies such as Hong Kong (43%) where more than 90% of residents live in high-rise buildings; firearms was the preferred method of suicide in the United States (61%); as was suicide by hanging in Eastern Europe (e.g., 92% in Lithuania, 85% in Latvia and 70% in Slovakia) (Ajdacic-Gross et al. 2008). While the highest use of hanging is found in Eastern Europe, hanging also occurs at much lower levels, at around 40% for males and 35% for females, in other countries (Peru, Hong Kong SAR, Republic of Korea, Norway and Sweden) (Pridmore & Walter, 2013). These differences are generally not due to localised un/availability of rope or hanging points, and cultural preferences are thought to be involved (Pridmore & Walter, 2013).

Access to the means of suicide does not fully explain the choice of method. For example, Finland has the fourth highest rate of gun ownership in the world (45.3/100 residence), however hanging accounts for 33.1% of suicides and shootings only 26.7% (Pridmore & Walter, 2013). Pridmore & Walter, (2013) suggest that research findings such as the use of hanging when firearms are available, and gender preferences for suicide methods (e.g. seppuka performed by males, and self-immolation, predominantly performed females in Iran and India) - appear to indicate a role for culture in suicide.

Certainly, the availability of the method is thought to be a key factor that leads to translation of suicidal thoughts into actual suicidal act (Hawton, 2005). More specifically, the nature of the method that is available may influence the outcome, particularly where an act is

impulsive. If the suicide method has a high risk of being fatal (e.g. firearms, jumping from building), then there is more likelihood that the act will result in death. Obviously, if the method of choice is less lethal, then the act is more likely to result in survival (Hawton, 2005).

Restricting access to the means of suicide is an important component of comprehensive strategies for suicide prevention. Historically, the most compelling example where restricted availability led to a reduction in overall suicide rates was seen in the changeover from toxic to non-toxic gas used in domestic gas supplies in the United Kingdom. Suicide by carbon monoxide poisoning (gassing oneself) was the most common method of suicide in the United Kingdom (Kreitman, 1976) until 1972. Indeed it was such a common method of suicide that the saying "to take the pipe" meant to commit suicide by inhaling toxic domestic gas (Lester, 2008). The subsequent reduction of the carbon monoxide content of gas paralleled a reduction in overall suicide rates. While there was a small increase in the use of other methods of suicide at the time of the gas changeover (1958-1970), the overall suicide rate decreased by a third (Kreitman, 1976). Lester (1995) found that detoxification of domestic gas reduced the use of domestic gas for suicide in six other nations as well as reducing the overall suicide rate as well. Other studies have shown that restriction of access has led to lower overall suicide rates with firearms (Snowdon & Harris, 1992), barbiturates (Whitlock, 1975), and pesticides (Gunnell et al. 2007).

Conversely, it has been suggested that restricting access to one method of suicide could lead to substitution by another method (Gunnell et al. 2000), and therefore a reduction of a method-specific suicide rate rather than overall suicide rates. For example, Killias, van Kesteren and Rindlisbacher (2001) found that in nations where a large proportion of the population owned guns (not in Finland, as discussed above), higher numbers of suicide were committed with guns. However, ownership of guns had no association with the total suicide rate. This suggests that, if guns are not freely available, people use guns less often for committing suicide but switch instead to other methods of suicide.

Daigle (2005) proposes that the likelihood of suicide method substitution is influenced by the similarity and differences of methods employed. For example, the transition probability between two violent methods, such as firearm suicide and hanging, is much higher than between a non-violent method (e.g. poisoning) and a violent method (Daigle, 2005). Substitution within the major modes of suicide, (e.g., one drug rather than another) may be psychologically easier than shifts between modes, (e.g. poisoning, violent method) (Kreitman & Platt, 1984).

Overall, the extent to which declining overall suicide rates (where they occur) are directly attributable to restriction in access to a particular means requires consideration of long-term suicide trends and a range of possible confounding factors (Mann, 2005). However, it is generally accepted in the epidemiology of suicide that the availability of a particular method of suicide does indeed effect total suicide rates (Kreitman & Platt, 1984; Lester, 2008).

1.7.5 Media and suicide method

In addition to traditional culture and accessibility of the means that influences method of choice, the mass media can play a powerful role in the dissemination of suicide events and suicide methods (Chen, Chen & Yip. 2011b). This is probably seen more clearly in Asian countries where it has been suggested that the extensive coverage of suicide deaths is more prevalent than in Western countries (Au, Yip, Chan, & Law, 2004). Charcoal burning and hydrogen sulphide poisoning are two recent examples of where the introduction of new technical means of suicide and its subsequent media reporting has influenced the acceptability of a method of choice to the community.

Chen, Chen, Gunnell, Paul, & Yip (2013) study found a sharp increase in charcoal burning suicide (carbon monoxide poisoning by burning charcoal in a closed space) in Taiwan during 1998-2002. Similar findings had previously been found in Hong Kong (Chen et al. 2011b).Widespread media coverage of this previously obscure suicide method, as well as

availability of packets of charcoal in shops, is thought to have seen it emerge as one of the leading methods of suicide in these Asian countries (Liu et al. 2007).

Another example of where new technologies and media exposure has introduced a new suicide method is suicide by hydrogen sulphide poisoning (mixing a bath additive and toilet cleaner to produce hydrogen sulphide gas). Morii, Mivagatani, Nakamae, Murao, & Yama (2008) found that suicide by hydrogen sulphide poisoning claimed 208 lives in less than 3 months in Japan in 2008 after media exposure.

Consequentially, it has become apparent that suicide prevention strategies needs to limit circulation of knowledge about new technologies (methods) being employed in suicides, as well as restricting access to the means of suicide.

1.8 Mental Health and Suicide

Researchers have studied only a small percentage of suicides and much of our understandings of suicidal behaviour have come from data obtained predominately from studies conducted within Northern European and United States populations. Thus any broad characterisation of the relationship between suicides and mental disorders is problematic (Bertolote, Fleischmann, De Leo, & Wasserman, 2003). Keeping in mind these significant limitations, the current suicide literature indicates the presence of psychopathology is one of the most important predictors of suicide completion (Lonnqvist et al. 1995).

The manifestations of mental disorders varies with age, gender, race, and culture (Satcher, 2000). There is considerable variability between studies in rates of total and specific psychiatric disorders (Barraclough, Bunch, Nelson, & Sainsbury, (1974). Descriptive suicide studies (e.g. Buzan & Weissberg, 1992; Lipschitz, 1995), and psychological autopsy studies (e.g. Hawton & Van Heeringen, 2009; Arsenault-Lapierre, Capierre, Kim, & Turecki, 2004) show up to 95% of individuals who commit suicide have a history of mental illness and/or are suffering from a mental disorder at the time of their death. Meta- analysis reviews, which have compared rates of

suicide between psychiatric patients with rates in the general population, have found significantly higher mortality rates among psychiatric patients than the general population (Harris & Barraclough, 1998). Other studies (Foster, Gillespie, McClelland, & Patterson, 1999; Mortensen, Agerbo, Erikson, Qin, & Westergard-Nielson, 2000) have found mental illness increases the risk of suicide by a factor of 10 or more, compared to those who complete suicide but who do not experience a mental illness.

In a sophisticated review of studies investigating psychiatric diagnoses in 15,629 cases of completed suicides, Bertolote et al. (2003) found that among the 7,379 psychiatric hospital population, severe disorders (e.g. schizophrenia, organic mental disorders) characterised 45.3% of all diagnoses of individuals completing suicide. In contrast, among the 8,205 suicides reviewed in the general population (non-hospital), less severe disorders (i.e. substance-related, anxiety/somatoform and adjustment disorders) formed 32.1% of all diagnoses, while mood disorders (i.e. depression) accounted for 35.8% of all diagnoses. Mood disorders were found to be highly comorbid with substance disorders (notably depression and alcoholism) (Bertolote et al. 2003).

In a substantial review of literature regarding suicide and schizophrenia, Pinikahana and Happell (2003) found that the lifetime risk of a person with schizophrenia committing suicide was estimated at between about 9 and13%, and a person with schizophrenia was 20 to 50 times more likely to complete suicide than the general population.

In developing countries, the relationship between mental illness and suicide is less robust (Vijayyakumar et al. 2005). In a study by Chen et al. (2011a) of epidemiologic patterns of suicide in Asia, risk factors of suicide (such as mental disorders, substance/alcohol misuse, prior history of suicide attempts, and acute life events) were found to be similar to those found in research studies in Western countries. However, Chen et al. found that the specific prevalence of depression or other psychiatric diagnoses in suicides were generally significantly lower than that

in Western countries. These findings are consistent with previous studies (Yang et al. 2005; Zhang, Xiao, &, Zhou, 2010; Li, Phillips, Zhang, Xu, & Yang, 2008).

Lower rates of mental disorders in those who complete suicide in Asian compared to Western countries have been suggested to stem from a number of factors. Firstly, as previously mentioned, distribution of mental disorders differs across different cultures and countries in Asia (Hjelmeland, 2010). Secondly, the diagnostic tools used to identify mental disorders may vary across different studies (Chen et al. 2011a). It is also thought that systematic under-diagnoses of mental illness in developing countries occur because of resource-based factors (e.g., lack of availability of mental health services (Vijayakumar, et al. 2005). In better resourced Asian countries, social stigmatisation of those with mental disorders is thought to be a factor in creating help-seeking barriers (Lee, Chiu, Tsang, Chui, & Kleinman, 2006). The discrimination resulting from mental disorders can be more severe in family-oriented Asian culture than experienced in the West because the stigma of mental illness influences the whole family unit (Lauber, & Rossler, 2007). Furthermore, there is some support to the notion that the role of acute life stresses may be more significantly related to suicide completion in Asia (and developing countries) than countries in the West (Chen et al. 2011a).

In Australia mental illness is common, with one in five (20%) Australians aged 16-85 and one in four (26%) of 18-24 year olds experiencing a mental illness in any one year (ABS, 2009). As previously stated, in 2011 in Australia a total of 2,273 deaths (.01%) resulted from suicide. The severity of suicide in Australia and its relationship to mental health was perhaps best captured in the ABS National Survey of Mental Health and Wellbeing conducted in the year 2007. Respondents were asked if they had experienced ‘serious thoughts about’, ‘made plans to commit’ or ‘attempted’ suicide in the 12 months prior to the survey. The number of people aged 16-85 years who indicated that they had serious thoughts about suicide was 368,110 (2.3%). The number of people who had made plans to commit suicide was 91,000 and 65,300 had attempted suicide.

Interestingly, of those who had serious thoughts, made plans, or attempted suicide, the majority had a diagnosis of a lifetime mental disorder and had experienced symptoms in the 12 months prior to interview. Of those who had reported serious thoughts about committing suicide, almost three-quarters (71.7%) fell into this category and of the 65,300 who attempted suicide, 94.2 % had a lifetime mental disorder and had symptoms in the prior 12 months (NSMHWB, 2007).

1.9 Impulsivity and Suicidal Behaviour

Impulsivity has been defined as encompassing "a range of actions which are poorly conceived prematurely expressed, unduly risky, or inappropriate to the situation and that often result in undesirable consequences" (Daruna & Barnes, 1993). Impulsivity can be viewed as a dimension of normal personality (Eysenck & Eysenck, 1977), but high levels of impulsivity are associated with psychiatric disorders, such as attention deficit hyperactivity disorder, mania, substance abuse, & personality disorders - indicating that impulsivity can be maladaptive **(**DSM IV TR, 2000**).** There is considerable debate in the literature about how to define and measure impulsivity, yet the term is often understood to reflect a continuum of a personality feature or a trait (Turecki, 2005).Over the last few decades, researchers have investigated whether people who complete suicide have a certain predisposition (Mann, 1998; Roy, Rylander, & Sarchiapone, 1997). While not all studies provide consistent findings supporting the role of impulsivity in suicidal behaviour (Apter et al. 1990), it has been estimated that 20-30% of all suicides in industrialised countries are unplanned and impulsive acts and a similar figure has been reported for China *(*Ajdacic-Gross et al. 2008). A noteworthy study by Conner et al. (2005), which reviewed 505 suicides in China, concluded that impulsive personality traits were an important risk factor for suicide.

Research has also has found that those that have suicidal thoughts and/or those that make a suicide attempt, showed significantly higher scores for impulsivity (on impulsivity assessment

tests). Turecki (2005) investigated impulsivity in suicidal behaviour. Using a case control study design, personality variants were compared between suicide attempters/suicide ideators with a control group from the general population. Both attempters and serious ideators had higher scores of impulsivity than controls.

In a study by Zouk, Tousignant, Seqin, Lesage, & Turecki (2006) suicide completers were found to have higher levels of impulsivity when compared to both non-psychiatric disorders control and psychiatric disorders control group populations. The researchers also found that suicide completers who had used violent methods of suicide (e.g. shooting, jumping, sharp implement) had significantly higher levels of impulsivity than those who used non-violent suicide methods (e.g. gassing, poisoning). Consistent with this, Oquendo et al. (2003) found patients from a clinical population who made a suicide attempt and used a more lethal suicide method had higher levels of impulsivity than those that used a less lethal method. Interestingly, impulsive suicides were more likely to have increased comorbidity with more than one mental disorder than non-impulsive suicides (Zouk et al. 2006).

An Australian study by De Leo, Evans and Neuliger (2002) compared characteristics of males who used different methods of suicide (hanging, firearm, and domestic gas) and found a possible relationship between impulsive traits and method of choice. The researchers hypothesised that differences in planning and preparation required for each suicide method may make hanging the preferred method for impulsive individuals. Their data showed that suicide notes were less likely to be left at the scene in hanging suicides than the other two methods. They hypothesised that the presence of a suicide note was an indication of time taken to write, and was evidence of a higher degree of planning and forethought. In addition their results show a higher proportion of those choosing hanging had a diagnosed psychotic disorder, possibly highlighting poor impulse control and acting out behaviour (De Leo et al. 2002).

There is a limited amount of research examining a possible association between impulsivity and specific suicide methods (De Leo et al. 2002). It has been suggested however, that each method has its own particular obstacles to overcome. For example, Ajdacic-Gross et al. (2008) suggests the possible obstacles that would need to be overcome when opting for hanging would be that it is (a) violent; (b) needs some preparation; and (c) needs some degree of courage and determination. Thus the researchers suggest hanging may be associated with less impulsivity compared with readily available poisons and firearms (in some countries) which can facilitate unplanned, impulsive suicide acts. Ajdacic-Gross et al. (2008) concluded, that typically, the greater the obstacles a suicide method presents to those considering it to kill themselves, the lower the acceptability of the method. If someone still chooses the suicide method regardless the obstacles it presents and its lack of general acceptability, the more likely it is associated with psychosis and other severe mental disorder (Ajdacic-Gross et al. 2008).

1.10 Substance-use, impulsivity and suicide method

Given the aforementioned discussion on potential obstacles the suicidal person may need to overcome in order to act on suicidal thoughts, it is not uncommon that those who attempt/complete suicide are substance affected at the time of the event. Indeed international figures suggest that substance use is found in 25-55% of suicides (Murphy, 2000). Substance-use may play a role to produce disinhibition or potentiate existing impulsivity.

In an Australian study by Oei, Foong, and Casey, (2006) of 893 substance-related suicides, the number and type of substances present in suicide victims was found to relate to the individuals' gender, age, marital status, employment status and the method of suicide. They found that 60% of the sample (n=538) had more than one drug present at time of death. Of these cases, 25% had two drugs present, 15 % had three drugs present, and 20% had four or more drugs present. In the remaining cases (n=355), alcohol accounted for 80% of completed suicides who had only one drug present at time of death. The suicide method the suicide completer chose was

also found to be significantly related to the type of drug present. Furthermore, Oei et al. (2006) found that those that had multiple drugs in their bodies were typically female, older, not in the workforce, and died through poisoning by solid/liquid substances. Conversely, suicide completers found to have only one drug were typically male, younger, never married, employed, and completed suicide by using violent methods such as firearms/explosives, jumping from a high place, hanging, strangulation, or suffocation. Notably, the majority of these cases were found to have alcohol as the only substance present.

Given the known effect of alcohol on human behaviour, specifically reducing inhibition and potentiating existing impulsivity, the researchers concur with the finding of De Leo et al. (2002) that those who tend to choose suicide methods that require less forethought and planning are likely to be more impulsive.

It is within the context of the preceding discussion on suicide that the author now turns attention to self-immolation – the focus of this thesis. Hendin et al. (2008) attributes choice of method of suicide to a form of final communication of both personal and social needs: a last message. Wee (2004) talks about self-immolation as a non-linguistic, communicative act. Self-immolation is a violent and dramatic way of suicide. It is an uncommon method of suicide in Australia and has been the topic of comparatively limited research internationally and in Australia.

1.11 Suicide by Self- Immolation

> *"An act of self-immolation affects all five senses: dark smoke generated by a moving body engulfed in flames, the screams by self-immolator and spectator alike, the ominous smell of gasoline and burning flesh, crisped up smoking body you dare not touch after the flames are gone, and a taste of immeasurable bitterness that accompanies utter shock and bleakness"* (Kim, 2012, p. 1)

1.11.1 Definitions and clarifications

Before discussing the complex and multifaceted act of self-immolation it is necessary to clarify some definitions and highlight some specific difficulties encountered when seeking to gain an understanding of this phenomenon in the literature.

Firstly, the term "self-immolation" may be used in different ways. Immolation, in fact, refers to sacrificial killing by any means (Collins English Dictionary) and is therefore not restricted to the use of fire. Today the term "self-immolation" is more widely used in regard to a *suicide* or *attempted* suicide, specifically by burning, although "self-incineration" is a technically more accurate term. In this study the term "self-immolation" will be used to describe *completed suicide by burning* unless otherwise specified.

Secondly, there is a general overlap between self-injury behaviour and suicidality in the literature. Intentionally burning oneself (often mistakenly referred to as an act of self-immolation) comprises between 4.1% and 36.6% of admissions to burn units around the world (Suhrabi, et al. 2012). In industrialised countries, suicide attempts account for between 1% and 9% of the causes of burn injuries (Daigeler et al. 2009).

Many studies combine self-injury and suicide attempts together as "deliberate self-harm" (Martin, Swannell, Hazell, Harrison, & Taylor, 2010). However, recent research suggests that there are clear differences between these behaviours and outcomes (Nock, 2010). Specifically, there are differences between those who attempt suicide by burning and those who burn themselves without suicidal intent (Suk, Han, & Yeon 1991; Wallace & Pegg, 1999). For example, Tuohig, Saffle, Sullivan, Morris & Lehto (1995) separated those who attempted suicide from those who burned as a means of self-mutilation and found that the latter had a higher prevalence of personality disorder. Self-injury by fire and suicide by fire are different, however studies on self-immolation do not always make these distinctions.

A growing body of literature was searched using database such as Psycinfo, Medline and Scopus for articles which mentioned deliberate self-burning, either as a single topic or as one

among other methods of suicide. The terms used for the search were: self-immolation, self-burning, self-incineration, suicidal burns and suicide by burning. A total of 856 publications were identified. Studies with fewer than 20 cases, or that did not distinguish para- suicidal from suicidal behaviour, or lacked clear definition of the act of self-immolation, were excluded. A summary of the literature on self-immolation is presented in Table 1. A total of 30 papers met the inclusion criteria, including retrospective, descriptive studies, one case-control study, and with the single largest number of papers published by United States researchers (n=6). The criteria for inclusion in this table was studies/reviews published in English in the last forty years (1973-2013) if they reported at least twenty cases of attempted suicide and/or completed suicide by flame (self-burning). If more than one study came from the same burns unit with a period of overlap, then the study covering the larger period was selected. Studies reporting single episodes of group protest (e.g. Waco event) were excluded. Papers which focus on specific features of self-burning were cited in text but not included in the table. Country of origin, size (number of cases reported), type of methodology, broad theme of study, and comment on specific study are presented in Table 1.

If more than one study came from the same burns unit with a period of overlap, then the study covering the larger period was selected. Papers which focus on specific features of suicide or self-burning were cited in text but not included in the table.

1.11.2 Patterns of self-immolation world wide

The literature review in this study reveals that risk factors of self-immolation vary across different cultures, socio-demographic characteristics, psychiatric disorders, and experience of adverse life events (Poeschla, Livingstone, Romm, & Klein, 2011; Shahana et al. 2011; Rezaeian, 2013; Ahmadi et al. 2012).

Rates of self-immolation and self-immolation attempts vary considerably across different regions and countries of the world. In the developed world self-immolations account for approximately 1% of all completed suicides (Poeschla et al. 2011) except Bulgaria where it

accounts for approximately 2% **(**Ahmadi, 2007). Self-immolation is more frequent in the Baltic region including Lithuania, Finland, and Russia (Malic, Karoo, Austin, & Phillips, 2007). Approximately 2% of all suicide attempts in the Western world (Suk et al. 1991) are by this method. It is a more common method of suicide in economically developing regions such as Africa, the Middle East (including Iran) and the Far East, particularly India and Vietnam (Singh, Santosh, Avasthi, & Kulhara, 2007). Self-immolation accounts for as much as 40% (Sheth, Dziewulski, & Settle, 1994) of suicides in some areas of the developing world (e.g. India) and for as many as 27% of all suicide attempts in the developing world (Ahmadi & Ytterstad, 2007).

Iran has the highest self-immolation rates world-wide and self-immolation is the most commonly reported suicide method among Iranian women (Saberi-Zafaghandi, Hajebi, Eskandarieh, Ahmadzad-asl, 2012). Rates of completed suicide range from 25-71% depending on region and account for up to 10% of all suicide attempts (Ahmadi et al. 2010). Up to 80% of hospitalised self-immolation patients in Iran die (Ahmadi et al. 2010).

Self-immolation in Afghanistan has been steadily increasing in the last three decades (Nawa, 2002). The Medica Mondiale (2010) study reviewed medical records within three Afghan provinces and found 77 cases of completed suicide by self-immolation spanning six years. The number of women completing suicide via self-immolation in Kabul and Herat provinces doubled between 2005 and 2006, with the majority of cases being aged between 16 and 19, married and with minimal education and literacy.

The Medica Mondiale, (2010) findings reflect a general pattern that emerges in developing countries where there are high rates of self-immolation. That is, the majority of those that attempt/complete self-burning are young married women from low socioeconomic backgrounds who are often illiterate and living in a traditional setting (Ramim et al. 2013). However, this generality may not be the case in countries where suicide by self-immolation has been adopted as an act of political protest.

Self-immolation is also comparatively widely practiced as form of suicide in the Republic of China (Mills, 2013) and South Korea (Kim, 2012), where many such suicides involve public self-immolation. Mills (2013) notes that this is often as a public statement protesting about poor living standards and government control.

As previously mentioned, self-immolation is a rare phenomenon in developed countries (approximately 1% of all suicides). In these countries the pattern of self-immolation is different than that found in developing countries. Self-immolation in developed countries mostly occurs among middle-aged males and is commonly related to a history of mental illness and substance abuse.

