

The economic impacts of stillbirth in Australia

*Stillbirth Foundation
Australia*

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Foreword

Stillbirth Foundation Australia engaged PwC to conduct an economic impact study to identify and estimate the costs associated with stillbirth.

We know that it is not possible to put a simple dollar number on the loss of an infant through stillbirth as it has devastating impacts on families. It has a profound emotional impact on those directly affected and the community more generally. Unfortunately, the causes of stillbirth are poorly understood. This complicates the development of effective strategies to reduce the risk and effects of stillbirth.

While stillbirth leads to significant economic and societal costs, the economic and social impacts of stillbirth are poorly documented in Australia.

We conducted this study to shed light on this issue and to contribute to the conversation on the nature and scale of impacts associated with stillbirth.

To do this we consulted with a steering committee consisting of subject matter experts, and we are thankful for their contribution. In particular, we would like to recognise that the expertise, feedback and support of the following individuals led to a higher level of quality for the analysis:

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Executive summary

Stillbirth is the death of a baby before or during birth, during the 20th week of pregnancy onwards, or 400 grams birthweight.¹ It is a traumatic event that has considerable impacts on those affected. The risk factors associated with stillbirth include, but are not limited to:²

- obesity
- advancing maternal age
- smoking
- first pregnancy
- diabetes and hypertension.

A large proportion of stillbirths are unexplained. In 2012, the number of unexplained antepartum deaths was 20.4%.³ This lack of clarity complicates the implementation of effective interventions to reduce the rate and effects of stillbirth.

In Australia, approximately one in every 135 babies born is a stillbirth, making it the most common form of child mortality in the country. The rate of stillbirth has largely remained unchanged between 7.1 – 7.4 per 1000 births over the 1991-2012 period (based on the Australian definition ‘a fetal death prior to the complete expulsion or extraction from its mother of a product of conception of 20 or more completed weeks of gestation or 400g or more birthweight’).⁴

Stillbirth rates are higher among women who:

- identify as Indigenous or Torres Strait Islander (10.8 per 1000 births in 2012) compared to non-Indigenous Australians (7.1 per 1000 births in 2012)
- are aged 20 or below
- first time mothers compared to women who have had a previous pregnancy
- high order multiples compared to twins and singleton babies.

For international comparisons, the World Health Organisation (WHO) recommended definition of stillbirth is ‘a baby born with no signs of life at or after 28 weeks of gestation or 1000g birthweight’.⁵ Based on this definition the stillbirth rate in Australia for 2015 was 2.7 per 1000 births. This rate is comparable to other developed countries such as USA (3.0 per 1000 births), UK (2.9 per 1000 births), Canada (3.1 per 1000 births), and New Zealand (2.3 per 1000 births).

1 Sidsandkids (2016). Australia and New Zealand Factsheet. Available at: http://www.sidsandkids.org/wp-content/uploads/Lancet_launch_ANZSA_Factsheet.pdf

2 Australian Institute of Health and Welfare (AIHW) (2014). Stillbirths in Australia 1991-2009. Perinatal Statistics Series No. 29

3 Ibid

4 Ibid

5 The Lancet (2016). Stillbirths: Recall to Action in High Income Countries. Available at: [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(15\)01020-X/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)01020-X/abstract)

There are significant costs associated with stillbirth. These include:

- direct costs such as stillbirth investigations, hospital costs, and counselling
- indirect costs such as funeral costs, absenteeism, presenteeism, government subsidies, divorce, and costs to the family, and
- intangible costs such as the impacts on mental well-being and relationships, and flow-on effects on family and friends.

However, these costs and the associated economic and social impact of stillbirth in Australia are poorly documented, resulting in an under-estimation of the impact of stillbirth.

The key objective of this study is to better understand the economic and societal burden of stillbirth. We estimated the economic impact of stillbirth by quantifying the direct and indirect costs and describing the intangible costs of stillbirth.

To achieve this objective this study conducted,

- a literature scan to inform and identify the direct and indirect cost metrics and assumptions for the analysis
- conducted an online survey on the economic impact of stillbirth in Australia. The survey was conducted to obtain information on the intangible costs of stillbirth, including impact on mental well-being, relationships and extended family and friends. The survey also included questions to support quantification of direct and indirect costs
- prioritised metrics and conducted economic modelling to estimate the cost of stillbirth and developed the narrative on the intangible costs of stillbirth.

If the current stillbirth rate of 7.4 per 1000 births remains unchanged and assuming an increase in the Australian population and the number of births between 2016-2020, the number of stillbirths will increase from approximately 2500 stillbirths in 2016 to 2700 stillbirths in 2020.

Table 1 presents the estimated direct and indirect costs of stillbirth for a five-year period from 2016-2020 across 13 identified cost categories. The total additional costs for these areas in Australia for the five-year period were estimated to be \$681.4 million, in 2016 present value terms. These costs are the additional costs of stillbirth (i.e. compared to no stillbirths).

Additionally to the costs identified in Table 1, the health and well-being cost of the stillborn child was also assessed and is estimated to be \$7.5 billion in 2016, in 2016 present value terms. This cost is not included in the main economic model due to the difficulty in quantifying health and well-being costs. However, it is important to note that these costs have serious impacts on people and society. Their absence from our modelling does not imply that we consider them to be less important than the readily quantifiable direct and indirect costs that have been included.

Five components of intangible costs were analysed to develop the qualitative narrative. These include impact on mental well-being, relationship with partner, relationship with others (family and extended family), other children, and the effect of financial loss.

It was found that stillbirth had a profound impact on parents. Many suffer from grief and anxiety, the effects often lasting long periods of time. Experiencing a stillbirth caused stress and anxiety in subsequent pregnancies and some parents received counselling to deal with this increased level of stress. Stillbirth put considerable strain on marital or partner relationships. Different grieving patterns between men and women, blame, anger and resentment were often cited. Some couples separated after the experience.

Stillbirth has flow-on effects on others including other children and extended family and friends. Other children experienced fear and anxiety and had difficulty separating from the mother. Parents reported bonding issues with children born after stillbirth. Relationships with extended family and friends were often strained due to a perceived lack of understanding and empathy towards stillbirth and parental grief.

Table 1: Cost of stillbirth for the five-year period 2016-2020, in 2016 present value terms

Cost category	Value (\$ millions)
Direct costs	
<i>Costs associated at the time of stillbirth</i>	
Cost of stillbirth investigations	33.3
Hospital fees	74.5
Cost of counselling	53.2
Cost of investigations 8-12 weeks postpartum	0.6
<i>Cost of a subsequent pregnancy</i>	
Cost of tests	5.6
Cost of counselling	4.9
Sub-total direct costs	172.1
Indirect costs	
Funeral costs	67.1
Absenteeism	129.4
Presenteeism	149.0
Lost productivity from exiting the labour force	70.6
Cost of divorce	37.4
Government subsidy	36.1
Absenteeism (family)	19.7
Sub-total indirect costs	509.3
Total cost	681.4

Many parents felt that the topic of stillbirth is a social taboo and experienced social isolation and loneliness as a result. Many felt the need to raise awareness on the topic and improve access to healthcare services after stillbirth to deal with bereavement.

The findings from this study indicate that there are potential benefits to be reaped from mitigating the negative effects of stillbirth. For example, stillbirth has a substantial effect on mental health. The combined economic cost of absenteeism and presenteeism is estimated to be \$278.4 million for 2016-2020, in 2016 present value terms. Improving access to child bereavement counselling, targeted interventions to reduce the impact on mental health, and raising awareness of the topic to minimise the social stigma attached to stillbirth could potentially result in a positive impact on people who have experienced stillbirth.

