

The economic cost of suicide and non-fatal suicide behaviour to the Northern Territory construction industry and the impact of MATES in Construction in reducing this cost

A report conducted for MATES in Construction (Queensland/Northern Territory) for the Queensland Building and Construction Industry.

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#### **EXECUTIVE SUMMARY**

#### Background

A suicide is a deliberate act of self-harm taken with the expectation that it will be fatal. A suicide-attempt is a non-fatal act of self-harm, often with the aim of seeking help. Attempted suicide is far more common than fatal suicide events and it is currently believed that for every death by suicide, there are between 10 and 30 attempted suicides. While the link between suicide and mental disorders (in particular, depression and alcohol use disorders) is well established, many suicides happen impulsively in moments of crisis due to a breakdown in the ability to deal with life or work stresses.

Suicidal behaviour is a significant public health problem. A death by suicide has a flowon effect, impacting the lives of any number of individuals who inevitably suffer intense and conflicted emotional distress in response to a death of this kind. While being employed often reduces the likelihood of suicide, rates of suicide among workers are often much higher than the general population. MATES in Construction is an example of a multi-faceted strategy developed in Australia to address suicide prevention in the workplace. Since its establishment, MATES has had substantial uptake in the building and construction sector and has developed an evidence-base supporting its effectiveness.

#### Aim

Although a death by suicide results in significant grief and trauma for family, friends and co-workers, it is important to consider the economic burden of this avoidable harm and how this burden may be averted with appropriate solutions. The objective of this study is to draw on the empirical research and a validated costing methodology to quantify the economic cost of suicide and non-fatal suicide behavior to the Northern Territory (NT) construction industry and estimate the impact of MATES in Construction in reducing this cost.

#### Methods

Rates of suicide and non-fatal suicide behaviour were sourced from a recent analysis of the National Coronial Information System (NCIS), findings from the National Mental Health and Wellbeing study, Safe Work Australia injury reports and the National Return to Work survey. The analysis used a costing methodology developed by the Industry Commission, refined by the National Occupational Health and Safety Commission, and applied in several costing studies. The costing analysis identifies direct, indirect and intangible costs for a range of economic agents with estimates derived for four levels of severity: short absence, long absence and return to work, long absence and no return to work and fatality. The classification structure for economic costs is based on seven conceptual cost groups: production disturbance costs, human capital costs, medical costs, administrative costs, transfer costs, other costs and the community value of life. Costs were derived using an incidence-based approach with costs that an injury imposes in future years, discounted to present value, expressed in 2022 dollars.

The MATES in Construction (QLD/NT) case management database was used to develop counterfactual estimates — potential suicides prevented by the intervention of MATES. A tiered system of inclusion criteria was developed to estimate the counterfactuals based on available case management data: variables for suicide ideation present, list of presenting issues, and referral information were used. The tiered structure allowed for comparison and consideration of different inclusion criteria.

Economic impact is measured using return on investment derived by comparing the operating costs of MATES in Construction with the savings generated through averted suicidal behaviour. Sensitivity analyses were undertaken to test the robustness of results to changes in key parameters.

#### Results

Over the period 2001-2019, there were 84 suicides among identifiable male construction workers and 228 suicides among the male non-construction workers in the NT. The agestandardised suicide rate for male construction workers is estimated at 51.9 per 100,000 (95% CI 40.5-63.3), almost twice that of other male workers (28.5 per 100,000, 95% CI 24.7-32.3).

The average costs of a self-harm attempt are estimated at \$1,175 for those resulting in a short-term absence, \$29,461 for a long absence with return to work, \$3.84 million for a long absence with no return to work and \$2.80 million per fatality. Adding the non-economic or intangible value of a statistical life (i.e., \$5.38 million) increases the average cost of a fatality to \$8.2 million. Consistent with the ex-post methodological approach used in this analysis, the majority of costs are borne by the society / government due to the fact that costs are attributed to incidents after they occur and as a direct result of the incident. The key cost driver in average cost estimates for a long absence with no return to work and fatality is the human capital costs associated with loss of income, loss of government revenue and social welfare payments.

For 2022-23 there were an estimated 5.5 fatalities by suicide among male construction industry workers in the NT (range between 4.3 and 6.7). Using the National Study on Mental Health and Wellbeing ratio of self-harm attempts to fatality of 20.35 to 1, and based on 5.5 fatalities, this equates to 70 incidents resulting in a short absence, 29 incidents resulting in a long absence with return to work and 12 incidents resulting in a long absence with no return to work. Multiplying unit costs with the number of male construction industry workers engaged in suicide and non-fatal suicide behaviour results in an economic cost of \$62.2 million expressed in 2022 dollars. Combining the community value of lost life increases the cost to \$92 million.

The counterfactual analysis suggests a potential reduction in fatality by suicide among NT male construction industry workers (due to MATES), at 0.13 fewer suicides each year. The potential economic benefit of averting this harm is estimated at \$1.5 million each year. Combining the community value of lost life increases the cost to \$2.2 million. The average annual operating cost of MATES in Construction (QLD/NT) for NT in the period 2018-19 to

2022-23 is \$209,387. The potential return on investment of MATES in Construction (QLD/NT) in NT is equivalent to 7.1:1, representing a positive economic investment of public funds. Incorporating the community value of life improves the return on investment to 10.5:1.

#### Discussion

In undertaking this analysis, a range of data, assumptions and methods were used. The analysis relied on the best available evidence and used a recent analysis of NCIS data that identified fatalities by suicide among male construction industry workers. Cost estimates vary according to methods used, the quality of available data and assumptions made. Assumptions relating to the values of key parameters in this study have been chosen to be deliberately conservative. This study has closely followed the methodology adopted by Safe Work Australia, however certain methodological variations were required. For example, unlike the Safe Work Australia report, this analysis included postvention costs associated with suicide bereavement and counselling. Conversely, we have not attempted to estimate the costs saved by the transfer of knowledge from the employee, learning workplace safety tools at work, and then applying them to family and friends outside of work. The ripple effects of other suicide gatekeeper programs like MATES have shown that for each person trained, another five people have conversations with that trainee and learn about best practices in suicide intervention. Further, no attempt was made to estimate the costs saved through the rehabilitation of emerging mental health conditions identified by trained MATES workers. While the individuals who were identified and referred for help by trained co-workers may not have been contemplating suicide, the progression of their mental health condition may have affected other absenteeism and presenteeism costs. The costs of the treatment for early identified mental health challenges is certainly less that the costs of lost productivity and life from untreated and progressive suicidal intensity.

Methodological challenges notwithstanding, the results provide a conservative assessment of the cost associated with suicide and non-fatal suicide behaviour in the NT construction industry and are in line with previous attempts to cost injury and suicidal behaviour in the construction industry. Although the valuation of community value using the statistical life concept is relatively controversial, it has been used in several studies, notably the recent assessment of the economic costs of suicide in Australia conducted by the Productivity Commission and a recent report commissioned by the Construction Industry Culture Taskforce that examined workplace issues within Australia's construction industry and the economic cost of doing nothing to address these issues.

MATES in Construction is a feasible, affordable, and acceptable workplace strategy to address suicide in the workplace. This analysis suggests that MATES in Construction saves lives and reduces the economic cost of suicide and suicidal behaviour. It represents a positive economic investment into workplace safety in the NT construction industry.

#### INTRODUCTION

Suicide and non-fatal suicide behavior are significant problems faced by most countries<sup>1</sup>. A suicide is a deliberate act of self-harm taken with the expectation that it will be fatal<sup>2</sup>. A suicide-attempt is a non-fatal act of self-harm, often with the aim of seeking help<sup>2</sup>. Estimates of the number of people who attempt suicide (a subset of the number of people who intentionally self-harm) vary widely. Most estimates suggest that for every death by suicide, there are a total of between 10 and 30 suicide attempts and that 15-25% of people who attempt suicide will re-attempt<sup>1</sup>.

Suicidal behaviour has gained recognition worldwide as a significant public health problem with over 700,000 people taking their own life each year<sup>1</sup>. Australian data suggests that in 2021 there were 3,144 deaths by suicide — an average of about 9 deaths per day representing an age standardised rate of 12.0 deaths per 100,000 population. Annual estimates of self-harm range from 63,000<sup>3</sup> to 79,000<sup>4</sup>, with more than 29,900 cases of intentional self-harm recorded in hospital statistics. Most deaths by suicide are among people of working age with suicide being the leading cause of death for males aged 25-44 years and females aged 25-34 years<sup>5</sup>.