Table 1.1

A summary of studies and reviews on cases of self-immolation (1981-current) (SI=self-immolation)

Reference (earliest to latest)	**Country of origin**	**Type of Methodology**	**Broad theme**	**Scope**	Comment
Persley & Pegg, (1981)	Australia	Retrospective Burns Unit Admissions (1968-1979) 2 case studies presented	Epidemiology of SI Psychiatric history Precipitating factors	30 cases (F=19:M=11)	SI 3% of total admissions 18 cases suffered from affect disorders.
Copeland, (1985)	United States	Review Case studies Medical examiners data base (1977-1984)	Epidemiology of SI	24 cases	
Cameron, Stuart, Pegg, & Muller, (1997)	Australia	Burns Unit Admission (1990-1995)	Compare characteristics of those that attempted suicide to self-harmer.	44 cases (F=16:M=28)	Almost all SI were males 71% psychiatric diagnosis Differences between completed & attempted. domestic disputes & alcohol
Leith & Hart-Madsen, (1997)	Denmark	Review Demark autopsy data bases (1980-1989)	Epidemiology of SI and forensic scene analysis	43 cases (F=20:M=23)	37 had psychiatric disorder, High % of previous suicide attempt
Meir, Sagi, Yakar, & Roenberg, (1990)	Israel	Review Burns unit admissions (1965-1986)		22 cases (F=17:M=5)	50% of cases had known psychiatric history. Jews= 20 Moslem=2 Country of origin: 41% Asian, 36% African, European=23%
Geller, (1997)	United States	Review (1965-1994) 17 Burn unit, 5 Psychiatry unit, 1 medical, 1 unspecified	Psychiatric history	27 studies, 582 cases	476 case had prior psychiatric history. 269 cases precipitant relationship conflict.
Hadjiiski & Todorov, (1996)	Bulgaria	Review Emergency department Admissions (1983-1994)	Epidemiology of SI Psychiatric history	89 cases (F=41:M=48)	23 cases had psychiatric disorder, 43 attempted suicide during period of acute mental affection

Sheth, Dziewulski, & Settle, (1994)	United kingdom	Burns unit admission (1983-1993)		20 cases of SI	17 female (14 were of Asia origin)
Bondi, Cipolloni, Parroni & Cecchi, (2001)	Italy	Pathology department. Psychological autopsy cases	Epidemiology of SI cases in Rome	34 cases between 1947-1997	No sex difference (M:F=1:1) No psychiatric history in only 14 cases
Bostic, (1973)	United States	Review SI reported in New York Times (1963-1972)	SI case descriptive Political self-immolation	115 cases USA, Europe, Non-Western	52 cases were enacted as protest against Vietnam war
Castellani, Beghini, Barisoni, & Marigo, (1995)	Italy	Burns unit Admission (1984-1993)	Epidemiology of SI cases in Verona, Italy	31 cases	No sex difference (M:F=1:1), High incidence of psychiatric disorders
Shkrum, Keith, Johnston, & (1992)	Canada	Case study Coroners reports (1986-1988)	Suicide forensic scene , Epidemiology factors for SI	32 cases	Precipitating factors: 15 cases had interpersonal relationship problems. Mental health issue in half of cases.
Rothschild, Raatschen, & Schneider, & (2001)	Germany	Forensic autopsy cases (1990-2000)	Etiological factors for SI	46 cases	Psychiatric history in 65%: separation from partner or financial issues precipitating factors
Daigeler, Langer, Hullmann, Illes et al. (2009)	Germany	Case study Burns unit Admissions (1995-2004)	Epidemiological Factors for SI Psychiatric history	45 cases (F=17:M=28)	Neither social background nor religion a factor. Psychiatric history Precipitating factors= aggression loneliness
Suhrabi, Delpisheh & Taghinejad, (2012)	Iran	Review	Epidemiology of self-immolation	Worldwide, Iran, developing countries	Majority SI with woman – low education, disadvantaged, psychiatric symptoms, cultural issue
Pham, King, Palmieri &Greenhalgh, (2003)	United States	Retrospective case study Burns unit admission	Etiological factors for SI, Psychiatric history	32 cases	91% had an active psychiatric diagnosis, 47% previous suicide attempt, 2/3 a chronic stressor
Laloe, (2002)	Sri Lanka	Prospective study Burns unit admission	Epidemiology & mortality of all	87 cases	345 burns admissions, 87 self-inflicted cases. Self-inflicted cases high mortality

		(1999-2001)	burns		
Poeschla, Combs, Livingstone, Romm, Klein, (2011)	United States	Review all published papers on self-immolation between 1973-2010	Epidemiologic and psychiatric risk factors compared higher/ lower-income countries	40 papers (5958 cases)	Higher income countries- SI rare, likely male, history of mental illness or substance abuse. Lower income countries- SI rates higher, likely female
Laloe, (2003)	France	Review on deliberate self-burning (DSB)/suicide from 1993-2003	Demographics of SI –Gender, age, psychiatric illness, intent.	55 studies Internationally	Patients 10 years older in Europe than Asia. Three broad groups: psychiatric patients, DSB for personal reasons, & politically motivated.
Campbell & Guiao, (2004)	United States	Review	Muslim culture, Islamic females and SI and research/practice implications	Muslim countries Central Asia Middle East	SI is generally under reported in Muslim countries
Al-Zacko, (2012)	Iraq	Burns unit Admission (2011-2012) Cross-sectional case studies	Compare patents characteristic-attempted suicide with accidental burns	103 cases	High fatality rate (80.6%) related to use of accelerant
Mulholland, Green, Horner, Myers, (2008)	England	Burns unit admissions (1999-2003)	Psychiatric histories	37 self-burn victims and 37 self-harm controls	Burns more likely have psychotic symptoms, psychiatric inpatients, on psychotropic
Lari & Alaghehbandan, (2003)	Iran	Burns unit admissions (1997-1999)	Epidemiologic features of SI in Tehran, Iran	110 cases of attempted suicide by SI	Interpersonal conflict was identified as most precipitating factor. Psychiatric history in 43.6% of cases.
Ahmadi, Mohammadi, Schwebel et al. (2012)	Iran	Control case study	The role of adverse life events in SI	30 SI cases 30 case controls	Risk factors, Financial hardship, break-up of intimate relationship, previous suicide attempt

Shahana, Chowdhury, Rumana et al. (2012)	Bangladesh	Review of largely Western studies Retrospective (1991-2005)	Psychiatric illness and SI	9 studies (15531 burn incidents)	Si rates higher with males. Main illness (schizophrenia, depression, substance abuse, personality disorder, psychoses
Ahmadi, (2007)	Ian Kermansha h province	Retrospective analysis of medical records (2004-2005)	Epidemiologic features of SI	37 cases	Female: male ratio 4.3:1. Approx 80% of SI died.
Ramim, Mobayen, Shoar,Naderan, & Shoar, (2013)	Iran	Prospective case study	Characteristics and causes of SI Among married woman in Tehran	35 cases	Majority young, low-socioeconomic background, traditional environment
Rezaeian, (2013)	Global	Review	Epidemiology of SI	Worldwide overview	SI has high fatality rate. High rates in India, Iran, Afghanistan, Sri Lanka, Copycat phenomenon by young married, not-well educated women.
Mills, (2013)	China, India, Tibet	Review	Epidemiology of SI Political self-immolation	Tibet/China (2009-2012)	SI in Tibet part of wider struggle in China for personal freedoms

In Australia there is limited research regarding deliberate self-burning or those who suicide or attempt suicide by self-immolation. Perhaps the most significant study was conducted by Cameron, Pegg & Muller (1997), in which patients who attempted suicide were compared to those who had deliberately burnt themselves without suicidal intent. Of 1072 admissions to the Royal Brisbane Hospital Adult Burns Unit from 1990 to 1995, 44 cases (4.1 per cent) were identified as deliberately self-inflicted, some being repeat admissions. Twenty admissions were due to suicide attempt (45%). Results showed that the suicide attempters were almost all male (19 male, 1 female). Of these patients, eight (40%) died as a result of their injuries.

1.11.3 Culture and self-immolation

As previously stated, cultural and traditional factors can instil meaning and/or popularity to a given method of suicide (Wu et al. 2012). Self-immolation is found with greater frequency in some countries than others and this can largely be explained in terms of socio-cultural factors. In one study it was observed that countries with high self-immolation rates are largely lower-income and have traditional cultures (Rezaeian, 2013). There are a number of examples where cultural/traditional factors on a macro level seem to influence the individual choice to self-immolate.

In India a number of cultural practices involved self-immolation. Santi (*Shakti*), meaning virtuous woman in Hindu, is the traditional practice of self-immolation by a woman over the funeral pyre of her husband (Ahmadi, 2007). Traditionally, in India, widows do not remarry and women were said to prefer death to the unacceptable unmarried state (Romm et al. 2008). By this act the woman is believed to go to heaven and redeem any of her ancestors' wrongdoing (Suhrabi et al. 2012). Although santi was banned by the British Government in 1829, the practice still continues in rural India (Romm et al. 2008). Literature has pointed to India as the origin of attempted/completed suicide by self-burning (Kumar, 2003).

The now ceased custom of johar (mass suicides by self-immolation) was also practiced in India. Johar (jauhar) was seen as an honorary act of self-immolation carried out by Rajput women before their men went to the battlefield (Wu et al. 2012). With their deaths women avoided molestation by soldiers invading their land (Ahmadi, 2007). Self-immolation acts were also performed by the Charans, a cast in the Gujarat and Rajasthan states of India, when demands of honour were unmet. They believe that using this means of suicide brought down the vengeance of heaven on the offender (Romm et al. 2008).

Religion and self-immolation

Self-immolation has also featured in some religions and religious groups. The use of fire and its symbolism for religious purposes has been described in the literature (Geller, 1997; Topp, 1973). In mythical Greek history, Deianeira, wife of Heracles, tried to kill Heracles by smearing his chest with a centaur's blood. Heracles' burns were so painful he threw himself on a funeral pyre. His death was marked by a fire festival and by his self-sacrifice he was elevated to the status of a god (Grimal, 1965). In Western civilization, influenced by the Judeo-Christian tradition, death by fire evokes both the association of torment in the eternal fires of hell and the notion of purification by the holy fires of redemption. In Islamic traditions, imagery of fire is seen as the most violent punishment (Ahmadi, 2007). Both Hinduism (through santi) and Buddhism are religions thought to have a higher propensity towards self-immolation (Laloe, 2003).

Even though violence against oneself is prohibited by most interpretations of Buddhist doctrine (Mills, 2013), some elements (e.g. Mahayana Buddhism) have tolerated the practice (Suhrabi et al. 2012). Religious practice in many Chinese communities involves a mixture of Buddhism and local religions, and the myth of incarnation may inadvertently sanction suicide as an acceptable practice (Chen et al. 2011a). With faiths such as Buddhism, suicide by fire would usually occur as a protest against political situations (discussed below).

One fifth (1.2 billion) of the world population consists of Muslims, a majority of whom live in the Middle Eastern countries (Pridmore & Pasha, 2004). Islam is the fastest growing religion and has now developed into the second most widespread religion after Christianity in the world (Rezaeian, 2010). Generally speaking, Islamic countries throughout the world display lower suicide rates compared to the other counties either developed or developing. It has, however been argued that these lower suicide rates might in part be attributed to an underreporting of suicide data in religion driven countries because of public shame (WHO, 2002). Current research shows that within Islamic countries of the Middle East, suicide rates are high or on the increase among the youths, especially females (Rezaeian, 2007).

Islam provides clear rulings against suicide and Muslim countries therefore generally have lower suicide rates (Chen et al. 2011a). Islamic teaching acts as a prevention against suicide (Rezaeian, 2003). For instance the Koran states "you should not kill yourself because God has been merciful to you" (verse 4:29) Under Islam, birth and death are considered divine decrees (Rubin & Yasien-Esmael, 2004). As a result, under Islamic law suicide is considered a crime (Pridmore & Pasha, 2004). Islamic beliefs also tries to prevent or control mental illness, reduce poverty, and prevent or control misbehaviours, such as alcohol abuse, all known risk factors of suicidal behaviour. To help in one's understanding of Islam, care must be taken to examine the effect of traditional customs in the Middle East which are inherently unrelated to the religion.

Underlying problems in Islamic countries are suggested to be a major contributor to increasing suicide rates among young females (Rezaeian, 2008). Islamic countries, as in many developing countries are presently being confronted with the rapid change in their socio-economic backgrounds. Internal migration from rural areas to suburban slums, especially around large cities have led to unemployment, poverty, and substance abuse (Mohit, 2001). Given these known stressors, mental health is still among the most neglected areas of public health within the Eastern Mediterranean Region (WHO, 2006).

Issues such as the aforementioned have placed increasing stress on a traditional culture, in which, a relatively strict masculine role, has been used to organise the society (Ruubin & Yasien-Esmal, 2004). Unfortunately, under these circumstances, more woman are being subject to their family members (e.g. father, brother, and husband). Marriage sadly increases the likelihood of young Muslim females committing suicide. Some studies show that in some Islamic countries married woman, compared to both married men and single woman, experienced higher rates of suicide and attempted suicide (Khan & Reza, 2000; Lari et al. 2007). This trend is the opposite of that observed within the Western countries, which indicates that marriage prevents people from committing suicide (Charlton, 1995). One reason for this is that a common belief in some Arabic countries is that a husband is justified in beating his wife (Douki et al. 2003). Studies show that at least one out of three woman experience such physical abuse (Douki, et al. 2003). Arranged marriages in these countries of very young females to older males may also lead to increase in the rate of domestic violence and overall oppression of woman in patriarchal society (Rezaeian, 2008).

Other religious or national groups willing to die through self-immolation also have been known to operate (FitzGerald, 1972). Fida' heart (self-sacrificer in Arabic fidaw) or fada' heart (in Persia), describes a devotee of a religious or national group willing to 'sacrifice' (often through self-immolation) in order to achieve a holy goal (FizGerald, 1972). Two examples were the agents of the Nizari Isma'ili sect in medieval Islam and the Shiah nationalist Fida' iyan-I Islam of Iran (Johnson, 2013).

Ethnicity and self-immolation

The above discussion shows that suicide is a complex phenomenon with numerous influences, including culture, religion, social environment, as well as the macroeconomic and political context. Adding further to the complexity is ethnicity. Aggregated figures can conceal major geographic discrepancies and variations in rates between ethnic groups within a country

(McKenzie & Serfaty, 2003, Graham et al. 2000). For example, there are high suicide rates in the aboriginal peoples of Australia and New Zealand compared with the colonists, and in a number of Indian migration populations around the world (McKenzie & Serfaty, 2003). We also know, through an Australian study (Burvill, 1995), that the suicide rates of migrant groups can reflect suicide rates within their country of birth (COB). Migrants' suicide rates increase in Australia compared with their COB according to their age (Burvill, 1995). There is some evidence that self-immolation features as a method of choice in some ethnic groups within non-heterogenetic populations (e.g. Kurdish women already mentioned).

High suicide rates by self-immolation have been reported in Asian countries (Wu et al. 2012), as well as countries where immigrants of Asian origin have settled (Soni Raleigh & Balarajan (1992). A key study by Soni Raleigh & Balarajan (1992) found that self-burning was a common form of suicide among Indian immigrants. Soni Raleigh & Balarajan investigated suicides among immigrants in England and Wales between 1979 and 1983. The analysis covered immigrants born in the Caribbean and East African commonwealths, and the Indian sub-continent (India, Pakistan, Bangladesh, and Sri Lanka). Among the immigrant groups, suicides by burning constituted a higher proportion of all suicides than in the general population, particularly among women from the Indian subcontinent (20% compared with 2% of all other women). The researchers found culture-specific precipitating factors such as parental/marital conflict, stress and isolation and pressures to conform to traditional expectations, explained this over-representation.

Sheth et al. (1994) investigated self-inflicted burns patients that presented at a Yorkshire burns unit over a 10-year (1983-1993) period. Among 234 adult burns admission cases, 20 patients, three male and 17 female, were found to have self-inflicted burns. Among the female patients, 14 (70%) were of Asian origin and nine (64.2%) died as a result of their injuries. All the Asian women were married with between two and six children. Most of the women had been brought up outside of the United Kingdom and had migrated after marriage. None of the Asian

women had a known history of previous psychiatric illness unlike the six non-Asian patients who all had a recorded past history of psychiatric illness. In a wider study by Prosser (1996) of 51 suicides by self-immolation cases registered in England and Wales, 30% of the females and 7% of males who died of self-immolation were Asian immigrants.

Similar findings have been reported in other countries involving immigrant populations. Meir, Sagi, Yakar, & Rosenberg, (1990) retrospective study investigated 5934 burn admissions to an Israeli burns unit between years 1965 and 1986 to identify those that had attempted suicide by fire. Results showed that 22 patients had attempted suicide by self-immolation , 17 were women (77%) and five were men (23%). Seventeen patients (77%) died from their burns. Twenty patients identified themselves as Jewish and two patients identified themselves as Islamic. Interestingly, the countries of origin of patients were: 41% Asian, 36% African, and 23% European.

In Saudi Arabia at the Medico-legal Centre Dammam, Elfawal, (1999) reviewed 221 cases of suicide during the 10-year period from 1986 to 1995 to see if cultural influences impacted the choice of method of suicide adopted. Suicide rates for the entire population averaged 1.1/100,000 population per annum. The male-to-female ratio was 4.5:1. Immigrants formed 77% of the cases, and of these, Asians accounted for 70% of the overall cases and Indians showed the highest suicidal rates (43%). The most common means of suicide chosen was hanging (63%), followed by jumping from heights (12%), gunshot injuries (9%); and death from poisoning (6%). Interestingly the researchers found that Asian immigrants showed a greater tendency to jump from heights or self-immolate.

Political protest

Political protest is generally considered to be a less frequent motive for self-immolation (Laloe, 2003). Though limited, previous research suggests that the act of self-immolation as a political means is a relatively recent phenomenon. Perhaps the most widely publicised act of protest by self-immolation took place in 1963, when Buddhist monk Thich Quang Duc sat cross-

legged in a busy Saigon street and set himself ablaze in protest of the Dinh Diem Government's repressive policies. Biggs, (2008) traces the origins of contemporary political self-immolation back to 1963 and the media exposure of Thich Quang Duc's sacrificial death. Grosby, Joong-Oh, & Holland, (1977) examined reports of self-immolation in the London Times and New York

Times from 1790 to 1972. They found that only 29% of the cases occurred in the period between 1790 and 1962, while 71% occurred in the nine-year period between 1963 and 1972. When self-immolation is a public act, it is usually motivated by political or social reasons, as opposed to personal causes (Romm et al. 2008). The self-immolator may choose a public setting to set themselves on fire in order to maximise the emotional reaction of witnesses. Biggs (2008) argues that appealing to the bystanders and inciting sympathisers are the two most prominent motives driving the extreme act.

In their literature review of self-immolation in different countries, Poeschla et al. (2011) examined the specific location of the act of self-immolation. Interestingly, they found the act of self-immolation in lower-income countries tended to be carried out in front of others, often with the intent of influencing public opinion and to elicit an emotional response in those witnessing the act. Comparatively, the researchers found that in higher-income countries, the tendency for the self-immolation to take place in private without witnesses was almost universal.

Self-immolation is not uncommon as form of political protest in the Republic of China (Mills, 2013) and South Korea (Kim, 2012), though specific numbers are unknown. Self-immolation was such a concern for the Beijing authorities, that in 2003 they created an exception to the general legality of suicide by banning suicides - many which involved self-immolation - in Tiananmen Square (Mills, 2013). It has also been reported that between 2009 and 2012, almost forty Tibetans committed self-immolation, either in Tibet, India or Nepal, in protest against Chinese rule or policies (Mills, 2013). Often this form of protest includes testaments and wills by

the self-immolators which are designed to galvanise opinion around notions of nationalism and cultural loyalty.

Self-immolation as a political act has also taken place in Korea. It has been reported that hundreds of South Korean labourers and student activists have died in this manner during the last three decades in the course of their struggle, struggling to organise unions and protest against government control (Kim, 2012).

Campbell & Guiano, (2004) conducted a detailed study into self-immolation among Islamic women in Muslim countries of Central Asia and the Middle East. The research took into account the Muslim cultural issues, Islamic religion, political and social issues. The researchers concluded that self-immolation was a form of protest against political and social discrimination or domestic abuse, predominately performed by young Muslim women. Often the act took place in the presence of others rather than in isolation in an attempt to cause feelings of guilt or sympathy in those witnessing the act.

It is worth noting here that there appears to be a copycat phenomenon (imitation of the method used) in countries with high rates of self- immolation (Mill, 2013), as well as countries with high rates of deliberate self-burning (Laloe, 2003). It is not uncommon in these countries for self-immolations to cluster in time and space. This is partly due to the dramatic act that attracts attention and can invite others to imitate (Kim, 2012). Mill, (2012) found that there were clear links with the clustering of Tibetan self-immolations in specific towns with local links and forms of communication. Media portrayals have also been associated with copycat suicides, especially if the reported suicide is sensationalised or if the method is clearly described (Chen et al. 2011b).

The most recent famous case of self-immolation was a Tunisian street vendor named Mohamed Bouazizi who set himself on fire on December 17, 2010 in protest of embarrassment that he reported was inflicted on him by municipal officials (Wikipedia, 2012). Bouazizi's self-immolation was covered extensively by the media, acted a catalyst for Tunisian Revolution and

triggered protests in several other North African and Arab countries. Several men did copycat suicide and emulated Bouazizi's self-burning (Wikipedia, 2012).

Additional socio-cultural factors and self-immolation

Other sociocultural conditions have been found to be associated with self-immolation. A recent study investigating female suicide rates in Iran (self-immolation being common) found that the trend had significantly increased in disadvantaged families and areas with lower education, female labour force participation, and urbanisation (Aliverdinia & Pridemore, 2009). In India, it has been estimated that 98.7% of suicides of women involve dowry disputes (Chen, et al. 2011a). The victim may be compelled to commit suicide, often by self-burning (Ahmadi, 2007). Afghani women also use self-immolation to escape family dilemmas, forced marriages, or abuse by kinship or extended family systems. High rates of self-immolation by Afghani woman are thought to be desperate acts to escape their social situation (Suhrabi et al. 2012). It has been reported that the majority of Afghani woman who self-immolate do so as a result of violence in the family (Kamal, 2006). Findings from Iran, one of the most affected countries by suicide by self-burning, indicate risk factors such as being young and female, illiterate or low educated, and from low socio-economic families (Rezaeian, 2013). It has also been found that people of Kurdish ethnicity living in Iran were more prone to use self-immolation as their preferred method of suicide (Rezaeian, 2013). Similar findings have been reported in patriarchal Iraq where, Iraqi Kurdish women, believe that the only way to solve their problems is through self-immolation.

Suicide by self-immolation is seen in Western countries to a far lesser extent. Motivations for self-immolation in higher-income countries tend to differ from those observed in lower-income countries (Poeschla et al. 2011). In higher-income countries self-immolation is more related to a history of mental illness, substance abuse, and unemployment (Poeschla et al. 2011).

Popular culture and self-immolation

In their review of self-immolation and culture, Romm et al. (2008) discuss the use of self-immolation as a literary device in the arts including fiction, opera, film and song. They suggest self-immolation is used by authors as a dramatic literary device, often used to convey self-guilt and expressions of madness. For example, in the third and final part of the novel by J.R.R. Tolkien (1955),"The Lord of the Rings", Denethor, the final ruling Steward of Gondor, stricken with grief and madness, pours an accelerant over himself and orders his men to set him alight. This third part of the trilogy, 'Return of the King' was released as a film in 2003 (Jackson, 2003).

Contemporary musicians have written, sung and used the image of self-immolation to both convey certain themes to the listener and to commercially sell records. Romm et al. (2008) highlight revolutionary socialist rock band "Rage against the Machine" featured Malcolm Browne's Pulitzer Prize-winning photograph of Vietnamese Buddhist monk, Thich Quang Duc's self-immolation in Saigon in 1963 on the cover of their self-titled debut album (Rage Against the Machine, 1993).

In recent years a Tibetan singer, who calls himself *Jampel*, from the Chinese province of Sichuan has released a song and musical video titled "Patriotic Martyrs" in tribute to Tibetan self-immolators (High Peaks Pure Earth, 2013). The song is clearly about the self-immolations in Tibet with many references to fire and flames in the lyrics.

1.11.4 Self-immolation and mental health

The psychiatric literature indicates that those that attempt/or complete suicide by self-burning have a high prevalence of serious mental illness (Suhrabi et al. 2012; Shahana et al. 2011).

Geller (1997) reviewed all published studies between 1965 and 1994 which investigated the pathology of self-incineration in Western countries. The total number of cases reviewed was 582, with 306 (53%) male and 276 (47%) female. Of the 475 cases where a psychiatric history

was known, 369 (78%) had a prior psychiatric history, 107 (22%) did not. Past suicide attempts were recorded for 234 cases (49%). He found from 476 cases where a psychiatric history was known, 369 (78%) had a prior psychiatric history. At the time of the self-immolation or shortly after, the primary psychiatric diagnosis of the 582 self-immolation patients was: affective disorder, 21%, schizophrenia 12%, substance-abuse disorder 8%, and personality disorder, 7%. In 269 cases where motives for self-immolation was known, motives included: relationship conflict (23%), suicide (16%), physical illness (9%), psychosis (8%), bereavement (7%), escape a situation (5%) and loneliness (4%).

Hadjiiski & Todorov, (1996) reviewed 89 patients (72 self-immolation suicide attempts) who had made an attempt on their life from 3,975 admissions to a Bulgarian burns unit over a twelve year period (1983-1994). Twenty-three patients were receiving psychiatric treatment as patients at the time of the suicide attempt. Forty-three patients attempted suicide during the period of an acute mental affliction: family misunderstanding (24 patients), love or jealousy (8 patients), and political grounds (3 patients). The researchers concluded that their findings indicated a suicide attempt by burning was an expression of a psychotic response to a traumatic situation, and psychosis alone was seldom the root of this action.

In an Irish study of suicide and attempted suicide by self-immolation by O'Donoghue et al. (1998) 12 cases of self-immolation (F=7; M=5) were identified from 260 burns admissions over a two year period. This represented an annual rate of 4.6 per cent of all burns treated annually. 10 out of the 12 patients had a psychiatric history. Eight of the 12 patients were residents on psychiatric wards when they burned themselves. Four of the 12 patients died (33%). Psychiatric diagnosis of patients was: (5) depression, (4) personality disorder, and psychosis (3). Motives for self-burning were identified in nine patients which included: suicide (7), delusional (1), and manipulative (1). The study identified a subset of the population that have self-immolated while

residing on psychiatric wards. In this study these people were usually female, had a previous psychiatric history, and either intended to suicide or self-harm through deliberate self-burning.

In a German study, Rothschild, Raatschen and Schneider, (2001) retrospectively identified and reviewed 46 cases of suicide by self-immolation from 6,036 suicides in Berlin from 1990 to 2000. Suicide victims were 35 men and 11 women. A psychiatric history was identified in 65% of cases with one-third under psychiatric treatment, mostly for psychotic disorders, at the time of their death. In another one-third of the cases, relatives and acquaintances reported a history of abnormal behaviour which often included patterns of reactive depression. The main motive found for the attempted/completed self-immolation was separation from a partner or financial problems. Thirty-six percent of individuals had already attempted suicide through means other than self-immolation.

A Californian study (Pham, King, Palmieri, & Greenhalgh, 2003) identified 32 cases of self-inflicted burns from a total of 1008 admissions to a regional burns unit between 1996 and 2001. The 32 cases included 19 males and 13 females. The method of injury in 29 patients (91%) was self-immolation. Of these twenty-nine, 91% were diagnosed with an active psychiatric disorder. Nineteen (59%) had a second psychiatric diagnosis, usually the combination of an affective and thought disorder with substance abuse. Depression and bipolar disorders accounted for 20 cases. Schizophrenia and psychosis syndromes not otherwise specified were present in seven patients. Thirteen patients had either a history of substance abuse or dependence. According to the researchers only four patients (13%) intended to mutilate themselves rather than commit suicide. Interestingly, two-thirds of the patients in this study identified a chronic stressor, such as a serious medical illness (16 patients) and / or a long-term disability (12 patients).

In an interesting study by Mulholland et al. (2008), characteristics of 37 self-burn patients (M=18; F=19) admitted to an inner city London psychiatric service were compared with a control group of 37 patients who had self-harmed by other means. They found there were significant

differences in the recorded primary diagnosis between the groups. Those in the self-inflicted burns group were more likely to have a mental illness involving psychotic symptoms with 17 (46%) such cases in the burns group, compared with only three (8%) in the control group. The researchers also found that the self-inflicted burns group was more likely to be taking prescribed psychotropic medication at the time of the self-burn. Patients from the self-inflicted self-burns group were more likely to require psychiatric inpatient treatment after discharge than patients from the non-burn control group.

In a recent Iranian case-control study (Ahmadi et al. 2010), 30 cases of deliberate self-inflicted burns were examined. Mental disorders were assessed and it was found that 67% of cases had an adjustment disorder (all female), one in ten (75%) had either a drug or alcohol disorder (all males), 7% were found to have dysthymia, 7% had borderline personality disorder (50% male), 7% a depressive personality disorder (100% female), 3% major depression, 3 % anorexia nervosa, 3% had a antisocial personality disorder. The researchers concluded that adjustment disorder was a major risk factor for self-immolation in Iran. What stands out with Ahmadi et al. (2010) findings is the high rate of adjustment disorders and relatively low rate of major psychiatric disorders.

Such findings are supported by previous research evidence (Zarghami & Khalilian, 2002) from interviews and/or completed psychological autopsies of 318 admissions of self-burning at an Iranian burns unit over a three-year period. The average age of patients was 27 and 83% were female. Sixty-two percent had an impulsive suicidal intention with the major motive identified as being marital conflict. Ninety-five percent had a psychiatric diagnosis with the majority of cases being diagnosed with adjustment disorders (42%). Zarghami & Khalilian concluded that although the diagnosis of adjustment disorder may be *subthreshold*, its morbidity may be highly significant, including risk of self-harm and death.