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Glossary

<i>Antepartum</i>	Occurring not long before childbirth
<i>Parity</i>	Number of pregnancies a woman has had that ended with a birth prior to the current pregnancy
<i>Primipara</i>	First time mothers
<i>Multipara</i>	Mothers who had at least one prior birth
<i>Gestational age</i>	The age of a pregnancy or how far along the pregnancy is

1 *Background*

One in every 135 babies born in Australia is a stillbirth, making stillbirth the most common form of child mortality in the country. However, compared to other forms of pregnancy complications, the impact of stillbirth is poorly understood in Australia and creates a gap in the discussion on effective strategies that may potentially reduce the rate and effects of stillbirth. This study provides an economic assessment of the impacts associated with stillbirth in Australia.

1.1 Definition of stillbirth

The definition of stillbirth varies internationally and different weight and gestational age cut-offs apply. For the purpose of international comparisons, the World Health Organisation's (WHO) recommended definition of stillbirth is a baby born with no signs of life at or after 28 weeks of gestation or 1000g birthweight.⁶

In Australia, a stillbirth is defined as 'a fetal death prior to the complete expulsion or extraction from its mother of a product of conception of 20 or more completed weeks of gestation or 400g or more birthweight'.⁷

The definition applied can have an impact on reported stillbirth rates. This study uses the Australian definition of stillbirth.

1.2 Risk factors and causes of stillbirth

The identified risk factors of stillbirth include obesity, advancing maternal age, smoking, pre-existing maternal disease such as diabetes and hypertension, and primiparity.⁸ Potentially modifiable risk factors such as obesity and smoking could result in a lower stillbirth rate in Australia.

The causes of stillbirth are poorly understood. A large proportion of stillbirths in Australia are unexplained. The Perinatal Society of Australia and New Zealand (PSANZ) has created a classification system to reduce variations in reporting perinatal deaths. According to this classification, 20.4 per cent of stillbirths in 2012 were unexplained antepartum deaths.⁹

This lack of clarity complicates the implementation of effective interventions to reduce the rate and effects of stillbirth in Australia. Table 2 presents the reported causes of stillbirth for Australia in 2012.

Furthermore, the autopsy rates for unexplained stillbirth is low. Between 2004 and 2008 the number of unexplained antepartum deaths were 1949 but the corresponding proportion of autopsies was less than half for this category (47 per cent).¹⁰

⁶ The Lancet (2016). Stillbirths: Recall to Action in High Income Countries. Available at: [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(15\)01020-X/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)01020-X/abstract)

⁷ Australian Institute of Health and Welfare (AIHW) (2014). Stillbirths in Australia 1991-2009. Perinatal Statistics Series No. 29.

⁸ Ibid

⁹ Australian Institute of Health and Welfare (AIHW) (2012). Australia's Mothers and Babies 2012. Perinatal Statistics Series No. 30

¹⁰ Australian Institute of Health and Welfare (AIHW) (2014). Stillbirths in Australia 1991-2009. Perinatal Statistics Series No. 29

Table 2: Stillbirths by PSANZ Perinatal Death Classification, 2012

Cause of death	Number	Proportion
Congenital abnormality	440	27.1
Hypertension	60	3.7
Antepartum haemorrhage	89	5.5
Maternal conditions	170	10.5
Specific perinatal conditions	128	7.9
Hypoxic peripartum death	20	1.2
Fetal growth restriction	109	6.7
Spontaneous pre-term	190	11.7
Unexplained antepartum death	332	20.4
Other categories ^(a)	40	2.4
Not stated	48	3.0
Total	1,626	100

Source: Australian Institute of Health and Welfare (AIHW) (2012). Australia's Mothers and Babies 2012. Perinatal Statistics Series No. 30.
^(a)Other categories combines 'perinatal infection' and 'obstetric antecedent'

Note: Includes Vic, Qld, WA, SA, Tas and ACT.

1.3 Stillbirths by selected characteristics

Table 3 presents stillbirth rates by selected demographic characteristics and pregnancy and risk factors for 2012 in Australia.

The highest rate of stillbirth occurred in the lowest gestational age and birthweight. The number of stillbirths occurred more frequently among mothers aged less than 20 years and 40 or over. The rate of stillbirth ranged from 6.4 per 1,000 births – 7.6 per 1,000 births among mothers aged 20-24 and 35-39. Women identifying as Aboriginal or Torres Strait Islander had a higher rate of stillbirth (10.8 per 1000 births) compared to non-indigenous women (7.1 per 1000 births).

The stillbirth rate was higher among first time mothers (primipara) (7.3 per 1000 births), compared to mothers who had at least one prior birth (6.5 per 1,000 births). The stillbirth rate for twins and higher order multiples was higher (22.2 per 1000 births and 78.5 per 1000 births) compared to singleton babies (6.7 per 1000 births).

Table 3: Stillbirth rates by selected characteristics, 2012

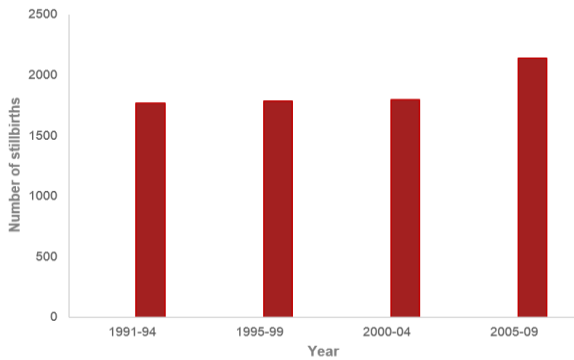
Characteristic	Stillbirth rate per 1,000 births
Gestational age (weeks)	
20-27	514.0
28-31	84.5
32-36	14.2
37-41	1.4
42 and over	2.6
Maternal age	
Younger than 20	12.6
20-24	7.6
25-29	6.4
30-34	6.6
35-39	7.1
40 and over	11.7
Birthweight (grams)	
Less than 1,500	329.2
1,500-2,499	16.5
2,500-2,999	3.0
3,000-3,999	1.1
4,000 and over	0.8
Maternal Indigenous status	
Aboriginal and Torres Strait Islander	10.8
Non-Indigenous	7.1
Parity	
Primipara	7.3
Multipara	6.5
Plurality	
Singletons	6.7
Twins	22.2
Higher order multiples	78.5

Source: Australian Institute of Health and Welfare (AIHW) (2012). Australia's Mothers and Babies 2012. Perinatal Statistics Series No. 30

1.4 Trends in stillbirth

Figure 1 shows the average annual number of stillbirths for each aggregated year group from 1991-2009. The average annual number of stillbirths has been on an increasing trend, partly reflecting the 16.3 percent increase in births in Australia.¹¹

Figure 1: Average annual number of stillbirths, 1991-2009

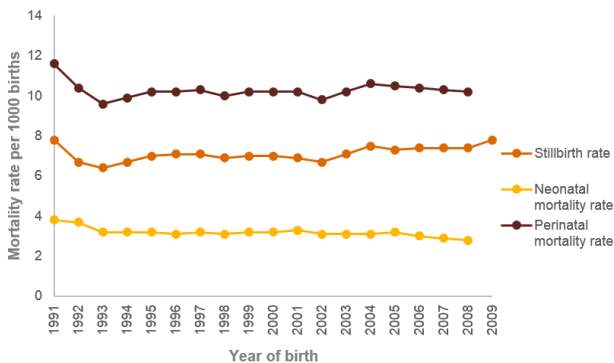


Source: Australian Institute of Health and Welfare (2014). Stillbirths in Australia 1991-2009. Perinatal Statistics Series No. 29

Figure 2 presents the rate of stillbirths in relation to perinatal mortality from 1991-2009. Perinatal deaths are the combination of stillbirths and neonatal deaths; perinatal mortality rate is defined as the number of perinatal deaths per 1000 births.

