

# Assessing the Impact of Suicide Exclusion Periods on Life Insurance

Short title: Impact of Suicide Exclusion Periods

**Abstract** We study the impact of suicide exclusion periods, which are common in life insurance, on the rates of suicide and of accidental death among life-insured individuals. The suicide exclusion period implies that if the life-insured individual were to die, where the cause of death is reported as suicide, during the exclusion period immediately after entering the policy of insurance, then the life insurance company would not be required to pay the sum insured to the deceased life's estate. Suicide exclusion periods are commonly thirteen months. Our first research hypothesis is that the imposition of a suicide exclusion period affects the timing of suicides of life-insured individuals. Our second research hypothesis relates to the rates of accidental deaths reported to insurers. Given that insurers will not pay sum insured benefits during the suicide exclusion period to individuals that die by suicide, it may be that there exists an increased desire to report deaths as accidental rather than as suicide during the suicide exclusion period. A third research hypothesis is that life-insured individuals with higher sums insured have higher rates of suicide than other life-insured individuals. Crude and age-standardized rates of suicide, accidental death and overall death, split by duration since the insured first bought their insurance policy, were computed. There were significantly fewer suicides and no significant spike in the number of accidental deaths in the exclusion period for Australian life insurance data. An increased number of suicides were detected for the first two years after the exclusion period. Also, life-insured individuals with higher sums insured have higher rates of suicide than other life-insured individuals. These provide evidence suggesting the existence of adverse selection as a result of the exclusion period adopted in the life insurance industry in Australia. We suggest that by extending the exclusion period to three years, we might prevent some “insurance induced” suicides. The rationale for preventing suicide deaths by lengthening the suicide exclusion period is given.

**Keywords:** suicide exclusion period, life insurance, age-standardized mortality rate, suicide rate, Australia

Suicide has become a major public health issue throughout the world. Over a million people kill themselves every year (World Health Organization, 2008; Yip, 2008). Aside from the emotional cost to the families and friends involved, the economic costs that can be attributed to suicide are also very significant (Clayton & Barcelo, 2000; Yip, Liu, Law & Law, 2005). There has been an increase in suicide rates among life-insured individuals which has raised concerns in the insurance industry recently (Kennelly, 2007). In this paper we examine suicide deaths among insured lives to explore the relationship between suicidal risk and being insured.

When a life insurance policy is purchased, a certain suicide exclusion period applies (a twelve-month period in Taiwan, Hong Kong and the United Kingdom; a thirteen-month period in Australia, a twenty-four-month period in the United States of America). What this means is that if the life-insured individual were to die, where the cause of death is reported as suicide, during the exclusion period immediately after entering the policy of insurance, then the life insurance company would not be required to pay the sum insured to the deceased life's estate. In setting a suicide exclusion period, life insurers are attempting to strike a balance between the desire to provide complete coverage relating to death from all causes (which naturally should include suicide) and the need to avoid paying sums insured to people that intentionally insure their lives with the intention of dying by suicide soon after (Kennelly, 2007; Chen, Choi & Sawada, 2008). It would seem reasonable to hypothesize that the suicide exclusion period may affect the timing of suicide for life-insured individuals especially in the periods during and soon after the exclusion period. This will be the first hypothesis that we examine in this paper. In assessing this research hypothesis we are making an implicit assumption that despite the considerable emotional stress facing individuals who are contemplating suicide, some of them may still be able to delay their suicide until after the expiry of the suicide exclusion period.

Our second research hypothesis concerns the potential interrelationship between deaths reported to an insurer where the cause of death is cited as an accident, where the cause of death is suicide and the suicide exclusion period incorporated into the

life-insured individual's contract. Anecdotal evidence suggests that some people who die by suicide during the suicide exclusion period may do so in such a way that their death can be attributed to an accident (Tseng, 2004). This would mean that the life-insured individual's family becomes eligible to receive a payment from the life insurer. If accidents are truly random, as one would expect, then the inclusion of suicides during the suicide exclusion period, classified as accidents, will cause an inflated accidental death rate to be reported to the insurer for lives during their period of suicide exclusion.