Poeschla et al.'s (2011) study of published papers on self-immolation compared epidemiologic and psychiatric risk factors between higher and lower income countries. They

found self-immolation was more frequently associated with a history of mental illness or substance abuse history in higher income countries than in lower income countries. They concluded that in lower income countries, it was more likely that environmental risk factors and stress (often associated with adjustment disorders) would be a factor in cases of self-immolation rather than a major mental disorder.

Indeed, in a more recent study by Ramim et al. (2013) of 35 married, female patients that self-immolated, and were admitted to a burns unit in Tehran between 2009 and 2010, a none were diagnosed with a mental or psychological disorder. Physical and verbal violence were reported to be contributing factors in 94% of the cases. Sixty percent of victims reported their spouse to play the main role in causing the violent incidents, followed by 14.3% being husband's family, 5.7% second degree relative, and 5.7% the woman's family. A further 5.7% were due to financial issues.

Shahana et al. (2011) conducted an extensive literature review to summarise existing findings of different studies regarding mental illness as a contributor to self-inflicted suicidal burn injury. Nine studies, focusing on time frames ranging from 2 years to 20 years, were selected by the researchers for detailed analysis. The countries that these studies originated from included: United States of America (3), Australia (2), Iran, Greece, Spain, and Finland. Among the self-inflicted burns patients, males were seen to be higher in number than females in the majority of studies. They found that many of the self-immolators had psychiatric problems ranging from 43.3% to 91%. Specifically they report schizophrenia and depression to be the most common psychiatric diagnosis across the studies. Substance abuse, personality disorder, and psychosis were among the mental health illnesses contributing to the incidence of self-inflicted burns injury.

Two notable Australian studies have investigated self-inflicted burn injuries and both involved patient admissions to the Royal Brisbane Hospital burns unit. In the first study, Persley & Pegg, 1988) reviewed 1060 burns admissions from 1968 to 1979 and identified 30 suicide

attempts (2.8% of admissions to the burns unit). Suicide victims who were dead on arrival at the hospital were not included. There were 19 females (63.3%) and 11 males (36.7%). Eighteen of these patients suffered from affective disorders, three from alcoholism, and two from chronic illnesses. The mortality rate was 14 of the 30 patients (47%) which was higher than the mortality rate for the burns unit as a whole (8.3%). Patients who used flammable liquid to self-immolate were more likely not to survive their burns (13 of 18 died).

In a later Australian study by Cameron et al. (1997), 37 individual cases of self-inflicted burns were identified from 1,072 admissions to the Royal Brisbane Hospital burns unit from 1990 to 1995. Suicide attempts represented 1.9% of these admissions. A major psychiatric disorder was present in 60% of cases. A diagnosis of schizophrenia was made in seven admissions (16%) and another seven patients (16%) were diagnosed as being depressed. A diagnosis of personality disorder was made in 17 admissions (39%). In the remaining 13 admissions, a psychiatric diagnosis was not identified, however in these cases, a common theme was domestic disputes involving alcohol intoxication.

In summary, the suicide/self-burning literature shows that risk factors of self-immolation differ across different socio-demographic characteristics, psychological predispositions, psychiatric disorders and experience of adverse events. Suicide by self-immolation is more common in lower income than higher income countries, with young women being over-represented (Poeschla et al. 2011). Environmental risk factors and stress are thought to lead to a higher rate of adjustment disorders experienced by women choosing self-immolation in countries with high self-immolation rates (Ahmadi et al. 2010). Clearly, gender status problems have influenced this behaviour by women in these countries. In high income countries, suicide by self-immolation is a relatively uncommon suicide method which has more prevalence among older males (Ahmadi et al. 2012) and is more frequently associated with a history of mental illness or substance abuse. The most common psychiatric disorders diagnosed in self-immolation cases

include major depressive disorder, schizophrenia, psychoses, alcohol and other drug addiction or abuse (Phan et al. 2003; Shahana et al. 2011)

1.12 Coroners Reporting of Suicide in Australia

The Australian Bureau of Statistics (ABS) is the independent statutory authority for the routine collation of data on suicide and 'other causes of death' in Australia. However, no single body is responsible for producing mortality data. Input of information comes from different parties: police, state and territory registries, forensic medical and scientific staff, coroners, the National Coroners' Information System (NCIS), the ABS and sometimes, funeral directors (see Figure 1; De Leo et al. 2010).

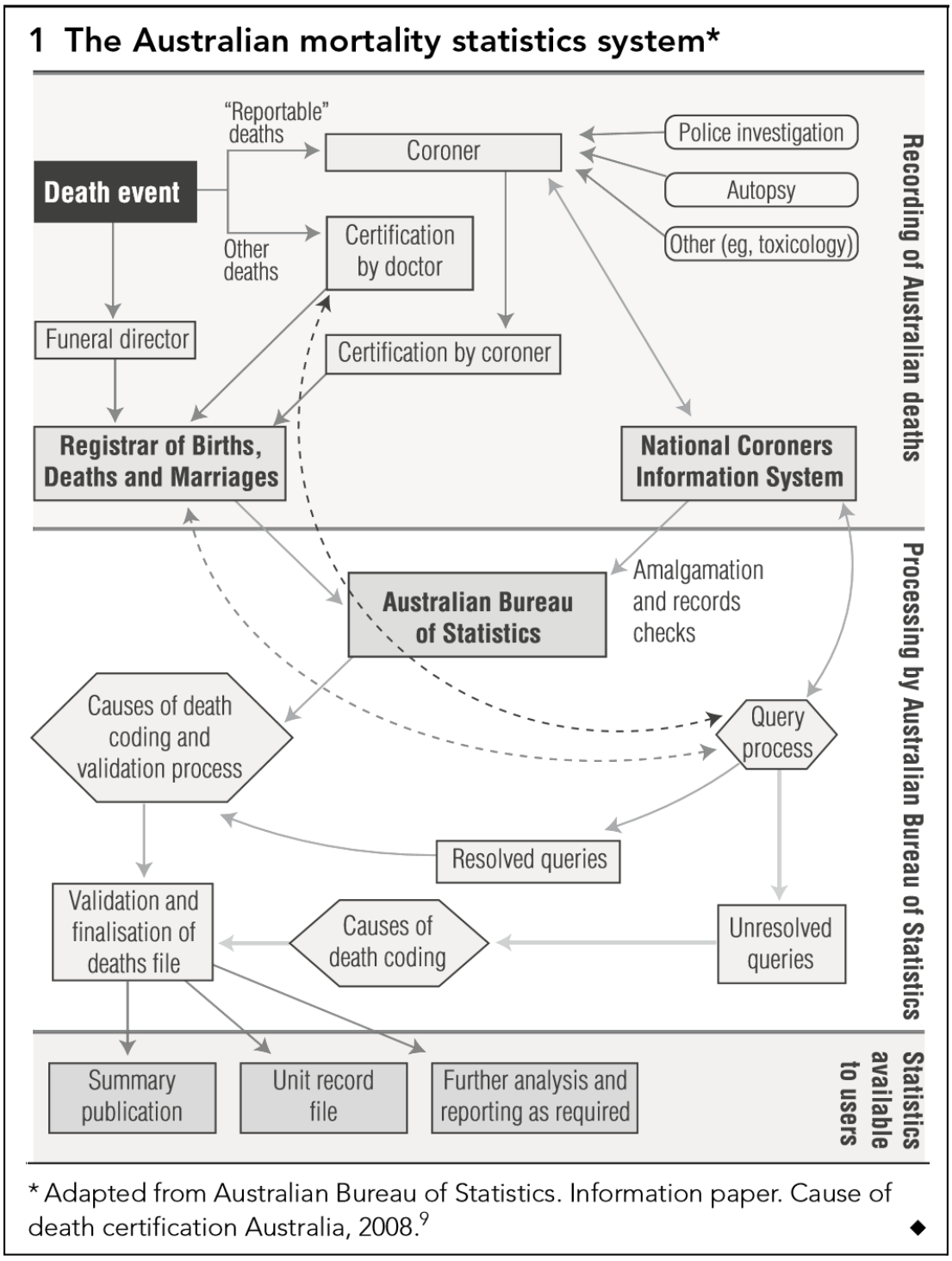

Figure 1.1. A model of the Australian mortality statistic system. Adapted from Australian Bureau of Statistics. Information paper. Cause of death certificate Australia, 2008.

Potentially, each party (Figure 1) providing information along the pathway to Australian Bureau of Statistics (ABS) output data can be recording different data for different purposes (legal, statistical, research). Parties may be using different standards of proof to determine outcomes and may be confronted with different problems in reporting deaths (De Leo et al. 2010). Such issues can be significant factors in the coding of mortality data and impacts on standardisation.

Given that the suicide data used in the current study has been obtained from coroners' reports, it is important to discuss the way that coroner's report mortality data, and how that may contribute to suicide under-reporting.

Coroners are usually magistrates who are charged to investigate all reportable deaths (De Leo et al. 2010). Reportable deaths are a special category of death required to be reported to the court and investigated by a coroner (Coroners' Court of Victoria, 2013). There does not have to be anything suspicious in order for a coroner to investigate a death. Coroners investigate deaths that are directly or indirectly the result of an accident or injury. They also investigate types of reportable deaths called unnatural deaths. This may include, but is not limited to: suicides, poisonings, homicides, and overdoses (Coroners' Court of Victoria, 2013). Finally the coroner investigates unexpected deaths. That is, where the person appeared to be healthy and did not suffer from any known disease, illness or medical condition that would have otherwise explained their death.

Each Australian state and territory has a coronial jurisdiction which can differ in legislation and can lead to inconsistent coding and reporting of mortality data. Coroners must establish the time, place, manner and cause of death.

Notably, however, coroners have discretion when it comes to ruling/not ruling on the notion of the person's 'intent' to take one's life. This is significant in that reliable coding of suicide requires clear adequate definitions. Australia, along with most countries in the world,

conform to the World Health Organisation's International Classification of Diseases (ICD-10) which requires both intended self-harm and suicidal intent to delineate suicide. In some circumstances the coroner may require a high standard of proof to determine intent. Further, policy is a major issue as Coroners' Acts in Australia do not explicitly mandate that a coroner record a statement of intent (De Leo et al. 2010). Thus, coroners' findings do not necessarily include a suicide coding.

Inconsistent coronial processes for determining 'intent' may be further confounded by other systemic problems. For example, the coroner relies on input from other parties such as police and forensic pathologists who investigate reportable deaths. Often there are variations between various parties and across jurisdictions with these bodies, in the information being provided to the coroner. It has only been as recently as 2009, with the introduction of standardised national police forms to record evidence of suspected suicide and demographic material, that there has been an improvement in the consistency of information (ABS, 2009).

The wording of coroners' findings is also diverse (Freckelton & Ranson, 2006). The word 'suicide' is used rarely, if ever, in some jurisdictions, and frequently in others. Some coroners avoid using the word suicide altogether and may refer to intent by 'letting the facts of the death speak for themselves' (e.g., hanging) (Freckelton & Ranson, 2006). Ambiguous wording in coroners' reports may reflect unclear coroners' categorisation or criteria for what constitutes a suicide. Stigma surrounding suicide and its possible association with psychological effects on family members has also been found to influence coronial practice (ABS, 2009).

The aforementioned issues relating to reporting and the quality of input information provided to coroners and coronial enquiries were relevant at the time of this study involving coronial data from 1997 to 2008. In 2009 the National Committee for Standardised Reporting of Suicide (NCSRS) was formed with the aims of addressing such issues and enhancing coronial processes.

1.13 Purpose of the study

To the authors' knowledge, there have only been two previously published studies (Persley & Pegg, 1988; Cameron et al. 1997) of suicide by self-immolation in Australia. These studies were limited to a small population group and both were conducted at the same tertiary hospital in the one State (Queensland). The population (those that had self-immolated) were also biased in these studies, given (a) the lethality of self-immolation and (b) the fact that only those who had survived long enough to be transferred to hospital and were not dead on arrival were included. Furthermore, there were prominent differences with respect to the gender ratios of self-immolators' in the two studies. In Persley & Pegg (1988) study the ratio of females to males was 2:1, whereas in Cameron et al. (1997) study the ratio was reversed. The difference in gender ratios between the two studies draws attention to difficulties eliciting inferences from the results. There is thus good reason for a wider community based study of this inadequately researched method of suicide in Australia.

After collecting and analysing the research data, comparisons were made with two previous Australian suicide studies (Large & Nielssen, 2010; De Leo et al. 2002) as discussed in section chapter 3. Although different independent statutory authorities provided suicide data for each of the comparable studies (ABS = Large & Nielssen, 2010; Queensland Suicide Register= De Leo et al. 2002), these studies were selected by the researcher because of the similarities in defining study populations for analysis. As previously stated, no single body is responsible for producing mortality data. Similarity between studies in the input, routine, collation of suicide data (police, state and territory registries, forensic medical and scientific staff, and State coroners) affords comparable analysis of rates and methods of suicides across studies.

The present study builds on previous Australian studies that have identified people choosing self-immolation as a method to attempt/complete suicide (Persley & Pegg, 1988; Cameron et al. 1997). These previous studies were limited to a small population group of patients

that presented to a regional burns unit. The overall objective of the present study was to examine coronial files of cases who have completed suicide by self-immolation from three Eastern Australian states over an eleven year period and examine a range of variables pertinent to those that suicide by this method (e.g. demographic and psycho-social factors). Comparisons would also be made with two key papers examining Australian suicide by other methods. Coroners' files (n=144; 100 male, 44 female) for suicide deaths by self-immolation (years 1997-2008) were examined (see Methodology for further details).

1.13.1 Research aims

The specific research aims guiding this study were:

Aim 1: Examine suicidal deaths by self-immolation for a range of demographic variables. Demographic parameters investigated will include: age; sex; country of birth; spirituality/religious belief; marital status; living arrangements; and occupation.

Aim 2 - Examine mental illness features in those that choose self-immolation. Mental health parameters investigated will include: psychiatric diagnosis; substance use (alcohol, mood altering drugs); interaction with mental health services; previous suicide attempts; and other psychosocial contributing factors.

Aim 3- Examine identifiable variables regarding each self-immolation suicide event. Suicide event variables under investigation will include: location of self-immolation; combined suicide methods; witnesses; suicidal intent; accelerant use; presence of suicide note; and survival interval.

Aim 4 - Examine gender difference in those who suicide by self-immolation across a range of identifiable variables.

Aim 5 - Compare self-immolation rates with Large and Nielssen's (2010) study that reported annual rates of suicide by different methods (not including self-immolation) for males and females in the same three Australian states (Victoria, NSW, and Queensland).

Aim 6 - Compare Australian males who suicided by self-immolation with De Leo, Evens and Neulinger (2002) study's findings of males who chose common suicide methods in Australia (hanging, shooting, gassing).

Chapter 2
Methodology

2.0 Study Design

This study involved a quantitative research design, involving descriptive and non-parametric analyses, which retrospectively examined coroners' files for suicide death by self-immolation occurring from 1997-2008 in the Australian states of Victoria, New South Wales, and Queensland. Initially the data was investigated examining a range of demographic and other variables, relating to both the deceased person and the event. Comparisons, in terms of the rates of self- immolation, were then made with Large & Nielssen's 2010 study that reported annual rates of suicides by different methods (hanging, shooting, gassing, poisoning, jumping from a height, drowning, use of sharp implement) for males and females in different Australian states. Selected characteristics of males who suicided by self-immolation were then compared to De Leo, Russell and Neulinger 2002 study's findings of males who chose common suicide methods in Australia (hanging, shooting, gassing). Note that the terms 'suicide by fire' and 'self-immolation' are used interchangeably throughout this thesis.

2.1 Sample

2.1.1 Coroners' records

The coroners' records of all cases across Victoria, New South Wales and Queensland (N=658) where there had been a recorded death by fire was examined across 11 years. The first and final dates of the files from each state varied but the overall span for all files was from the years 1997 to 2008. These cases included death by fire in a variety of circumstances such as vehicle accidents, residential fires and self-immolation. Coronial data was obtained through accessing relevant information directly from the original coronial records. One hundred and forty four cases (n=144) met the below criteria for suicide by self-immolation from a total of 658 coroners' files where there had been a recorded death by fire between the years 1997 and 2008. Age and sex characteristics are examined in the results section 3.1

Coronial records are a rich source of detailed information. All deaths suspected to have been due to suicide are required to be referred to a coroner, as are deaths for any other reason except 'natural causes'. Each file may have attached a collection of documents from sources such as police investigations, medical examiners, fire and arson investigators and fire fighters. Witness statements from those who observed the event as well as statements from family and friends who can provide relevant information about the deceased are often also included. The quality and consistency of these source documents may vary between and within each jurisdiction as well as between states. For example, Queensland coroners' records are often constrained by the absence of several types of source documents such as autopsy reports, witness statements and toxicology reports. Coronial records are crucial in providing the most accurate mortality data to the Australian Bureau of Statistics (ABS) - the main source of suicide statistics in Australia. The ABS provides suicide case counts (and similar information on all other deaths) based on information provided to it by state and territory Registrars of Births, Deaths and Marriages, supplemented by data from other sources, notably coroners' case files.

2.1.2 Criteria used in study to assign a case as a suicide

This study is informed by the comments of Harrison, Pointer, and Elnour, (2009) regarding how to utilise an imperfect coroners' information system. "Best use of the system can be made if its information properties, including timing and the information content of the records, are well understood, and if it is used in a standardised manner that takes this knowledge into account"(pg. 23).

This study utilises a criteria for suicide that includes cases where a person's death has resulted through intentional self-harm with the intent to kill oneself. The coroner may or may not have given an unambiguously worded finding of suicide. In this way the researcher has adopted essentially the same criteria as to the National Coroner's Information System. The National Coroner's Information System criteria for suicide includes cases where, although the coroner has not given the finding of suicide, accompanying information (e.g. a legal or medical authority report regarding both the self-inflicted nature and suicidal intent of the incident) clearly indicates the person has died as the result of intentional self-harm (ISH) with the intent to take their life (Harrison, Pointer & Elnour, 2009).

Thus, for the purposes of this study, the criteria used to assign a case as a suicide (within the coroners' files where the death involved fire) was:

- When the coroner assigns their verdict as that of suicide.
- Where the context (information content of records) implies a focus on suicide rather than ISH.
- Intention to take one's life was inferred on the basis of either; a suicide note; *prima facie* evidence of intent; or circumstantial evidence as to the most reasonable and possible explanation for the death.

2.2 Data Management

2.2.1. Construction of suicide by fire coronial database

The Suicide by Fire Coronial Database ("the Database") was developed by the researcher to record information about self-immolation with the aim of identifying personal/event characteristics and to compare this data with research findings from key studies where other methods of suicide have been used. The information for the database was obtained from coronial files that were compiled to explain the circumstances surrounding the death.

The process for recording information for each suicide death started with the coroners' files of 'all deaths by fire' being carefully read to ascertain those cases where death resulted through suicide by self-immolation, using the above criteria. Once these cases were identified, the data from each of these files was then systematically coded.

The development of the codes used in the Database was a threefold process:

1. A number of coroners' reports were carefully viewed to determine the type/quality/consistency of standardised information within and between state coroner files.
2. An extensive literature review was conducted to identify relevant variables and coding systems used in suicide literature.
3. The researcher consulted the Victoria University Coronial Fire Database manual (developed to record information about fatal fires) and adopted relevant codes (especially regarding categorising personal characteristics, environmental factors, and capturing human behaviour).

Approximately 20% of the files were comprehensively discussed on a one-to-one basis with a group of mental health professionals (MHP). In each case the MHP read the relevant sections of the file and discussed both whether the case met the above criteria for a suicide and reviewed the completed coding sheet with the researcher. In practice there was rarely any ambiguity on the issue of whether the case met the criteria for suicide or not. While this was a

comprehensive process and resulted in the resolution of key ambiguities, especially around coding, it was not a blind process.

2.2.2 Structure of suicide by Fire Coronial Database

In general terms the Database was constructed in three sections. The first group of variables (n=10) outlined in detail the socio-demographic information available from the coroners' file about the particular characteristics of each individual who chose to use self-immolation as their method of suicide.

The second section of the Database recorded information about mental health and other contributing factors known about the individual. Included in this group of variables was psychiatric condition and history (n=7); contributing factors (n=6) and any evidence of previous self-harm, suicide attempts using fire or other methods (n=5).

In the third section of the Database variables about the suicide event were recorded (n=22). This included details such as location where the self-immolation took place; accelerant use, presence of suicide note and survival interval if relevant. In this section selected additional background information from witness statements of family members, close friends and medical professionals associated with the person prior to their death were included (see Appendix A for a listing of all variables).

The Database was developed to allow multiple entries to be made for some of the more complex variables. It was often the case that more than one important or contributing factor, either surrounding the event or the individual, needed to be recorded. For example, up to fifteen pre-existing diagnosable psychiatric disorders could be accommodated for each person who suicided. Likewise up to ten contributing factors could be nominated for any one suicide.

2.2.3 Suicide by Fire Coronial Database coding manual

A coding manual was developed to provide precise definitions of all codes in the order they appear in the Database (Appendix B). Codes were grouped into three distinct code types:

standard codes; confidence codes; and specific codes (see below). It should be noted that the development of this coding manual was, to a certain extent, an ongoing process, where new codes were developed as informed by new information in files.

Standardised codes

A number of standard codes applied in a standardised way to all variables, for example 99 was used for all missing data (see coding manual pg 2, Appendix B).

Confidence codes

Confidence codes appear throughout the Database and were included to indicate the degree of certainty the researcher had regarding the coding of some variables. They were linked to findings regarding psychiatric history and diagnosis, contributing factors, and events leading up to the suicide.

They systematised the degree of certainty surrounding the accuracy of information that may, for example have come from multiple sources, or where there was the absence of solid evidence. Confidence codes captured the degree of certainty used by experts such as the coroner and fire investigators in describing underlying causes. They were also used to describe the degree of certainty regarding subjective judgments made by the researcher, for example the mental health status of the deceased prior to the suicide.

Two confidence codes were listed in the manual, definite or probable. The confidence code of "definite' was given when one of the following occurred:

- the self-immolator was still alive at some point following the incident and was able to give their account of events;
- a suicide was directly witnessed;
- a suicide note was written;
- the forensic scientist/coroner was able to declare the death was a suicide.

The confidence code of 'probable' was given when the information in the coroners' report was detailed enough to suggest a strong likelihood that the variable under question was more likely than not to have been a factor. For example, a case file may have provided supporting evidence (e.g. family observations of the deceased person's deterioration of mental health and change of behaviour) of symptomology that the researcher judged met the criteria for clinical depression according to the criteria listed in the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision (DSM IV, TR, 2000). The deceased person may not have had any contact with mental health services leading up to their death and therefore there had been no mental health assessment. In this case the researcher may record 'probable' next to the variable of depression.

Specific codes

Specific codes were used to describe the variables being investigated in the study. They were organised into the three general sections reflecting the structure of the Database. The first cluster of specific codes contained codes pertaining to the socio-demographic information of each individual who chose self-immolation. The second cluster related to mental health and other contributing factors. Lastly, the third cluster described information about the suicide event itself (see Appendix B).

2.2.4 Coronial Case Summary Record

Standardisation of information retrieval from coroners' files was obtained through the aid of a semi-structured instrument called the Coronial Case Summary Record (see Appendix C) which was designed by the researcher to record information from coronial files. The Coronial Case Summary Record was structured to reflect the database and included all variables under investigation in the study.

The first section of the Coronial Case Summary Record identified relevant social-demographic information for each case. For example, ranking of occupation type for those

employed was categorised using Victorian Department of Education and Training Groupings (State Government Victoria: Department of Education & Training, 2004).

The second section of the Coronial Case Summary Record recorded mental health history and other contributing factors (see Appendix C). In cases where there was recorded evidence of significant mental health deterioration but no known psychiatric history or no diagnosis, the researcher made a 'probable' judgement. The classifications of mental illness was derived from the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision (DSM-IV-TR) (DSM-IV-TR, 2000) and included mood disorders (depressive disorders, bipolar disorder), anxiety disorders, substance related disorders (alcohol, drugs), delirium, dementia and amnestic cognitive disorders, schizophrenia and other psychotic disorders (DSM-IV-TR, 2000). A 'definite' diagnosis of mental illness was recorded if a clinical diagnosis was available from a health professional, such as a General Practitioner, Psychiatrist or Psychologist that the victim was suffering a mental illness. It was also recorded if there was an explicit statement from the Coroner that the deceased was suffering from a mental illness prior to their death, which the coroner had determined based on data obtained through various parties (e.g. statement from family member) informing the coronial process. A 'probable' diagnosis will only be permitted where there is significant evidence to indicate a person was most likely suffering from a mental illness; such evidence can often be found in statements from police, family and friends, and autopsy reports or toxicology reports (often this is where medications are detected and recorded). To aid the researcher in classifying the presence and type of mental illness symptomology described in the coroners' files a previously developed classification tool was used (see Appendix D).

The third section of the Coronial Case Summary Record focused on the circumstances surrounding the death, including: precipitants, witnesses, involvement of alcohol and other drugs, location of the suicide, accelerant use, notes left, and survival interval where relevant. Witness statements were categorised into three distinct categories, according to which parts of the

sequence of the self-immolation each witness observed: those that witnessed the ignition, those that witnessed the burning and immediate aftermath, and those that witnessed both the ignition and burning. This enabled the researcher to have more information as to whether the presence of a witness was in itself a possible factor of importance.

Completed Coronial Case Summary Record forms provided a hard copy of information that was later manually transposed into a computerised Database. Clerical errors transposing data from hard copy to data base were checked by an independent research assistant.

2.3 Data Analysis and Comparisons

After collecting and analysing the research data, comparisons were made with two previous Australian suicide studies (Large & Nielssen, 2010; De Leo et al. 2002) as discussed in section chapter 3. Although different independent statutory authorities provided suicide data for each of the comparable studies (ABS = Large & Nielssen, 2010; Queensland Suicide Register = De Leo et al. 2002), these two studies were selected by the researcher because of the similarities in populations being sampled the researchers current study population. As previously stated, in Australia, no single statuary body is responsible for producing mortality data used to record suicides. It is therefore the similarity of the routine collation of suicide data from the same sources (police, state and territory registries, forensic medical and scientific staff, and State coroners) that affords comparable analysis of rates and methods of suicides across studies.