The perinatal mortality rate levelled in the 1990s and only increased after 2001. During this period there has been a small increase in the rate of stillbirth while neonatal and perinatal mortality rates have seen a small decrease. The average annual neonatal mortality rate declined by 0.04 per 1000 live births and the average annual rate of stillbirth increased by 0.03 per 1000 births.

Figure 2: Trends in stillbirth, neonatal and perinatal mortality rates, 1991-2009



Source: Australian Institute of Health and Welfare (2014). Stillbirths in Australia 1991-2009. Perinatal Statistics Series No. 29

Notes:

- (1) Stillbirth and perinatal mortality are presented per 1000 total births and neonatal mortality is presented per 1000 live births
- (2) Perinatal and neonatal mortality rates were not available for Australia in 2009 as Victoria did not provide data on neonatal deaths

¹¹ Ibid

1.5 International comparisons

The WHO recommended definition of stillbirth for international comparisons includes a baby born with no signs of life at or after 28 weeks of gestation or 1000g birthweight. Using this definition, The Lancet reports the rate of stillbirth for 49 high income countries.¹²

Based on this report, the rate of stillbirth in 2015 was 2.7 per 1000 births in Australia. Australia's rate of stillbirth is either similar or marginally lower compared to other high income countries. For example, the stillbirth rate was 3.0 per 1000 births in USA; 2.9 per 1000 births in UK. 3.1 per 1000 births in Canada. It is marginally higher than the 2.3 per 1000 births rate in New Zealand.

1.6 Estimating the rate of stillbirth

The rate of stillbirth in Australia ranged from 6.4-7.8 per 1000 births for the period 1991-2009, with no discernible trend.¹³ The median stillbirth rate for this period, therefore, is 7.1 per 1000 births. The median stillbirth rate for the period 2008-2012 was 7.4 per 1000 births.¹⁴ This rate is higher than the rate reported by WHO (2.7 per 1000 births in 2015) because of the restricted definition of stillbirth used by WHO for international comparisons.

Assuming a stillbirth rate of 7.4 per 1000 births, and an increase in the Australian population and the number of births from 2016-2020, an increase in the number of stillbirths is expected over this period. Table 4 shows the estimated number of stillbirths from 2016-2020 – a total of 2,500 stillbirths are expected to occur in 2016 and over 13,000 stillbirths in the five years between 2016 and 2020.

Table 4: Estimated number of stillbirths from 2016-2020

	2016	2017	2018	2019	2020
Projected growth in the Australian population ¹⁵	24,002,458	24,455,145	24,917,746	25,387,067	25,862,832
Projected growth in number of births ¹⁶	336,913	344,534	351,987	359,152	365,978
Estimated number of stillbirths	2,513	2,569	2,625	2,678	2,729

Note: Estimated number of stillbirths is calculated assuming a stillbirth rate of 7.4 per 1,000 births. The rate of 7.4 is assumed to be constant over the period 2016-2021

¹² The Lancet (2016). Ending Preventable Stillbirths 4. Recall to action in high income countries. Available at: [http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(15\)01020-X.pdf](http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(15)01020-X.pdf)

¹³ Australian Institute of Health and Welfare (AIHW) (2014). Stillbirths in Australia 1991-2009. Perinatal Statistics Series No. 29

¹⁴ SIDS and Kids (2015). Annual report. Available at: http://www.sidsandkids.org/wp-content/uploads/SIDS07_2015-Annual-Reportweb.pdf

¹⁵ Australian Bureau of Statistics (ABS). (2013). Population Projections Australia, 2012 (base) to 2101. "Table 1 Projected Population, Components of change and summary statistics, Australia(a)". Time series spreadsheet, cat. No. 3222.0, available at: [http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/2A3AF8EC0D8AF32CCA257C2E00172062/\\$File/3222ods10_summary_statistics_2012\(base\)-2101.xls](http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/2A3AF8EC0D8AF32CCA257C2E00172062/$File/3222ods10_summary_statistics_2012(base)-2101.xls)

¹⁶ Ibid

2 *Project approach*

The Stillbirth Foundation Australia contracted PwC to conduct a study on the economic impact of stillbirth. This included identification of the costs of stillbirth, and potential interventions based on consultation and literature.

PwC developed an economic model to estimate the cost of stillbirth in Australia. It presents estimates of the costs of stillbirth, incorporating direct, indirect and intangible costs. The study also estimates the health and well-being costs of the stillborn child.

A project steering committee consisting of three members from the Stillbirth Foundation Australia was established to provide expertise advice.

The project involved four steps:

- The first step was a literature scan to inform the cost metrics and assumptions incorporated into the estimation of the cost of stillbirth. The literature scan focused on the following broad categories: definition of stillbirth, hospital costs, stillbirth investigations, government costs, productivity losses, impact on family, and intangible costs.
- The second step involved conducting an online survey on the economic impact of stillbirth in Australia (see box 1). A set of questions were included to obtain information on the intangible costs of stillbirth. Another set of questions on the direct and indirect costs of stillbirth were included to support quantification of costs. Development of the survey was informed by the literature scan and consultation with the steering committee.
- The third step involved prioritisation of metrics to estimate the cost of stillbirth in Australia. The metrics were selected based on their perceived importance and their ability to be measured. Prioritisation was based on the literature scan, PwC experience and in consultation with the steering committee members.
- The last step of the project was modelling the cost of stillbirth and developing the narrative on the intangible costs of stillbirth in Australia. This involved collecting relevant data on the direct, indirect and intangible costs and drawing on the literature to develop assumptions for input into the economic model. The model assumptions were tested with the steering committee members. Not all of the costs associated with stillbirth have been included in this study. This was mainly due to a lack of evidence to estimate those costs.

Box 1: The economic impact of stillbirth survey

The 'economic impact of stillbirth' survey was conducted by PwC in 2016 as part of the economic impact of stillbirth study. A set of questions were included to obtain information on the intangible costs of stillbirth. This includes questions regarding the effect of stillbirth on mental well-being, relationships with a partner, relationship with others (family and extended family), other children, and other potential financial impacts.

Questions on the direct and indirect costs of stillbirth were also included to support quantification of costs. The survey included questions on the use of healthcare services and counselling at the time of stillbirth and subsequent pregnancy, absences from work, impacts on productivity at work, and employment impacts on the family.

The survey was sent to 792 individuals and a total of 593 completed surveys were received, resulting in a 75 per cent response rate. Based on this response rate the results of the survey was deemed reliable to inform assumptions in the economic analysis. 89 per cent of the respondents were mothers and the remaining 11 per cent of respondents were fathers or the mother's partner. The responses were collated and analysed according to the cost category and have been used as an input in this study.

3 Direct, indirect and intangible costs

The cost of stillbirth include direct, indirect and intangible costs.

3.1 Direct costs

The most common direct cost reported in the literature is the additional costs of health care. This analysis estimates the direct cost to the health system through the increase in use of healthcare services as a result of stillbirth. These costs can be grouped temporally:

- costs associated with the time of stillbirth
- costs incurred after the initial loss
- costs associated with of a subsequent pregnancy.

Costs associated with the time of stillbirth

The costs associated with the time of stillbirth include, cost of stillbirth investigations, cost of counselling and hospital costs. The costs incurred after the initial engagement include cost of further investigations 8-12 weeks postpartum and cost of counselling 6 months following stillbirth.

Cost of stillbirth investigations include investigations of the mother and the stillborn baby. Appendix A presents a summary of the core components of the recommended care offered to parents following a stillbirth by the Perinatal Society of Australia.¹⁷ Cost of counselling refers to counselling accessed by parents between the period immediately following stillbirth and the 6 months following stillbirth. Hospital costs are the medical costs incurred during a stillbirth. Cost of further investigations, presented in Appendix A, refer to recommended further investigations at 8-12 weeks postpartum.¹⁸ These investigations are required in the presence of: fetal growth restriction, pre-eclampsia, maternal placental thrombosis, maternal/family history of thrombosis, positive thrombophilia testing at diagnosis of fetal demise or unexplained stillbirth.