While the link between suicide and mental disorders (in particular, depression and alcohol use disorders) is well established, many suicides happen impulsively in moments of crisis with a breakdown in the ability to deal with life stresses such as financial problems, relationship breakdown or chronic pain and illness<sup>6</sup>. The impact of the work environment, peer support, supervisor support and organisational design similarly can impact the wellbeing of workers and likelihood of help offering and help seeking behaviors in periods of distress<sup>7,8</sup>. Recent data suggest that almost two-thirds of people who die by suicide have a diagnosed mental illness, yet most people with mental illness do not experience suicidal thoughts or behaviours. Of the one-third of suicides not associated with mental illness, many occur when the individual is in a moment of crisis or is having difficulty dealing with some of the stresses in their life. Almost two-thirds of people who die by suicide had a psychosocial risk factor, such as personal history of self-harm, separation and divorce, or relationship problems<sup>9</sup>.

A death by suicide has a flow-on effect, impacting the lives of any number of individuals: from family to friends, colleagues, clinicians, first responders, coronial staff, volunteers of bereavement support services and other associates — who inevitably suffer intense and conflicted emotional distress in response to a death of this kind<sup>10,11</sup>. The combination of grief, guilt and remorse can remain for years and potentially three to four generations can be bereaved.

A few international studies have examined the economic loss and burden of suicide and non-fatal suicide behaviour including studies in Australia, Canada, Ireland, New Zealand, and the United States<sup>4,12-20</sup>. The Australian Productivity Commission estimated the total costs (direct, indirect and intangible) associated with suicidal behaviour at \$30.5 billion each year<sup>4</sup>. On average, a person who dies by suicide loses almost 43 years of their expected life. The Commission's estimates included average costs of suicide deaths, which includes average direct costs of \$134,000 and average intangible costs of \$9.2 million per person. The cost of non-fatal suicide attempts that leave the person permanently incapacitated was between \$1.7 million to \$2.1 million per person. The cost of suicide attempts resulting in a short absence from normal activity was \$1,200–5,300 per person, depending on whether they were hospitalised<sup>4</sup>.

Authors of costing studies note that economic costing is not an exact science, and due to various limitations in data and methods, various assumptions are required<sup>14,16,17,21,22</sup>. As noted by the Productivity Commission, their estimates of the economic cost of suicidal behaviour are considered conservative. For example, they assume that a smaller proportion of the people who attempt suicide are permanently incapacitated than other estimates, and they do not include the cost of providing mental health services for people who have survived a suicide attempt. They also exclude government expenditure directly on suicide prevention activities. The Australian Government spent almost \$50 million on suicide prevention under its National Suicide Prevention Program in 2017. State and Territory Governments also fund their own suicide prevention activities, designed to meet local needs. However, this expenditure is currently not publicly reported in a consolidated and consistent way. While understanding and quantifying the true impact of suicidal behaviour is difficult, quantifying the economic cost can help raise awareness and inform the national call to preventive actions<sup>23</sup>.

An emerging area of interest in suicide research is the impact of employment status and industry on rates of suicide<sup>9,24-27</sup>. While being employed is associated with reduced risk of suicide overall, recent evidence suggests suicide rates are differentially distributed across industry and occupational groups. A review by Milner et al (2013) on suicide by occupation found a stepwise gradient in risk, with the lowest skilled occupations being at greater risk of suicide than the highest skill-level group<sup>27</sup>. In a separate analysis using data from the NCIS, Milner et al (2014) confirmed that this gradient also applies within the construction industry<sup>28</sup>.

In a review undertaken by Doran (2013) for the New South Wales Mental Health Commission, it was noted that several experts point to the need for workplaces to become better equipped to handle psychological stress within their own companies<sup>29</sup>. If employers were more aware of the economic consequences of the impact of mental disorders on their employees, the workplace could provide an ideal setting for mental health promotion and prevention. Hilton et al (2008) suggest that effective treatment for mental health problems yields substantial increases in employee productivity and would be a sound economic investment for employers<sup>30</sup>. Unfortunately, the prevention of suicide has not been adequately addressed in society or the workforce, due to a lack of awareness of suicide as a major problem and the taboo in many societies to discuss it openly<sup>6,24,31</sup>. Mann et al (2005) conducted a systematic review of suicide prevention strategies and found that, overall, a range of national suicide prevention strategies have been proposed despite knowledge deficits about the effectiveness of some common key components<sup>32</sup>. The authors suggest that the most promising interventions are physician education, means restriction (i.e., reducing access to lethal methods), and gatekeeper education (i.e., where the roles of gatekeepers are formalized and pathways to treatment are readily available)<sup>32</sup>. An updated systematic review of suicide prevention strategies conducted by Zalsman et al (2016) did not include any workplace-specific strategies<sup>33</sup>.

MATES in Construction is an example of a multi-faceted strategy developed to address suicide prevention in the workplace. MATES was established in Queensland in 2008 by the Building Employees Redundancy Trust to prevent suicide in the construction industry. The program was subsequently implemented in Western Australia in 2010, New South Wales in 2012, South Australia in 2013 and NT in 2018. MATES is a multimodal prevention and early intervention program, consistent with the Living Is For Everyone strategy (LIFE) and Mrazek and Haggerty's spectrum of prevention and intervention<sup>34,35</sup>. MATES has three main components: general awareness training (GAT), connector training and applied suicide intervention skills training (ASIST). GAT involves a one-hour training session provided by accredited trainers to construction workers on sites with the aim of increasing awareness of suicide as a workplace health and safety issue, improving knowledge of warning signs and encouraging workers to seek support. Connector training involves a four-hour training session provided by MATES. The role of a connector is to keep coworkers safe while connecting them to help, i.e. to an ASIST-trained worker, MATES field officer or case manager. ASIST workers undergo an intensive two-day training course to better prepare them for identifying cues and responding appropriately to calls for help with the objective of reaching a contract or safe plan involving extra help and safety. MATES engagement also includes a 24/7 helpline that offers support and guidance for Connectors, ASIST Volunteers and construction workers when broader support is required to create suicide and psychosocial safety via case management<sup>36</sup>.

MATES most recent initiatives engage broader workplace mental health activities that fall within the Blueprint for Better Mental Health and Suicide Prevention Framework (Figure 1)<sup>37</sup>. This framework includes preventative and early intervention activities for apprentices, particularly vulnerable to suicide, and support for developing site-based responses to bullying and harassment<sup>38</sup>. This also includes transformational leadership development for supervisors as part of a new MATES initiative to mitigate workplace psychosocial hazards in alignment with the Blueprint for Better Mental Health and Suicide Prevention in the Building and Construction industry<sup>38-41</sup>. Having undertaken postvention and critical incident support since inception, MATES also have developed an evidence based program, MATES Respond, to train Connectors and ASIST volunteers on how to initiate a postvention or critical incident support plan when a death or accident including suicide of a colleague impacts a construction site<sup>39</sup>.





Since its inception, MATES has had substantial uptake in the building and construction sector and has developed an evidence-base supporting its effectiveness. Previous evaluation research has demonstrated the social validity of the program among construction workers<sup>42</sup>, effectiveness in shifting beliefs around suicide<sup>43,44</sup>, improvements in suicide prevention literacy, and increased intentions among workers to offer help to workmates and to seek help for themselves<sup>43,45-47</sup>. Research has also demonstrated the significant economic return of investing in workplace suicide prevention initiatives such as MATES<sup>17,21,48</sup>. MATES in Construction recently developed a program logic model to describe how program outputs are expected to generate program outcomes including improved mental health and reducing suicidality<sup>49</sup>. MATES is a program rolled out organically and continuously over time. In this context short-, medium- and long-term outcomes are to be understood as referring to the order of the outcomes rather than a timeframe<sup>49</sup>. Since its establishment, MATES has inspired other workplace mental health and suicide prevention programs such as the 'Blue Hats' program in Australia<sup>50</sup>, 'Mates in Mind' in England<sup>51</sup> and has also been extended to the mining and energy industries and the New Zealand construction industry (established 2019)<sup>52</sup>, with significant interest from several other male-dominated industries in Australia<sup>47</sup>.