Our third and final research hypothesis relates to the observed rate of suicide and the amount of money for which life-insured individuals are insured. One might hypothesize that higher levels of insurance coverage, that is higher sums insured, might be associated with higher rates of death by suicide.

## **Data and Methods**

This paper investigates three hypotheses relating to suicide, using a very detailed Australian life insurance dataset made available by the Institute of Actuaries of Australia (IAAust), the professional body for actuaries in Australia. The IAAust collected data on the mortality rates of individuals who have taken out either an insurance product or an annuity product with an Australian, New Zealand, Fiji or Papua New Guinea based life insurer during the period from 1992 to 1999. An annuity product is an agreement between a customer and an organization that provides financial services. At the outset of the agreement under an annuity product, the customer pays a sum of money (often the proceeds from a superannuation savings account) to the financial services provider. In return for this payment by the customer, the financial services provider pays a regular payment to the customer for the remaining lifetime of the customer. Mortality rates are important when assessing the financial implications of selling annuity products. The IAAust data includes submissions from all the major life insurers operating in Australia during the period 1992 to 1999. Some smaller insurers elected not to participate in the survey and are therefore not included in the data analysed here. We certainly have sufficient data, in terms of years of insurance coverage and number of life-insured individuals covered in order to be able to conduct useful analysis. The period of data, from 1992-1999 was

chosen because during this period, the IAAust did not make any material changes to their data collection methodology. As a result we are able to analyse the data from these eight years without the complexity and potential bias that could arise from using data collected in different ways after 1999. The data only include life-insured individuals from Australia, New Zealand, Fiji and Papua New Guinea. No other data, from other countries, were included in the analysis. The data identify all life-insured individuals during this period in addition to all related deaths during this period. For each death, we are able to classify it as being the result of suicide, accident or some other cause. We are also able to classify the deaths by age, gender and the amount of life insurance purchased by the life-insured individual. The suicide exclusion period is 13 months for all life insurances policies sold in Australia and in the other countries to which our data relate.

It is worth noting that life insurance products are increasingly being sold as part of a superannuation arrangement or through group insurance arranged by employers. The data included in our analysis include mortality rates relating to life-insured individuals that have purchased insurance either through their employer or as part of their superannuation.

The crude suicide rates, split by gender and by policy duration (time since the policy was bought by the life-insured individual) are used to assess the impact of the exclusion period on suicidal risk. The crude suicide rate is calculated as the observed number of suicides divided by the total number of years that life-insured individuals are observed for during the study.

Since information on the insured amount is also available in our data and different lives insure for different amounts, it is of interest to calculate the crude suicide rates and the crude overall death rates as the number of deaths divided by the amount insured. To clarify, if a person is insured for 6 months, with a total insured amount of \$100,000, then the contribution to the amount insured exposure is \$50,000. We sum this across all life-insured individuals to determine the denominator of our revised crude suicide and crude death rates to assess the impact of the insured amount on the suicidal risk. We aim to assess whether the insured amount for suicidal deaths is higher than that for other causes of death.

We consider the effect of age on death rates and on suicide rates. While the exponential increase in the hazard rate for natural deaths with age is well-documented (Magnus, 2008), the impact of age on suicide rates is less well-known. Australian Bureau of Statistics (ABS, 2006) data indicate that there is a general decrease in the rate of suicide beyond age 40 with peaks in suicide rates around age 30 for males and around age 35 for females (Cantor, Neulinger & Deleo, 1999).

In order to adjust for this potential age-related distortion of lives insured in each policy duration category, we produce age-standardized suicide rates and age-standardized overall natural death rates. The age standardization works by assuming that the data that we have in each of the policy duration bands is distributed according to the age distribution of the Australian 2001 population. This means that even if there are differences in the age structures between the various policy duration classes, they will not impact the age-standardized crude mortality rates. “Natural deaths” refers to deaths excluding suicides and accidental deaths.

## **Results**

There were in total 671,295 insured individuals (female: 209,080 and male: 462,215) for the first five policy duration years, of which there were 1,651 natural deaths (female: 554 and male: 1097), 82 suicides (female: 12 and male: 70) and 216 accidental deaths (female: 44 and male: 172). Table 1 gives the numbers of suicides/accidental deaths/natural deaths split by gender and policy duration, respectively. The suicide rates for females and males are 1.3 and 2.8 per 100,000 person years, respectively.