The type of investigations included in this study is based on the availability of cost information.

Costs associated with a subsequent pregnancy

The costs associated with a subsequent pregnancy include, medical costs incurred during a subsequent pregnancy and cost of counselling incurred during a subsequent pregnancy.

Costs incurred during a subsequent pregnancy vary depending on the cause and complication of the earlier stillbirth. This study includes the costs associated with an increase in: ultrasounds, visits and caesareans and inductions. Cost of counselling refers to counselling services accessed by parents during the subsequent pregnancy.

¹⁷ Perinatal Society of Australia and New Zealand (2009). Perinatal Mortality Audit Guideline. Appendix 1. Available at: http://www.stillbirthalliance.org.au/doc/Section_2_Version_2.2_April_2009.pdf

¹⁸ Ibid.

3.2 Indirect costs

Indirect costs refer to costs that are not directly associated with the event of stillbirth but are included as part of an estimate of the total cost. Cost categories included in this study are:

- funeral costs
- absenteeism (decreased employee productivity through absences from work)
- presenteeism
- lost productivity from exiting the labour force
- cost of divorce
- associated government subsidies, and
- impacts on the family who have experienced a stillbirth.

Funeral costs

The most frequent indirect cost identified in the literature is funeral and/or burial or cremation costs.¹⁹ According to The Lancet funeral costs range from \$469-\$11719, extending to \$1179-\$11605 for burial plots and \$1410-\$4605 for a memorial.²⁰

Absenteeism

Absenteeism is lost worker productivity through absences from work. The results from the 'economic impact of stillbirth' survey indicate that 78 per cent of parents took time off work following stillbirth.

Presenteeism

Presenteeism is the lost productivity that occurs when employees come to work but as a consequence of illness or other medical conditions, are not fully functioning. The Lancet estimates productivity after stillbirth is only at 26 per cent after 30 days, increasing to 63 per cent after 6 months.²¹ The study assumes full productivity at 12 months.

Lost productivity from exiting the labour force

This refers to the lost worker productivity from exiting the labour force. The results from the economic impact of stillbirth survey indicate that 9.7 per cent of parents did not return to work.

Divorce

A study by Najman et al. found that 4 per cent of parents experienced dissolution of their marriage or cohabitation 6 to 8 months after perinatal or infant death, compared to a non-bereaved control group. We use this statistic to estimate the cost of divorce.²²

¹⁹ The Lancet (2016). Stillbirths: Economic and Psychosocial Consequences. 387: 604–16. Available at: [http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(15\)00836-3.pdf](http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(15)00836-3.pdf)

²⁰ Ibid.

²¹ Ibid.

²² Najman, J.M., Vance, J.C., Boyle, F., Embleton, G., Foster, B and Thearle, J. (1993). The Impact of a Child Death on Marital Adjustment. *Social Science and Medicine*. 37(8):1005-10

Government subsidies

The Australian government provides a stillborn baby payment to parents who experience stillbirth. It is \$2,127 if the baby is the mother's first stillborn child and \$1,064 if the baby is not the mother's first stillborn child. To be eligible for the payment the family's estimated combined adjustable taxable income must be \$60,000 or less for the six months after the baby's birth.²³

The study also includes the cost of unemployment benefits for those who did not return to work. The fortnightly unemployment benefit is \$527.60 if single with no children; \$570.80 if single, with a dependent child or children; \$476.40 if partnered; and \$737.10 if single principal carer granted an exemption from Mutual Obligation Requirements for either: foster caring, non- parents relative caring under a court order, home schooling, distance education and large family.²⁴

Another government subsidy included in the study is payment rates for Family Tax Benefits (FTB).²⁵ Individuals are eligible for a family tax benefit for a child who dies if they were receiving a FTB or were eligible to receive it.²⁶ The Australian Government provides a base rate of \$58.66 per fortnight for each child for FTB part A. To be eligible for FTB part A base rate the annual income limit is \$68,365 for 1 child 0-12 years of age and \$84,826 for 2 children 0-12 years of age. A maximum rate of \$4409.20 per year is paid under FTB part B. FTB part B is for single parents and couples where the primary earner has an adjustable taxable income of \$100,000 or less per year.

Impact on other family members

Stillbirth can have an impact on the extended family members. 52 per cent of respondents from the survey reported that family members took time off work to support parents and/or to deal with their own grief. This study estimates the cost of lost worker productivity through absences from work for the family as an indirect cost of stillbirth.

3.3 Intangible costs

Many of the costs of stillbirth are intangible and are not quantifiable at this stage. This report discusses intangible costs qualitatively using PwC's 2016 'economic impact of stillbirth' survey as the basis for the narrative. Five components of intangible costs were analysed in this study. They include the effects on

- mental well-being
- personal relationships
- relationships with others (family and extended family)
- other children, and
- impact of financial loss.

²³ Department of Human Services (2016). Stillborn baby payment. Available at: <https://www.humanservices.gov.au/customer/services/centrelink/stillborn-baby-payment>

²⁴ Department of Human Services (2016). Newstart Allowance. Available at: <https://www.humanservices.gov.au/customer/services/centrelink/newstart-allowance>

²⁵ Department of Human Services (2016). Family Tax Benefit. Available at: <https://www.humanservices.gov.au/customer/services/centrelink/family-tax-benefit>

²⁶ Department of Human Services (2016). Bereavement Payment. Available at: <https://www.humanservices.gov.au/customer/services/centrelink/bereavement-payment>

4 Results of the analysis

This section describes the results of the analysis. Appendix A includes details from the literature, assumptions and analysis.

4.1 Estimating the cost of stillbirth

The cost of stillbirth is expressed as the additional costs of stillbirth relative to no stillbirth. The model incorporates only the difference between the cost of stillbirth and the costs for no stillbirth. The impact of stillbirth, therefore, is equal to this difference. While all people having a baby incur medical costs, the model takes into account only the difference between medical costs for no stillbirth and medical costs for stillbirth.

The model does not use the comparator of a live birth because women experiencing live births are exposed to similar conditions (eg hospital stay, delivery, absenteeism) as women experiencing a stillbirth, complicating the calculation of additional costs of stillbirth.

This study calculates the cost of stillbirth for a five-year period from 2016-2020. Table 5 presents the estimated costs for this period (undiscounted). With an increase in the number of stillbirths the cost of stillbirth is expected to increase over the five-year period.

Table 5: Cost of stillbirth for 2016-2020, undiscounted

	2016	2017	2018	2019	2020
Estimated Number of stillbirths	2,513	2,569	2,625	2,678	2,729
Estimated total cost (value \$ millions), undiscounted	141.2	147.9	151.2	154.2	157.2

4.2 Direct and indirect costs

The identified costs, presented in Table 6, were chosen based on the literature and the availability of data. Based on the modelling underlying this report the additional cost of stillbirth in Australia from 2016-2020 is \$681.4 million, in 2016 present value terms.

The estimated total additional direct costs are \$172.1 million, in 2016 present value terms and the estimated total additional indirect costs are \$509.3 million, in 2016 present value terms. The estimated average cost per stillbirth is almost \$52,000.

Table 6: Additional cost of stillbirth for the five-year period 2016-2020, in 2016 present value terms

Cost category	Value (\$ millions)
Direct costs	
Costs associated at the time of stillbirth	
• Cost of stillbirth investigations	33.3
• Hospital fees	74.5
• Cost of counselling	53.2
• Cost of investigations 8-12 weeks postpartum	0.6
Cost of a subsequent pregnancy	
• Cost of tests	5.6
• Cost of counselling	4.9
Sub-total direct costs	172.1
Indirect costs	
Funeral costs	67.1
Absenteeism	129.4
Presenteeism	149.0
Lost productivity from exiting the labour force	70.6
Cost of divorce	37.4
Government subsidy	36.1
Absenteeism (family)	19.7
Sub-total indirect costs	509.3
Total cost	681.4

4.3 Intangible costs

This section describes the intangible costs of stillbirth using the stillbirth survey conducted by PwC. Stillbirth is a traumatic event that can have negative impacts on parents' mental well-being and relationships, the effects often lasting for long periods of time. There are also flow-on effects on other children, grandparents, extended family and friends.