The objective of this study is to draw on the empirical research and a validated costing methodology to quantify the economic cost of suicide and non-fatal suicide behavior to the NT construction industry and estimate the potential impact of MATES in Construction (QLD/NT) in reducing this cost.

#### **METHODS**

#### Rates of suicide and non-fatal suicide behaviour

King et al (2022) recently conducted a search of NCIS data examining suicide in the construction industry over the period 2001-2019<sup>53</sup>. The study used a retrospective caseseries design and coronial data from the NCIS to assess suicide rates among employed Australians, comparing rates among construction workers relative to non-construction workers over time. Non-construction workers refer to people employed in an industry other than construction. As noted by King et al (2022), mental illness and suicide rates are generally higher among the unemployed and those who are not in the labour force. Therefore, comparison of rates of suicide in occupational groups to rates in the general population that includes the unemployed would lead to biased estimates. To ensure comparability between construction workers and the referent population, the analysis conducted by King et al (2022) was restricted to the employed population. The authors coded all information regarding occupational text according to the Australian and New Zealand Standard Classification of Occupations (ANZSCO) four digit<sup>54</sup>, for all deaths due to intentional self-harm, and for the years 2001-2019. This definition comprised 144 occupations at the 4-digit level. Population estimates were obtained from the Australian Bureau of Statistics (ABS) using the 2006, 2011 and 2016 census data by occupation, state, year, age and sex. The construction industry population fluctuates over time, and to account for this, population numbers were adjusted using the quarterly released labour force data<sup>55</sup>. This adjustment accounts for the average change in population (each year) with reference to the corresponding census year.

King et al (2022) reported that, over the period 2001-2019, there were 84 suicides among identifiable male construction workers in the NT, and 228 suicides among the male non-construction workers. King et al (2022) estimated an overall age-standardised suicide rate for male construction workers at 51.9 per 100,000 in NT (95% CI 40.5-63.3), almost twice that of other male workers (28.5 per 100,000, 95% CI 24.7-32.3)<sup>53</sup>. Overall rates among male construction workers have remained higher than non-construction workers, however there was convergence in rates between the two groups for the three most recent time points (Figure 2).





#### **Costing methodology**

The costing approach used in this analysis relied on a methodology developed by the Industry Commission<sup>56</sup>, refined by the National Occupational Health and Safety Commission<sup>57</sup>, and applied in costing studies by Safe Work Australia (SWA)<sup>58,59</sup>, Doran et al (2016)<sup>21,48</sup>, Kinchin and Doran (2017)<sup>16</sup>, with elements of the method endorsed by the Productivity Commission<sup>4</sup>. The costing analysis identifies direct and indirect costs for a range of economic agents (including employers, workers, and society) segregated by severity, in line with the Productivity costing estimates<sup>4</sup> and other suicide costing studies<sup>60</sup>. The current analysis introduces a non-economic category that attempts to consider the community value of a lost life, commonly referred to as intangible costs. This category was considered in SWA's original costing study<sup>58</sup>.

#### Levels of severity of work-related incidents

SWA created five mutually exclusive categories of severity to define the level of severity associated with workplace injury and disease. These categories were based on definitions from the national dataset for compensation and were developed using incident severity and duration of absence. Severity ranges from minor incidents involving little or no absence from work to fatalities. Previous costing used only three severity categories: short absence, full incapacity and fatality<sup>17,21</sup>. The current analysis considers four levels of severity corresponding to recent work by the ABS in reporting work related injury and illness<sup>61</sup>: short absence, long absence and return to work (combination of long absence and partial incapacity), long absence and no return to work (referred to as full incapacity) and fatality (Table 1).

Doran and Ling (2016) and Kinchin and Doran (2017) adopted a Word Health Organisation estimate that for every 15 suicide attempts there is one fatality and from the 15 attempts, 12 (83%) were classified as short absence and 3 (17%) as full incapacity<sup>17,21</sup>. Data from the 2020-21 National Study on Mental Health and Wellbeing supports a ratio of 20.35<sup>62</sup>.

Data from the SWA injury reports indicate that 63.1% of workplace injuries result in a short absence<sup>58,59</sup>, suggesting that 36.9% are for a long absence. The 2021 National Return to Work Survey suggests that the return to work rate for those workers with a probable serious mental illness was 70.9% (compared with the national average of 91.6%<sup>63</sup>). These data are used to assume in the current analysis that for every fatality there are 20.35 attempts with 63.1% resulting in a short absence, 26.2% resulting in a long absence with return to work.

Category label	Severity	Category Definition
Short absence	Less than 5 days off work	A minor work-related injury or illness, involving less than 5 working days absence from normal duties, where the worker was able to return to full duties
Long absence - return to work	Five days or more off work and return to work	A minor work-related injury or illness, involving 5 or more working days and less than 6 months off work, where the worker was able to return to work
Long absence - no return to work	Full incapacity with no return to work	A work-related injury or disease, which results in the individual being permanently unable to return to work
Fatality	Fatality	A work-related injury which results in death

Table 1: Cate	gories and	proportion	of injur	y b	y severity

Source: Safe Work Australia<sup>58</sup>, ABS injury and illness<sup>61</sup>

#### Conceptual cost categories

Seven cost groups are used to derive cost estimates: production disturbance costs, human capital costs, medical costs, administrative costs, transfer costs, other costs and the community value of life (Table 2). Appendix A provides a summary of methods used in costing analysis. Appendix B provides a summary of key parameters used in the analysis by severity.

#### Production disturbance costs

Production disturbance costs reflect short-term impacts until production is returned to preincident levels and includes the cost of overtime and overemployment, employer excess payments, staff turnover costs, staff training and retraining costs. Cost of overtime and employment is the proportion of overtime totally related to work-related injuries and wage of workers that would not be required if there were no work-related injuries. It is estimated by combining average weekly earnings (AWEs) multiplied by duration of absence by severity multiplied by 0.4. It is assumed that workers that incur injuries resulting in a long absence with no return to work are replaced after 26 weeks, consistent with turnover and recruitment costs. Employer excess payments represent the portion of costs of a claim requiring payment by the employer before workers' compensation provisions begin. Employer excess payments are estimated as average daily earnings multiplied by the average of the excess period of 3.3 days. Employer excess payments are applied to long absence and fatalities. Staff turnover costs are the costs to the employer associated with hiring new employees to replace injured or absent workers. This includes advertising costs and the costs associated with time spent in the recruitment process. Turnover and recruitment costs are estimated to be equal in value to 26 weeks at AWE. Staff training and retraining costs are the costs to the employer associated with training existing staff and retraining new staff. This could arise both from legislative requirements because of work-related incidents or simply the need to train staff with new skills as a result of increased responsibility or changed duties. Staff training and retraining costs in the event of full incapacity or a fatality is equivalent to 2.5 weeks of AWE.

#### Human capital costs

Human capital costs are long run costs occurring after a restoration of pre-incident production and include loss of future earnings, loss of government revenue and social welfare payments for lost earning capacity. This analysis uses the human capital approach to value loss of future earnings for full incapacity and fatality. For cases involving full incapacity or fatality: loss of earnings from time of injury to retirement age (66.5 years), assuming a discount profile and productivity loss. For full incapacity, future earnings can also include average social welfare payments received (since these contribute to post-injury income). Workers are assumed to increase productivity (through experience and job knowledge) at the rate of 1.2% per annum<sup>64</sup>. This figure is used in conjunction with discount and inflation rates to determine the present value of future income streams. Loss of government revenue reflects the tax losses due to foregone income and are valued using the marginal tax rate appropriate to the AWE (i.e., 32.5%)<sup>65</sup>. Future earnings for full incapacity cases also include the average social welfare payments received in the form of disability support pension (\$1,097 per fortnight) since these contribute to post-injury income<sup>66</sup>.