We investigate the first hypothesis that insurance companies have lower reported rates of suicide during the period of suicide exclusion. Table 2 gives the ratios of the crude rates in person years for different insured periods, in months, [0, 13], (13, 36] and (36, 60]. We chose policy duration of 60 months as the maximum for our study. Note here that [0,13] means all months from 0 to 13 inclusive. Also, (13,36] includes months after 13 up to and including 36. This agrees with the common usage of 5-year select

periods in life insurance, whereby it is commonly assumed that the impact of decisions made and medical examinations conducted, prior to the purchase of insurance on mortality rates will have worn off (CMI1, 1973). The ratio of the crude rates between [0, 13] and (13, 36) was 0.38 (95% CI 0.18-0.82) which suggested a significantly smaller suicide rate in the exclusion period than in the two years following this period. We note here that the estimates in Table 2 are based on a relatively small number of deaths. It is for this reason that we have included 95% confidence intervals which provide a band within which we are confident that the underlying ratios lie. Importantly, our ratio of suicide rates in the [0, 13] period band is entirely less than 1 which is indicative of lower suicide rates occurring during the suicide exclusion period.

Figures 1a, 1b and 1c show the crude rates (per 100,000 person years) of suicide, accidental deaths and natural deaths split by gender and by policy duration. As in Table 1, the number of deaths by gender and policy duration, particularly deaths due to suicide are small. However, they are sufficient, as they were in Table 1, to produce the statistically significant conclusions outlined here. Figure 1a shows a sharp increase in suicide rate as we move from 0-13 months' policy duration to between 13 and 60 months' policy duration whereas the effect is less significant among the accidental and natural deaths. For the suicide deaths, the crude rate does reduce significantly after 36 months but remains above the level witnessed during the suicide exclusion period. The well known phenomenon of higher rates of male suicide than female suicide is also evident across all policy durations (Mann, Apter, Bertolote, et al, 2005). On the other hand, the crude rates for accidental deaths and natural deaths increased with the length of insured period. This is to be expected due to the ageing of the insured population as we move to longer policy durations and due to the wearing off of positive insurance underwriting related effects (CMI1, 1973).

In order to eliminate the ageing effect among the insured individuals in different insured periods, Figures 2a, 2b and 2c give the age-standardized rates for suicide, accidental and natural deaths. The "protective effect" for suicide of the exclusion period is even more significant here. The age-standardized rates have increased significantly after the exclusion period from 1.7 to 4.7 and 7.1 for the two periods (13, 24] and (24, 36], respectively. Furthermore, the age-standardized rates have reduced

to 3.2 and 1.9 for the two periods (36, 48] and (48, 60] respectively. For standardized accidental and natural deaths shown in Figures 2b and 2c, they exhibit a monotonic increasing trend as the insured period increases.

We now turn to our second research hypothesis, namely is there evidence of an increased accidental death rate during the suicide exclusion period as a result of life-insured individuals disguising their suicidal death during this period as an accident? Crude and standardized rates of accidental death, per 100,000 person years of exposure split by gender and by policy duration given in Figures 1b and 2b do not appear to provide evidence of an increased accidental death rate during the suicide exclusion period. This differs to the conclusions from a similar study on the life insurance policy in the United States where there was strong evidence of an increase accidental death rate during the two-year suicide exclusion period offered to insured lives in the US (Tseng, 2004).

For the third hypothesis, if suicide deaths among life-insured individuals are somehow financially driven, we would expect the sums insured for deaths by suicide to be higher than those for other deaths. Evidence that suicides can be financially driven is provided in Joiner (Joiner, 2005). He reports on the average sums insured for suicide deaths and natural deaths for Metropolitan Life (the largest life insurer in the United States) and finds that the suicide death sums insured are generally higher and by as much as 60% in some years. Hence it is of interest to compare the ratios of the person-years crude death rate and the by-insured-amount death rate for the suicide and natural deaths. The estimated ratio for the suicide deaths and natural deaths were 1.84 and 0.99, respectively. The ratio of the suicide and natural death ratios was 1.76 (95% confidence interval being 1.41-2.19) which suggested that the insured amounts for suicide deaths were significantly higher than that for natural deaths.