These effects will further impact use of health care services in the longer term, productivity, and use of government assistance by those affected.

Impact on mental well-being

Almost all parents reported a negative impact on their mental well-being after stillbirth. 52 per cent and 43 per cent of parents reported that their mental well-being was impacted 'to a high degree' and 'to some extent', respectively, after stillbirth. 5 per cent of parents reported that their mental well-being was 'not particularly' impacted and 0.3 per cent reported no impact on their mental well-being.

Stillbirth caused a profound impact on parents and the grief and pain lasted long periods of time, and in some cases throughout their life: *It is a lifelong experience that has a profound impact of EVERY aspect of your life*

with little support out there...'; 'It was a time of great grief and is something that never goes away it just becomes easier to deal with'.

The impact of stillbirth is associated with stress and anxiety in a subsequent pregnancy: *'The fear and anxiety during my subsequent pregnancy were very high...'; '...each subsequent pregnancy has been very taxing mentally, it is a very stressful experience going through a pregnancy when you know how high the risks are'.*

Societal misunderstandings about parental grief and the social stigma associated with stillbirth left parents feeling isolated and lonely, further deteriorating their mental well-being. Some parents voluntarily cut social ties while social isolation was involuntary for others: *'Those around me did not understand my grief and slowly stopped talking to me'; 'The pain and grief I felt after my daughter died left me very isolated and withdrawn'; 'My experience left me traumatised and I felt very isolated. I totally cut off people who did not acknowledge my loss...'; 'It's a lonely and painful experience that I have ever been made. People seem to avoid me since I lost my son as if I have a contagious disease. No one talks about stillbirth as if it doesn't exist'.*

Relationship with partner

Different grieving patterns between mothers and fathers was a recurring theme. In some cases, the grieving period lasted longer for mothers compared to fathers and this difference led to serious relationship issues, and in some cases divorce. Blame, anger and resentment are some of the common reasons for conflict experienced in a marriage. Many parents reported being mentally and physically distant from their partner. *'It put a strain on our relationship because we both grieved in different ways and for different lengths of times. I will never recover from the loss whereas my husband was able to move on after approx. 1 year'; 'We eventually divorced. The stillbirth changed myself and my partner due to blaming each other for the stillbirth'; '...we grieved in totally different ways, which caused us to feel distant from each other. It is an ongoing source of grief for both of us'.*

It is also important to note that in other cases, the experience brought some parents closer together and the negative effects they faced during the initial months subsided over time: *'Mostly it has strengthened our relationship: we've depended on each other more than ever before'; '...it has brought us even more close together, because we are the only people that fully understand the trauma we have been through'.*

Impact on other children

Children who were born before the stillbirth were affected negatively as a result of the grief suffered by parents. Parents were at times unavailable emotionally to other children following stillbirth. As a result, older children experienced fear and anxiety and appeared emotionally withdrawn: *'I was unable to parent well following my stillbirth....emotionally giving to my children and caring about their emotional needs was very very difficult... I was always sad and weepy, they would comment on that....my oldest, she has a lot of anxiety and some of it is connected to how I was unavailable to her at the time. She sees a clinical psychologist weekly...'; 'Daughter sometimes gets upset easily. Has become a little anxious on occasions. Very protective of her parents'.*

Mothers also reported having bonding issues with children born subsequently: *'I found it hard to bond with my next child for the first 12 months in particular. I loved her to bits but I was cautious about letting myself get wrapped up in her just in case we lost her...'*

Effect on finances

Many parents reported experiencing a negative impact on finances after a stillbirth. Some parents experienced reduced earnings from absenteeism or not returning to work. Hospital fees, medical tests, and counselling were the most commonly cited expenses. Reducing budgets for daily expenses, and difficulty or inability to make regular rental, mortgage and loan payments were recurring themes. The unexpected costs associated with funerals was an added strain on finances: *'Unable to maintain investment properties, had to rely on family to cover these costs. Much tighter household budget than normal'; 'I did not have the strength to return full-time after taking 5 weeks off to deal with our loss so only returned 3 days a week so our whole household budget has suffered. Our mortgage repayments have been lowered and savings are much less'; 'We had added bills of the funeral and cremation that we had to pay for. So we struggled with having to pay that on top of our mortgage and other bills at the time'.*

Family and government assistance were frequently cited sources of financial support after stillbirth: *'Moved back home to live with family (parents), have continued to remain living here indefinitely'; 'We did get financial support from our family during this time so were lucky in that respect. Due to this we were able to meet all of our commitments'; 'I was on Government support.... so that made it possible to still meet necessary payments, though funds were much tighter and we could no longer put money aside'.*

Parents who temporarily left employment found it difficult to re-enter the workforce: *'The lack of understanding in the working environment where you are perceived to be just "not working" when it is a matter that is deeply private to some women who do not wish (or should need) to explain the time out of work can prevent re-entering the workplace so much more challenging. Women who experience stillbirth should receive the same understanding (if not more) that women who give birth to live babies do. Giving up work to recover from the most difficult of losses should not leave a woman disabled in the workforce. Unfortunately for me it did'.*

Impact on relationship with others

Many parents felt that their loss and grief were not completely understood by others, resulting in strained or broken relationships. The social stigma surrounding stillbirth made it difficult for society to understand or process the grief and pain felt by parents: *'Those around me did not understand my grief and slowly stopped talking to me. The pain and grief I felt after my daughter died left me very isolated and withdrawn'; 'I lost most of my friends and have grown apart from a lot of people including family. I am feeling better after one and a half years but those relationships have not been able to be repaired. I am thankful to have my husband'; 'Friends don't know what to say and how to act so they stop inviting you to places. Family either push too far into your grief or think you should get over it. Acquaintances and strangers just don't understand at all'.*

Other intangible impacts

Many parents expressed the need to lift the stigma associated with stillbirth. Many also expressed the need to raise awareness on the topic, particularly around prevention: *'More awareness needs to be out there about stillbirth occurrence...'; 'Pregnancy loss and stillbirth seems a taboo subject. Greater awareness of the significant loss and after effects would be helpful'.*

Some survey respondents felt that there was variability in the services they received across facilities and geographies: *'Rural/regional Australia needs to have the same services that are available in the cities; As a rural Australian....my local support services were few'; 'the total lack of empathy from the doctor who was looking after me in the absence of my doctor and the staff..., was disgraceful of the profession'; 'I felt that there should have been more support and counselling following being discharged and I would have been able to return to work earlier. Also I wish there was more support groups that both myself and husband could attend'; 'At the time I wasn't offered anything more than a handful of leaflets'.*

Many parents recognised and appreciated the support offered by midwives: *'The midwives at our hospital do fantastic work under such devastating circumstances, our midwife went above and beyond the call of duty even staying back the next day, when her shift finished, to make some arrangements for us before we went home'; 'The midwife and doctor at the time my stillbirth was announced were amazing... they were supportive, informative and very gentle'.*

The effect of stillbirth on other family members and close friends was another recurring theme. Siblings and grandparents in particular were affected negatively by stillbirth. Some family members sought counselling to deal with the negative effects: *'My Father in law was very sad & depressed by the stillbirth of his first grandchild. So much so that he sought counselling'; 'My mum was highly affected by the loss... She was her first grandchild and she really struggled to be there for me as her grief was so intense...'; 'Parents on both sides were profoundly impacted and depressed, some had to seek therapy...'; '..my best friend was put on anti-depressants. All my friends rallied around us and it had financial and mental impacts on many people'.*

4.4 Health and well-being cost of stillborn child

It is difficult to quantify and monetise the loss of the future productivity of the stillborn child. One approach that has been used in previous studies to monetise the social and well-being costs is the Disability Adjusted Life Years (DALYs) approach.