#### Medical costs

Medical costs are costs incurred though medical treatment of workers injured in work-related incidents. Average medical costs are sourced from SWA<sup>59</sup> and have been recently endorsed by the Productivity Commission<sup>4</sup>. Adjusted to reflect 2022 prices<sup>67</sup>, medical costs by severity are estimated at \$1,011 for a short absence, \$9,860 for a long absence with return to work, \$15,434 for a long absence with no return to work and, \$2,997 per fatality. In all work-related incidents involving medical care, the employer covers the first \$617 (adjusted to reflect 2022 prices), and workers contribute 15% of the difference with the government assumed to cover the remainder. Although the relative contributions by workers and the government may vary according to private insurance arrangements, the total cost will not.

#### Administrative costs

Administrative costs included in this analysis are costs incurred in investigation costs, legal fines and penalties, travel expenses and funeral costs. Investigation costs relate to the costs of investigating an incident and the administrative cost of collecting and reporting

information on work-related incidents. Average investigation costs are sourced from SWA<sup>59</sup> and adjusted to reflect 2022 dollars<sup>67</sup>: \$35 per short absence; \$838 for a long absence with return to work, \$2,928 for a long absence with no return to work and, \$3,502 per fatality. Legal fines and penalties are costs associated with successful prosecutions associated with proceedings initiated by workers' compensation authorities as a result of serious work-related incidents. Based on SWA estimates (adjusted to reflect 2022 dollars), the average fine per conviction is \$123,325 and the prosecution rate is assumed to be 3% of incidents for full incapacity and fatality (cost equivalent to \$3,700) dollars<sup>67</sup>. Travel costs represent expenses for travel to doctors, rehabilitation centers, solicitors, etc. SWA estimates<sup>59</sup>, adjusted to reflect 2022 dollars<sup>67</sup>, \$6 per short absence; \$114 for a long absence with return to work, \$321 for a long absence with no return to work and \$234 per fatality. For full incapacity cases, the government is assumed to match travel expenses 1:1 with the individual, in effect assuming a 50% travel concession for full incapacitated workers. Funeral costs are estimated at \$10,411<sup>68</sup>. It is acknowledged that funeral costs will vary by cultural or religious beliefs so a conservative estimate is applied. Further, while funeral expenses may be associated with all deaths, fatality by suicide brings these costs forward.

#### Other costs

Other costs are costs not classified in other areas and include cost of carers. aids/modifications for full incapacity cases, and the cost of bereavement and postvention services for fatalities. Services Australia provide a career allowance of support payments of \$144.80 per fortnight<sup>69</sup> and an annual payment of \$183 to cover the cost of aids and modifications<sup>59,67</sup>. The total of these payments is discounted to present value terms over the period between the incident and life expectancy. Postvention is psychological first aid, crisis intervention, and other support offered after a suicide to affected individuals or the workplace as a whole to alleviate possible negative effects of the event. A fatality by suicide has a flow-on effect with research suggesting that each fatality by suicide impacts directly on six to twenty people<sup>10</sup>. The economic cost associated with suicide bereavement is estimated at \$16,630 per person multiplied by six people bereaved (adjusted to reflect 2022 dollars)<sup>67,70</sup>. Evidence from an industry source suggests that each fatality by suicide may be witnessed by on average three colleagues that would then require counselling and time off work as part of postvention care. These costs are estimated at \$10,000 per worker from time of incident to return to full duties<sup>21</sup>. This assumption is in line with other attempts to measure the ripple effects of a suicide but may be considered as conservative as it only considers the impact on workers and not families or friends<sup>17,23</sup>.

#### Transfer costs

Transfer costs refer to the deadweight losses associated with the administration of taxation and welfare payments. Deadweight costs due to inefficiencies incurred through tax loss are estimated at 10.81% of the total net present value of loss of government revenue (i.e., taxation revenue). Deadweight costs due to inefficiencies incurred by social welfare payments are estimated at 9.75% of the total net present value of welfare payments.

#### Non-economic community value of lost life

The community value of lost life cost is estimated using a 'willingness to pay' approach based on the value of a statistical life. As noted in the Productivity Commission report, this approach is used by Bureau of Infrastructure, Transport and Regional Economics in calculating the costs associated with road fatalities<sup>71</sup>. The value of a statistical life is an estimate of the financial value society places on reducing or avoiding the death of one person. By convention, it is assumed to be based on a healthy person living for another 40 years. It is a known as a 'statistical' life because it is not the life of any particular person. An estimate of the value of life is, therefore, a tool for decision-making, not the value that is placed on any particular person. There are a variety of methods used to value a life, but the 'willingness to pay' method is viewed as the most appropriate technique<sup>72,73</sup>. Unlike other methods, such as the human capital model that captures the discounted value of future earnings, the willingness to pay method quantifies non-market preferences and values, such as quality of life, health and leisure<sup>73</sup>. The Office of Best Practice Regulation has estimated the value of a statistical life to be \$5.38 million, adjusted to 2022 dollars<sup>67,72</sup>.

#### Other methodological considerations

Consistent with previous costing attempts<sup>17,21</sup>, the methodology used in this analysis is based on an incidence-based approach. The incidence-based approach allows a better estimate of the economic cost, since it allows the future costs for new cases to be followed over the expected lifetime of the case. This approach is known as the lifetime cost approach and provides an indicator of the benefits of reducing work-related incidents. The costs that an injury imposes in future years are discounted to present values (i.e., constant 2022 dollars in this analysis). The lifetime cost approach assumes the levels and structures of current costs accurately reflect future costs. A further assumption is that the methodology is based on an ex-post approach in which costs are attributed to incidents after they occur and as a direct result of the incident. The nature of the compensation-based data, which the SWA methodology is based, lends itself to an ex-post estimation process. The current and future costs associated with each case can be assigned individually (since the number of cases and the nature of each case is known) and the total cost estimated by aggregating the cost of each case and/or cost component from the bottom-up. Table 2: Economic cost borne by the employer, worker, and society

Total	Employer (E)	Worker (W)	Society (S)
Production disturbance costs			
Overtime and overemployment	Overtime premium	Zero	Zero
Employer excess payments	Employer excess payments	Zero	Zero
Staff turnover costs	Staff turnover costs	Zero	Zero
Staff training and retraining costs	Staff training and retraining costs		
Human capital costs			
Present value of earnings before incident minus earnings after incident	Zero	Loss of income, net of compensation, welfare and tax	Compensation and welfare payments for lost income earning capacity; tax losses
Medical costs			
Medical and rehabilitation costs incurred as a result of injury	Threshold medical payments	Gap payments	Medical payments not covered by employer or worker
Administrative costs			Worker
Investigation costs	Employer investigation costs	Zero	Costs of running the compensation system (including investigation claims)
Legal fines and penalties	Employer fines and penalties	Zero	Zero
Travel costs	Zero	Out of pocket expenses	Compensation for travel costs
Funeral costs	Zero	Out of pocket expenses	Compensation for funeral costs
Other			
Carers	Zero	Zero	Payments to carers
Aids, equipment and modifications	Zero	Zero	Reimbursements for aids, equipment, modifications
Postvention	Postvention	Zero	Postvention
Transfer costs			
Deadweight costs of tax revenue foregone and social welfare paid	Zero	Zero	Deadweight costs of tax revenue foregone and social welfare paid
Community value			
Economic cost that society places on value of a life	Zero	Zero	Years of life lost by value of statistical life

### Estimating the effectiveness of MATES in Construction

Since its inception, MATES has had substantial uptake in the building and construction

sector and has developed an evidence-base supporting its effectiveness. Table 3 provides an overview of MATES in Construction activities over the period 2018-19 to 2022-23. All activities have increased steadily since commencement of MATES. By 2022-23, an estimated 15% of the NT construction industry workforce had undertaken a GAT. Over 200 workers had completed connector training and over 66 workers had reached out for support through case management.