## **Discussion**

We first comment that the suicide rates observed for life-insured individuals are lower than that of the Australian general population. The life-insured individuals have observed suicide rates of 1.3 and 2.8 per 100,000 person years for females and males

respectively. For the general population, the corresponding suicide rates are 5.0 and 22.0 per 100,000 for females and males, respectively (ABS, 2006). Tickle (2004) discussed the issue of mortality differences among insured lives and confirms the commonly held view that insured lives have lower rates of mortality than the general population. Her analysis, interestingly, reports on the extent of the difference in insured and general population mortality rates by cause of death.

Despite a relatively lower rate of suicide among the insured population, this paper has established the evidence of the impact of a thirteen-month suicide exclusion period on suicide and accident related deaths using Australian life insurance policy data. It seems that suicide behavior is modified by the inclusion of a suicide exclusion period, with strong support of the theory that exclusion periods do prevent some of the “insurance induced” suicides. We are not making the claim that all suicide deaths after the exclusion period must have been “insurance induced”; however, the results do suggest that there are significantly fewer suicides in the exclusion period and an excessive number of suicide deaths shortly after the exclusion period. Apparently, some of the insured individuals delay their suicide act until after the suicide exclusion period. Also, the ratio of the crude death rate using the sum insured to the person years is significantly greater than one. This further suggests that insurance cover has some linkage with suicide risk and the insured amount for those individuals is statistically significantly higher than those died of other causes. Nevertheless, the study found no real evidence of an increase in the reported rate of deaths by accident during the period of suicide exclusion. This implies that there is not sufficient evidence in the Australian data that some people who die by suicide during the suicide exclusion period may do so in such a way that their death can be attributed to an accident as in the United States (Tseng, 2004).

The strength of the paper is that it is based on the individual record data rather than aggregated population data used in previous studies (Chen, Choi & Sawada, 2008; Tseng, 2004). It allows us to examine the effect of the exclusion period on the risk of suicide using individuals' characteristics. The study suggests strongly the presence of adverse selection and moral hazard in the life insurance market. Moral hazard is a term commonly used in insurance circles and refers to the lack of incentive to guard against a risk when you are protected against it. Adverse selection refers to the

likelihood of people purchasing insurance who are more likely than the average to profit from the benefits provided from the insurance. In the case of life insurance, we are referring to individuals that may have a greater likelihood of death by suicide purchasing life insurance than individuals who do not purchase life insurance. There is evidence of this by comparing the higher rates of suicide in the period immediately after the suicide exclusion period to those observed in the general population. Such adverse selection is a real issue for life insurers because it is the means by which they attract business that is not profitable to them.

Suicide deaths not only cause loss of productivity in the community but also certainly increase the insurance premium for each insurance policy holder since the suicide death benefit needs to be taken into account in premium calculations. If suicide deaths could be removed or reduced, the life expectancy for the whole population would be longer and life insurance premiums would reduce. More importantly, it is the wastage of human lives and emotional pain caused to the survivors which are our primary concern. Certainly, insurance companies would be able to save money too,

Our study provides evidence that lengthening the exclusion period (to say 36 months) may indeed help to reduce the number of insured deaths. Some can argue that such a policy would unfairly penalize the families left behind by those who died in the first thirty six months after taking out their policy. Life insurance cover is meant to provide protection to family members after the death of the life-insured individual. Most of the time, the best cover for the livelihood of family members is for the insured to stay alive and healthy. However, for some vulnerable members in the community, the insurance cover might work in the opposite way and become an incentive for them to consider death by suicide. We are not advocating to completely remove insurance cover for suicide deaths but rather to set up sufficient barriers to remove the incentive especially in the first few years of the contract. The rationale is that we are buying time and widening the window of possible interventions. The “incentive effect” for receiving the death benefits from death due to suicides among insured should be discouraged.