It should be noted that the population figures used in the current study for each state were based on one year (a midpoint across the years) while the comparison study ((Large and Nielssen, 2010) used annual figures. This may have introduced some wider level of error in the comparative rates determined, but it is unlikely to have a major factor and the comparative magnitude of the rates would still be robust

The two comparative studies were also selected by the researcher because the results of these studies provided gender specific data on suicide rates for different suicide methods in Eastern

Australian states. Comparing the current study results to Large and Nielssen's annual rates of suicide by different methods enabled the prevalence of annual rates of suicide by self-immolation to be compared to other methods across three Australian states. De Leo et al, study of males who chose common suicide methods investigated many of the same social, psychological, and health related factors as the current study which enabled similarities and differences of males who completed suicide using self-immolation to be identified compared to male using other suicide methods.

All data analyses were performed using SPSS Statistics GradPack version 19.0 (IBM., 2010). Descriptive statistics such as frequencies, means (*M*), standard deviations (SDs) and percentages were used to present characteristics of data on all the measures used in the study. Chi Square analyses were conducted as relevant and alpha was set at 0.05. As a series of tests were conducted, the issue of alpha inflation was considered. However, as all analyses conducted were pre-designed as part of a set of hypotheses and were considered necessary for the current study, adjustments were deemed unnecessary (Keppel & Wickens, 2004).

After collecting and analysing the research data comparisons were made with two previous Australian suicide studies (Large & Nielssen, 2010; De Leo et al. 2002) as discussed in section chapter 3.

2.4 Ethics approval

This project was conducted with the approval of the Victorian Human Research Ethics Committee.

Chapter 3

Results

In the following presentation of results, a variety of factors relating to those who suicide by self-immolation are reported with details presented as a function of sex. Factors investigated included demographic factors (age, sex and Australian state; country of birth; spiritual/religious

belief; marital status; living arrangements; occupation), mental health factors (psychiatric history; use of mental health service, suicide attempts, alcohol/drugs use) and details of the suicide event (location, combination suicide methods, witnesses, known suicidal intent, accelerant use, suicide note, and survival interval if relevant).

A comparison is then made between annual self-immolation rates found in the present study and the rates of seven other main suicide methods in three Australian states as presented by Large & Nielssen, (2010). Lastly, comparisons are made between the characteristics of Australian males who suicide by self-immolation with those males who use one of the three other main suicide methods in Australia as presented by De Leo et al. (2002).

3.1 Demographic Variables

3.1.1 Sample size by state, sex and age

The self-immolation sample consisted of 144 adult cases which were identified from a total fire death population of 658 cases. The number and percentage of self- immolation cases in the database from federal states were: Victoria, 52 (36.1%); New South Wales, 54 (37.5%), and Queensland, 38 (26.4%). Note that the time periods of available coronial cases varied from state to state and this variability is taken into account in comparisons made in section 3.2.

The sample comprised of 100 males (69.4%) and 44 females (30.6%), and this was compared to Australian population statistics (established to be close to 50: 50 based on ABS, 2001a data).The difference between the observed frequencies and the expected, population based, frequencies was significant (Chi Square = 21.78, df=1, $p<.001$). This indicates that males are significantly over-represented in the self-immolation data.

Figure 2 shows the age group and sex distribution and it can be seen that for both males and females most cases of self-immolation were in the 46-64 year age group, with this trend being more evident for males than females.

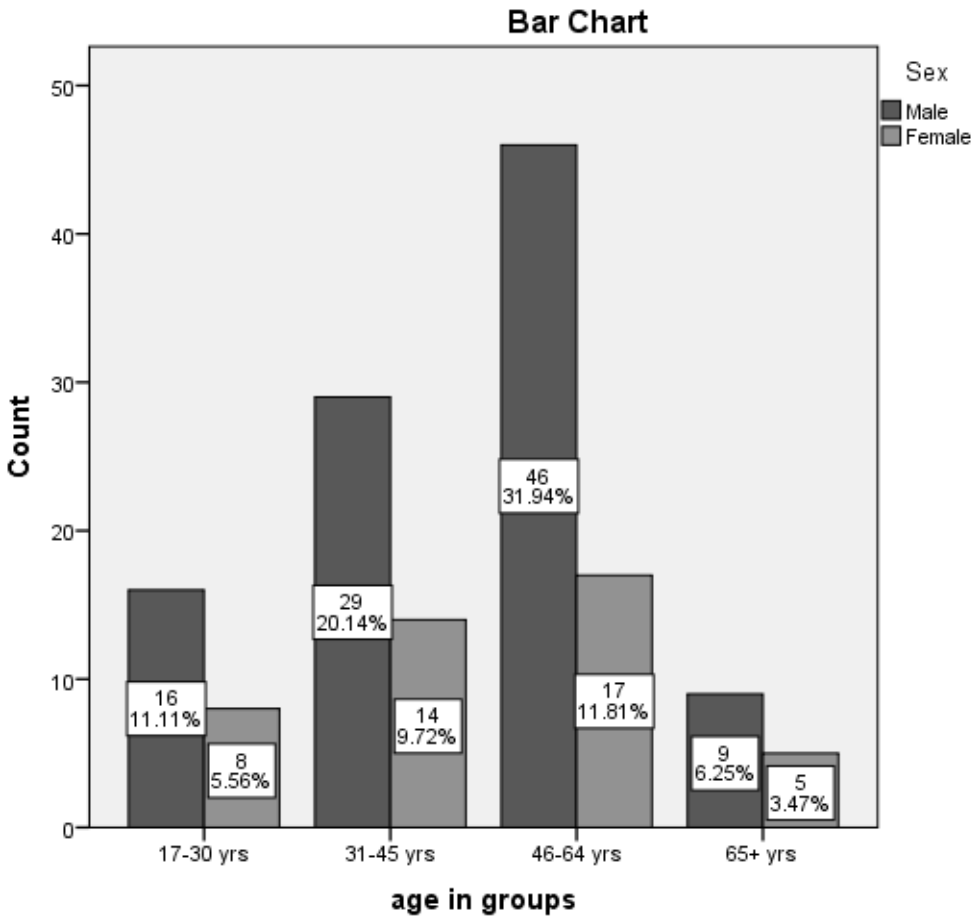

Figure 2: Bar chart showing age group and sex distribution (both count and percentage) for the self-immolation sample, (*N*=144)

3.1.2 Country of birth

One hundred and four subjects were born in Australia (72.2%), while 23 (16.5%) were born in Asia, and 12 (8.3%) were born in Europe. Table 3.1 presents self-immolations by sex and country of birth. A statistical comparison was made to determine whether the ratio of Australian born versus overseas born was significantly different for the self-immolation sample compared to the ABS census data for Australian (2001), and no significant difference was found (Chi Square = 1.96, *df*=1, p=.16). The high number of Vietnamese-born cases (4.9%) in the data was noteworthy.

Table 3.1

Self-immolations as a function of country of birth and sex (*N*=141)

Country	Male, n (%)	Female, n (%)	Total, n (%)
Australia*	73 (50.7)	31 (21.5)	104 (72.2)
...Vietnam	4 (2.8)	3 (2.1)	7 (4.9)
...South Africa	1 (.7)	0	1 (.7)
...Serbia	1 (.7)	0	1 (.7)
...Italy	1 (.7)	0	1 (.7)1
...Iraq	0	1 (.7)	1 (.7)
...England	2 (1.4)	0	2 (1.4)
...Pakistan	1 (.7)	0	1 (.7)
...Russia	1 (.7)	1 (.7)	2 (1.4)
...Korea	1 (.7)	0	1 (.7)
...Croatia	1 (.7)	0	1 (.7)
...China	1 (.7)	0	1 (.7)
...Eritrea	1	0	1 (.7)
...Greece	1 (.7)	1 (.7)	2 (1.4)
...Hungary	3 (2.1)	0	3 (2.1)
...Scotland	0	1 (.7)	1 (.7)
...Switzerland	0	1 (.7)	1 (.7)
...Germany	0	1 (.7)	1 (.7)
...Netherlands	3 (2.1)	0	3 (2.1)
...India	1 (.7)	0	1 (.7)
...Spain	1 (.7)	0	1 (.7)
...Japan	0	2 (1.4)	2 (1.4)
...Samoa	1 (.7)	1 (.7)	2 (1.4)

Note: *One indigenous born Australian.
The country of birth was missing for 3 cases (2.1%).

3.1.3 Spirituality/religion

In 134 (93.1 %) cases, no spiritual or religious belief or unknown spiritual or religious belief was recorded. Where a spiritual orientation or religious belief was recorded, 8 (5.6%) subjects identified themselves as Christian, while 2 (1.4%) identified themselves as Buddhists. Only one case in the present sample of self-immolation was directly related to religiosity (Buddhism) according to the coroner.

3.1.4 Marital status

With regards to marital status, 42 (29.2%) of the 144 subjects were single and of these 31 (21.5%) were male and 11 (7.6%) were female. Forty (27.8%) self-immolation cases were married, 27 (18.8%) being male and 13 (9.0%) female. A further 11 (7.6%) subjects, 7 (4.9%) male and 4 (2.8%) female were currently living in defacto relationships. Fourteen (9.7%) were divorced, 6 (4.2) male, 8 (5.6) female. Twenty-eight (19.4%) of the sample were separated, 22 (15.3%) male, 6 (4.2%) female. Six (4.2%) of subjects were widowed which included 5 (3.5%) male, and 1 (.7) female. One female was currently engaged at the time (.7) and 2 cases had unknown marital status. Comparisons with ABS data in relation to marital status was not undertaken as some definitions used by the coroner were different or ambiguous compared to ABS categories (e.g. does ‘single’ mean ‘never married’ and there was no ‘defacto’ category in the ABS data).

3.1.5 Living arrangement

At the time of completed suicide, 30.6% of subjects were living alone. This is slightly higher than the national average which showed that in 2001 twenty- four percent *of all households* were lone person households (ABS, 2001). Over 9 per cent (9.4 per cent, 1,616,213) of all Australians lived alone (ABS, 2001). Fifty-five percent of subjects were living in some sort of family structure. A further 7% of subjects were in shared housing with non-family members. Table 3.2 identifies the living arrangements of subjects.

Table 3.2

Self-immolation as a function of living arrangements and sex

Living arrangements	**Male, n (%)**	**Female, (n)%**	**Total, n (%)**
...Alone	33 (22.9)	11 (25.0)	44 (30.6)
...With spouse	11 (7.6)	8 (5.6)	19 (13.2)
...With parents and siblings	7 (4.9)	0 (0.0)	7 (4.9)
...With spouse and children	20 (13.9)	9 (6.3)	29 (20.1)
...Extended family	2 (1.4)	0 (0.0)	2 (1.4))
...With children only	2 (1.4)	6 (4.2)	8 (5.6)
...With parents	8 (5.6)	6 (4.2)	14 (9.7)
...Sharing with house mate	3 (2.1)	0 (0.0)	3 (2.1)
...Boarding	6 (4.2)	1 (.7))	7 (4.9)
...Homeless	3 (2.1)	1 (.7)	4 (2.8)

Note. Living arrangements for seven subjects was unknown

3.1.6 Occupation

At the time of self-immolation, 35.7% of subjects had an occupation and were engaged in paid employment. A further 48.3% of the sample were not working and received some form of government financial assistance. Occupation type for each subject are grouped and displayed in Table 3.3.

Table 3.3

Self-immolation as a function of occupation and sex

Occupation	Male, n (%)	Female, n (%)	Total, n (%)
...Senior management, professional	2 (1.4)	2 (1.4)	4 (2.8)
...Managers, associates, professionals	2 (1.4)	3 (2.1)	5 (3.5)
...Trades person, clerk, skilled office worker and sales	15 (10.5)	1 (.7)	16 (11.2)
...Machine operators, hospitality, assistants, labourer	21 (14.7)	3 (2.1)	24 (16.8)
...Private business	1 (.7)	1 (.7)	2 (1.4)
...House wife	0 (0.0)	4 (2.8)	4 (2.8)
...Stay home parent	0 (0.0)	1 (.7)	1 (.7)
...Student	1 (.7)	3 (2.1)	4 (2.8)
...Unemployed	24 (16.8)	11 (7.7)	35 (24.5)
...Retired	12 (8.4)	2 (1.4)	14 (9.8)
...Sickness benefits, disability pension	9 (6.3)	7 (4.9)	16 (11.2)

Note. Forty-five percent of subjects were not working at the time of death (unemployed, retired, sickness benefits, disability pension). Occupation status was unknown for five subjects.

3.2 Mental Health and Other Contributing Factors

3.2.1 Psychiatric history

One hundred and eight cases (75%) contained data which was relevant to mental health symptomology or psychiatric diagnosis. Frequency and percentage of diagnosable and probable mental illness are presented in Table 3.4, as well as the numbers where a mental illness was found to not be present or the status was unknown. (Given the nature of the coroners' files these latter two conditions could not be separated.) Depression was the most commonly diagnosed psychiatric illness amongst self-immolators. Substance abuse (alcohol) and anxiety disorders were also frequently diagnosed psychiatric illnesses. Comorbid diagnoses (more than one psychiatric disorder, or co-occurring psychiatric and substance abuse disorder) was present in 37 (25.7%) of cases. Fifty-four subjects had one diagnosable mental illness. Seventeen cases (11.8%) were judged by the current researcher as 'probable' in terms of presenting undiagnosed psychiatric symptomatology shortly before or/and at the time of their death.

Table 3.4

Frequency and percentage of different mental illness diagnoses within the self-immolation sample as a function of sex

Variable	**Definite**			**Probable**			**No or not known**		
Psychiatric diagnosis	**Male, n (%)**	**Female, n, (%)**	**Total, n (%)**	**Male, n (%)**	**Female, n (%)**	**Total, n (%)**	**Male, n (%)**	**Female, n (%)**	**Total, n (%)**
...Depression	41 (29.2)	22 (11.8)	64 (44.4)	17 (11,8)	8 (5.6)	25 (17.4)	41 (28.5)	14 (9.7)	55 (38.2)
...Schizophrenia	9 (6.3)	3 (2.1)	12 (8.3)	1 (.7)	0	1 (.7)	90 (62.5)	41 (28.5)	131 (91)
...Psychosis	1 (.7)	4 (2.8)	5 (3.5)	5 (3.5)	1 (.7)	6 (4.2)	94 (65.3)	39 (27.7)	133 (92.4)
...Dementia/Alzheimer's	1 (.7)	0	1 (.7)	0	0	0	99 (68.8)	44 (30.6)	143 (99.3)
...Personality disorder	2 (1.4)	6 (4.2)	8 (5.6)	1 (.7)	1 (.7)	2 (1.4)	97 (67.8)	37 (25.7)	134 (93.1)
...Anxiety disorders	14 (9.7)	3 (2.1)	17 (11.8)	3 (2.1)	2 (1.4)	5 (3.5)	83 (57.6)	39 (27.1)	122 (84.7)
...Substance disorder-(alcohol)	14 (9.7)	4 (2.8)	18 (12.5)	2 (1.4)	1 (.7)	3 (2.1)	84 (68.3)	39 (27.1	123 (85.4)
...Substance disorder-(drugs)	7 (4.9)	3 (2.1)	10 (6.9)	2 (1.4)	1 (.7)	3 (2.1)	91 (63.2)	40 (27.8)	131 (91.0)
...Adjustment disorder	1 (.7)	0	1 (.7)	0	0	0	99 (68.8)	44 (30.6)	143 (99.3)
...Bipolar disorder	4 (2.8)	2 (1.4)	6 (4.2)	0	0	0	96 (66.7)	42 (29.2)	138 (95.8)
...Post traumatic stress disorder	1 (.7)	0	1 (.7)	0	0	0	99 (68.8)	44 (30.6)	143 (99.3)
...Anorexia	0	1 (.7)	1 (.7)	0	0	0	100 (69.4)	43 (29.9)	143 (99.3)
...Attention deficit ...disorder	0	0	0	0	0	0	100 (69.4)	44 (30.6)	144 (100)
...Intellectual disability	1 (.7)	0	1 (.7)	0	0	0	99 (68.8)	44 (30.6)	143 (99.3)

Note. More than one contributing factors may have been indicated per case and thus each percentage is calculated from the overall sample (*N*=144)

3.2.2 Role of alcohol

From the 144 coroners' files, 54 cases (41.7%) did not provide the results of alcohol testing in toxicology reports. The vast majority of these were from the state of Queensland. From the 84 files that did provide blood alcohol content (BAC) reading, 58 (69%) cases had no alcohol in their blood at the time of death. Alcohol was detected in blood samples from 26 (31%) cases, comprising of 19 (73%) males and 7 (27%) females. Of these 26 cases 9 (34.6%) had levels in excess of 0.1 or 100 mg/dL (6 male, 3 female). Table 3.5 shows BAC level for males and females. Note that six cases (5 males, 1 female), who were described by eye witnesses to be heavily intoxicated at the time of self-immolation, are included in unreported BAC total because BAC reading was not recorded in the coroners' files. This means that 32 cases out of 84 cases had either a positive BAC reading or were witnessed to be heavily intoxicated at the time of death. Blood alcohol cases are underrepresented in the sample due to: missing data attributable to the information not being recorded in coroners' files (a number of Queensland coroners' files did not have a toxicology report included); subject died after prolonged period of treatment for burns, thus alcohol was no longer detectable in blood at time of autopsy; or blood sample was unable to be obtained because of the destruction of body.

Table 3.5
BAC levels as a function of sex

Sex		**BAC categorised**				
	.00	.01-.05	.06-.10	.11+	Witnessed heavy intoxication (no BAC)	No BAC measured
Male, n (%)	42 (29.2%)	5 (3.5%)	8 (5.6%)	6 (4.2%)	5 (4.1%)	34 (23.6%)
Female, n (%)	16 (11.1%)	2 (1.4%)	2 (1.4%)	3 (2.1%)	1 (0.7%)	20 (13.8%)
Total, n (%)	58 (40.3%)	7 (4.9%)	10 (6.9%)	9 (6.3%)	6 (4.7%)	54 (37%)

Note. Percentages calculated as a function of the overall sample of cases (n=144)

3.2.3 Use of mood altering drugs

The presence of mood altering prescription drugs was found in 40 (27%) cases. These drugs were prescribed by general practitioners or psychiatrists to reduce symptoms of the individual's diagnosed psychiatric illness. Table 3.6 shows the percentage of males and females whose toxicology results indicated the presence of a mood altering prescription drug at the time of self-immolation. The presence of mood altering prescription drugs is underrepresented in the sample due to: missing data attributable to the information not being recorded in file (a number of Queensland coroners files did not have toxicology reports included); subject died after prolonged period of treatment for burns, thus the presence of drugs was no longer detectable in blood at time of autopsy; or blood sample was unable to be obtained because of destruction of the body.

Table 3.6

Mood-altering prescription drugs as a function of sex.

Sex	**Mood altering prescription drug status**		
	Drug Present	**No Drug**	**Unreported**
...Male, n (%)	24 (16.7%)	36 (25.0%)	40 (27.8%)
...Female, n (%)	16 (11.1%)	13 (9.0%)	15 (10.4%)
Total, n (%)	40 (27.8%)	49 (34.0%)	55 (38.2%)

Note. Percentages calculated as a function of the overall sample, (n=144)

The use of illicit mood altering drugs was identified in 11 (7.6%) cases immediately prior to the self-immolation. Table 3.7 shows the numbers of males and females where the toxicology report indicated the presence of an illicit drug. The presence of mood altering non-prescription drugs is underrepresented in the sample due to: missing data attributable to the information not being recorded in file (a number of Queensland coroners' files did not have toxicology report included); subject died after prolonged period of treatment for burns, thus the presence of drugs was no longer detectable in blood at time of autopsy; or blood sample was unable to be obtained because of destruction of the body.

Table 3.7
Mood altering non-prescription drugs as a function of sex

Sex	**Mood altering non-prescription drug present**		
	Drug Present	**No Drug**	**Unreported**
...Male, n (%)	9 (6.3%)	49 (34.0%)	42 (29.2%)
...Female, n (%)	2 (1.4%)	24 (16.7%)	18 (12.5%)
Total, n (%)	11 (7.6%)	73 (50.7%)	60 (41.7%)

. Note. Percentages calculated as a function of the overall sample, (n=144)

3.2.4 Interaction with mental health services

At the time of self-immolation 37 (25.4%) cases were engaged with either outpatients or inpatients mental health services. Thirty-three (22.9%) cases were seeking inpatient services but had not been admitted to an inpatient ward. Table 3.8 shows the interaction with outpatient mental health services. Interaction with inpatient mental health services are presented in Table 3.9.

Table 3.8

Interaction with outpatient mental health services as a function of sex

Use of Outpatient MH service	Male, n (%)	Female, n(%)	Total, n (%)
...Current interaction	23 (16.0)	10 (6.9)	33 (22.9)
...Within 12 months	3 (2.1)	7 (4.9)	10 (6.9)
...Greater than 12months	4 (2.8)	5 (3.5)	9 (6.2)
...No known interaction	66 (45.8)	21 (14.6)	87 (60.4)
...Not Known	4 (2.8)	1 (.7)	5 (3.5)

Note. Percentages calculated as a function of the overall sample, (n=144)

Table 3.9:

Interaction with inpatient mental health service as a function of sex

Use of Inpatient MH service	Male, n (%)	Female, n (%)	Total, n (%)
...On waiting list	23 (16.0)	10 (6.9)	33 (22.9)
...Current interaction	2 (1.4)	2 (1.4)	4 (2.5)
...Within 12 months	3 (2.1)	7 (4.9)	10 (6.9)
...Greater than 12months	4 (2.8)	5 (3.5)	9 (6.2)
...No known interaction	66 (45.8)	21 (14.6)	87 (60.4)
...Not Known	4 (2.8)	1 (.7)	5 (3.5)

Note. Percentages calculated as a function of the overall sample, (n=144)

3.2.5 Previous suicide attempts

The majority of self-immolation (87, 60.4%) cases were first-time suicide attempters with no known previous history of suicide attempts. Fifty-five (38.2%) cases had made a previous attempt to take their lives while in two cases (1.4%) it was 'probable' that a previous suicide attempt had been made. Three of these 55 cases attempting suicide had also used fire as their preferred method of choice at the previous attempt. Of the 144 cases of self-immolation, 13 (9.0%) cases had a known history of non-suicidal self-injury (self-harm). Table 3.10 shows the history of previous suicide attempts and non-suicidal self-injury.

Table 3.10
History of non-suicidal self-injury and previous suicide attempts as a function of sex

	Definite			**Probable**			**No or not known**		
Previous self-harm or suicide attempt	Male n, (%)	Female n, (%)	Total n (%)	Male n%	Female n, (%)	Total, N, (%)	Male n, (%)	Female n, (%)	Total n, (%)
...Previous self-harm	4 (2.8)	9 (6.3)	13 (9.0)	2 (1.4)	0 (0.0)	2 (1.4)	94 (65.3)	35 (65.3)	129 (89.6)
...Previous suicide attempt	34 (23.6)	21 (14.6)	55 (38.2)	2 (1.4)	0	2 (1.4)	64 (44.4)	23 (16.0)	87 (60.4)
...Previous suicide attempt involving fire	1 (.7)	2 (1.4)	3 (2.1)	0 (0.0)	0 (0.0)	0 (0.0)	99 (68.8)	42 (29.2)	141 (97.9)

Note. More than one previous self-harm or suicide attempt variable may have been indicated per case and thus each percentage is calculated from the overall sample for each row, (n=144)

3.2.6 Non-psychiatric contributing factors

Other contributing factors (non-psychiatric) for each case of self-immolation in the coroners' files are presented in Table 3.11. Contributing factors include known reasons why the person committed suicide or factors thought to have contributed to the individual choosing to suicide. In most cases contributing factors were as listed by the coroner. Any additional contributing factors not recorded in the coroners' report but listed in supporting documentation (e.g. police report) were included. Inter-partner conflict was the most commonly reported contributing factor for the individual suiciding, accounting for 50 (34.7%) of cases. Financial problems (33 cases, 22.9%), and having a chronic physical illness (29 cases, 20.1%) - were the second and third leading contributing factors, respectively. Fifty-three (36.8%) cases had multiple contributing factors. Fifty-two (36.1%) had one contributing factor. Thirty-nine (27.1%) cases had no identifiable features that could be considered a contributing factor.

Table 3.11

Non-psychiatric contributing factors within the self-immolation sample as a function of sex

	Definite			Probable			No or not known		
Other contributing factors	**Male, n (%)**	**Female, n (%)**	**Total, n (%)**	**Male, n (%)**	**Female, n (%)**	**Total, n (%)**	**Male, n (%)**	**Female, n (%)**	**Total, n (%)**
...Intimate partner conflict	36 (25)	14 (9.7)	50 (34.7)	0	0	0	63 (43.8)	30 (20.8)	93 (64.65)
...Interpersonal conflict	8 (5.6)	9 (6.35)	17 (11.8)	4 (2.8)	0	4 (2.8)	88 (61.1)	35 (24.5)	123 (85.4)
...Legal/criminal	19 (13.2)	6 (4.2)	25 (17.4)	1 (.7)	1 (.7)	2 (1.4)	80 (55.6)	37 (25.7)	117 (81.3)
...Financial problem	23 (16.0)	10 (6.9)	33 (22.9)	1 (.7)	1 (.7)	2 (1.4)	76 (52.8)	33 (22.9)	109 (75.7)
...Chronic physical illness	21 (14.6)	8 (5.6)	29 (20.1)	0	0	0	79 (69.4)	36 (25.0)	44 (30.6)
...Sexual abuse	7 (4.9)	4 (2.8)	11 (7.6)	0	0	0	93 (64.6)	44 (30.6)	133 (92.4)
...Relationship breakdown	8 (5.6)	5 (3.5)	13 (9.0)	0	0	0	92 (63.9)	39 (27.1)	131 (91.0)
...Murder/suicide	4 (2.8)	4 (2.8)	8 (5.6)	0	0	0	96 (66.7)	40 (27.8)	136 (94.4)
...Recent job-loss	5 (3.5)	1 (.7)	6 (4.2)	0	0	0	95 (66.0)	43 (29.9)	138 (95.8)
...Child custody access	2 (1.4)	2 (1.4)	4 (2.8)	0	0	0	98 (68.1)	42 (29.2)	140 (97.2)
...Recent significant death	2 (1.4)	2 (1.4)	4 (2.8)	0	0	0	98 (68.1)	42 (29.2)	140 (97.2)

Note. More than one contributing factors may have been indicated per case and thus each percentage is calculated from the overall sample for each row, (n=144)

3.3 Suicide event

3.3.1 Location type

Table 3.12 records the location in which the self-immolation took place. Commonly, the person set themselves on fire at their home (91 cases, 63.2%). Twelve cases (8.3%) selected the less familiar location of bushlands or parks. Thirty-seven cases (25.7%) chose to self-immolate in transport vehicles (all cars apart from one case where the vehicle was a boat). The majority of cases who self-immolated in cars had driven themselves to the location.