Year	CI workforce*	General awareness training (GAT)	GAT cumulative	% GAT / workforce	Connector training	ASIST training	Case management
2018-19	11,174	208	208	1.9%	23	8	7
2019-20	10,879	359	567	5.2%	34	0	15
2020-21	10,448	409	976	9.3%	74	9	18
2021-22	9,442	226	1,202	12.7%	39	3	17
2022-23	10,571	409	1,611	15.2%	64	0	16

Table 3: MATES in Construction (NT) activities 2018-19 to 2022-23

\*CI = NT construction industry workforce<sup>55</sup>

Previous evaluation research has demonstrated the social validity of the program among construction workers<sup>42</sup>, effectiveness in shifting beliefs around suicide<sup>43,44</sup>, improvements in suicide prevention literacy, and increased intentions among workers to offer help to workmates and to seek help for themselves<sup>43,45-47</sup>. Help-seeking behaviour is reinforced via contact with MATES case managers primarily when a distressed worker is offered help by a Connector or ASIST volunteer from their site. This eventuates in a case plan of broader support for the person of concern. MATES case managers do not provide a clinical service to clients but provide a brokerage model encompassing crisis intervention, referral and psychoeducation. The MATES case management brokerage model is a brief approach to case management in which case managers attempt to help clients to identify their needs and broker supportive services over a brief contact period<sup>42</sup>. This model assumes that a client in need will voluntarily use the services once they know that they are available and learn how to access them. This model works best when a client's biggest challenge is access to services, rather than availability of services. In a brokerage case management model, the case manager provides very little direct therapeutic support to the client. Instead, they serve as a link between a client and community resources. The focus is on assessing needs, planning a service strategy, and connecting and following up with clients<sup>74</sup>. A non-clinical case management approach has shown to be effective in improving depression scores, suicide ideation, and quality of life<sup>75,76</sup>.

Doran et al (2021) conducted an in-depth review of MATES in Construction (QLD/NT) case management for the period 2010-2018<sup>36</sup>. The aim of the review was to quantify service demand, examine the demographic and occupational profile of clients, document presenting issues, referral pathways and the perceived benefit of case management among individuals who used this service. The review found that workers who had

contacted case management felt that their needs and concerns were being appropriately addressed, particularly in relation to suicide ideation<sup>36</sup>.

The current analysis draws on the MATES in Construction (QLD/NT) case management database for Queensland cases to develop a counterfactual that estimates the number of potential suicides prevented by the intervention of MATES. It is the concept of what would have happened if MATES programs, and in particular, case management, had not been available.

#### Case management data

An extract of the MATES in Construction (QLD/NT) case management records was analysed from Queensland. The dataset contained 4,220 case management records for 3,759 unique person identifiers, entered between January 2010 and December 2018. Most clients (90.3%) were associated with only one case record and 0.5% of clients had four or more records, up to a maximum of six<sup>36</sup>.

#### Counterfactual classification

A tiered system of inclusion criteria was developed to estimate the counterfactuals based on available case management data. Variables for suicidality, list of issues, and referral information were used. Table 4 describes the relevant information contained in these variables.

Variable	Description	Summary statistics
Providers	The list of providers to which a client was referred for assistance.	3213 records where the client was referred to at least one provider.
Suicide ideation	A binary variable indicating whether the client was identified as being at risk of suicide.	245 records.
Suicide related issues	The list of issues for a client included suicide ideation, suicide intervention or suicide attempt.	554 records. (No records included suicide attempt).
Suicide bereavement	The list of issues for a client included suicide bereavement.	38 records.
Mental health	The list of issues for a client included diagnosed or undiagnosed mental health.	337 self-reported as diagnosed.131 undiagnosed (includes 6 cases with both diagnosed and undiagnosed).
Number of issues	The number of presenting issues listed for a client.	2105 with more than 1 issue. 1036 with 3 or more issues.

#### Table 4: Case management information considered in developing counterfactuals

#### Inclusion criteria

Inclusion criteria were designed to enable analysis of counterfactuals under a variety of different assumptions. Categorical criteria separated cases into discrete groups by their nature, such as whether the case was referred to providers. Cumulative criteria were designed to sequentially relax the exclusivity of their rules over a set of seven different profiles. Cases that are included under more stringent criteria are also included under more relaxed criteria resulting in a cumulative count across profiles for comparison. Criteria are described below with the full classification scheme presented in Table 5.

#### Categorical criteria

- *Referred to at least one provider*: MATES utilise the brokerage model whereby case managers connect clients with services rather than provide direct services themselves<sup>74</sup>. As such, a fundamental assumption of the counterfactual based on case management data is that the client must have been referred to at least one provider.
- Suicidality: Case managers' assessment of suicidality is taken at face-value. That is, a client assessed as having thoughts of suicide and therefore more likely to die by suicide without intervention than a client assessed as not having thoughts of suicide. Given the difficult nature suicidality, counterfactuals were calculated both for the category of suicidality and for those both with or without suicidality.

#### Cumulative criteria

• Suicide-related issues: It was assumed that suicide attempts and ideation related to a

higher likelihood of suicide. Case records with "suicide ideation", "suicide intervention", or "suicide attempt" included in the list of presenting issues were assumed to relate to an increased likelihood of suicide for those clients.

- *Suicide bereavement*: Suicide-related issues was extended to include "suicide bereavement" from the list of presenting issues in this category.
- Mental health: It was assumed that mental health issues when compounded with other presenting issues increased likelihood of suicide. . Case records were included under this criterion for two levels — "diagnosed" where the list of issues included "Mental health (diagnosed)" as self-reported by the client, and "any" where the list of issues contained either "Mental health (diagnosed)" as self-reported by the client or "Mental health (undiagnosed)".
- Number of issues: It was assumed that a greater number of presenting issues was related to a higher likelihood of suicide. Case records were included under this criterion at three levels "three or more", "more than one", and "any". The mode of the frequency distribution for the number of issues among cases assessed as being at a higher likelihood of suicide that also had at least one suicide-related issue was 2. The threshold of "three or more" was set to include cases with more noted issues than was typical of this subset of cases.

#### Classification scheme

Counterfactual profiles A-through-G describe the sequentially more-inclusive criteria. All counterfactuals required that the client was referred to at least one provider, and counterfactual profiles were computed separately for cases that were assessed as being at a higher likelihood of suicide and those where this assessment may or may not have been made.

Cate	egorical	Cumulative				
Suicide Risk	Referred to provider(s)	Counterfactual	Suicide- related issues	Include bereavement	Mental health	Number of issues
		A (most restrictive)	Yes	No	Diagnosed only	> Mode (3+)
		В	Yes	Yes	Diagnosed only	> Mode (3+)
Voc	Ves	С	Yes	Yes	Any	> Mode (3+)
163	163	D	Yes	Yes	Any	> 1
		Е	Any or none	Any or none	Any	> 1
		F	Any or none	Any or none	Any	Any
		G (most inclusive)	Any or none	Any or none	Any or none	Any
		A (most restrictive)	Yes	No	Diagnosed only	> Mode (3+)
		В	Yes	Yes	Diagnosed only	> Mode (3+)
Δον	Voc	С	Yes	Yes	Any	> Mode (3+)
Ану	163	D	Yes	Yes	Any	> 1
		E	Any or none	Any or none	Any	> 1
		F	Any or none	Any or none	Any	Any
		G (most inclusive)	Any or none	Any or none	Any or none	Any

#### Table 5: Counterfactual classification scheme

#### Application of counterfactuals to suicide counts and rates

The potential impact of MATES in Construction is estimated as the difference between the actual and potential suicides numbers compared to total number of clients accessing case management. Type A counterfactuals were added to the suicide counts for males in the Queensland construction industry provided by King et al (2022)<sup>53</sup> to demonstrate what the suicide count would have potentially been had these persons died by suicide. Queensland construction industry labour force estimates<sup>55</sup> were used to estimate crude suicide rates and the counterfactual suicide rates over the period. This information is then compared with case management numbers to provide an estimate of proportion of workers that engage with MATES (through case management) who do not die by suicide. This

proportion is then applied to NT case management clients to estimate the potential impact of MATEs in Construction (NT).

#### Estimating the return on investment of MATES in Construction

The economic impact of MATES in Construction is calculated by comparing the operating costs of MATES in Construction with the savings generated through averted suicidal behaviour derived from the counterfactual scenario. MATES in Construction (NT) operating costs are available for the period 2018-19 to 2022-23. An annual average operating cost is calculated for this period.

#### Sensitivity analysis

Sensitivity analyses were undertaken to test the robustness of results to changes in key parameters. The number of fatalities by suicide was varied between 4.3 and 6.7 to reflect uncertainty in suicide numbers. The ratio of suicides to suicide attempts (i.e., 1:20.35) was adjusted to 1:15 reflecting the World Health Organisation estimate<sup>1</sup>. The proportion of suicide attempts resulting in full incapacity (i.e., 10.7% of attempts) was reduced by 5 percentage points (i.e., to 5.7%) to reflect a lower estimate reported by the Productivity Commission<sup>4</sup>.