A DALY is a measure of the burden of disease that captures the gap between current health status resulting from a disease or condition and an ideal health situation where a given population lives to an advanced age, free of disease and disability.

DALYS for a disease or health condition are calculated as the sum of the Years of Life Lost (YLL) due to premature mortality in the population and the Years Lost due to Disability (YLD) for people living with the health condition or its consequences.²⁷

The years of life lost due to premature mortality due to stillbirth can be used as a measure of the loss of future productivity of the stillborn child. The average life expectancy in Australia is estimated to be 82.4 years.²⁸ This number can be used as the YLL due to premature mortality due to stillbirth. YLD of a stillborn child would be null.

To calculate the health and well-being costs of the stillborn child this study uses the concept of value of statistical life (VSL).²⁹ VSL is usually assumed to be the life of a young adult with at least forty years of life ahead. A related concept is the value of statistical life year (VSLY). VSLY is the constant annual sum which, taken over a remaining life span, has a discounted value equal to the estimated VSL.³⁰

This study estimates the health and well-being costs of the stillborn child, starting at age 18 until 65 years (economic life). The estimated number of stillbirths for 2016 is 2513 and the VSLY is estimated to be \$183,700 in 2015-16 dollars.³¹ The estimated health and well-being cost is \$7.5 billion, in 2016 present value terms.

4.5 Costs not included in the study

There are other important costs of stillbirth that are not included in this study due to limited availability of data and/or evidence. The effect of stillbirth on healthcare professionals is one such cost.³² Studies have shown that there is a substantial personal and professional burden for staff involved in caring for families during and after stillbirth. Psychological effects include trauma, diminished emotional availability, stress, guilt, anger and blame. Professional effects include fear of litigation and disciplinary action.

Another example is the long term impact on health and well-being. Many parents suffer from grief, anxiety and depression for long periods of time. The costs associated with such effects could be substantial. The estimate of counselling, absenteeism and presenteeism may partially account for these costs but there are long term health and well-being effects that are not included in this estimate of cost.

²⁷ World Health Organisation (WHO) (2015). Health statistics and information systems: Metrics: Disability-Adjusted Life Year (DALY). Available at: http://www.who.int/healthinfo/global_burden_disease/metrics_daly/en/

²⁸ Australian Bureau of Statistics (2014). Deaths, Australia. Table 3.9 Life expectancy, Selected ages, Australia-2004-2014. Available at: <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3302.02014?OpenDocument>

²⁹ Abelson, P (2007). Establishing a Monetary Value for Lives Saved: Issues and Controversies, Working Papers in Cost benefit Analysis WP 2008-02. Department of Finance and Deregulation. Available at: https://www.dpmc.gov.au/sites/default/files/publications/Working_paper_2_Peter_Abelson.pdf

³⁰ Ibid

³¹ Department of Prime Minister and Cabinet (2014). Best practice Regulation Guidance Note: Value of statistical life.

³² The Lancet (2016). Stillbirths: Economic and Psychosocial Consequences. Available at: [http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(15\)00836-3.pdf](http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(15)00836-3.pdf)

5 *Possible interventions*

The causes of stillbirth are poorly understood. This complicates the development and assessment of medical research to identify effective strategies to mitigate stillbirth rates. Unless there is definitive knowledge on the causes of stillbirth and effective interventions, it is challenging to measure the benefits of preventing unnecessary loss of life. More research needs to be conducted to understand the number of unexplained stillbirths in Australia.

There are also benefits from mitigating the negative effects post stillbirth. Stillbirth has a substantial effect on parents' mental health. This study estimates the combined economic cost of presenteeism and absenteeism to be \$278.4 million over 2016-2020, in 2016 present value terms. Furthermore, the responses consolidated from the stillbirth survey find that the effect of stillbirth lasts for long periods of time and parents do not always receive the mental health services they need immediately after stillbirth.

Improving access to bereavement counselling and targeted interventions to reduce the impact on mental health could potentially result in a positive impact on people who have experienced a stillbirth. One potential area of intervention would be to train health workers who provide care at birth on providing the appropriate level of bereavement care following stillbirth.³³

There is also a need to minimise the social stigma associated with stillbirth. As evidenced from the stillbirth survey responses, many parents feel isolated in their grief after stillbirth and there is a lack of societal understanding of their pain and suffering. Stigma worsens the negative impact on mental well-being. Greater awareness on stillbirth through educational programmes in communities and society would help to reduce this stigma.³⁴

³³ The Lancet (2016). Stillbirths: Ending Preventable Stillbirths. Available at: <http://www.thelancet.com/pb/assets/raw/Lancet/stories/series/stillbirths2016-exec-sum.pdf>

³⁴ Ibid

Appendices

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Appendix A Modelling the cost of stillbirth

The cost of stillbirth is calculated for a five-year period from 2016-2020, and it is expressed in 2016 present value terms.

All cost assumptions have been adjusted to reflect nominal and/or real values (2015-16 dollars) to ensure consistent treatment of cost estimates across the study period. Costs have been inflated using the consumer price index (CPI), sourced from the Australian Bureau of Statistics. The costs for 2016-2020 are inflated based on the projected inflation rate which is expected to be between 2 per cent – 3 percent.^{35,36} A 5 per cent discount rate has been applied to cost estimates over the five year period.³⁷ The value of a statistical life is also inflated using these rates.

As a result of limitations in data availability, the model incorporates a number of assumptions that are outlined below. The assumptions are informed by Australian and international literature.

1. Assumptions for direct cost metrics

1.1. Costs associated at the time of stillbirth

Cost of stillbirth investigations

= cost of investigations x number of stillbirths

Cost of hospital fees

= average hospital cost x number of stillbirths

Cost of counselling

= cost per counselling session x number of sessions x [proportion who received counselling x number of stillbirths]

Cost of investigations at 8-12 weeks postpartum

= cost of investigations x [proportion who conducted investigations x number of stillbirths]

Assumption	Rationale
The estimated cost of investigations (core investigations and post-mortem) is \$4279.2 in 2015-16 prices	Recommended investigations are calculated based on Perinatal Society of Australia and New Zealand (2009). Perinatal Mortality Audit Guideline. Appendix 1. Available at: http://www.stillbirthalliance.org.au/doc/Section_2_Version_2.2_April_2009.pdf
The estimated proportion of post-mortems is 49%	http://www.stillbirthalliance.org.au/doc/Section_2_Version_2.2_April_2009.pdf
Number of sessions range from 1-5 tests to 20 or more tests. The mid-point for each range is used	The cost of post-mortem is calculated using the midpoint of

³⁵ Reserve Bank of Australia (2016). Statement on monetary policy. Economic outlook February 2016.