Table 3.12

Location type of self-immolation as a function of sex

Location at time of suicide	Male, n (%)	Female, n (%)	Total, n (%)
...In residency	36 (25.0)	13 (9.0)	49 (34.0)
...Outside residency but on property	25 (17.4)	17 (11.8)	42 (29.2)
...Bushland/park	7 (4.9)	5 (3.5)	12 (8.3)
...Transport vehicle (private property)	5 (3.5)	2 (1.4)	7 (4.9)
...Transport vehicle (public space)	25 (17.4)	5 (3.5)	30 (20.8)
...Adjacent property	0 (0.0)	1 (.7)	1 (.7)
...Parliament house	1 (.7)	0 (0.0)	1 (.7)
...Petrol station	1 (.7)	1 (.7)	2 (1.4)

Note. Percentages calculated as a function of the overall sample, (n=144)

3.3.2 Self-immolation combined with other suicide method

In 12 cases an alternative method of suicide other than fire was used moments prior to, or simultaneous to, the eventual completed suicide by self-immolation. In all 12 cases the coroner had recorded death by self-immolation. In a number of these cases, the coroner determined that the subject had, just prior to their self-immolation,

engaged in an alternative (but unsuccessful) method to take their life. In a number of these cases, the person unsuccessfully attempted to take their life using another means (i.e. hanging) prior to completing the suicide through self-immolation. However, in two of these cases, eye witnesses' accounts report the subject cutting and stabbing themselves simultaneous to self-immolation.

Cases where actions of employing more than one means to take one's life were used were categorised as the one event (and not as a previous attempted suicide) based on both the closeness of time (almost simultaneous or simultaneous) to the completed suicide and the coroner's stated belief that it was one event. Table 3.13 shows the alternative methods used (almost simultaneous or simultaneous) with self-immolation by male and females.

Table 3.13

Concurrent suicide method with self-immolation as a function of sex

	Simultaneous/additional method of choice to suicide or self-harm							
	Firearm	**Overdose**	**Car fumes**	**Stabbing**	**Cutting wrists**	**Hanging**	**Car crash**	**No other method**
Male, n (%)	2 (1.4%)	0	2 (1.4%)	3 (2.1%)	0 (0.0)	0.0	2 (1.4%	91 (63.2%)
Female, n (%)	0 (0.0)	2 (1.4%)	0 (0.0)	1 (.7)	1 (.7%)	1 (.7)	0 (0.0)	40 (27.8%)
Total, n (%)	2 (1.4)	2 (1.4)	2 (1.4%)	4 (2.8%)	1 (.7%)*	1 (.7%)*	2 (1.4%)	131 (91.0%)

Note 1. * In two cases (both female) the individual had tried two other methods to self-harm or attempt to suicide before taking their life by self-immolation. In the first case the person cut her wrists and stabbed herself (non-suicidal self-injury can't be ruled out). In the second case the woman attempted to hang herself as well as take an overdose of prescription drugs before setting herself on fire.

Note 2. Percentages calculated as a function of the overall sample, (n=144)

3.3.3 Witnesses

The self-immolation was witnessed in 55 cases (38.2%). Thirty-five (63.6%) of the 55 cases of self-immolation that were witnessed were done so by someone who had a significant interpersonal relationship with the subject. ‘Significant relationship’ status is based on the witness being involved in a sexual relationship, having a family relationship, cohabitating, or known intimately by the deceased, as judged by the researcher on the basis of evidence in the coronial file. In eighty-nine cases (61.8%) of the total 144 sample, no witnesses were present. Table 3.14 shows what sequence of the self-immolation act was observed (ignition only; ignition and burning; burning only) as well as the nature of the relationship to the person setting themselves on fire (significant/non-significant).

Table 3.14

Sequence of self-immolation observed by a significant/non-significant witness as a function of sex

	Witnesses observation of self-immolation and relationship to the deceased					
	Ignition only- S	**Ignition/burning - S**	**Ignition/burning - NS**	**Burning only- S**	**Burning only- NS**	**No Witnesses**
...Male, n (%)	3 (2.1%)	7 (4.9%)	4 (2.8%)	12 (8.3%)	14 (9.7%)	60 (41.7%)
...Female, n (%)	1 (.7%)	6 (4.2%)	0 (0.0)	6 (4.2%)	2 (1.4%)	29 (20.1%)
Total, n (%)	4 (2.8%)	13 (9.0%)	4 (2.8%)	18 (12.5%)	16 (61.8%)	89 (61.8%)

Note 1: S = Significant inter-personal relationship. NS = Non-significant interpersonal relationship.

Note 2. Percentages calculated as a function of the overall sample, (n=144)

3.3.4 Expression of suicide intent

Sixty cases (41.7%) expressed their suicidal intent by various means, either around the time of the self-immolation or in the recent past (within 12 months of their death). Forty-one (28%) of those expressing intent were male while 19 (13.2%) were female.

3.3.5 Accelerant

At least 126 (87%) cases used an accelerant - the most frequent accelerant being petrol. Of those that used an accelerant 87 (60.4%) were male and 39 (27.1%) were female. In only 7 cases (4.9%) was an accelerant not used. The use of an accelerant was suspected but not confirmed in two cases.

3.3.6 Suicidal note

Suicide notes were left by 36 individuals (25%). Table 3.15 shows the number of male and female cases, compared to the total number of cases, where a suicide note was found. It can be seen that about a third of both males and females left suicide notes.

Table 3.15

Suicide notes left as a function of sex

Variable	Male, n (%)	Female, n (%)	Total, n (%)
Suicide note			
...Note found	25 (17.5)	11 (7.7)	36 (25)
...No note found	76 (52.7)	32 (22.4)	108 (75)

Note. Percentages calculated as a function of the overall sample, (n=144)

3.3.7 Survival interval

Ninety-four cases were declared dead at the scene, including all 37 cases found in motor vehicles. The remainder of those who self-immolated died in hospital. Table 3.16 shows the survival intervals as a function of sex.

Table 3.16

Dead at scene and survival time interval as a function of sex

	Survival interval			
	Dead at scene	**0-6 hrs**	**6-12 hrs**	**More than 12 hrs**
Male, n (%)	69 (47.9%)	14 (9.7%)	5 (3.5%)	12 (8.3%)
Female, n (%)	25 (17.45)	9 (6.3%)	2 (1.4%)	8 (5.6%)
Total, n (%)	94 (65.3%)	23 (16.0%)	7 (4.9%)	20 (13.9%)

Note. Percentages calculated as a function of the overall sample, (n=144)

3.4 The Present Sample Compared to Rates of Other Suicide Methods in Eastern Australian States between 1998 and 2007

A comparison was made between the present sample and the meta-analysis findings of Large and Nielssen (2010). Large and Nielssen's meta-analysis examined the rates of suicide by method (hanging, shooting, gassing, poisoning, jumping from height, drowning, and use of sharp implement) in Australian states and territories in two decades between 1988 and 2007. They found falls in numbers in male suicide were associated with significant reductions in shooting, gassing and poisoning in spite of an increase in suicide by hanging. Large and Nielssen's results showed a significant variation in the rates of, and trends in, methods of suicide between states and territories which coincide with a reduction in the availability of lethal methods of suicide- specifically buy-back of firearms, and the fitted of new cars with catalytic converters.

Self-immolation annual rates for males and females (1997-2008) were calculated and compared with Large and Nielsen's 1988 - 2007 rates and methods of suicide for males and females in the Australian states of VIC, NSW, and QLD. To facilitate this comparison, the researcher firstly obtained population numbers for each state (NSW pop = 6,731, 300; VIC pop=4,972,800; QLD pop=3,882,000) based on June 2004 ABS data. The year 2004 represents an appropriate midpoint of the span of the coroners' files (1997-2008). Large and Nielssen had used such ABS figures for each state's population (taken annually in the month of June) to enable them to calculate annual non-age-adjusted suicide rates. Secondly, dates of coroner files availability across the three states and the number of months for each state were determined for data in the current study. Months that coroner's files were available in

the states were: NSW=96 months from June 2000; Vic=114 months from January 1998; QLD=74 months from October 2000.

Using the above two sets of data and the known cases of self-immolation for each state, the annual rate of self- immolation per 100,000 of population in each state was calculated. Table 3.17 presents annual self-immolation rates in comparison to suicide mortality rates for other suicide methods (hanging, shooting, gassing, poisoning, jumping from a height, drowning, and use of a sharp instrument) in NSW, VIC, and QLD, all as a function of sex. Table 3.17 indicates that self-immolation is the least prevalent of all the suicide methods for both sexes in all states. The highest rate of self-immolation was found for males in Queensland, however, self-immolation was still the lowest rate of all suicide methods in Queensland for males. Self-immolation rates for males are similar to those for females using sharp implements.

Across all states hanging was the most prevalent method of suicide for both males and females. For males self-immolation rates were around one hundredth of hanging rates.

Table 3.17

Comparison of annual self-immolation rates in the current study between males and females and mortality rates using other suicide methods (Large and Nielssen, 2010) in the Australian states of NSW, VIC, QLD. All rates are per 100,000

Variable	**Self-immolation 1997-2008**		**Large & Nielssen, 2010, Suicide in Australia: meta-analysis of rates of suicide between 1988-2007**													
	Hanging		**Shooting**		**Gassing**		**Poisoning**		**Jumping**		**Drowning**		**Sharp Object**			
State	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
NSW	.07	.03	8.02	1.58	1.64	0.12	2.67	0.43	1.55	1.28	0.99	0.36	0.29	0.19	0.38	0.07
VIC	.08	.03	7.38	1.82	1.70	0.16	3.51	0.68	1.33	1.43	0.51	0.17	0.27	0.19	0.36	0.07
QLD	.11	.05	9.46	1.91	2.51	0.20	3.78	0.80	2.04	1.53	0.54	0.22	0.28	0.13	0.34	0.08

3.5 Characteristics of Australian Males who Suicide by Self-Immolation Compared with those who use more Common Suicide Methods

The characteristics of males who completed suicide using self-immolation were compared to the De Leo et al. (2002) study. Data used in De Leo et al's study was obtained from the Queensland Suicide Register (QSR). This data was derived from several sources including police report, post-mortem examination report, a toxicology report, and a psychological autopsy report. De Leo et al. study included 950 males that had completed suicide between 1994 and 1996 in Queensland by hanging (*n*=401), firearms (*n*=316), and by non-domestic gas (*n*= 233). The variables compared between our study and De Leo et al.'s study were grouped and reported within the following themes: lived alone; presence of a suicide note; suicide at residence, previous attempts, psychiatric treatment (current), depression, psychotic disorder, and legal trouble. Care was taken to ensure that the definitions of these characteristics were comparable across the current study and De Leo et al's study. Where relevant, only those cases where a variable was coded as 'definite' were included (i.e. probable and no/not known were excluded).

Table 3.18 presents the frequency data and percentages for the self-immolation data and De Leo et al. data, as well as the results of chi-square goodness of fit analyses. Two by two chi square analyses (with Yates correction) were computed, comparing the frequency of a particular characteristic between those who self-immolated and each of the other methods of suicide in turn.

For the eight variables analysed there were six variables that showed significant differences between the characteristics of the men who suicided by self-immolation compared to other methods. It was found that significantly more males who self-immolated lived alone than males that chose hanging and shooting as their

suicide method of choice. No significant difference was found on the variable 'Lived Alone' between self-immolation and gassing. Those who chose suicide by self-immolation were significantly less likely to leave a suicide note that those who suicide by hanging, firearms or gassing. Males that chose self-immolation were more likely to complete suicide at their residence than males who chose hanging and gassing. There was a significant difference found, with results showing more males were diagnosed with depression who chose self-immolation, than males that chose gassing as method of suicide. Males who completed suicide by self -immolation were more likely to have previously attempted suicide than males who chose shooting.

Table 3.18

Frequency, percentages and chi square results for comparisons of male characteristics for those who self-immolated compared to those in De Leo et al.'s (2002) study who chose other suicide methods.

Characteristics	**Self-Immolation**		**De Leo, Evens & Neulinger, 2002: Hanging, firearm, and domestic gas suicides among males**													
			Hanging		Chi Sq result			Shooting		Chi Sq results			Non-domestic Gas		Chi Sq result		
	%	n=100	%	n	*X2*	*p*		%	n	*X2*	*p*		%	n	*X2*	*p*	
...Lived alone	**33%**	33/100	**20%**	28/140	4.54	.033	<.05	**27%**	63/116	9.03	.003	< .05	**36%**	60/222	.51	.475	> .05
...Suicide note	**25%**	25/100	**34%**	131/385	2.56	.110	<.05	**44%**	136/309	10.66	.001	<.05	**53%**	120/222	22.35	.0001	<.05
...Suicide at ...residence	**36%**	36/100	**73%**	293/401	47.15	.0001	<.05	**71%**	223/314	38.23	.0001	< .05	**49%**	144/232	18.09	.0001	<.05
...Previous ...attempts	**34%**	34/100	**34%**	110/323	0.00	.998	> .05	**18%**	44/244	9.42	.002	<.05	**34%**	77/226	.000	.990	> .05
...Psychiatric ...treatment	**25%**	25/100	**31%**	124/400	1.11	.293	> .05	**24%**	77/320	0.003	.954	>.05	**30%**	70/233	.64	.423	> .05
...Depression	**42%**	42/100	**54%**	63/116	0.01	.917	>.05	**68%**	46/68	2.89	.088	>.05	**67%**	45/67	9.197	.002	<.05
...Psychotic ...disorder	**41%**	1/100	**18%**	28/155	15.99	.0001	>.05	**10%**	8/80	5.80	.016	< .05	**6%**	4/66	1.97	.161	> .05
...Legal ...trouble	**19%**	19/100	**21%**	86/409	.097	.756	>.05	**17%**	53/311	.09	.766	> .05	**13%**	31/238	1.55	.213	> .05

Chapter 4

Discussion

The present study results builds on our understanding of self-immolation when compared to the two previous Australian studies of burn injuries related to suicide conducted by Persley & Pegg (1981) and Cameron et al. (1997). Both these studies were conducted in the same tertiary hospital and were limited to small population groups. Suicide victims who were dead on arrival at the hospital were not included. Persley & Pegg study aimed at identifying the medical history (including psychiatric history) and events surrounding the self-immolation. Cameron et al. (1997) study compared the different patterns of burns exhibited by two distinct groups of patients admitted to the burns units – (1) those that had attempted suicide by self-immolation and (2) those that had deliberately burnt themselves without suicidal intent. Our study' criteria differed significantly from these studies in that it was a wider community based study that investigated demographic, psycho-social factors and suicide event variables related to deaths by self-immolation in three Australian States.

Furthermore, it is worth restating that the mechanism by which impulsivity combines with suicidal behaviour is unclear although the association between the two is well documented both in non-psychiatric and psychiatric patient populations (Dougherty et al. 2004; Wyder & De Leo, 2007. There is however, a marked lack of consensus in the literature on the relationship between impulsivity and suicidal behaviour. For example, some authors believe impulsivity is a characteristic of nonlethal suicide attempts (Baca-Garcia, Diaz-Sastre, Basurte et al. (2001), while others report evidence of higher levels of impulsivity in those who die by suicide than those who do not (Dumais, Lesage, Lalovic

et al. 2005). Other recent research has shown that although people who attempt suicide tend to be more impulsive than those who do not, the actual act of completed suicide is often not made impulsively. Dissimilarities in the literature with regard to impulsivity-suicidal behaviour relationship may be explained in part by the confusion between different definitions off the impulsivity-suicide relationship such as *state* (impulsivity of the attempt) and *trait* (impulsivity of the attempter), differing definitions of impulsivity, the measures used and the populations studied (Gvion & Apter, 2011). Be that as it may, the association among impulsivity and suicidality is well documented both in research and in clinical practice across diagnoses (Brent, Bridge, Johnson et al. 1996; Zalsman, Braun, Arent et al. 2006; Critchfield, Levy, & Clarkin, 2004). Thus, the current study seeks to add to the discussion of impulsivity-suicidality relationship despite all the inherent difficulties involved in this area of enquiry.

4.1 Discussion of Present Findings

The current chapter first presents a brief summary of the study's aims, a discussion of the main findings (organised in sections corresponding to each aim), comments about the strengths and limitations of the present study, some methodology issues, as well as implications for practice. Finally, concluding remarks are offered to capture the substance and scope of what has been covered in this research and recommendations are made for further research.

4.1.2 Aim 1: Examine suicidal deaths by self-immolation for a range of demographic variables.

Age

The findings show that those that chose self-immolation were slightly older than the national median suicide age, with the majority of those completing suicide by self-immolation being aged between 46 years and 64 years. Females on average were slightly younger (median = 45.5 years) than males (47.0 years). In Australia, the median age at death for suicide across different suicide methods in 2003 was 40.6 years for males and 41.2 years for females (ABS, 2011), suggesting that Australian females who suicide by self-immolation are, on average, 4.3 years older than those who suicide by all different methods. Males who suicide by self-immolation are, on average, 5.8 years older than those who suicide by all different methods.

The age of those that self-immolated in this study are comparable to the self-immolation literature for Western, European countries, though to the higher end of the age bands recorded in different countries. The present mean age finding (46.03 years) is considerably higher than the mean age of 32 years reported by Cameron et al. (1997) in his Australian study of 44 self-inflicted burns cases admitted to a burns unit. It is unclear what factors in the current self-immolation cases may have led to a higher average age that the Australian study by Cameron et al. (1997), although it is possible that the fact that Cameron's study was based on those who had survived (at least initially) a self-immolation/self-harm attempt maybe a factor. In the current study most individuals (n=94, 65.3%) died at the scene.

The average age at time of self-immolation in this study may be reflective of an age group that is confronting a cumulating of life event stresses. In their German study of 45 cases of attempted/completed self-immolation, Daigeler et al. (2009) present middle age (40 + 10 years) as a risk factor. They suggest that critical family and career situations

develop in this age group and these require decisions that put the individual under stress. In their Italian study, Cave Bondi et al. (2000) also suggest that mean ages found in their study (F=50; M=43.1) often coincide with a critical period linked (1) to the physiology of menopause and consequent mood changes of a depressive type for women, and (2) male psychosocial imbalances closely linked with the need for social-economic affirmation.

The age of people who self-immolate is often lower in Asian countries. The review by Laloe (2003), consisting of fifty-five studies from various parts of the world, found the median age (or most common age group according to the way it was expressed in different studies) of self-burn patients were on average 10 years older in Europe (30 year of age) compared to self-burn patients in Asia (20 year of age).

Gender

In the current study there was a marked preponderance of males (69.4%) who completed suicide through self-immolation compared to females (30.6%). While male immolators numbered more than double the females, the gender gap in these rates are somewhat less than the Australian average gap for suicide by all means, with approximately 78% of individuals who die by suicide in Australia being male (Graham et al. 2000). This constitutes a male to female ratio of nearly 4:1 (Victorian Suicide Prevention Task Force, 1997). International literature on suicide also indicates that men are more likely to commit suicide than women (Roy, 2000).

Consistent to our results, male immolators have mostly been shown to predominate in Australia as well as other developed countries (Shkrum & Johnston, 1992; Hadjiiski & Todorov, 1996; Cameron et al. 1997; Ahmadi, 2007; Daigeler et al. 2009). In Cameron et al.'s (1997) Australian study of 44 cases of deliberately self-

inflicted burns patients, 64% were male, 36% female. Interestingly, nearly all cases deemed as being suicide attempts were male. Internationally, Pham et al. (2003) found that of 32 self-immolators admitted to a burn centre in California, 59% were male. Laloe, (2003) reviewed patterns of deliberate self-burning in various parts of the world and found that, excluding Greece, there was a male predominance among people committing deliberate self-burning in European countries and in far-east Asia.

Although the above authors concur with our finding concerning a male gender preponderance to self-immolation, others have found no sex difference (Cave Bondi, et al. 2001) or a predominance of women (Andreasen & Noyes, 1975; O' Donoghue et al. 1998; Copeland, 1985; BenMeir, 1990). A female predominance was noted in most Middle East countries and the Indian sub-continent (Ahmadi, 2007). Early Australian research of 30 cases of self-inflicted burn injuries related to suicide showed sex distributions of 63.3% female, and 36.7% males (Persley & Pegg, 1981).

In summary, in Western countries males predominate among those who self-immolate with a suicide intent, while self-immolation female rates with a suicide intent predominate over male rates in certain developing countries (Ahmadi, 2007). The situation is not so clear cut where the studies include those who self-harm through burning where suicide was not the intent.

Country of birth

The first question of interest was whether the ratio of Australian born versus overseas born was significantly different for the self-immolation sample compared to the ABS census population data for Australians (2001) and no such difference was found. Thus overseas born Australians are not significantly over-represented in the self-

immolation data set compared to Australian born. In the present study 72% of those that self-immolated were born in Australia, 16.5% were born in Asia and 8.3% were born in Europe. Of those individuals in the present dataset who died by self-immolation and were born in Asian countries (16.5%), the highest number (4.9%) was born in Vietnam. This is a fivefold increase of what would be expected when compared to the proportion of Vietnamese-born Australians, which is cited as 1% in Victoria and New South Wales (ABS, 2005). As previously stated, high suicide rates by self-immolation have been reported in Asian countries (Wu et al. 2012), as well as countries where immigrants of Asian origin have settled (Soni Raleigh & Balarajan (1992). The real suicide rate in Vietnam is unknown because the rate reported by the Vietnamese Ministry of Health is based only on hospital data (Thanh et al. 2006). While recent publications on self-immolation rates in Vietnam were unable to be located, Biggs (2005) identified 92 self-immolations having taken place in Vietnam from 1963 to 2002. Self-immolation as an expression of political protest is popular in Vietnam (Romm et al. 2008). It is difficult to separate the role of culture or religion here. Buddhists are thought to have a higher propensity towards self-sacrifice by fire (Laloe, 2003) and most Vietnamese people are strongly influenced by Buddhist practices, even if they do not openly identify as Buddhists (Thanh et al. 2000). However, Thanh et al. found that Vietnamese who followed the Buddhist religion experienced less suicidal thoughts than those who either had no religion or followed other religions (Islam, Christianity, Judaism).

Spirituality/religious belief

In this study spirituality or religious belief could not be determined in 93% of cases due to missing data. Only one case was deemed as directly related to religiosity

according to the coroner. In this case the self-immolator was a Buddhist monk of high status who self-immolated at his Australian Buddhist temple.

Marital status

In agreement with other Western studies, the majority of self-immolators did not live in a steady partnership (Cave Bondi et al. 2000; Pham, et al. 2003; Daigeler et al. 2009). Forty three percent of self-immolators were single, either because they were never married (29.2%) or as a result of divorce or being widowed (13.9%). A further 19% of self-immolators were separated at the time of self-immolation. In general, divorced, widowed and separated persons have higher rates of suicide than married persons (Moscicki, 1995). Some Western studies have linked separation from partner as a significant contributing factor for self-immolation (Rotheschild, 2001; Hadjiiski &Toorov, 1996). Rotheschild's (2001) study of 46 German self-immolation cases, found the most common precipitant was separation from a partner. Hadjiiski &Toorov's (1996) study of 89 cases of attempted/completed suicide by self-immolation identified relationship troubles to be a risk factor. Similar finding were found in a Californian study by Pham, et al. (2003) of 32 self-inflicted burns patients where divorce and conflict with family or a love interest were identified as contributing stressors.

Sociological studies generally show that the suicide rate among married people tends to be lower (Hassan, 1996). In Australia, over the most recent period for which suitable data is available (1995-97), people in registered marriages exhibited lower suicide rates than people who were not married (whether never married, divorced, or widowed) (ABS, 2000).

Living arrangements

It was found that 30.6% of self-immolators lived alone while 54.9% were living in some sort of family structure – most often spouse and/or children (38.9%). Findings of the numbers living alone is considerably higher than the national average, which was reported in the 2001 census population as 8.8% (ABS, 2002). Four people (2.1%) in the present study were homeless at the time of their death.

It is difficult to make any comparative comment about these results given the paucity of Western self-immolation studies reporting living arrangements. However, our results are comparable with Leth & Hart-Madsen's (1997) Danish study of 43 cases self-immolation which found that 17 (39.5%) self-immolators lived alone at the time of their death. They found 26 cases, (60.4%) lived with others – most often spouse and/or children. Leth & Hart-Masen's study reported only these two categories (lived alone, lived with others) so it is unknown if any of their cases of self-immolation were homeless at the time of self-immolation. However, homelessness was identified as a risk-factor of self-immolation in the Californian study by Phan et al. (2003) of 32 cases of self-immolation. Although the Phan et al. study did not include the category of living arrangement the researchers did report that five (15.6%) were homeless at the time of self-burning.

Occupation

It was found that 65 cases (45%) were not engaged in paid work at the time of their self-immolation, with most being unemployed (24.5%) and others on sickness or disability benefits (11.2%) or (9.8%) retired. A third of self-immolators were in some form of employment. Our results regarding occupation are comparable with other

Western studies. For example, the Finland study by Palmu et al. (2004) found (comparing 46 burns patients that had attempted suicide with a burns control group), that suicide attempters were more often unemployed (28.2 versus 12.9%) or on disability pension (30.8 versus 7.1%). The Californian study by Phan et al. (2003) found that 65.5% of 32 cases of self-immolation were unemployed. While the Danish study by Leth and Hart-Madsen, (1997) found that only 19% of 42 cases were employed.

Employed work, in general, protects against suicide (Ahmadi, 2007). The unemployed have greater suicide rates, probably owing to an interaction of socioeconomic circumstances, psychological vulnerability and stressful life events (Ahmadi, 2007). Recent studies of fluctuations of suicide rates in Australia show a strong correlation between unemployment and suicide rate (Hassan, 1996). During the depression in 1930's Australia experienced a very high unemployment rate and a very dramatic increase in the male suicide rate (to 24 per 100 000 population) (Hassan, 1996). Female suicide rates were not affected to the same degree, possibly due to differential impact of unemployment on male and female family roles. Thirty-five percent of self-immolators had an occupation and were engaged in work. Whilst engaged in employment and work is a protective factor for suicide, adverse psychosocial working conditions, such as monotonous work, increased responsibility and pronounced mental strain due to contact with work clients, significantly increased suicide risk as well, again independent of categorized psychiatric diagnosis (Schneider et al.,2011). Occupations which are generally high status, have good career paths and are well paid have lower suicide rates. Downward occupational mobility appears to be an important factor in explaining suicide rates as it may negatively impact of 'self-image' and 'self-worth' (Hassan, 1996).