#### Ethics

Ethics approval to use NCIS data was granted by the Department of Justice and Community Safety Human Research Ethics Committee (JHREC) (Project identification code: CF/21/5112) and the Central Queensland University Human Research Ethics Committees (application reference 22877).

#### RESULTS

#### Cost of suicide and non-fatal suicide behaviour

Table 6 provides a summary of the average and total cost associated with suicide and non-fatal suicide behaviour by severity of injury expressed in 2022 dollars. Appendix C provides a detailed summary of the average cost associated with suicide and non-fatal suicide behaviour by severity of injury for each conceptual group expressed in 2022 dollars.

The average economic cost per incident is estimated at \$1,175 for a short-term absence, \$29,461 for a long absence with return to work, \$3.84 million for a long absence with no return to work and \$2.8 million per fatality. Adding the non-economic or intangible value of a statistical life (i.e., \$5.38 million) increases the average cost of a fatality to \$8.2 million. Consistent with the ex-post methodological approach used in this analysis, the majority of costs are borne by the society / government due to the fact costs are attributed to incidents after they occur and as a direct result of the incident. The key cost driver in average cost estimates for a long absence with no return to work and fatality is the human capital costs associated with loss income, loss of government revenue and social welfare payments.

Data from King et al (2022) estimate an overall age-standardised suicide rate for male construction workers at 51.9 per 100,000 in NT (95% CI 40.5-63.3). These rates are combined with estimates of the NT construction industry workforce (i.e., 10,571 workers in 2022-23) to estimate 5.5 fatalities by suicide among male construction industry workers in NT (range of 4.3 to 6.7 used in the sensitivity analysis). Using the National Study on Mental Health and Wellbeing ratio of self-harm attempts to fatality of 20.35 to 1, and based on 5.5 fatalities, this equates to 70 incidents resulting in a short absence, 29 incidents resulting in a long absence with return to work and 12 incidents resulting in a long absence with row ork and 12 incidents resulting in a long absence with the number of male construction industry workers engaged in suicide and non-fatal suicide behaviour results in an economic cost of \$62 million expressed in 2022 dollars. Combining the community value of lost life increases the cost to \$92 million.

Table 6: Average and total annual cost of suicidal behaviour in the NT industry, 2022 dollars

	Short	Long absence -	Long absence -	Fatality	
Average cost	absence				
Production disturbance costs	\$123	\$18,649	\$67,462	\$55,675	
Human capital costs	\$0	\$0	\$3,431,185	\$2,501,839	
Medical costs	\$1,011	\$9,860	\$15,434	\$2,997	
Administrative costs	\$40.70	\$952.07	\$6,948.14	\$17,847.94	
Other costs	\$0	\$0	\$128,668	\$129,780	
Transfer costs	\$0	\$0	\$191,052	\$87,896	
Total average economic cost	\$1,175	\$29,461	\$3,840,750	\$2,796,035	
Community value	0	0	0	\$5,382,317	
Total average economic and non-economic cost	\$1,175	\$29,461	\$3,840,750	\$8,178,352	
Total costs	Short absence	Long absence -	Long absence -	Fatality	Total
Production disturbance costs	\$8,646	\$546,130	\$805,914	\$305,450	\$1,666,140
Human capital costs	\$0	\$0	\$40,989,576	\$13,725,891	\$54,715,467
Medical costs	\$71,209	\$288,739	\$184,379	\$16,441	\$560,769
Administrative costs	\$2,866	\$27,881	\$83,004	\$97,919	\$211,670
Other costs	\$0	\$0	\$1,537,094	\$712,015	\$2,249,109
Transfer costs	\$0	\$0	\$2,282,345	\$482,225	\$2,764,570
Total economic cost	\$82,721	\$862,750	\$45,882,312	\$15,339,942	\$62,167,724
Community value	\$0	\$0	\$0	\$29,529,111	\$29,529,111
Total economic and non-economic cost	\$82,721	\$862,750	\$45,882,312	\$44,869,053	\$91,696,836

#### **Effectiveness of MATES in Construction**

#### Counterfactual estimates

The counterfactual classification scheme was applied to MATES in Construction (QLD/NT) case management for the period 2010-2018. For each year, duplicate personal identifiers were removed to prevent double counting of clients, however the same client may appear in different years. Results are presented in Table 7 with counterfactual counts as percentage of all clients by year presented in Appendix C. The cumulative, inclusive nature of the counterfactual profiles is demonstrated in Appendix D, showing the aggregate number of cases across all years of available data. As highlighted in Table 7, as the classification restrictions are relaxed (i.e., from type A to type G), the number of clients included within each category increases, together with the estimate of counterfactual numbers. For example, in 2018, the most restrictive classification (A) involved 6 clients, representing 1% of all clients contacting case managers in that year; the least restrictive classification (G) involved 487 clients, representing 82.4% of all clients contacting case managers in that year.

			Counterfactual						
Year	Referred to provider(s)	Suicide risk	Α	В	С	D	Е	F	G
2010	Yes	Yes	1	1	1	1	1	1	11
	Yes	Any	3	3	3	4	12	13	159
2011	Yes	Yes	1	1	1	1	1	1	8
	Yes	Any	4	4	4	4	18	22	264
2012	Yes	Yes	0	0	0	1	1	1	16
	Yes	Any	5	5	5	6	21	27	281
2014	Yes	Yes	1	1	1	1	1	1	13
	Yes	Any	2	2	2	3	10	18	284
2013	Yes	Yes	1	1	1	1	1	1	11
_0.0	Yes	Any	2	2	2	2	16	18	256
2015	Yes	Yes	0	0	0	1	1	1	21
	Yes	Any	5	5	5	6	28	38	367
2016	Yes	Yes	1	1	1	2	2	2	22
	Yes	Any	3	3	3	4	13	17	361
2017	Yes	Yes	2	2	2	2	2	2	46
-	Yes	Any	8	9	10	10	39	48	472
2018	Yes	Yes	6	6	14	15	18	18	51
	Yes	Any	14	14	42	46	158	171	487

Table 7: Counterfactual counts based on classification scheme

Type A counterfactuals were added to the suicide counts provided by King et al (2022)<sup>53</sup> to demonstrate what the suicide rate may have been had these persons died by suicide. Engagement of at-risk clients through MATES case management over the period 2010-

2017 is estimated to potentially avert 7 fatalities or an average of 0.875 fewer suicides each year. These numbers suggest that 0.2% of clients (i.e., 7 lives saved / 3,497 clients) that engaged with MATES through case management over the period 2010-2017 do not die by suicide. This proportion is applied to NT case management clients (Table 3) to estimate an average 0.13 lives saved due to MATES (i.e., 0.2% x 66 clients).

#### The return on investment of MATES in Construction

The average annual operating cost of MATES in Construction (NT) for the period 2018-19 to 2022-23 is \$209,387. The counterfactual analysis suggests a potential reduction in fatality by suicide among NT male construction industry workers due to MATES to be 0.13 fewer suicides each year. This equates to averting 0.3 self-harm attempts ending in a long absence with no return to work, 0.7 self-harm attempts ending in a long absence with return to work and 1.7 self-harm attempts ending in a short absence from work. The potential economic benefit of averting this harm is estimated at \$1.5 million each year expressed in 2022 dollars. Combining the community value of lost life, increases the cost to \$2.21 million. The potential return on investment of MATES in Construction (NT) is equivalent to 7.1:1, representing a positive economic investment of public funds. Incorporating the community value of life improves the return on investment to 10.5:1.

#### Sensitivity analysis

Several sensitivity analyses were undertaken to test the robustness of results to changes in key parameters. Varying the number of fatalities by suicide between 4.3 and 6.7 changes the economic cost from \$62 million to between \$41 million and \$76 million (or from \$92 million with the community value of lost life to between \$72 million and \$112 million). Varying the proportion of self-harm attempts that resulted in full incapacity from 10.7% to 5.7% had the largest impact on the return on investment, reducing the ratio from 7.1:1 to 4.7:1. Long absence with no return to work had the highest unit cost of any incident (including fatality) so any reduction in the number of these incidents had a larger than average impact on economic cost estimates. Adopting the World Health Organisation estimate of 15 suicide attempts for each fatality reduced the return on investment ratio from 7.1:1 to 5.7:1.