³⁶ Reserve Bank of Australia (2016). Inflation target. Available at: <http://www.rba.gov.au/inflation/inflation-target.html>

³⁷ The 5 per cent discount rate is the preferred rate for discounting future costs in the health sector. Department of Health (2015). Guidelines for preparing submissions to the Pharmaceutical Benefits Advisory Committee. July 2015. Version 4.5. Available at: <https://pbac.pbs.gov.au/content/information/printable-files/pbacg-book.pdf>

Assumption	Rationale
as the number of tests	the rate reported by AIHW for 2004-08 (38.1%) and the rate based on the 'economic impact of stillbirth survey (59%) The number of sessions is based on the 'economic impact of stillbirth' survey
The estimated average hospital cost is \$6,141, in 2015-16 prices	Average hospital cost is based IHPA cost of a hospital delivery (DRG 001C-066C). Available at: https://www.ihipa.gov.au/sites/g/files/net636/f/publications/nhcdc-round18.pdf
Cost per counselling session is \$124.65 Number of sessions range from 1-5 tests to 20 or more tests. The mid-point for each range is used as the number of tests. Proportion who received counselling was 47% at the time of stillbirth and 42% at 6 months	Cost of counselling is based on MBS item number 80005 Number of sessions are based on the 'economic impact of stillbirth' survey Q36 & Q42 Proportion who received counselling is based on the 'economic impact of stillbirth' survey Q35 & Q41
The estimated cost of further investigations is \$145.80 Proportion who reported having tests at 6 months was 36%	Recommended investigations are calculated based on Perinatal Society of Australia and New Zealand (2009). Perinatal Mortality Audit Guideline. Appendix 1. Available at: http://www.stillbirthalliance.org.au/doc/Section_2_Version_2.2_April_2009.pdf Proportion who had tests done at 6 months is based on the 'economic impact of stillbirth' survey Q43

1.2. Costs associated during a subsequent pregnancy

Cost of tests

= cost of tests x [proportion who reported having a subsequent pregnancy x number of stillbirths]

Cost of counselling

= cost per counselling session x number of sessions x [proportion who received counselling x number of stillbirths]

Assumption	Rationale
Cost of tests include investigations, ultrasounds, visits, and caesarean and induction 40% have 2 extra ultrasounds: \$120 40% make 5 extra visits: \$152 50% increase in caesarean and induction: \$986	Average cost per ultrasound is based on MBS item numbers 55700-55855. Average cost of antenatal visits is based on MBS item numbers 16400-16514. Average cost of a caesarean and induction is based on MBS item numbers 16515-16528.
Cost per counselling session is \$124.65 Number of sessions range from 1-5 tests to 20 or more tests. The mid-point for each range is used as the number of tests. Proportion who received counselling during the subsequent pregnancy was 37%	Cost of counselling is based on MBS item number 80005 Number of sessions are based on the 'economic impact of stillbirth' survey Q50 Proportion who received counselling is based on the 'economic impact of stillbirth' survey Q49

2. Assumptions for indirect cost metrics

Funeral costs

= average cost of a funeral x number of stillbirths

Assumption	Rationale
Average cost of a funeral is \$5533 in 2015-16 prices	<ul style="list-style-type: none"> Calculation based on estimated costs of a stillbirth funeral by The Lancet (2016). Stillbirths: Economic and Psychosocial Consequences. 387: 604–16. Available at: http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(15)00836-3.pdf Cost of a funeral ranges from \$469–\$11 719; increases to \$1179–\$11 605 for burial plots; \$1410–\$4605 for memorials in USD 2013 prices The average of the three cost categories is used to calculate the average cost of a funeral.

Absenteeism

= number of days absent from work due to stillbirth x daily wage rate x [proportion who took time off work x number of stillbirths]

Assumption	Rationale
<p>Number of days absent from work ranges from 1-5 days to over 20 days. The midpoint for each range is used to calculate the cost.</p> <p>Daily wage rate is \$163.67</p> <p>Proportion who took time off work is 78%</p>	<ul style="list-style-type: none"> Number of days absent is based on the economic impact of stillbirth survey Q13 Average daily earnings are calculated using, average weekly earnings from ABS http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/1063DFAD5BE2E4D6CA257F63001545C3/\$File/6302001.xls Proportion who took time off work is based on the economic impact of stillbirth survey Q12.

Presenteeism

= number of days of lost productivity due to stillbirth x average daily wage rate x number of employed parents who experienced stillbirths

Assumption	Rationale
<p>Number of days of lost productivity at 1 month is 15 days, 56 days at 6 months, and 19 days at 12 months</p> <p>Average daily wage rate is \$163.7, in 2015-16 prices</p> <p>Proportion of employed parents is 84%</p>	<p>Calculation based on estimated reduction in productivity as a result of stillbirth by The Lancet (2016). Stillbirths: Economic and Psychosocial Consequences. 387: 604–16. Available at: http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(15)00836-3.pdf</p> <p>The Lancet: productivity is at 26% at 1 month, increases to 63% after 6 months</p> <p>Days of lost productivity is calculated assuming 20 working days per month</p> <p>Days of full productivity at 1 month: 20 days x 26% = 5 days. Therefore, days of lost productivity is 15</p> <p>Days of full productivity at 6 months: 100 days x 44.5% (average of 26% and 63%) = 44.5 days. Therefore, days of</p>

Assumption	Rationale
	<p>lost productivity is 56.</p> <p>Days of full productivity at 12 months: 100 days x 81.5% (average of 63% and assuming full productivity at 12 months) =81 days. Therefore, days of lost productivity is 19.</p> <p>Average daily earnings are calculated using, average weekly earnings from ABS http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/1063DFAD5BE2E4D6CA257F63001545C3/\$File/6302001.xls</p> <p>Proportion employed is based on ‘economic impact of stillbirth survey’ Q12</p>

Lost productivity from exiting the labour force

= average annual wage rate x [proportion who did not return to work x number of stillbirths]

Assumption	Rationale
<p>The estimated average annual wage rate is \$59,860</p> <p>The proportion who did not return to work is 10%</p>	<ul style="list-style-type: none"> The average annual wage rate is calculated using the average weekly earnings from ABS http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/1063DFAD5BE2E4D6CA257F63001545C3/\$File/6302001.xls The proportion who did not return to work is based on the ‘economic impact of stillbirth’ survey Q18.

Divorce

=average cost per divorce x number of divorces as a result of stillbirth

Assumption	Rationale
<p>Average cost per divorce is \$77,142 (2015-16 prices)</p> <p>Proportion divorcing after stillbirth is 4%</p>	<ul style="list-style-type: none"> Cost per divorce ranges from \$30,000 – \$40,000, based on http://www.news.com.au/finance/money/readying-for-the-financial-hit-of-divorce/story-e6frfmdg-1225843542671?pg=1#comments Proportion divorcing after stillbirth is based on a study of parents conducted 6 to 8 months after perinatal or infant loss by Najman et al. (1993) http://www.ncbi.nlm.nih.gov/pubmed/8235733

Government subsidy

=cost of stillborn baby payment x number eligible for payment

=cost of unemployment benefit x number eligible for payment

=cost of family tax benefit x number eligible for payment

Assumption	Rationale
<p>Average cost of stillborn baby payment is \$1,595.79</p> <p>Proportion eligible for payment is 22.35%</p>	<p>The payment is \$2,127.23 if the baby is the mother's first stillborn child. It is \$1,064.35 if the baby is not the mother's first stillborn child, available at Australian Government Department of Human Services https://www.humanservices.gov.au/customer/services/centrelink/stillborn-baby-payment</p> <p>Due to data limitations the average of these two figures is assumed to be the cost of a stillborn baby payment.</p> <p>To be eligible for the payment the family's estimated combined adjustable taxable income must be \$60,000 or less for the 6 months after the baby's birth.</p> <p>Proportion eligible is estimated from the economic impact of stillbirth survey Q5</p>
<p>Average unemployment benefit is \$ 15,027</p> <p>Proportion who did not return to work and is eligible for the benefit is 5%</p>	<p>The payment ranges from \$527.6-\$737 per fortnight depending on the number of children and partner and we use the average of these figures. Payment rate for those aged 60 or over is excluded because parents experiencing stillbirth are unlikely to be in this category. Available at: https://www.humanservices.gov.au/customer/services/centrelink/newstart-allowance</p> <p>The average per year therefore is \$15,027 per year (based on 52 weeks).</p>
<p>FTB part A base rate is \$1525</p> <p>FTB part B maximum rate per year is 4409</p> <p>Proportion eligible for FTB part A is 30%</p> <p>Proportion eligible for FTB part B is 48%</p>	<p>FTB rates are based on Australian Government Department of Human Services, available at: https://www.humanservices.gov.au/customer/services/centrelink/family-tax-benefit</p> <p>The annual income limit for payment of base rate part A is between \$68,365 and \$84,826 depending on number of children. The average of the two limits are used in this study to determine proportion eligible</p> <p>FTB part B is for single parents and couples where the primary earner has an adjustable taxable income of \$100,000 or less per year</p> <p>Proportion eligible based on 'economic impact of stillbirth survey' Q5</p>