Furthermore, there is also a moral responsibility of the life insurance agents who are aware of the suicide risk of their clients to enter a contract without providing any help

and support to them to reduce the risk. On the other hand, they could be an effective gatekeeper to prevent the tragic deaths by helping those who are suicidal. By keeping their clients alive and well, it would be a WIN-WIN situation for all sides.

In view of this, more educational and training effort is needed to raise the awareness of suicide risk for the insurance agents. Identifying suicidal risk clients and getting them to receive support and promoting mental well-being among their clients should be encouraged. Ironically, the implementation of lengthening the suicide exclusion period should not cause any inconvenience to anyone except those who are considering death by suicide in order to receive the benefit. It is exactly this group of clients we like to discourage. As the proportion of insurance cover in the community in developed and developing countries is ever increasing, even though there are only a small but not insignificant proportion of suicides among the insured population, this does have the potential to lead to an increased rate of suicide. Certainly, suicide is a very complex phenomenon that requires multi-layered interventions (Mann, Apter, Bertolote, et al, 2005). Providing life education, offering and improving services for people who suffer from clinical depression, and aiding individuals and families in times of turmoil or distress are all important steps that must be taken. Nevertheless, removing the incentive effect of the insurance cover is one method which certainly worth trying.

There are some limitations of our work. First, more detailed psycho-socio individual data of the suicide deaths were not available and there is no detailed information on accidental deaths either. The applicability of the results to other countries might require further study. Moreover, we need to understand better the mechanism of how suicide decisions are made by the life-insured individuals and the information would be ideally provided by the insurance agents and/or survivors who have attempted suicide who hold life insurance policies.

#### Acknowledgements:

The authors like to thank the two reviewers for providing very constructive reviews for the paper. The work is support by the Dyson Fellowship of the University of Melbourne (for Yip) and we are grateful for data provided by the Institute of Actuaries of Australia.

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Table 1: Numbers of suicides/accidental deaths/natural deaths split by gender and policy durations (in months).

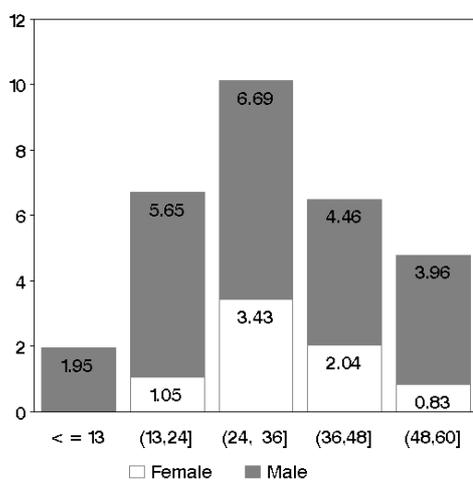
|          | Male    |          |         | Female  |          |         |
|----------|---------|----------|---------|---------|----------|---------|
|          | suicide | accident | natural | suicide | accident | natural |
| <=13     | 9       | 32       | 167     | 0       | 9        | 89      |
| (13, 24] | 19      | 36       | 200     | 2       | 7        | 106     |
| (24, 36] | 21      | 38       | 232     | 6       | 10       | 110     |
| (36, 48] | 12      | 33       | 241     | 3       | 10       | 127     |
| (48, 60] | 9       | 33       | 257     | 1       | 8        | 122     |

Table 2: Ratios of crude suicide rates in person years (95 % C.I. in parentheses)

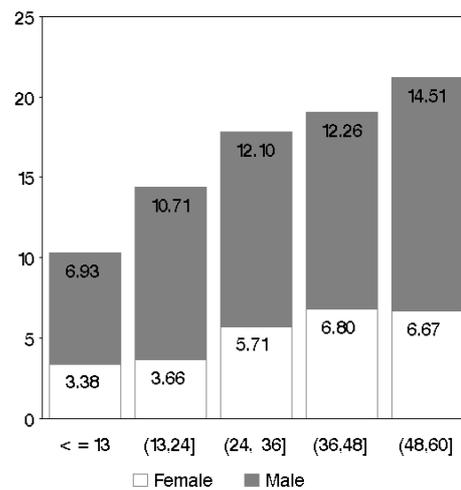
|        | Ratio of Suicide Rate in<br>0-13 Months to suicide<br>rate in 36-60 months | Ratio of suicide rate in<br>13-36 months to suicide<br>rate in 36-60 months |
|--------|--|---|
| Male   | 0.46 (0.21-1.01)   | 1.47 (0.86-2.49)  |
| Female | #  | 1.56 (0.47-5.19)  |
| All    | 0.38 (0.18-0.82)   | 1.47 (0.90-2.38)  |

Note: #--There was no female suicides during the period [0, 13].