### DISCUSSION

The purpose of this study has been to quantify the economic cost of suicide and non-fatal suicide behavior in the NT construction industry and estimate the impact of MATES in Construction in reducing this cost. In undertaking this analysis a range of data, assumptions and methods were used. The analysis relied on the latest available evidence that had used NCIS data to identify fatalities by suicide among construction industry workers. Data were, however, available for males only. Although males represent most construction industry workers<sup>55</sup> and have higher rates of suicide than females<sup>5,53</sup>, the results will, nevertheless, be an underestimate of the true cost.

As highlighted by Safe Work Australia<sup>58,59</sup> and the Productivity Commission<sup>4</sup>, economic costing is not an exact science. Cost estimates depend on the costing approaches used,

the range of cost components that can be estimated, the quality of available data and the value of key parameters. Assumptions relating to the values of key parameters in this study have been chosen to be deliberately conservative. This study has closely followed the methodology adopted by Safe Work Australia which had been endorsed by the National Occupational Health and Safety Commission<sup>57</sup>. However, certain methodological variations were required to suit this study and to add value to the Safe Work Australia report. For example, unlike the Safe Work Australia report, this analysis included postvention costs associated with suicide bereavement and counselling. Evidence suggests that postvention costs are significant to both the community and the industry and failure to include these costs would underestimate any cost estimate<sup>11,70</sup>.

Conversely, we have not attempted to estimate the costs saved by the transfer of knowledge from the employee, learning workplace safety tools at work, and then applying them to family and friends outside of work. The ripple effects of other suicide gatekeeper programs like MATES have shown that for each person trained another five people have conversations with that trainee and learn about best practices in suicide intervention. This transfer of knowledge then increases the potential that costs of lives lost outside of work are saved, similar to the dissemination of CPR skills taught at work and applied in community. Further, no attempt was made to estimate the costs saved through the rehabilitation of emerging mental health conditions identified by trained MATES workers. While the individuals who were identified and referred for help by trained co-workers may not have been contemplating suicide, the progression of their mental health condition may have affected other absenteeism and presenteeism costs. The costs of lost productivity and life from untreated and progressive suicidal intensity.

Our costing methodology, consistent with the Safe Work Australia approach<sup>59</sup>, adopts an incidence based approach. The incidence-based approach is more appropriate for comparative economic analyses. The alternative prevalence-based approach assesses the number of people within the system at a given point in time, regardless of when the injury occurred. Under this approach, costs are generally allocated in a top-down manner, where total expenditures for a given year are proportioned across the identified categories of injury or illness<sup>77</sup>. While the prevalence approach to measuring total cases would provide the best estimate of total costs, since costs would be estimated over the total number of cases currently in the system at a given point during the reference year, it is difficult to obtain accurate prevalence data relating to occupational injury. Using inaccurate or incomplete prevalence data is likely to result in an underestimate of the number of cases and therefore produce an underestimate of total costs<sup>77</sup>.

The counterfactual method used in this analysis provides the basis of a transparent and communicable framework for measuring one aspect of the impact of MATES on suicide and psychosocial wellbeing in the construction industry. Importantly, it is based directly on evidence of MATES activity and intervention with respect to individuals, as opposed to analyses of overall suicide rates which include persons who died by suicide and were not exposed to MATES programs or personnel. The clear articulation of this method permits discussion and debate as to the appropriateness of each level of classification toward

refining and improving the measure. Three main limitations of this counterfactual approach are noted. First, the method classifies severity of case features that are available in case management data and it is assumed that this correlates with suicidality. Second, it assumes that the applied case management approach effectively prevents suicide and therefore cannot be used to directly evaluate the effectiveness or efficacy in preventing suicide. Individual case-level outcomes (i.e., persons in case management who did or did not die by suicide) are required to support this type of analysis. There may, however, be use for such a classification toward monitoring and describing the nature of caseloads experienced by MATES, and a broader assessment of psychosocial wellbeing. Third, the estimated counterfactual using the strictest inclusion criteria (Type A) may still overestimate the number of suicide deaths prevented.

In spite of these methodological challenges, the results provide a conservative assessment of the cost associated with suicide and non-fatal suicide behaviour in the NT construction industry and are in line with previous attempts to cost injury and suicidal behaviour in the construction industry<sup>21,78</sup>. Each incident involving a short-term absence is estimated to cost \$1,175, \$29,461 for a long absence with return to work, \$3.84 million for a long absence with no return to work and \$2.8 million per fatality. Adding the noneconomic or intangible value of a statistical life increases the average cost of a fatality to \$8.2 million. In 2022-23, there were an estimate 5.5 fatalities by suicide among male construction industry workers in the NT. Using the National Study on Mental Health and Wellbeing ratio of self-harm attempts to fatality of 20.3 to 1, and based on 5.5 fatalities, there were 70 incidents resulting in a short absence, 29 incidents resulting in a long absence with return to work and 12 incidents resulting in a long absence with no return to work. Multiplying these numbers with average cost per incident, suggest that the economic cost of suicide and non-fatal suicide behaviour in the NT construction industry is \$62.2 million, expressed in 2022 dollars. Combining the community value of lost life increases the cost to \$91.7 million. Although, the valuation of community value using the statistical life concept is relatively controversial, it has been used in several studies<sup>14</sup>, notably the recent assessment of the economic costs of suicide in Australia conducted by the Productivity Commission<sup>4</sup>, and a recent report commissioned by the construction industry culture taskforce<sup>60</sup> that examined workplace issues within Australia's construction industry and the economic cost of doing nothing to address these issues.

The impact of MATES in Construction in averting the economic cost of suicide and nonfatal suicide behaviour in the NT construction industry was calculated by comparing the operating costs of MATES in Construction with the savings generated through averted suicidal behaviour derived from a counterfactual analysis. Engagement of at-risk clients through MATES case management was estimated to result in 0.13 fewer suicides each year. This equates to averting 0.3 self-harm attempts ending in a long absence with no return to work, 0.7 self-harm attempts ending in a long absence with return to work and 1.7 self-harm attempts ending in a short absence from work. The potential economic benefit of averting this harm is estimated at \$1.5 million each year expressed in 2022 dollars. Combining the community value of lost life increases the cost to \$2.2 million. The potential return on investment of MATES in Construction (NT) is equivalent to 7.1:1. For every one dollar invested in MATES in Construction, the benefits are in excess of \$7.10, representing a positive economic investment. Incorporating the community value of life improves the return on investment to 10.5:1. Several sensitivity analyses confirmed the robustness of these results to changes in key parameters. All variations resulted in a positive return on investment for MATES in Construction.

#### CONCLUSION

Rates of suicide and non-fatal suicide behaviour are far too high in the NT. Although being employed has a protective effect on suicide behavior, over one-third of all Australian suicide fatalities are among employed people<sup>5</sup>. The burden and impact of suicide and non-fatal suicide behaviour in the construction industry is avoidable. More needs to be done to reduce and avert this harm. Workplace strategies such as MATES are a cost-effective approach to reducing the economic and epidemiological burden of suicide and non-fatal suicide behaviour in the construction industry.