4.1.2 Aim 2 - Examine mental illness features in those that choose self-immolation.

Psychiatric History

Only a quarter of cases (36 cases, 25%) were found to have no diagnosable mental illness or there was no information provided in coroners' files suggesting a mental illness. The single largest group were found to have one diagnosable mental illness (54 cases, 37.7%), while a further thirty-seven cases (25.7%) had more than one diagnosable mental illness. Seventeen cases, (11.8%) contained undiagnosed psychiatric symptomology prior to/and/or at the time of suicide. The main psychiatric diagnosis of the 108 self-immolators were shown to be depression (64 cases, 44.4%), followed substance use disorder (28 cases, 9.4%), and anxiety disorder (17 cases, 11.8%). Schizophrenia (12 cases, 8.3%) and personality disorder (8 cases, 5.6%) were also major type of mental illnesses experienced.

Internationally, the association of suicide and mental disorders has been widely discussed. In Bertolote et al.'s (2003) study of cases of suicide worldwide, mood disorders (depression) were found to be the most common diagnosis among those that suicided in the general population. Comorbidity of mood disorders with substance-related disorders were most frequently found by those conducting general population studies (Bertolote et al. 2003).

Literature on self-burning (including attempted/completed suicide by burning) indicates that those that self-incinerate have a high prevalence of mental illness (Geller, 1997; Laloe, 2003; Shahana et al. 2011). Geller, (1997) found that of 582 self-immolation patients the most frequent diagnosis were affective disorders, schizophrenia, and personality disorders. In a review of 56 studies, Laloe (2003), found that depression

was the most frequent mentioned diagnosis, followed by schizophrenia. Similar results were found in a later review of nine studies of suicidal burn injury by Shahana et al, (2011) in which found schizophrenia, depression, substance abuse, personality disorder, and psychosis were the main mental health illnesses contributing to the incidence of self-inflicted burn injuries.

Our study's results broadly reflect much of the self-immolation literature which indicates that people who attempt/complete suicide by burning themselves have a high prevalence of serious mental illness, such as mood disorders, affective disorders, and substance disorders. However, it is unclear why the present results with regard to depression and schizophrenia prevalence differ from those found in the Australian study by Cameron et al. (1997), where 31 cases of self-immolation were analysed for psychiatric diagnoses. The researchers found eight patients to have a diagnosis of schizophrenia, six patients to have depression, and four patients to be diagnosed with personality disorder.

The Californian study by Pham et al. (2003) of 32 cases of self-immolation found that 29 patients were diagnosed with an active disorder: depression, substance abuse, personality disorder, and bipolar disorder, respectively. The researchers also found that 19 people who had self-immolated had a second psychiatric diagnosis – usually the combination of an affective and thought disorder with substance abuse.

Furthermore, the presence of the three main psychiatric disorders found in our study (though different percentages) have been reflective in people who have serious thoughts of suicide in the wider Australian community. The 2007 Survey of Mental Health and Wellbeing (ABS, 2008), asked people about suicidal tendencies in the

previous 12 months. Almost three-quarters of people who had had serious thoughts about committing suicide had a mental disorder (72%). Of these people, 77% had an anxiety disorder, 63% had a mood disorder and 34% had a substance use disorder.

The role of alcohol

Recent results support our findings on the role of alcohol in self-immolation, showing that alcohol disorders are the second most commonly diagnosed disorder among those who die by suicide; second only to depressive disorders (Bernal et al. 2007). This is due to both the high prevalence of alcohol disorders and the proportion of people with alcohol disorders who experience suicidality. Because of the neurobiological and neurosensory effects of alcohol consumption, individuals can become dis-inhibited, impulsive, judgment-impaired, depressed, and antisocial. Therefore alcohol can act as a tipping point for pre-existing suicide risk factors (Hufford, 2001). Suicide attempts in alcoholics have been linked to behavioural disinhibition, impulsivity, and aggression; with the use of violent methods for the attempts (Bergmann & Brismar, 1994; Mezzich, Giancola, Tarter et al. 1997; Suominen, Isomets, Henriksson et al, 1997). It has been estimated that at least one-quarter of all suicides in Australia record alcohol dependence as a causal factor (Begg et al. 2007). The link between alcohol use and suicidality is well established in the Australian population.

It has been argued that self-immolation in high-income countries is commonly related to mental illness and substance abuse (Rezaeian, 2013). Alcohol consumption has been linked to self-inflicted burns, including attempted and completed suicide by self-immolation in Australia. Cameron et al.'s (1997) study of 37 admissions of self-inflicted

burns found that 13% of admissions, where a primary diagnosis was not made, were deemed to be precipitated by domestic disputes in the setting of alcohol intoxication.

In our study we know that alcohol was present in the 35% of cases where a positive BAC reading or witness account of alcohol use was recorded. Missing data (e.g. due to no BAC assessment) suggests the true rate may in fact be higher. These results are comparable to international figures that suggest that substance use is found in 25-55% of suicides across different suicide methods (Murphy, 2000) and self-immolation studies (e.g. Pham et al. 2003; Daigeler et al. 2009).

Use of mood-altering drugs

In the current study mood altering *prescription drugs* were detected in 40 cases of self-immolation, while the presence of *illicit* mood altering drug was identified in 11 cases. Toxicology results were unknown in 115 cases due to missing data (destruction of body, subject died after prolonged burn treatment, no toxicology report).

The presence of prescription drugs in 27% of cases of self-immolators is worthy of comment. Detailed analysis of prescription drug type was beyond the scope of this study, so it is unknown to what degree the drug type present was psychotropic medication. Interestingly, a previous study has shown that the presence of psychotropic medication was significant for self-inflicted burns patients. The study by Mulholland et al. (2008) of 37 self-inflicted burns patients were compared to a non-burn self- harm control group. They found the self-burning group (62%) were more likely than the control group (30%) to have psychotic symptoms and be currently taking psychotropic medication.

Our study's results showed a presence of illicit drug use with 7.6% of self-immolators. Again this is likely to be under-reported given the scope of missing data. Depending on the drug type, intoxication or psychosis associated with the illicit drug use may have rendered these people more prone to irrational behaviours, including acting on suicidal thoughts. Similar findings were obtained in a study by Pompili, Innamorati, Lester et al. (2009) that compared two groups of psychiatric subjects, a group with substance dependence and another without. The substance dependent group had a tendency towards more impulsive aggressive personality and a history of suicidal thoughts and behaviour. The statistical significance of these findings was, however low.

Interaction with mental health services

Results showed that very few (2.8%) of self-immolators had a current interaction with an inpatient mental health service. A similar percentage of self-immolators were waiting to be admitted to an inpatient service. Twenty-two percent of self-immolators had had an interaction with an inpatient mental health service in the last 12 months. With regards to interaction with outpatient mental health service, 22.9% of self-immolators were having a current interaction at the time of their death. A further, 6.9% had had an interaction with an outpatient service in the last 12 months.

Thus about a quarter of the cases had current contact with inpatient services or contact within the last 12 months. A number of these individuals had recently been discharged or had recently had a risk assessment for self-harm or suicidality but had not been admitted to an inpatient unit. Early discharge and difficulty being allocated a bed in an inpatient unit for these cases is perhaps reflective of an over stretched mental health

system. It is known that individuals experiencing mental illness are at greatest risk of suicide immediately following discharge from psychiatric inpatient care (Suicide Prevention Australia, 2009). Studies have calculated rates of suicide death within 28 days of discharge as being between 2.9 and 4.3 suicide deaths per 1,000 discharges (NSW Mental Health Sentinel Events Review Committee, 2005).

Sixty percent of coroner's files in this study did not record any known interaction with mental health services. This result is likely inflated by the lack of documented mental health history available to the coroner. Given this, the lack of contact with mental health services is not unusual for those who suicide by self-immolation. Prossler (1996) reported that of 51 suicide by self-immolation cases registered in England and Wales in 1991, the majority were not in contact with current psychiatric services and 43% had never had contact with psychiatric services. While the literature also suggests that a significant number of mental disorders in those that complete suicide by a range of methods (estimated to be more than 80 per cent) are untreated at time of death (Suicide Prevention Australia, 2009). The most recent National Survey of Mental Health and Wellbeing, (2007) (ABS, 2008), revealed that, among participants aged 16 to 85 years, only 35 per cent of people with a need for mental health care received any care.

History of non-suicidal self-injury and previous suicide attempt

The lack of a previous suicide attempt by the majority of our self-immolation cases (87, 60.4%) is similar to data from those using other suicide methods. Roy (1991) reports that up to 70% of suicide victims die on their first attempt. In other words as few as 30% of all suicides have made a prior attempt.

Fifty-eight (40.3%) had made previous suicide attempt, three (2.1%) of which were by fire. The presence of prior suicide attempt may suggest that an individual's suicide is the result of intense and long-lasting psychological suffering rather than an impulsive act. However, it has been shown that the suicidal crisis experienced by multiple attempters are more intense but of no greater duration than crises experienced by first-attempters (Joiner, Rudd, Rouleau, & Wagner, 2000). There is probably a difference between a person who commits one act of suicide and a person who commits repeated attempts (so called "repeaters"). A study that compared patients with repeated suicide related behaviours to ones with a single episode found that patients with repeated episodes were more depressed, hopeless, and impulsive, and had higher scores on factors associated with expected outcome and planning activities of the Suicide Intent Scale (Sheikholeslami, Kani, Kani et al. 2009).

The percent that had made a previous suicide attempt and went on to complete suicide by self-immolation (40.3%) is comparable with other findings. In Geller's (1997) 30-year review of 476 self-immolators whose prior psychiatric status was known, almost half, 234, had a past suicide attempt. While the German study by Rothschild et al. (2001) of 46 cases of completed suicide by self-immolation found that one-third of individuals (36%) had already attempted suicide by means other than fire. A higher percentage was reported by Leth and Hart-Madsen, (1997), who found that from 30 self-immolation (whose history was available), 22 (73%) had previously attempted suicide.

While prior suicide attempts are strong risk factors for completed suicide, self-immolation stands out for the infrequency of repeated suicide attempts after a failed attempt by this method (Geller, 1997). Our results show that nearly all those who had

made a previous suicide attempt had used a different suicide method other than fire. This has been observed in other studies of attempted/completed suicide by self-immolation (Geller, 1997; Leth & Hart-Madsen, 1997; Rothschild et al. 2001; Zarghami & Khalilian, 2002; Pham et al. 2003; Daigeler et al. 2009).

The reason why people change from one suicide method to selecting fire as a method of suicide is of interest. Interviews with patients who have survived suicide attempts by fire have suggested that for some they chose this means because it seemed that the method ensured their death (BenMeir et al. 1990; Leth & Hart-Madsen, 1997). Others have reported that self-incineration was chosen as a method because that was most easily accessible means of suicide (Andreasen & Noyes, 1975; Leth & Hart-Madsen, 1997). Ahmadi (2007) found that most cases of attempted suicide by self-immolation regretted their attempts and would not use fire as a method of suicide if they were attempting suicide in the future.

While prior suicide attempts must be seen as distinct from self-harming behaviour, there is evidence to show people engaging in severe self-harm are also at higher risk of suicide (Suicide Prevention Task Force Report, 1997).The relationship between self-harm and suicide is complex. A small percentage (9%) of self-immolators in this study had a known history of self-harm. Often the motivation for self-harming behavior is to cope with or to gain a sense of relief from painful emotions or distressing personal experiences. Self-harmers do not intend to die. Whiles many studies combined self-injury and suicidality there have been recent calls for non-suicidality to be recognized as a unique syndrome (Martin et al. 2010).

Others have linked self-harming behavior to suicide. In a key review by Owens, Horrocks, and House, (2002) covering 90 studies on self-harm, it was found that non-fatal self-harm frequently lead to non-fatal self-harm repetition and sometimes suicide. Specifically, they found that after one-year, non-fatal repletion rates are around 15%, while self-harm and later suicide lies somewhere between 0.5% and 2% after one-year and above 5% after nine years.

Other contributing factors

While self-immolation in Western countries is more commonly related to a history of mental illness, substance abuse and substance abuse (Rezaeian, 2013), the body of literature generally notes the importance of recent stressful life events in suicidal behaviour. Fifty-two (36.1%) cases in our study had only one contributing factor (generally stressful life events), while 53 (36.8%) had multiple contributing factors. The most frequently recorded contributing factors were: intimate partner conflict (34.7%), financial problems (22.9%), and having a chronic physical illness (20.1%).

The leading contributing factors in this study were found to be consistent with that found with other methods of suicide discussed in the literature (Maris, 1997, Vijayakumar, John, Pirkis & Whiteford, 2005). Stressful life events that have been cited across different suicide methods have included: interpersonal loss, conflict, or rejection; loss of employment; economic problems; incarceration or legal problems; and being diagnosed with a terminal illness (Vijayakumar et al. 2005). Our findings regarding contributing factors with regards to self-immolation are largely reflective of other Australian studies that show that "relational" problems (unhappy love, family/marital problems), "instrumental "problems (financial and unemployment) and "health"

problems are some of the principal circumstances preceding suicide (Hassan, 1996). We therefore agree with Geller (1997) that the relationship between suicide and stressful life events does not appear to differentiate the self-immolator from those who choose other methods.

4.1.3 Aim 3- Examine identifiable variables regarding each self-immolation suicide event.

Location type

The location of setting oneself on fire was familiar for the majority of self-immolators in this study, with many choosing to deliberately set themselves alight inside their residency (49 cases, 34.0%) or its immediate vicinity (42 cases, 29.2%)). A further 37 cases (25.7%) self-immolated in transport vehicles (all cars apart from 1 boat), with the majority having driven themselves to the location. Only 8.3% (12 cases) chose the less familiar location of bushland or parks. In one case the self-immolation was a human rights protest and took place on the steps of Parliament House.

Other studies have also found that the majority of attempted/completed self-immolations took place in familiar locations - usually at home (Al-Zacko, 2012; Lari & Slaghehbardan, 2003). In Geller's, (1997) thirty-year review found from 398 cases where the location was known, 45% of cases set themselves on fire at home, 20% was in a psychiatric hospital, 14% chose an outdoor location (familiar/unfamiliar not stated), while 5% set themselves alight in a car. The Canadian study by Shkrum and Johnson (1992) of 32 completed self-immolation deaths, found the scene of the self-immolation was familiar to 26 of the individuals. Thirteen people chose to set themselves on fire at their residency, while the remaining 13 cases chose its vicinity, or other familiar

locations. However, contrary findings were found by Rothschild et al. (2001) who found only 23% of those that completed suicide by self-immolation chose inside their residence. The majority of self-immolators (65%) chose outdoors locations to set themselves on fire.

The significance and interpretation of the self-immolation may vary according to the location that people chose to set themselves alight. The majority of individual in our study set themselves alight at home using an accelerant that was easily accessible around the home. While access to the means of suicide does not solely determine the choice of suicide method, the availability of the method is thought to be a key factor that leads to translation of suicidal thoughts into actual suicidal act (Hawton, 2005). Furthermore, the nature of the method of suicide may increase the likelihood that the suicide act is impulsive and fatal. Readily available suicide means (e.g. poisons and firearms in some countries) can facilitate unplanned, impulsive suicide acts. (Ajdacic-Gross et al. 2008).

Impulsive suicide attempts are acts of self-harm involving little preparation or premeditation; non-impulsive suicide attempts are often proceeded by preparation and forethought (Conner, 2004). Suicidal planning is related to, but not synonymous with, suicidal intent. Planned suicide is a more complicated construct that involves a more subjective element drawn from the desired outcome and perceived lethality of the act of self-harm (Beck, Schulyer, & Herman, 1974). Suicide by self-immolation has been shown to have a case fatality rate of up to 70% (Rezaeian & Sharifirad, 2012). Therefore it is plausible that the amount of planning involved in the suicide attempt is another estimate of impulsivity (Brown, Overholser, Spiritoetal et al. 1991; O'Donnell, Farmer, & Catalan, 1996).

Self-immolation combined with other methods of suicide

We found 12 cases (8.3%) in which different suicidal mean were used together (combined suicide). In one case a woman tried to hang herself but was unsuccessful and then poured an accelerate over herself and ignited herself. In 4 cases the victim had poisoned themselves and immediately afterwards self-immolated. Others had stabbed themselves and lacerated their wrists before setting themselves on fire. In all 12 cases the coroners' findings were that the person died of self-immolation. This was determined by witness accounts or the fact that soot was found in the tracheobronchial system of all victims which indicated the person was still alive when the fire was ignited.

Other studies on self-immolation have also found similar small percentages of people who used combine self-immolation with another suicide means. For example, an Italian study by Cave Bondi et al. (2001) of 34 completed cases of self-immolation found six percent of cases had used combined suicide means. A Bulgarian study by Hadjiiski and Todorov, (1996) of 89 cases of attempted/completed self-immolation found four percent of cases had combined another suicide method with fire. While a German study by Daigeler et al. (2009) found that four out of 11 survivors of suicide by fire had additionally ingested an overdose of pharmacological substances.

Witnesses

The majority of self-immolators (89, 61.8%) set themselves on fire in isolation with no eye witnesses. The self-immolation was witnessed in 55 cases (38.2%) and thirty-five of these eye witnesses had a significant interpersonal relationship with the self-immolator. In twenty-one cases the witness observed the ignition and burning, while 34 individuals witnessed the burning only.

Comparatively, our findings that the majority of individuals that self-immolate do so in private without witnesses, has been found to be a common phenomenon in Western countries. Poeschla et al.'s (2011) literature review of self-immolation in different countries found that in high-income societies there was a tendency to deliberately burn oneself in private, ensuring both that prevention by others is unlikely and that others do not witness the event. This seems to be in contrast to many cases in some lower income societies (e.g. Iran, Afghanistan, Iraq) where the suicidal act is usually carried out in front of others often with the intent of influencing public opinion and/or to elicit an emotional response in those witnessing the act (Poeschla et al. 2011). Many of these self-immolations are a protest about the lack of human rights (Campbell & Guiao, 2004).

It is worth noting that the majority of those in this study that witnessed the self-immolation had a significant relationship with the person. It would appear that the likely intention of the person setting themselves alight was for the act to be witnessed by this person. Romm et al. (2008) reminds us that "*the image of the burning body undoubtedly remains permanently imprinted in the minds of those who witnessed the horror of this act"* p. 992.

Expression of suicide intent

Eighty-four (58.3%) self-immolators did not communicate suicide intent before killing themselves, while in 60 cases (41.7%) the individual expressed suicidal intent either just prior to the self-immolation or at a time before their suicide (within 12 months). Comparatively, it is estimated that between 60% and 80% of those who commit suicide will have communicated their intention either directly or indirectly through hints or suggestions (Retterstol, 1993).

What appears to be a choice not to communicate intent to others may be a reflection of the persons' isolation and lack of connection with others. For others perhaps the lack of communication of suicidal intent is more calculated. Being secretive about their intention to commit suicide decreases the possibility of any preventative intervention interfering with achieving their goal. Finally, the lack of communication of intent may indicate the impulsivity of the suicidal act.

There does not appear to be any obvious difference in frequency of communicating suicidal intent between those that choose self-immolation and those that choose other methods.

Suicide notes

A total number of 36 (25%) cases of self-immolation left a suicide note while the majority of self-immolators (108 cases, 75%) left no notes. Comparably, the percentage of suicide notes left by self-immolators is similar to what has been found across other methods of suicide. Research indicates that suicide notes (all suicide methods) are left by approximately 15-30 percent of those who complete suicide (Holmes & Holmes, 2005; Leenaars, 1992; Schneidman, 1981). According to Gelder, Mayou and Geddes (2005) one in six leave a suicide note whether written, audio, or video.

Other Western studies on self-immolation have found similar rates of presence/absence of suicide notes to our study's findings. For example, in the Canadian study by Shkrum and Johnston (1992) of 32 self-immolations, 25% of self-immolators left written statements before dying by fire. Geller's (1997) review of 263 cases of self-immolation (where the presence/absence of a suicide note was determined) found that a lower percentage, 13.9%, of those that completed suicide had left a written suicide note.

It has been argued that note writers are qualitatively different to those who do not leave notes, and findings obtained through use of suicide notes cannot be generalized to all completed suicides (O'Connor, Sheehy & O'Conner, 1999). However, other research studies differentiating note writers from non-note writers have found few differences in terms of demographic characteristics, psychological and physical health conditions, and precipitating circumstances (Callanan & Davis, 2009).

So is the presence or absence of a suicide note meaningful? Suicide notes that were left by self-immolators in this study generally were orientated to ease the pain of those known to the person completing the suicide and to explain the reason why they were taking their life. This has also been found in other Australian studies. For example, Lester, Wood, Williams, & Haines (2004) study of suicide notes from 262 suicides in Australia found that men less often had escape from pain as a motive for their suicides and more often had love/romantic problems. The suicides of older persons were more often motivated by escape from pain and less often had love/romantic problems.

There are many possible reasons why some people leave suicide notes and others do not. We know that the vast majority of those attempting suicide engage in suicidal ideation (having thoughts, ideas, intentions, plans and wishes) about suicide prior to attempting/completing suicide (Leonard & Flinn, 1972; Retterstol, 1993).

The high number of people (108) who did not leave a suicide note may be an indication of the impulsiveness of the suicide act and the suicide method chosen. This explanation would support De Leo et al. (2002) findings that there may be a possible relationship between impulsiveness and the suicide method of choice. The Australian study by De Leo et al. found that suicide notes were less often left by those that chose the

more impulsive method of hanging compared to other suicide methods of firearms and non-domestic gas. De Leo et al. argues that access to firearms and equipment needed for carbon monoxide poisoning (hose, tape) require more planning, preparation and time. Others have proposed that taking time to write a suicide note may indicate a higher degree of planning and forethought, and a less precipitate decision-making process (Kaplan & Sadock, 1998).

Accelerant

It was found that nearly all of those who completed self-immolation (126 cases, 87%) used an accelerant – the most frequent being petrol. These results compare well with other studies, which also cite the use of an accelerant with self-immolation.

Persley & Pegg's (1981) Australian study found that amongst 30 cases of attempted/completed suicide by fire 18 (60%) had used a flammable liquid. In the later Australian study by Cameron et al. (1997) of 53 self-inflicted burns cases found that all 31 cases of attempted/completed suicide by self-immolation used an accelerant. Rothschild et al. (2001) study of 45 completed suicides by self-immolation found 89% doused themselves with a flammable fluid. While the Bulgarian study by Hadjiiski & Todorov of 89 patients who had made an attempt on their life by self-burning found that 72 patients burned themselves by dousing themselves with highly flammable liquids.

The type of fire accelerants used by self-immolators varies according to availability in various parts of the world. Laloe's (2003) review of 55 studies of deliberate self-burning or suicide by burning found kerosene and petrol (gasoline) were the most frequently mention accelerants. Petrol was the most commonly used accelerant

in the present study, probably because it is easy to purchase, often stored on property, and is generally known to be highly flammable.

The case fatality rate in self-inflicted burn patients is nearly universally higher than found in accidental burn cases (Al-Zacko, 2012). This could be attributed to the greater use of flammable liquids (Al-Zacko, 2012). For example, the Australian study by Persley & Pegg (1981) of 30 cases of attempted suicide by fire found that patients that used a flammable liquid did poorly compared to those where an accelerant was not used. They found 13 of the 18 patients (72%) who used an accelerant with self-ignition died because of the greater depth and percentage of the burn injury.

Accelerant used by self-immolators in this study reflected the main domestic fuel available in the home. This presents major challenges for suicide prevention strategies employed by organisations such as the World Health Organisation, which has a strong emphasis on restricting access to the means of suicide.

Survival interval

Ninety- four cases (65%) of individuals died at the location of their self-immolation. Thirty cases (20.9%) died within the first 12 hours, and 20 cases (13.8%) survived self-immolation for more than 12 hours. In this study, as in others (e.g. Cave Bondi et al. 2001) survivors of the initial act of self-immolation lived for several hours to several months. Most studies describe self-immolation patients as having a higher total body surface area affected, a higher incidence of smoke inhalation injury, and a more difficult course of recovery, compared with patients whose burns were not self-inflicted (Daigeler et al. 2009; Ahmadi, 2007). Those that survive the initial act of self-immolation often die from medical complication related to their burn injuries. Studies report case

fatality rates of these initial survivors as from 29% to 84% (Lari & Alaghehbandan, 2003; Cameron et al. 1997; Hadjiiski & Toodorov, 1996; O'Donoghue et al. 1998).

4.1.4 Aim 4 - Examine gender difference in those who suicide by self-immolation across a range of identifiable variables.

The sex distribution in our study was 100 men and 44 females. Compared to Australian population statistics this indicates that males are over-represented in the self-immolation data. The present gender results are comparable to other Western studies that show a predominance of male immolators in most developed countries (Poeschla et al. 2011). Throughout the period 1992 to 2002 the male standardised suicide death rate was higher than the female rate by a ratio of approximately four to one (ABS, 2003).

In our data, suicide by self-immolation was dispersed across the life age span, however, for both sexes there was a higher propensity for self-immolation between 46-64 year age group. Males were slightly older (median =47) than females (median=45). The most recently available statistical information regarding median age at death for suicide in was in 2009 which records a median age of 43.4 years for males and 44.9 years for females (ABS, 2012).

According to the current results male self-immolators are older than female self-immolators, on average, by 2 years which is contrary to Australian suicide data which suggest female are older than males across all suicide methods.

Our results showing a propensity for male self-immolators to be older than female immolators, differ from the majority of Western studies' findings (Daigeler et al. 2009; Cave Bondi et al. 2001; Rothschild & Schneider, 2001; Poeschla. et al. 2011) which have found the opposite with women being slightly older than men.

At the time of suicide, 30.6% of self-immolators were in living alone households. Men and women experience similar rates of mental illness, but rates are highest for men and women living alone. The majority of those living alone were females (F=11, 25%) compared to males (M=33, 22.9). Comparatively, gender differences of self-immolators living alone are consistent with the Australian population. According to the Australian census in 2001 (ABS, 2002), women (16.4%) outnumber men (13%) among older people (aged 55-64), who live alone. The opposite is true among younger people living on their own. Indeed, this holds for all age groups younger than 55 years of age. While we know our rates of self-immolators living alone are comparable with other self-immolation studies (Leth & Hart-Madsen, 1997) we are unable to compare sex ratios as a function of living alone due to the majority of studies not specifying sex distributions.