Absenteeism (family)

=number of days absent from work due to stillbirth x daily wage rate x [proportion of family members who took time off work x number of stillbirths]

Assumption	Rationale
<p>Number of days absent from work ranges from 1-5 days to over 20 days</p> <p>Daily wage rate is \$163.67</p> <p>Proportion of family members who took time off</p>	<ul style="list-style-type: none"> Number of days absent is based on the economic impact of stillbirth survey Q26 Average daily earnings are calculated using average weekly earnings from ABS

Assumption	Rationale
work is 51.63%	<p data-bbox="778 271 1453 353">http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/1063DFAD5BE2E4D6CA257F63001545C3/\$File/6302001.xls</p> <ul data-bbox="746 367 1422 495" style="list-style-type: none"><li data-bbox="746 367 1422 427">• Proportion who took time off work is based on the economic impact of stillbirth survey Q25<li data-bbox="746 434 1422 495">• We use a conservative approach and assume that only one family member took time off work.

Type of recommended core investigations included in this study

Type of investigation	Cost per investigation in 2015-16 prices \$	Source
Kleihauer test	10.45	MBS
Ultrasound scan	100.00	MBS
Amniocentesis	63.50	MBS
Full blood test	16.95	MBS
Renal function test	84.95	MBS
Liver function test	17.70	MBS
Thyroid function test	34.80	MBS
HbA1c	16.80	MBS
Serology	29.00	MBS
Lupus anticoagulant	25.35	MBS
Microbiology (swabs)	22.00	MBS
Thrombophilia	60.00	MBS
Guthrie test	69.70	VCGS
Fetal blood sampling (from umbilical cord)	243.25	MBS
Placental pathology	110.60	Mistry et al. (2013)
Cytogenetics	394.50	MBS
Post mortem	2979.70	AIHW (2013)
Total cost	4,279.25	

Type of additional investigations included in this study

Type of investigation	Cost per investigation in 2015-16 prices \$	Source
Thrombophilia	60.00	MBS
Lupus anticoagulant	25.00	MBS
Factor V Leiden mutation	35.45	MBS
Antithrombin III	25.35	MBS
Total	540.30	

Appendix B Summary of intangible costs

Themes associated with intangible costs

Cost category	Themes
Relationship with partner	<ul style="list-style-type: none"> • Different grieving pattern • Mentally and physically distant • Divorce • Blame, anger, resentment • Strengthened relationship • Effect on relationship different closer to the stillbirth vs. later.
Impact on other children	<p>Impact on children who were born before the stillbirth</p> <ul style="list-style-type: none"> • Clingy – difficulty separating from mother • Fear and anxiety – fear of other siblings dying, scared for parents' well-being • Withdrawn • Acting out • Impact on emotional development <p>Impact on children born after the stillbirth</p> <ul style="list-style-type: none"> • Confusion • Bonding issues with child.
Effect of financial loss	<ul style="list-style-type: none"> • Unable to meet regular payments (rent, mortgage, loans) • Reduced budget for daily expenses (holidays, groceries etc.) • Did not return to work • Re-entering the workforce is challenging • Family and government assistance helped finances • Unexpected costs – eg funeral.
Impact on mental well-being	<ul style="list-style-type: none"> • Profound impact • Grief & pain • Life changing experience • Stress during subsequent pregnancies • Isolated & lonely.
Impact on relationship with others	<ul style="list-style-type: none"> • Cut ties with family/extended family & friends • Pain and grief not completely understood by others.
Other	<ul style="list-style-type: none"> • Stillbirth is a social taboo • Need to raise awareness • Rural vs. metro – variations in care • Disappointed with healthcare provided after stillbirth • Satisfied with healthcare services • Effect on others.

Source: Economic impact of stillbirth survey conducted by PwC (2016).

Appendix C Literature review

The following table summarises some of the key studies that were identified from the international literature on the economic and social impact of stillbirth.³⁸

Study	Findings and notes
Gold, K.J., Sen, A., Hayward, R.A. (2010). Hospital Costs Associated with Stillbirth Delivery. <i>Maternal Child Health Journal</i> . 17(10):1835-41.	<ul style="list-style-type: none"> Retrospective medical chart review of stillbirths at three large hospitals in Michigan over a ten year period between 1996 and 2006 of 533 stillbirths matched with 1053 live births. Calculated healthcare cost includes labour, birth and any fetal testing and monitoring. Average hospital cost for stillbirth was \$7495 (range: \$659-\$77,080) in 2010 US prices. Average additional cost of stillbirth relative to a live birth was \$750 (2010 US prices).
Mistry, H., Heazell, A.E.P., Vincent, O., and Roberts, T. (2013). A Structured Review and Exploration of the Healthcare Costs Associated with Stillbirth and a Subsequent Pregnancy in England and Wales. <i>BMC Pregnancy and Childbirth</i> . 13:236	<ul style="list-style-type: none"> Explored UK guidelines from the RCOG to establish the full range of investigations that are likely to be offered to women immediately after a stillbirth. Cost to the National Health Service (NHS) UK for investigation immediately following stillbirth ranged from £1242 to £1804. Costs in a subsequent pregnancy is nearly £500 greater than the pregnancy following a stillbirth due to a known non-recurrent cause.
The Lancet (2016). Stillbirths: Economic and Psychosocial Consequences. 387: 604-16.	<ul style="list-style-type: none"> Comprehensive literature review of the direct, indirect and intangible costs of stillbirth worldwide. Findings used to inform this study include: <ul style="list-style-type: none"> Hospital fees range from \$118-\$20,000 Funeral costs range from \$469-\$11719, extending to \$1179-\$11605 for burial plots and \$1410-\$4605 for memorials Productivity after stillbirth was at 26% after one month and increases to 63% after six months.
Najman, J.M., Vance, J.C., Boyle, F., Embleton, G., Foster, B and Thearle, J. (1993). The Impact of a Child Death on Marital Adjustment. <i>Social Science and Medicine</i> . 37(8):1005-10.	<ul style="list-style-type: none"> Parents were interviewed 6-8 months after perinatal or infant loss 4% of bereaved parents experienced dissolution of their marriage or cohabitation, compared to only 1% of non-bereaved control parents.
Gold, K.J., Sen, A., and Hayward, R.A. (2010). Marriage and Cohabitation Outcomes After Pregnancy Loss	<ul style="list-style-type: none"> Conducted a survival analysis for married and cohabitating women who experienced live births, miscarriages, or stillbirths in the US. Cox proportional hazards models controlled for multiple independent risk factors known to affect relationship outcomes. Controlling for known risk factors, women who experienced stillbirths had a significantly greater hazard of their relationship ending, compared to women whose pregnancies ended in live births (hazard ratio: 1.40).

³⁸ Costs may be different or not directly comparable when different definitions of stillbirth are used.

Study	Findings and notes
Ogwulu, C.B., Jackson, L.J., Heazell, A.E.P., and Roberts, T (2015). Exploring the Intangible Costs of Stillbirth. BMC Pregnancy and Childbirth	<ul style="list-style-type: none">• A narrative review of the intangible costs of stillbirth in the UK• Based on responses received from a questionnaire that was developed to capture the intangible costs• Identified themes include: profound grief, depression, social isolation, impact on couple's relationship, sibling's issues, return to normality, need for support and recovery.

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