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### APPENDIX A: SUMMARY OF METHODS USED IN COSTING ANALYSIS

COST	DESCRIPTION	SOURCE
CATEGORY		
Production distur	bance costs	
Value of lost production	Average weekly earnings (AWE) x average duration of absence (by severity category) x 0.4	ABS (Estimates of weekly earnings classified by industry, sector, state and territory) <sup>79</sup> ; SWA (duration of absence) <sup>59</sup>
Employer excess payments	Average daily earnings x 3.3 days	ABS (Estimates of daily earnings classified by industry, sector, state and territory) <sup>79</sup> ; SWA (duration of absence) <sup>59</sup>
Staff turnover costs	The cost of replacing existing staff affected by work- related incidents (26 weeks of AWE) and training of new staff (2.5 weeks of AWE)	ABS (Estimates of weekly earnings classified by industry, sector, state and territory); SWA (duration of absence) <sup>59</sup>
Human capital co	sts	
Loss of future earnings	For full incapacity: loss of earnings from time of injury to retirement age (i.e., <66.5years), cash rate=3.84%, inflation rate=2.44%, productivity rate=1.2%. For full incapacity, future earnings includes average disability support payments received (\$972 per fortnight) since these contribute to post-injury income.	ABS (Estimates of weekly earnings classified by industry, sector, state and territory) <sup>79</sup> ; RBA (cash rate 1990-2023), ABS (inflation rate 2000-2022) <sup>67</sup> , Treasury (productivity rate) <sup>64</sup> , Dpt Human Services (disability pension) <sup>66</sup>
Loss of government revenue	For full incapacity, taxation and other revenue foregone when workers are unable to work due to work-related incidents	ABS (Estimates of average weekly earnings classified by industry, sector, state and territory) <sup>79</sup> ; ATO (estimates of marginal taxation rate) <sup>65</sup>
Social welfare payments	Social welfare payments borne by the government for people with disabilities (disability support pension payments of \$1,096.70 per fortnight), discounted to present value over the period between the incident and reduced life expectancy	Services Australia (disability support payment) <sup>66</sup>
Medical costs		
Health and medical costs	Average medical costs from National dataset for compensation-based statistics	SWA (medical cost), ABS (inflation rate)
Administrative co	osts	
Investigation costs	As a proxy for the costs to firms, investigation and inspection costs reported in jurisdictional annual reports are assumed to match the cost to employers for these functions	Safe Work Australia report <sup>59</sup>

Legal fines and penalties	Legal fines and penalties are costs associated with successful prosecutions as a result of serious work- related incidents. The average fine per conviction is \$100,000 and the prosecution rate is assumed to be 3% of incidents for full incapacity and fatalities	Safe Work Australia report <sup>59</sup>
Travel expenses	Payments made for travel expenses to workers" compensation jurisdictions by claimants (as a proxy, assuming that compensation is adequate to cover these expenses).	Safe Work Australia report <sup>59</sup>
Funeral expenses	Average funeral costs are estimated at \$10,411	White Lady Funerals <sup>68</sup>
Other		
Carer costs	For full incapacity, the additional cost of care (estimated applicable carer allowance of \$144.80 each fortnight, discounted to present value over the period between the incident and death)	Dpt Human Services (carer support allowance)69
Cost of aids, equipment and modifications	For full incapacity cases only, the present value of future costs for aids and modifications (of \$183 per annum, discounted to present value over the period between the incident and death)	Dpt Human Services (essential medical equipment payment) <sup>80</sup>
Postvention costs	Cost associated with bereavement for 6 family / friends - estimated at \$14,058 per person; employer cost associated with providing counselling and time off work for 3 colleagues who may have witnessed fatality - estimated at \$10,000 from time of incident to return to full duties	Multiplier effect for 6 people by Corso et al (2007) <sup>10</sup> , Average social cost of bereavement by Comans et al (2013) <sup>70</sup>
Transfer costs		
Transfer costs	The redistribution of public sector resources to care for incapacitated person incurs deadweight costs on society. Deadweight costs are estimated at 10.81% of the total value of loss of government revenue and 9.75% of the total value of welfare payments.	Safe Work Australia report <sup>59</sup>
Community value		
Community value	Years of life lost (fatalities x (average life expectancy - average age of suicide) x value of statistical life	NCIS data analysis (fatalities and average age suicide) <sup>53</sup> , ABS (life expectancy) <sup>81</sup> , OBPR (value of statistical life) <sup>72</sup>

## APPENDIX B: SUMMARY OF KEY PARAMETERS USED IN COSTING ANALYSIS BY SEVERITY

Parameter	Short absence	Long absence - return to	Long absence - no return	Fatality
		work	to work	
Average earnings (construction - male)				
Per annum	\$88,676.06	\$88,676.06	\$88,676.06	\$88,676.06
Per week	\$1,705.31	\$1,705.31	\$1,705.31	\$1,705.31
Per day	\$341.06	\$341.06	\$341.06	\$341.06
Marginal tax rate of average earnings	32.5%	32.5%	32.5%	0.3
Average absence from work (days)*	0.9	128.5	130.0	43.6
Time required to replace staff (weeks)	0	0	26	26
Time required to train new staff (weeks)	0	0	2.5	2.5
Average age of injury / fatality (years)			37.8	37.8
Average retirement age (years)	66.5	66.5	66.5	66.5
Average productive years lost	0	0	0	28.7
Discount rate (per annum)	3.84%	3.84%	3.84%	3.84%
Inflation rate (per annum)	2.4%	2.4%	2.4%	2.4%
Productivity rate (per annum)	1.20%	1.20%	1.20%	1.20%
Average disability support pension (per annum)	\$0	\$0	\$28,514	\$0
Average years of life lost	0.0	0.0	0.0	43.1
Average medical costs	\$1,011	\$9,860	\$15,434	\$2,997
Average threshold medical payments	\$617	\$617	\$617	\$617
Average workers contribution	\$59	\$1,386	\$2,223	\$357
Medicare excess contribution	\$335	\$7,857	\$12,595	\$2,023
Average investigation costs	\$35	\$838	\$2,928	\$3,502
Average fine and/or penalty	\$0	\$0	\$3,700	\$3,700
Average travel expenses	\$6	\$114	\$321	\$234
Average funeral expenses	\$0.00	\$0.00	\$0.00	\$10,411
Average carer allowance (per annum)	\$0	\$0	\$3,765	\$0
Average life expectancy at birth males (in years)	80.9	80.9	80.9	80.9
Average years of life lost	0	0	0	43.1

Cost of aids, equipment and modifications (per annum)	\$0	\$0	\$183	\$0
Average years of life receiving disability support pension, carer allowance, equipment payment	0	0	43.1	0.0
Postvention costs - suicide bereavement (family and friends)	\$0	\$0	\$0	\$99,780
Postvention costs - suicide bereavement (coworkers)	\$0	\$0		\$30,000
Deadweight loss of government revenue	0%	0%	10.8%	10.81%
Deadweight costs of welfare payments	0%	0%	9.75%	9.75%
Value of a statistical life	\$5,382,317	\$5,382,317	\$5,382,317	\$5,382,317

\*Workers replaced after 26 weeks

# APPENDIX C: COUNTERFACTUAL COUNTS AS PERCENTAGE OF ALL CLIENTS BY YEAR.

	Deferred to	Quisida	Counterfactual						
Year	provider(s)	risk	Α	В	С	D	Е	F	G
2010	Yes	Yes	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	6.7%
		Any	1.8%	1.8%	1.8%	2.4%	7.3%	7.9%	97.0%
2011	Yes	Yes	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	2.8%
		Any	1.4%	1.4%	1.4%	1.4%	6.4%	7.8%	93.6%
2012	Yes	Yes	0.0%	0.0%	0.0%	0.3%	0.3%	0.3%	4.4%
		Any	1.4%	1.4%	1.4%	1.7%	5.8%	7.5%	77.6%
2014	Yes	Yes	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	3.4%
		Any	0.5%	0.5%	0.5%	0.8%	2.6%	4.7%	74.0%
2013	Yes	Yes	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	2.5%
		Any	0.4%	0.4%	0.4%	0.4%	3.6%	4.0%	57.4%
2015	Yes	Yes	0.0%	0.0%	0.0%	0.2%	0.2%	0.2%	4.1%
		Any	1.0%	1.0%	1.0%	1.2%	5.5%	7.4%	71.8%
2016	Yes	Yes	0.1%	0.1%	0.1%	0.3%	0.3%	0.3%	3.2%
		Any	0.4%	0.4%	0.4%	0.6%	1.9%	2.4%	52.0%
2017	Yes	Yes	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	7.0%
		Any	1.2%	1.4%	1.5%	1.5%	6.0%	7.3%	72.2%
2018	Yes	Yes	1.0%	1.0%	2.4%	2.5%	3.0%	3.0%	8.6%
		Any	2.4%	2.4%	7.1%	7.8%	26.7%	28.9%	82.4%

# APPENDIX D: CUMULATIVE PROPERTIES OF COUNTERFACTUAL CLASSIFICATIONS, ALL YEARS



## IVECO

## MATES 24/7 Helpline 1300 642 111

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