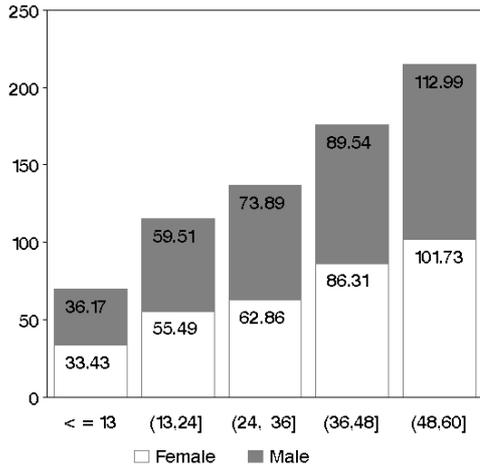
Figure 1: Crude death rates per 100,000 person years. (a): suicide; (b): accidental death; (c): natural death.



(a)

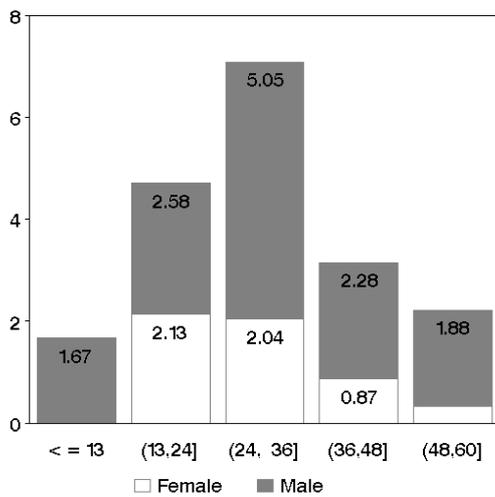


(b)

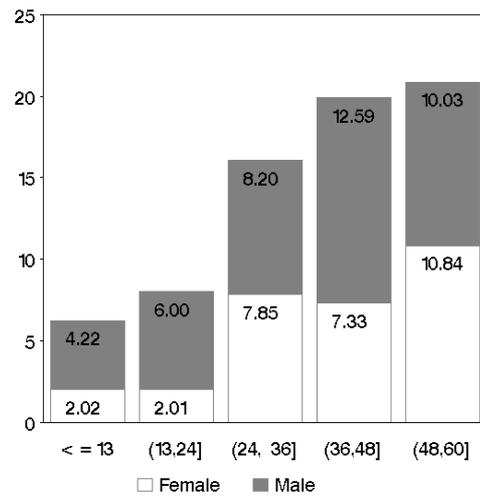


(c)

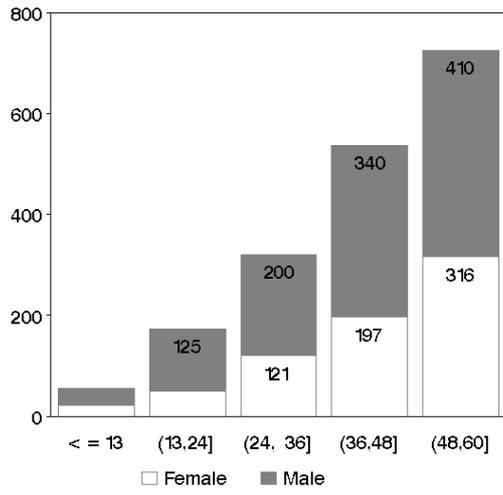
Figure 2: Age-standardized death rates per 100,000 person years. (a): suicide; (b): accidental death; (c): natural death.



(a)



(b)



(c)