The present results showed that 33 (22%) males and 15 (10.4%) of females were separated, divorced, or widowed at the time of suicide. It is known that separated males, especially younger males (Cantor & Slater, 1995; Wyder, Ward & De Leo, 2009); men who have experienced the breakdown of a marriage or de facto relationship (Kolves, Ide and De Leo (2011), and elderly widowed or divorced males (Harwood, Hawton, Hope and Jacoby (2000), are particularly at risk of suicide. In Australia between 1995 to 1997 the average suicide rates for males who had never married was more than twice as high as those for married males, and the rates for widowers and divorced men were about three times higher (ABS, 2000) . Similar patterns were observed for women though to a lesser degree (ABS, 2000).

Durkheim (1897) suggests that marriage provides protection against suicidal behaviours, as people are more integrated in a supportive social network. When these

bonds are broken by separation and divorce, the risk for suicide increases. This theory still receives support today (Giddens, 2001; Hassan, 1996, Jacob et al., 2003; Stack, 2000) with marriage seen as a protective factor against suicide in the self-immolation literature (Suhrabi et al. 2012).

Seventy-five percent of coroners' cases contained data which indicated mental health symptomology or psychiatric diagnosis. Males were more likely to be exhibiting symptoms of a mental illness (96, 66.6%) than females (48, 33%). Depression was the leading diagnosable mental illness for both males and females. Anxiety disorders and substance disorder (alcohol) were the next most frequently diagnosed disorders for males. In contrast, personality disorder, psychosis and substance disorders (alcohol) was the next most frequently diagnosed disorders for females. Rates for one diagnosable mental illness were higher for males (37, 25.7% of the overall sample) than females (17, 11.8%). Comorbid diagnoses (more than one psychiatric disorder, or co-occurring psychiatric and substance abuse disorder) was present in 37 (25.7%) of cases. Of these cases, 25 (17.4%) were male and 12 (8.3%) were female. Thus, according to our results, more males had a diagnosable mental illness and/or exhibited symptoms of a diagnosable mental illness immediately prior to/or at the time of self-immolating than females.

Sex differences regarding mental health in self-immolators show some similarity and difference with Australian research. In 2007, the Australian Bureau of Statistics (ABS) conducted the second National Survey of Mental Health and Well-being. Contrary to our results, women were found more likely than men to experience anxiety disorders (18% compared with 11%) and affective disorders (7.1% compared with 5.3%). While, similar to our results, men were more than twice as likely as women to have substance

abuse disorders (7% compared with 3.3%), with alcohol use disorders more common than drug use disorders. Women were more likely to have anxiety and affective disorders in combination. Men were more likely to have substance use disorders in combination with either affective or anxiety disorders. In accordance with other studies of self-immolation, previous psychiatric diagnosis such as depression, personality disorders, substance disorders, schizophrenia and psychosis were a feature in the majority of self-immolators for both sexes (Poeschla et al. 2011; Ahmadi et al. 2009; Shahana et al. 2012).

With regards to unemployment, 45 (32.3%) of males and 20 (14.3%) of females were unemployed, retired or on sickness benefits. In Australia, unemployment (in particular, for more than six months), early retirement, or homemaker status has been found to be associated with significantly increased suicide risk, independently of categorized psychiatric diagnosis (ABS: 2008). Self-immolation literature does not digress from the general suicide literature in that, work, for both sexes, protects against suicide (Ahmadi, 2007; Leth & Hart- Madsen, 1997; Rezaeian, 2013).

The role of alcohol in the suicidal act features more regularly with males than females. Twenty-four (28.5%) males were found to have consumed alcohol prior to self-immolation compared to 8 (9.5%) females. Comparatively, in Australia suicide is the third leading cause of alcohol related death for males, and suicide attempts are the fifth most common cause of alcohol-related hospitalisations for females (NDRI, 2009). There is little information available regarding sex distribution, alcohol and self-immolation in the self-immolation literature. In the Australian study by Cameron et al. (1997) with 44 self-inflicted burns cases, 13 (29.9%) of cases were considered to be alcohol related, with the majority being male.

With regards to interaction with mental health services it was found that women were more likely to have had involvement with inpatient and outpatient services (both within a 12 months period and greater than 12 months period), prior to the suicide event, than their male counterparts. This is not surprising given that women are more likely than men to use services for mental health problems in the general Australia population (ABS, 2008).

4.1.5 Aim 5 - Compare self-immolation rates with Large and Nielssen's (2010) study that reported annual rates of suicide by different methods (not including self-immolation) for males and females in the same three Australian states (Victoria, NSW, and Queensland).

The annual self-immolation rates were calculated using coroners' data and ABS figures and compared with Large and Nielssen's (2010) meta-analysis of rates and methods (shooting, gassing, poisoning, jumping from height, drowning, and use of sharp implement) between Eastern Australian states. Large and Neilssen's data showed variations in the rates of, and trends in, suicide methods between 1988 and 2007 in Australian states and territories. During the Large & Neilssen's research period, Australia introduced national suicide prevention strategies to reduce the availability of some lethal methods, including introducing a firearms 'buy back' scheme and the introduction of catalytic converters in all new cars. During this time there were also changes in the pattern of prescription of antidepressant medication with an increase in the use of less toxic serotonin re-uptake inhibitors. Large & Neilssen's results showed a reduction in the availability of these lethal methods of suicide coincided with a decline in rates of suicide using these methods in most parts of Australia.

Our results showed variation between states in annual rates of suicide by self-immolation. As expected, when compared to Large & Neilssen, (2010), self-immolation was found to be the least prevalent of all suicide methods across all three Australian states. The highest rate of self-immolation was found for males in Queensland (0.11), but self-immolation was nevertheless still the lowest rate of all suicide methods in Queensland. Suicide by self-immolation rates for males exceeded female rates across the three Eastern states, with males 2.27 times more likely to self-immolate than females.

4.1.6 Aim 6 - Compare Australian males who suicided by self-immolation with De Leo, Evens and Neulinger (2002) study's findings of males who chose common suicide methods in Australia (hanging, shooting, gassing).

Differences were found in a number of the characteristics of males who completed suicide using self-immolation compared to males using other suicide methods, based on the De Leo, et al. (2002) study. De Leo et al. (2002) compared social, psychological, and health related factors of males who completed suicide using hanging, firearms, and domestic gas in Australia between 1994 and 1996. Specifically, the variables under investigation were: age, ethnicity, geographical location of residence and household composition, suicide note and suicide site, prior suicide attempts, previous psychiatric treatment and psychiatric diagnosis, and prior legal trouble.

Two by two chi square analyses (with Yates correction) were computed, comparing the frequency of a particular male characteristic between our study's findings and De Leo et al. (2002) results with regards to the following variables: lived alone, suicide note, suicide at residence, previous suicide attempts, psychiatric treatment, depression, psychotic disorder, and legal trouble.

Comparatively, our results show significantly more males who chose to suicide by self-immolation lived alone than males that chose shooting and hanging as suicide method. Self-immolators were more likely to choose to suicide at home than those that choose other suicide methods. Furthermore, self-immolators were less likely to leave a suicide note than those that completed suicide by other methods. Self-immolators were more likely to have made a previous suicide attempt than those that chose shooting.

Self-immolation may be more acceptable for individuals with poor impulse control. De Leo et al. (2000) argued that hanging was a more acceptable method of suicide for impulsive individuals than shooting or non-domestic gassing. De Leo et al. hypothesised the differences in planning and preparation required for each suicide method (hanging, shooting, gassing) may make hanging the preferred method to impulsive individuals. This argument was supported by the finding that suicide notes were less likely to be left at the scene in hanging suicides than the other two methods. Indeed De Leo et al's inferences were supported by the finding that the method requiring the most preparation, non-domestic gas, was also the method most likely to have a suicide note left at the scene. Given that self-immolation is likely to require less planning and preparation (pour an accelerant over the body and ignite) than hanging (preparing a ligature and a chair) and suicide notes were less likely to be left by self-immolators than gassing, shooting and hanging – it is argued that the current data suggests a possible relationship between impulsive traits and self-immolation.

4.2 Limitations

The coroner's files provided limited or incomplete evidence in several key areas. The data was limited to the information that can be provided by people that were

associated with the suicide completer. If the person was isolated there was very little information available, apart from that provided by authorities such as the police, and this was typically only about the act itself and not about contributing factors. Further, it was not until 2009 that the states brought in a uniform reporting system for the police in recording details of a suicide.

The population figures used for each state were based on one year (a midpoint across the years) while the comparison paper (Large and Nielssen, 2010) used annual figures. This may have introduced some wider level of error (or imprecision) in the comparative rates determined, but it is unlikely to have been a major factor and the comparative magnitude of the rates would still be robust.

The files were uneven across different states, with a major limitation being that the Queensland files did not consistently include toxicology reports. Furthermore, toxicology reports relating to the time of the self-immolation were not available if the person initially survived the attempt and were hospitalised. Almost one in five survived more than 6 hours after the self-immolation. Toxicology was also not possible if the remains were too incinerated.

Some of the literature included people who had self-harmed with burns and often the self-harm cases were combined with the suicide completers, making valid comparisons with the present data set of suicide completers difficult. In some papers the deliberate self-burn patients varied from having a series of cigarette burns on an arm to pouring petrol over themselves and burning an extensive part of their body.

In this area quite a lot of the literature is from non-Western countries, such as Iraq, Iran and Afghanistan with different mental health systems and mental health

classifications and widespread limited availability of mental health services. This makes comparisons with Western data sets difficult.

For all files the issue of whether they died by self-immolation was not ambiguous. However, in a few cases, it was unclear as to whether the method of suicide clearly set out to include self-immolation. These were some cases where multiple methods of suicide were being employed, such as shooting or gassing with car fumes, at the same time as behaviour causing self-immolation (e.g. falling into a deliberately created fire pit on shooting oneself).

In the coding of some variables three categories were created and featured in the tables; 'definite', 'probable' and 'no or not known'. In discussing the different variables the focus was clearly on the 'definite' category and this raises the possibility that the numbers were conservative for the particular variable under discussion. Further, the combining of the' no and not known' category was necessary to take into account the many cases where reference to a variable was not raised in the coroner's file and was thus assumed to be not present. However, it may not always have been the case that no reference to a variable in a file meant it was absent (e.g. a previous suicide attempt).

Although no formal process of blind inter-rater reliability was undertaken, about 20% of the coroner's files were discussed with other mental health professionals. It is acknowledged that a blind process would have been more rigorous.

In coding the coroner's files it would have been possible to create many more variables than the ones presented in this research and some discretion was thus used in deciding what variables may have been of importance. For example, most files gave the exact time of day of the self-immolation and it was decided that this variable was of

insufficient relevance to the issues under consideration and was thus not coded and included. Further, some categories of data were collapsed, such as mood-altering drugs.

4.3 Conclusions

This research has uncovered a wealth of information about 144 cases of self-immolation in Australia. What follows below is a short summary of some key findings.

In the literature there are three broad areas of motivational factors for suicide by self-immolation. The first is *political*, and the current data set revealed that only one person fell into this category, with a suicide on the steps of Parliament House, related to distress directed to the government of a lack of permitted family reunion via immigration. The second influence could be seen as *cultural and/or religious* and one Buddhist monk self-immolated in the Buddhist temple and this was interpreted as his chosen way of transcending to the next world. The remaining 142 cases of self-immolation are all related to mental health, substance abuse and/or relationship issues. The overwhelming preponderance of the cases in this third category is consistent with other studies of suicide by self-immolation in Western, European countries, in contrast to those occurring in Asian/Middle East countries.

Almost three quarters of the self-immolation cases involved people born in Australia, with no overall bias found for the overseas born. However, a breakdown of country of origin showed an over-representation of those born in Vietnam compared to their population prevalence in Australia.

Impulsivity is highly correlated with suicidal behaviour across psychiatric samples and non- psychiatric populations. The nature of this relationship remains unclear. The literature is somewhat confusing probably since, as noted previously, impulsivity is

an ill-defined concept. It is important to distinguish between a suicidal act that can be impulsive (or not) and a person who can be impulsive or not. Adding to this confusion is the many inconsistencies in the current conceptualisations and measurements of the impulsivity trait (Gvion & Apter, 2011). This study operationalize the notion of impulsivity by looking at the degree of objective signs of planning as well as examining the amount of time spent between the decision to attempt suicide and the actual suicide.

Some suicide acts are more impulsive than others and some suicide means lend themselves to more impulsive acts than others. The current investigation of the circumstances of these self-immolation cases suggests that in the majority of cases impulsivity played a role. This is supported by the fact that many of these events took place at home, with easy access to an accelerant (i.e. petrol in the shed) and less likelihood of leaving a suicide note. Given that self-immolation is likely to require less planning and preparation (pour an accelerant over the body and ignite) than hanging (preparing a ligature and a chair) and suicide notes were less likely to be left by self-immolators than gassing, shooting and hanging – it is argued that the current data suggests a possible relationship between impulsive traits and/or impulsive suicide act and self-immolation.

Our study's results broadly reflect much of the suicide literature which indicates that people who attempt/complete suicide have a high prevalence of serious mental illness, such as mood disorders, affective disorders, and substance disorders. It has been well established that substance dependent individuals who use of violent methods of suicide has been linked to behavioural disinhibition, impulsivity, and aggression (Bergmann & Brismar, 1994). It however, remains unclear whether the association

between impulsive behaviours and the risk of suicide is at least partly explained by axis I disorders that are commonly associated with suicide, such as major depressive disorder. Impulsivity may instead/also constitute a temporal vulnerability to suicide independent of Axis I diagnosis such as seen as a characteristic feature of borderline personality disorder (Gunderson, 2001). The mechanism by which impulsivity combined with psychopathology to produce suicidal behaviour still remains uncertain. Future studies should aim at clarifying and refining the concept of impulsivity and its link to psychopathology with all different forms of suicidal behaviour.

Depression, in severe form, has a high incidence of mortality (Porter et al. 2001) in line with findings that mood disorders are commonly associated with suicide (Bertolote et al. 2003). Three characteristics appear to differentiate people with depression who are suicidal and people with depression who are not (Van Heeringen & Marusic, 2003):

(a) a sensitivity to particular life events reflecting signals of defeat, based on attentional biases ('perceptual pop-out') leading to involuntary hypersensitivity to stimuli 'loser' status;

(b) the sense of being trapped, which is related to an insufficient capacity to solve problems, commonly of an inter-personal or social nature;

(c) the absence of rescue factors, mediated by deficient prospective cognitive processes and leading to feelings of hopelessness.

The great majority of people who experience a diagnosable mental health illness do not die of suicide. Our study's results indicate that 105 (72.9%) that chose self-immolation

had one or more contributing factor (generally stressful life events) other than a mental health diagnosis. Much is made of mental health diagnosis and suicide (rightly so) however, perhaps in assessing suicidal risk in those with a diagnosable mental illness more attention should be paid to the accumulating affect of contributing factors or the likely impact of possible adverse life events on those with a diagnosable mental illness and suicidal risk.

About a quarter of the cases in this study had current contact with inpatient services or contact within the last 12 months. A further 22.9% of self-immolators had a current interaction with outpatient mental health service, at the time of their death. A number of these individuals had recently been discharged or had recently had a risk assessment for suicidality but had not been deemed high suicidal risk to be admitted to an inpatient unit. Suicidal ideation alone is not sufficient for a person to be deemed high risk. High suicide risk appears to include active suicidal intent expressed in the carrying out of an act of deliberate self-harm and/or the making plans to commit suicide. Deliberate self-harm is associated with significant risk of suicide (Haw et al. 2001). Active suicidal intent and/or an act of deliberate self-harm are possibly too high a standard to set as it is possible that patients who are planning an imminent suicide are not likely to communicate this to clinicians as this may lead to their plans being thwarted (Porter, Linsley & Ferrier, 2001). Suicide ideation should be taken seriously even in the absent of plans, as it may be the case that, the victims clues are not given to clinicians but to family and/or friends instead (Porter, Linsley & Ferrier, 2001). Perhaps the standard set to determine whether or not a person is high risk or not could be lowered, if only to err on the side of caution. Any reassessment of suicide risk should include a review of

what circumstances in the social environment may have changed and a re-evaluation of previously detected at risk mental state. The implications of this is that more staff and resources would be required to care for the increase number of patients who would then be deemed high risk and in need of closer observation.

Part of the rationale for choosing self-immolation as a suicide method appears to be related to the finality of the act, and the knowledge that it is typically an effective means of ending one's life. Support for this comes from the testimony of survivors and also from the fact that for some people this has not been their first suicide attempt. Further, for most people self-immolation was a solitary act, suggesting they had no wish to be saved.

Suicide by self-immolation is a rare act in Australia, with the rates for males being around one hundredth of hanging rates (with hanging being the most popular method). Consistent with other violent methods of suicide, females were less likely to choose this method, with less than a third of cases being female.

Consistent with evidence from people who suicide by all methods, the majority of cases of self-immolators (60%) had no history of previous contact with mental health services. This is despite the fact that the coroner's files documented behaviour and statements from significant others consistent with serious mental health decline and/or distress. Barriers to accessible and effective mental health care may stem from the patient's own limitations, from providers who may not recognise the presence of mental illness and drug abuse, or from a system under financial incentives to limit services. Data gathered from advocacy groups indicate that, in many countries, mental health services

are limited, and that access to both inpatient and outpatient services is poor (Pham et al. 2003). Better funding in the mental health sector will ultimately save more lives.

Results of this study support previous findings that self-immolation involves a complex mix of intrapsychic, interpersonal, and environmental risk factors, including adverse life events. Culturally sensitive interventions should be developed to target at risk individuals and communities for self-immolation prevention. The WHO has placed a strong emphasis on restricting access to means of suicide as a major approach to suicide prevention. Putting obstacles to easy access of inflammable accelerants might reduce self-immolation, particularly those that are impulsive acts. Providing education to prone people, improving mental health care, reducing substance abuse and improving social and family supports, are reforms that will likely reduce suicides.

In summary, this study on self-immolation has characterised an Australian population group involved by several parameters and compared such a group with previous studies on the phenomenon as well as with other types of suicide. We found that motives for self-immolation hardly differed from those for other methods of suicide. Special religious/cultural motives did not play a major role in our sample. However, a history of psychiatric disorders, substance dependence, and adverse life events were found in the majority of cases. A number of self-immolators were in contact or had contact with inpatient/outpatient mental health services within the last 12 months. Some of which had only recently been deemed moderate/low risk of suicide prior to their taking their lives. Perhaps less stringent risk assessments and better discharge planning and/or easier access to outpatient services would reduce the number of suicides.

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Appendix A List of categories of variables that recorded coronial information in the Suicide by Fire Coronial Database ("the Database").

Socio-demographic Information

1: Case Number

2: Sex

3: Age

4: Relationship Status

5: Post Code

6: Country of Birth

7: Occupation of Deceased

8: Living Arrangements

Mental Health History and other Contributing Factors

9: Pre-existing Mental Illness

10: Current Mental Illness

11: Level of Impairment of Mental illness

12: Interaction with Outpatient Mental Health Service

13: Interaction with Inpatient Mental Health Service

14: Known Previous Suicide Attempts

15: Method used in Previous Attempt

16: Previous Suicide Attempt Involving Fire

17: Period of Time since Last Suicide Attempts

18: Known History of Self-harm

19: Intimate Partner Conflict

20: Interpersonal Conflict (not intimate partner)

21: Financial Problems

22: Bereavement Issue

23: Specific Adverse Life Event

24: Issues with Law

25: Pre-existing Physical Illness

26: Level of Impairment of Physical Illness

27: Pre-existing Disability

28: Level of Impairment of Disability

Suicide Event and Circumstances Surrounding Death

29: Observed Behaviour before Self-incineration

30: Deceased Location Prior to Self-incineration

31: Activity before Ignition

32: Condition before Ignition

33: Location at Ignition

34: Condition at Ignition

35: Activity at Ignition

36: Location after Self-incineration

37: Condition after Self-incineration

38: Activity after Self-incineration

39: Survival Interval before Resulting Death

40: Statement Given before Self-incineration

41: Suicide Letter Recovered

42: Witness Involvement

43: Sequence of Self-incineration Witnessed

44: Alcohol Testing

45: Alcohol Volume

46: Drug Testing

47: Blood Co2 Level

48: Coroners Finding

49: Suicide Motive

50: Why Fire was method of choice of Suicide if Know

APPENDIX B

SUICIDE BY FIRE MANUAL

The Suicide by Fire Manual (SFM) is an introduction and explanation to the coded classification used to develop the Suicide Coronial Database which records information about completed suicides by self-incineration from 1997 to 2007 in Victoria, New South Wales, and Queensland.

TABLE OF CONTENTS

INTRODUCTION

The SFM is an introduction and explanation to the coded classification used to develop the Suicide Coronial Database (SCD) with the purpose of identifying characteristics of those **who** completed suicide by self-incineration with the aim to compare these people (i) with the general population and (ii) with people who chose suicide by another method. Suicide by fire, or ICD-10' coded classification of intentional self-harm (ISH) by fire, occurring from 1997 to 2007 in Victoria, New South Wales, and Queensland will be examined This information will be used to gain a deeper understanding of **why** these people chose self-incineration as a suicide method. All data used to develop SCD was drawn from the coronal file that was compiled to explain the circumstances surrounding the death. Coronial records are rich source of detailed information. Each file may include reports from several sources such as mental health professionals, police, the medical examiner, fire and arson investigators, and fire fighters. Witness statements about the event, and from family and friends who can provide relevant information about deceased are often also included.

The process for recording information for each death starts with the coroner's file being carefully read line by line in an attempt to extract the core details surrounding the incident, the deceased, and their life experience. The data from each file is then systematically coded.

The development of the codes used in the SCD was a threefold process. Firstly, the CESARE Coronial Database (developed to record information about fatal fires) provided the framework for codes, especially regarding the environment, ignition, and human behaviour implicated in each fire death. Secondly, relevant variables were identified and coded after an extensive literature review into risk factors associated with suicide (including suicide by fire). Thirdly, a number of coroner's files were carefully viewed for categories which provided information for relevant variables and codes.

STRUCTURE OF THE DATABASE

In general terms the SCD is constructed in three sections. The first section outlines in details regarding the socio-demographic, clinical, and environmental/situational risk factors that are obtained from coroners' files as well as research literature.

The second section records information about the behaviour of the deceased in relation to self-incineration. Three basic descriptors are used to code information about the person's location, behaviour, and condition in a stage sequence format for time immediately before, during and after

the fire. Additionally, background information from witness statements of family members, close friends and medical professionals associated with the person prior to their death can be included.

The third section gives information about the autopsy findings as well as coroner's findings. While the deceased has died as the result of self-incineration, autopsy results provide information as to direct cause of death (i.e. infection as the result of burns). Also, importantly, autopsy findings provide information about possible levels of drug/alcohol intoxication. The coroner's findings provide clear definition of suicide and may indicate possible motivational factors influencing the choice of self-incineration as a method of suicide.

The database has been developed to allow multiple entries to be made for some of the more complex variables. It is often the case that more than one important or contributing factor needs to be highlighted. For example wherever human behaviour or condition is recorded, variables have been created to allow multiple behaviours or conditions for each of several people (multiple witnesses) at several points in time (before ignition, at ignition, during the fire, after the fire). Likewise up to three pre-existing mental conditions or physical disorders can be accommodated for each casualty.

STANDARD CODES

A number of standard codes apply in a standardised way to all variables, e.g. 99 for "unknown". The standard codes are outlined below. Many variables are also accompanied by confidence codes which are explained in the next section.

No.	Code	Definition
97	unspecified	Not stated in the coroners' report
99	unknown	Stated as "unknown" in the coroners' report
94	n/a	Does not apply to the current case

100	See note	Any data not fitting into an existing code must be added in the 'notes' column. For example, unusual circumstances which are not easy coded.

CONFIDENCE CODES

Confidence codes appear throughout the SCD and are included to indicate the degree of certainty regarding the coding of some variables. They are linked to findings regarding a number of variables such as: the ignition factors, motivational factors influencing the choice of self-incineration as a method of suicide, expressions of suicide intent including previous attempts and threats, psychiatric condition and level of impairment, possible associations between emotional pain and the method of self-incineration, possible relationship between impulsive traits and method choice. Confidence codes capture the degree of certainty used by experts such as the coroner, police, and fire investigators describing the complexities that may have influenced the person's decision to self-incinerate. Confidence codes are also used to describe the degree of certainty regarding subjective judgments made by the coder, for example regarding the mental health status of the deceased prior to self-incineration.

The confidence code of "definite" is given when:

- The victim was still alive at some point following the incident and was able to give their account of events;
- key witness provided background information to the persons mental state.
- a suicide id directly witnessed;
- the forensic scientist was able to declare a definite cause.

Is this coder's judgment on which best suits?

The coder's judgment should be based on the judgements of others (i.e. the coroner) in the report.

No.	Code	Definition
1	definite	Clearly stated or decided; not vague or doubtful
2	probable	Probable is given when the information in the coroners' report is detailed enough to suggest a

		strong likelihood that the variable under question was more likely than not to have been a factor

SPECIFIC CODES

The following sections include precise definitions of all codes in the order they appear in the database (with the exception of confidence codes which have already been covered). They are organised in three general sections. The first section contains codes pertaining to socio-demographic, clinical, and environmental/situational risk factors; the second section pertains to the behaviour of the deceased in relation to self-incineration; and the third pertains to autopsy and coroners findings. Each section has been further broken down into smaller subsections to assist researchers who are searching for specific information.

SOCIAL DEMOGRAPHICS

CASE NO: Case number

Assigned by the Coroner's office. Made up of case number and year.

Example:

151698 represents case 1516 in 1998.

SEX : Sex of deceased

No.	Code	Definition
1	male	
2	female	

AGE: Age of deceased

Insert chronological age

RELST: Relational Status

No	
1	Single
2	Married
3	Defacto
4	Separated
5	Other

POSTC: Post code of deceased

No	Post code
1	

POSTCRU: Post code Rural/Urban

No	
1	Rural
2	Urban

COB: Country of Birth

No	
1	Australia
2	Vietnam

RE/SP: Spirituality/Religion

No	
1	Yes
2	No

OCCUPT: Occupation of deceased

Occupation type for those employed was categorised using the Victorian Department of Education and Training Occupation Groupings (State Government Victoria: Department of Education & Training, 2004).

No.	Employment Status	Code	Definition
1	employed	Type A	**Senior management & professionals** Senior Management in large business organizations, government administration and defense, and qualified professionals.
2			**Managers & associate professionals**

		Type B	Other business managers, arts/ media/ sportspersons and associate professionals.
3		Type C	**Trades persons, clerks, skilled office & sales** Tradespersons, clerks and skilled office, sales and service staff.
4		Type D	**Machine Operators, hospitality, assistants, labourers** Machine operators, hospitality staff, assistants, labourers, and related workers.
5	not employed		Unemployed
6	not in labour force	Retired	
7		Stay Home Parent/ home maker	
8		Student	
9		child	
10		Sickness benefits/ disability pension	

LIVING: Living arrangements of deceased

No.	Code	Definition
1	Alone	
2	With family	Includes defacto relationships and divorced families

		where children stay intermittently.
3	With others	
4	No fixed address	e.g. if person transient

Note: If person living in bungalow in rear of another dwelling on the same property & lives in bungalow alone = 1 'alone'.

A.2: MENTAL HEALTH HISTORY AND OTHER CONTRIBUTING FACTORS

A.2.1 PE-MI: Pre-existing mental illness

This code documents mental illness that may have been present. Provision is included for up to 3 pre-existing mental illness.

It is assumed that these conditions have been formally diagnosed at some point. Based on coroners judgment.

Pre-existing mental illness 1

No.	Code	Definition
0	no diagnosed mental illness	
1	depression	
2	schizophrenia	
3	dementia	Medically defined.

4	alzheimer's disease	
5	previous inpatient	
6	psychosis	
7	delusions	Disorder thought, e.g. voices on the radio are speaking to you and instructing you
8	dysthymic disorder	
9	obsessive personality	
10	borderline personality	
11	anxiety disorder	
12	suicidal ideation	
13	panic attacks	
14	paranoia	
15	alcohol related disorder	Includes alcoholism, prolonged alcohol/substance abuse. Korsakoff's syndrome: affects the brain, severe memory loss, confusion, tremors and irregular eye movements, among other symptoms. If victim ***has both*** Wernicke's & Korsakoff's syndrome : code in PI

		& MI.
16	Delusional disorder	
17	Histrionic personality disorder	
18	anorexia	
19	Hallucinations	Sensory disorder, e.g. hearing voices, seeing things that aren't there, feeling ants crawling on skin, etc.
20	OCD	Obsessive Compulsive Disorder
21	Bi- polar	Formerly manic-depression
22	adjustment disorder	Can be associated with anxiety and depression, but due to situational factors, e.g. loss of spouse.
23	substance (drug) abuse	For substance abuse to be coded it must be directly affecting the daily functioning of the person (i.e. occupational functioning) or use = regular or daily use but not necessarily affecting daily life.
90	multiple	

Note:

- If both an adjustment disorder and depression (or anxiety) are mentioned, code depression/ anxiety first. If there is no room to code the adjustment disorder, then include it in the notes section.

A.2.2 PE-MI2: Pre-existing mental illness

Same categories as above (mental illness 1); with one additional category:

No.	Code	Definition
24	no other mental illness	

A.2.3 CURME: Current mental illness

A classification system was developed in order to accurately detect which people were suffering from a mental illness prior to their death. This classification system is reflective of the Diagnostic Statistical Manual of Mental Disorders [DSM IV TR] structure. The classification system seeks to categorise the deceased as either definitely, probably, possibly or not mentally ill.

No.	Code	Definite	Probable	Possible	No mental illness
1	depression				
2	schizophrenia				
3	dementia				
4	alzheimer's disease				
5	previous inpatient				
6	psychosis				
7	delusions				

8	dysthymic disorder				
9	obsessive personality				
10	borderline personality				
11	anxiety disorder				
12	suicidal ideation				
13	panic attacks				
14	paranoia				
15	alcohol related disorder				
16	Delusional disorder				
17	Histrionic personality disorder				
18	anorexia				
19	Hallucinations	Sensory disorder, e.g hearing voices, seeing things that aren't there, feeling ants crawling			

		on skin, etc.			
20	OCD	Obsessive Compulsive Disorder			
21	Bi- polar	Formerly manic-depression			
22	adjustment disorder				
23	substance (drug) abuse	For substance abuse to be coded it must be directly affecting the daily functioning of the person (i.e. occupational functioning) or use = regular or daily use but not necessarily affecting daily life.			
90	multiple				

Table 2. Mental illness classification for those completing suicide by self-immolation.

Definite mental illness (1)	Probable mental illness (2)	Possible mental illness (3)	No mental illness (4)
Essential features: A definite classification of mental illness must include a clinical diagnosis (according to DSM IV criteria) as stated	*Essential features:* A probable diagnosis includes significant evidence to suggest that the deceased was most	*Essential features:* A possible diagnosis includes evidence to suggest that the deceased may have	There is no evidence of MI within the coronial case file.

by either a: a. Coroner b. General Practitioner c. Psychologist d. Psychiatrist e. Other equally qualified health care professional This information must be explicitly stated within the coronial documentation and may include information extracted from the medical history of the deceased.	likely suffering from a mental illness (however not sufficient to meet the criteria of definite mental illness). A probable diagnosis must include either category A or B. Police, family or friends of the deceased can make these statements. a. Two or more explicit statements within the coronial case file that directly indicates the presence of a mental illness. b. One explicit statement within the coronial file that directly indicates the presence of a mental illness and the presence of either antidepressant, antipsychotic or anxiolytic medication as indicated in the toxicology report of the deceased.	suffered from a MI, either diagnosed or undiagnosed. A possible diagnosis of MI must include either category A or B. a. One statement within the coronial case file that indicates the possibility of a MI. Police, family or friends of the deceased can make this statement. b. The presence of antidepressant, antipsychotic or anxiolytic medication in the toxicology report of the deceased.

A.2.4 IMPMI: Level of Impairment of Mental Illness

This variable relates to the severity of the level of impairment listed above under mental illness. **The relevant codes are also to be used regarding level of impairment in relation to the other illnesses of disabilities that follow** (i.e. physical illness and disability). It is based on the judgment of the coder, which is informed by an understanding of the 'Burden of Disease' and the coroner's report. Burden of Disease is the combined effect of premature death and years lived with disability caused by an illness.

No.	Code	Definition
1	slight	
2	moderate	
3	severe	

A.2.5 INOUTPA: Interaction with outpatient mental health service

No.	Code	Definition
1	Current interation	
2	Within 12 months	
3	Greater than 12 months	
4	No known interaction	

A.2.6 INPAT: Interaction with inpatient mental health service

No.	Code	Definition
1	Current interation	

2	Within 12 months	
3	Greater than 12 months	
4	No known interaction	

A.2.7 KPSA: Known previous suicide attempts

No		
1	No	
2	Yes	

A.2.8 NKPSA: Number of known previous suicide attempts

No	Number of previous attempts	
1	1	
2	2	
3	3	
4	4	

A.2.9 MPREAT1: Method used in previous attempt

No		
1	Self incineration	
2	Drowning	
3	Electrocution	
4	Jumping from height	
5	Gunshot	
6	Hanging	
7	Cutting/Stabbing	
8	Strangulation	
9	Poisoning	
10	Carbon monoxide poisoning	

A.2.10 MPREA 2: Method used in previous attempt

Same categories as above (Method used in previous attempts 1)

No		
1	Self incineration	
2	Drowning	
3	Electrocution	
4	Jumping from height	
5	Gunshot	
6	Hanging	
7	Cutting/Stabbing	

8	Strangulation	
9	Poisoning	
10	Carbon monoxide poisoning	

A.2.10 MPREA3: Method used in previous attempts

Same categories as above (Method used in previous attempts 1)

A.2.11 SUIATTF: Suicide attempt involving fire

No		
1	No	
2	Yes	

A.2.12 PTLPA: Period of time since last previous attempt

No	Time interval between last attempt	
1	> 3 months	
2	> 6 moths	
3	> 12 months	
4	< 12months	

A.2.13 KHSH: Known history of self-harm

No		
1	No	
2	Yes	

A.2.14 INTPARTCON: Intimate partner conflict

In the last 12 months has the person had any known significant relationship problems?

No		Description
1	No	
2	Yes	

A.2.15 INTERPER: Interpersonal conflict (not intimate partner)

No		Description
1	No	
2	Yes	

A.2.16 FINPROB: Financial problems

In the past 12 months has the person had major financial problems?

No		Description

1	No	
2	Yes	

A.2.17 BERISSU: Bereavement issues

In the last 12 months had the person suffering any bereavement issues?

No		Description
1	No	
2	Yes	

A.2.18 SPECLE: Specific adverse life events

Has there been any recent specific life events?

No			
1	No		
2	Yes	Approx date:	Event:

A.2.19 IWL: Issues with the law

Has the person been in any trouble with the law in the last 12 months?

No	YES	
1	No	
2	Yes	Describe:

A.2.20 OCONTRIBF: Other Contributing factors to the person taking their life

This code pertains to **contributing factors** from the **personal history** of the deceased that were observed by others and are not disputed. Data was sourced from several reports within the overall coroner's case file for that person including reports from police, doctors, and witnesses including friends and family. The bulk of information came from witness reports from the most significant

people in the deceased's life. A contributing factor is anything that contributes to the circumstances that lead the suicide.

This can include mental, physical, or social factors and history of previous behaviour.

For a variable to be considered a contributing factor it **must be reported consistently by multiple informants**. Provision for up to 4 contributing factors is included, with identical coding between each.

Example:

A history of drug taking behaviour that appeared to significantly impact on the persons emotional, physical, and social wellbeing .

History 1

No.	Code	Definition
0	no contributing factors	
1	drug abuse	
2	alcohol abuse	
3	socially isolated	e.g. husband lives wife (but works long hours) and wife is very lonely (not socializing)
4	criminal acts	
5	grief/loss	
6	sexual abuse	

7	interpersonal conflicts	
8	work related problems	
9	violent acts	
10	property disputes	
11	homeless	
12	Intervention order on perpetrator	
13	Intervention order against deceased	
14	gambling problems	
15	allegations offence	

History 2 & 3

Same categories as above (history 1); with one additional category:

No.	Code	Definition
19	Multiple see note	When there are more than 7 contributing factors code the first as 90 and list the factors in the notes section.

The following codes document ***pre-existing conditions that were present in the deceased prior to self ignition***. It was designed to highlight the unique conditions that existed for each individual with a view to bring to light ***any special circumstances that may have contributed to the person's decision to take their own life.*** The contribution of pre-existing conditions is emphasised in coroner's reports. For example a person with a pre-existing health issue such as cancer. Pre-existing conditions are entered based upon reports from reputable sources such as a doctor or other health professional, or if a witness such as a family member has noted that a diagnosis had been made in the past.

Pre-existing conditions were coded in three sections including physical illnesses, physical disabilities, and others. Detailed descriptions follow.

A.2.21 PE-PI: Pre-existing physical illness or impairment

Pre-existing physical illnesses are documented, that may have contributed to the person's decision to take their life. For example heart disease; lung disease; arthritis; etc. Provision is made for up to 3 pre-existing physical illnesses. Coder to rate degree of severity based on information provided in Coroners Report.

Physical illness 1

No.	Code	Definition
0	no pre-existing condition	
1	heart disease	
2	liver disease	
3	brain damage	
4	alcohol related disorders	Physical symptoms only. May include "alcoholic gait", nystagmus, disco-ordination, etc.

		Wernicke's syndrome: ataxia (difficulty in walking and maintaining balance), paralysis of some of the muscles responsible for movement of the eyes, and confusion. If victim ***has both*** Wernicke's & Korsakoff's syndrome : code in PI & MI.
5	respiratory disease	
6	epilepsy	
7	Hepatitis	Include if evidence of careless drug use or improper hygiene of deceased (i.e. Self inflicted= Yes included, Tattoo= No, do not include).
8	back pain/ injury	
9	arthritis	
10	previous stroke	
11	bronchial pneumonia	
12	diabetes	
13	history of cancer	
14	high blood pressure	
15	recent neurosurgery	Brain or spinal surgery.
16	graves disease	

17	Bronchial asthma	
18	Repetitive strain injury	
19	Hip replacement / operation	
20	osteoporosis	
21	Polymyalgia	
22	"subdual brain haemorrhage"	
23	“multiple sclerosis”	
24	drug related disorders	
25	Parkinson’s disease	
26	Peripheral *neuropathy*	
27	myopathy	
28	coronary artery disease	
29	transient ischemic attacks	

30	Traumatic Brain Injury	

Note :

Only enter conditions that MAY directly relate to person having chosen suicide. If other conditions were present (not judged directly related to suicide) but that may related to background lifestyle – list in 'Other Medical Conditions' in the NOTES section**.**

- Minor ailments like h**ead colds or flu** should be noted in observed behaviour, rather than here.

Physical illness 2 & 3

Same categories as above (physical illness 1); with one additional category:

No.	Code	Definition
31	no other physical condition	

A.2.22 IMPPI: Level of Impairment of Physical Illness

This variable relates to the severity of the level of impairment listed above under physical illness. **The relevant codes are also to be used regarding level of impairment in relation to the other illnesses of disabilities that follow** (i.e. physical illness and disability). It is based on the judgment of the coder, which is informed by the coroner's report.

No.	Code	Definition
1	slight	

2	moderate	
3	severe	

A.2.23 PE-DISABL1: Pre-existing disability

Refers to **clinically diagnosed** physical and intellectual disabilities that affect a person's abilities.

An intellectual disability represents impaired functioning across multiple cognitive domains. A learning disability is specific to a singular domain, e.g. reading. This variable is not intended to indicate a measure of depth of disability.

Provision is included for up to two pre-existing disabilities per casualty.

Pre-existing disability 1

No.	Code	Definition
0	no disability	
1	visually impaired	
2	hearing impaired	
3	learning disability	
4	impaired mobility	
5	intellectual disability	

90	multiple	See note below. If more than 2 disabilities- record additional in notes section.

Note:

- **Multiple=** use this code when the deceased had *more than 2 disabilities*. Then record additional disabilities in the **'note'** column.

A. SUE: SUICIDE EVENT AND CIRCUMSTANCE SURROUNDING THE DEATH

A.3.1 OBSBEHBFIRE: Observed Behaviour before Self Incineration

Observed behaviour before fire. This code was developed to provide historical context to the person's behaviour or state of mind leading up to self incineration. The time period prior to self incineration could be days, weeks, or even months. The information was drawn from the accounts of witnesses to the deceased person's behaviour and so represents a general pattern of behaviour. This can be telling as it can contribute to explaining the person's state of mind that may of impacted on the person's decision to take their life.

No.	Code	Definition
1	usual behaviour	Usual behaviour = Ordinary behaviour for that person
2	depressed	Depressed = Low mood characterised by feelings of despondency, dejection, hopelessness, inadequacy accompanied by low energy and a lack of interest in life.
3	anxious	Anxious = Mood characterised by worry, nervousness, fear or unease.
4	intoxicated	Intoxicated = Behaviour appeared drunken. Can including poor balance, unsteady gait, slurring of words, disinhibited behaviour , etc.

5	distressed	Distressed = Displaying extreme anxiety, sorrow, or pain.
6	drug use	Drug use = Observed taking drugs that affect behaviour.
7	unusual behaviour	Unusual behaviour = not ordinary for that person and does not meet the criteria for other behaviour codes.
8	Upset/ angry/ or agitated	Upset over a particular incident
9	In physical pain	

A.3.2 LOC-BIGN: Deceased's location prior to self- incineration

The location of the deceased prior to self- incineration.

No.	Code	Definition
1	in RFO	
2	In backyard	
3	in house/ building but not in RFO	
4	outside of house/ building of RFO but on property	

5	on property but in a separate dwelling	
6	off property of fire origin	
7	Inside fire affected transport vehicle	
8	outside of fire affected transport vehicle	

A.3.3 LOC-AINC: Location after the incident

Documents the location of the deceased after the incident.

No.	Code	Definition
1	hallway	
2	Foyer, entrance, lobby	
3	lounge	
4	sales area	
5	Bedroom/ lounge	

6	bedroom	
7	kitchen	
8	toilet/bathroom	
9	laundry	
10	office	
11	process, manufacturing area	
12	tool storage	
13	rubbish area/container	
14	garage	
15	parking garage	
16	exterior balcony	
17	Car port	
18	ceiling	
19	veranda	

20	cabin/ passenger area	
21	boot/ trunk	
22	engine	
23	fuel tank	
24	lawn field, open area, parks, vacant lots	
25	wild land area	
26	Backyard/ frontyard	

A.3.4 SURINT: Survival interval before resulting death

Documents the length of time between the persons survived from the time they were after incineration to when they are pronounced dead as the result of injuries.

No.	Code	Definition
1	Date and time found alive	
2	Date and time of death	

3	Total survival time	

A.3.5 STATBEFDEA: Statement given before death

Documents what the person said regarding their self-incineration. This statement could have been given at the scene, on route to the hospital or while receiving hospitalised care. Any statement made by the deceased before their death (as documented in the Coroner's report) may provide important information regarding the persons reasons for self-incineration, state of mind before, at time of incineration; as well, as after the event.

No.	Code	Definition	
1	No		
2	Yes	**Intent:**	**Motivation:**

A.3.6 SLR: Suicide letter recovered

Documents whether a suicide letter has been left and if so what the deceased letter indicates about their state of mind, intent and motivation as it pertains to their suicide.

No.	Code	Definition	
1	No		
2	Yes	**Intent:**	**Motivation:**

Data from witnesses are included from the Coroner's report. Witnesses include person's who: witnessed the self-incineration; witnessed the fire; took some direct action to extinguish the fire;

called emergency services (fire brigade, police, and ambulance); were first on the scene after the fire.

Provision for details of all variables from up to 3 witnesses is included.

A.3.7 WITNESSINV: Witness involvement

No.	Code	Definition	
1	No		
2	Yes	I	

A.3.8 WITNESTYP: Witness type

No.	Code	Definition
1	Significant relationship	Partner, x-partner, family member
2	Non-significant relationship	e.g. Passer-by, neighbour

A.3.9 SW: Sequence of self-immolation witnessed

No.	Code	Definition
1	Ignition only	
2	Burning but not ignition	
3	Both ignition and burning	

A.3.10 TESTALC: Alcohol testing

Documents whether toxicology reports requested blood assays for alcohol.

No.	Code	Definition
1	yes	
2	no	
3	no toxicology report	
4	"tox. after hospital treatment"	

Note:

- If 4 used then n/a (94) in alcohol detected.

A.3.11 ALCVL: Alcohol volume

Documents results of toxicology reports regarding the presence of alcohol in the system of the deceased. The blood alcohol volume from the toxicology report is exactly recorded.

A.3.12 TESTDR: Drug testing

Documents whether toxicology reports requested blood assays for the presence of drugs.

No.	Code	Definition
1	yes	
2	no	

3	no toxicology on file	
4	"tox. after hospital treatment"	**Report exists, but carried out after a hospital stay in which drugs reflect treatment**

Note:

- If selecting 4 here = 94 (n/a) in drugs detected.

A.3.13 DRUGDETECT1: Drugs detected

Documents specifically which drugs are reported in the toxicology results. Provision is made for up to 3 drugs to be reported.

Drugs detected 1

No.	Code	Definition
0	no drugs	
1	temazepam	
2	promethazine	
3	diazepam	
4	paroxetine	
5	venlafaxine	
6	mirtazapine	

7	cannaboid	
8	codeine	
9	morphine	
10	cerbanazepine	
11	heroin	
12	alprazalom	
13	methadone	
14	tricyclics	
15	zolpidem	
16	fluoxetine	
17	nitrazepam	
18	sertraline	
19	amphetemine	

21	Paracetamol	
22	Frusemide	
23	benzodiazepine	
24	citalopram	
25	olanzapine	
26	"toluene"	
27	"alprazolam"	
28	amitriptyline	
28	diltiazem	
30	"oxycodone"	
31	"tramadol"	
32	"methamphetemine"	
33	phentermine	
34	doxylamine	

35	thiridazine	
36	dothiepin	
37	verapimil	
38	celecoxib	
39	gilclazide	

Note:

- If person died at hospital and has been treated with therapeutic drugs which are noted – **do not** enter these in the database.

Drugs detected 2 & 3

Same categories as above with one additional category:

No.	Code	Definition
20	No further drugs	

A.3.14 CARBMONOLVL: Blood CO_2 level

Documents the volume of carbon monoxide reported in the toxicology results. Blood CO_2 level is recorded exactly.

A.3.15 SM: Suicide Motive

Circumstances such as suicide, murder and suicide, suicide and destruction of property, intention of act to be witnessed.

No.	Code	Definition
1	Suicide via self- immolation	
2	To murder another as well as suicide	
3	For others to witness suicide	
4	To destroy property	
5	Anger and rage	
6	Other	

SUICIDE MOTIVE 2 &3

Same categories as above with one additional category:

No.	Code	Definition
1	Suicide via self immolation	
2	To murder another as well as suicide	
3	For others to witness suicide	
4	To destroy property	
5	Anger and rage	
6	Other	

A.3.16 MEANSSUI: Why fire was used as a means of suicide

This variable is included to report any conclusion by the coroner that may be reported why the deceased chose to use self- incineration as the method to take their life.

No	Code		
1	Religious/spiritual significance		
2	Political statement		
3	Cultural significance		
4	Relationship dispute		
5	Easy access to means		
6	Other- state		

A.3.17 SUF: Suicide Findings

No	Code		
1	CORONER ASSIGNS VERDICT OF SUICIDE	Clearly stated	
2	CONTENT OF RECORD IMPLIES SUICIDE	Unstated	
3	INTENTION TO TAKE ONES LIFE IMPLIED ON BASIS OF SUICIDE NOTE, PRIMA FACIE EVIDENCE OF INTENT, OR CIRCUMSTANCIAL EVIDENCE	Unstated	

Appendix C - Coronial case summary record

CASE NUMBER		
DEMOGRAPHICS:		
AGE (YRS)		
SEX		
STATE		
ETHNICITY		
DATE OF DEATH		
RELIGIOUS BELIEF/AFFILIATION		
COUNTRY OF BIRTH		
POSTCODE		
RELATIONSHIP STATUS		
LIVING ARRANGEMENTS		
OCCUPATION		
MENTAL HEALTH &CONTRIBUTARY FACTORS:		
PSYCHIATRIC HISTORY (NOT CURRENT)		
CURRENT MENTAL ILLNESS		
DEPRESSION		
SCHIZOPHRENIA		
PSYCHOSIS		

DEMENTIA/ALZHIEMERS		
PERSONALITY DISORDER		
ANXIETY DISORDER		
SUBSTANCE ABUSE DISORDER - ALCOHOL		
SUBSTANCE ABUSE DISORDER - DRUGS		
ADJUSTMENT DISORDER		
BIPOLAR DISORDER		
PTSD		
ANOREXIA		
ADD		
INTELECUALY DISABLED		
IDENTIFIED PROBLEMS (WITHIN 1 MONTH)		
LEVEL OF IMPAIRMENT OF MENTAL ILLNES		
INTIMATE PARTNER CONFLICT		
INTERPERSONAL CONFLICT (NOT INTIMATE PARTNER)		
LEGAL/CRIMINAL PROBLEM		
FINANCIAL PROBLEM (INCLUDING GAMBLING)		
BEREAVEMENT		
PRE-EXISTING PHYSICAL ILLNESS		
OTHER		

INTERACTION WITH MENTAL HEALTH SERVICES:		
OUTPATIENT (MH SERVICES)		
INPATIENT (MH SERVICES)		
PREVIOUS SELF HARM:		
PREVIOUS SUICIDE ATTEMPTS		
PERIOD OF TIME SINCE LAST SUICIDE ATTEMPT		
SUICIDE ATTEMPT INVOLVING FIRE		
TOXICOLOGY:		
ALCOHOL TESTED		
BAC PERCENTAGE		
DRUG TESTED		
MOOD ALTERING PRESCIPTION DRUGS PRESENT		
MOOD ALTERING NON PRESCRIPTION DRUGS PRESENT		
BLOOD CO2 LEVEL		
SUICIDE EVENT DESCRIPTORS:		

WITNESSES (PRIOR TO IGNITION)		
OBSERVED BEHAVIOU BEFORE SELF INCINERATION		
LOCATION AT IGNITION		
LOCATION AFTER BURNING		
WITNESS INVOLVMENT		
SUICIDE NOTE (PRIOR TO IGNITION)		
LOCATION OF SUICIDE		
VERBAL INTENTION		
ACCELERANT USE		
CORONER ASSIGNS VERDICT OF SUICIDE		
CONTENT OF RECORD IMPLIES SUICIDE		
INTENTION TO TAKE ONES LIFE IMPLIED ON BASIS OF SUICIDE NOTE, PRIMA FACIE EVIDENCE OF INTENT, OR CIRCUMSTANCIAL EVIDENCE		

Appendix D: Mental illness classification for those completing suicide by self-immolation.

Mental illness classification for those completing suicide by self-immolation.

Definite mental illness (1)	Probable mental illness (2)	Possible mental illness (3)	No mental illness (4)
Essential features: A definite classification of mental illness must include a clinical diagnosis (according to DSM IV criteria) as stated by either a: f. Coroner g. General Practitioner h. Psychologist i. Psychiatrist j. Other equally qualified health care professional This information must be explicitly stated within the coronial documentation and may include information extracted from the medical history of the deceased.	*Essential features:* A probable diagnosis includes significant evidence to suggest that the deceased was most likely suffering from a mental illness (however not sufficient to meet the criteria of definite mental illness). A probable diagnosis must include either category A or B. Police, family or friends of the deceased can make these statements. c. Two or more explicit statements within the coronial case file that directly indicates the presence of a mental illness. d. One explicit statement within the coronial file that directly indicates the presence of a mental illness and the presence of either antidepressant, antipsychotic or anxiolytic medication as indicated in the toxicology report of the deceased.	*Essential features:* A possible diagnosis includes evidence to suggest that the deceased may have suffered from a MI, either diagnosed or undiagnosed. A possible diagnosis of MI must include either category A or B. c. One statement within the coronial case file that indicates the possibility of a MI. Police, family or friends of the deceased can make this statement. d. The presence of antidepressant, antipsychotic or anxiolytic medication in the toxicology report of the deceased.	There is no evidence of MI within the coronial case file.