## S1. Methods

#### Coronial inquests into suicide clusters

The flowchart of cases involved in coronial inquests into suicide clusters shown in **S1 Figure**. A total of 56 young people were identified by searching for the police and coroner reports for the term “contagion” or “cluster.” The search was limited to closed cases, involving the suicide of a young person aged 10-24 years, who died in 2006-2015. The custom search identified a total of 58 cases comprising 7 independent clusters. Of these, 18 cases were excluded as false positives due to the description of “cluster B personality” in the police and/or coroner’s report. Excluded cases were therefore identified as non-cluster members in the analyses. The final sample involved 40 cases which comprised 7 independent suicide clusters. Since coronial inquests into suicide clusters were based on the communities perception of a suicide cluster the definitions and reasons for holding an inquest may potentially differ between each jurisdiction and suicide cluster. The definition and rational for the coronail inquest for each of the 7 suicide clusters is provided in **S1 Table**.

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**S1 Figure.** Flow chart of included studies in the descriptive network analysis of suicide clusters

**Table S1**. Definitions of suicide clusters and rationale for the coronial inquest into the suicide cluster

|  |  |  |
| --- | --- | --- |
| **Location** | **Year** | **Definition/rationale for inquest into the suicide cluster** |
| Queensland | 2007-2008 | The community was described as having *“experienced an unusually high number of suicides in a small geographical area or institution and over a relatively brief period of time.”* |
| Queensland | 2014-2014 | Multiple youth suicides in an inpatient treatment unit within a short period of time. It was described *“There appears to have been a contagion effect”* |
| Victoria | 2009 | It came to the attention of the Coroners Court of Victoria that seven persons aged 18 years and under residing in the region. A retrospective examination of suicides showed that the region had experienced a suicide cluster *“as defined by the Centres for Disease Control and Prevention.”* |
| Victoria | 2011-2012 | A member of the public contacted the Coroners Court of Victoria's  Coroners Prevention Unit (CPU)15 to convey concern about a perceived increased frequency of youth 16 suicide in the City. Statistical analysis revealed the region had experienced an elevated frequency of suspected suicide and *“this met the Centres for Disease Control and Prevention's definition of a suicide Cluster.”* |
| Western Australia | 2006-2007 | The number of youth suicides were described as having *“increased 100% during a 12-month period, constituting a suicide cluster.”* |
| Western Australia | 2008-2009 | The youth suicides in the community were described as *“100 times greater than the rate of suicide in the general population.”* |
| Western Australia | 2012-2015 | The number of youth suicides were described as *“significantly higher than expected for the community“* during the four-year time period. |

#### Descriptive Network analysis

The flowchart of linked cases is shown in **S2 Figure**. A total of 202 young people who died by suicide had been exposed to the suicide of another during the study period. Of these 120/202 (59.2%) were known to have been exposed to the suicide of another young person and were therefore examined for evidence of links to an unexposed (index) cases. Forty-nine (40/120, 40%) individuals with prior exposure to suicide could not be linked to an index suicide due to insufficient information contained in the police and narrative text in the NCIS. An examination of the core demographic characteristics recorded in the NCIS indicated no significant differences between linked cases and the 49 cases that were not successfully linked (**S2 Table**).

We successfully linked 71/120 (59.2%) exposed cases to a total of 46 index suicides, resulting in a total of 117 linked cases. Of the 117 linked cases, a total of 37 cases involved links between at least three or more young people. The remaining 80 cases were excluded because they involved links between two suicide descendants (comprising 40 linked pairs) and therefore not meet our definition of a suicide cluster. The final sample involved 37 linked cases, which comprised a total of 11 suicide clusters (7 triads and 4 tetrads). Overall, 15 cases were index suicides (with no prior exposure to suicide) 16 exposed cases (exposed to at least one index suicide). Dependencies between six cases were observed. These cases functioned as both an index and exposed case within the descriptive network. All cases included in the descriptive network analysis were directly linked as friends, peers and relatives. The direction of exposure between index and exposed cases included in the descriptive network analysis is shown in **S2 Table**.

Descriptive network analysis was conducted to identify transmission pathways among index and exposed cases. Transmission networks were identified among linked cases according to the relationship between descendants and the date of death. The first suicide in the network was defined as the index death and exposed cases were identified as subsequent deaths. All cases included in the descriptive network analysis were directly linked as friends, peers and relatives. The direction of exposure between index and exposed cases included in the descriptive network analysis is shown in **S3 Table**.

**S2 Table**. Demographic characteristics of linked and missing cases

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Variable** | **Eligible (N=71)** | |  | **Missing (N=49)** | |  |
|  | **N** | **(%)** |  | **N** | **(%)** | **X2 *P* value** |
| Sex (male) | 44 | (62) |  | 35 | (71.4) | 0.28 |
| Aged 18 years or less | 35 | (49.3) |  | 22 | (44.9) | 0.64 |
| Aboriginal or Torres Strait Island origins | 15 | (21.1) |  | 9 | (18.4) | 0.71 |
| Employed | 22 | (31) |  | 16 | (32.7) | 0.85 |
| Student | 23 | (32.4) |  | 19 | (38.8) | 0.47 |
| Residing in a remote location | 9 | (12.7) |  | <5 | (<10) | 0.56\* |

\*Fishers exact test

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**S2 Figure.** Flow chart of included studies in the descriptive network analysis of suicide clusters

|  |  |
| --- | --- |
| **Cluster description** | **Case ascertainment** |
| Triad: The third person (3) was exposed to two index suicides (1,2). | First and last name of index case(s) were identified in the police narrative of case (3). Cases were known to each other. |
| Triad: The third person (3) was exposed to two index suicides (1,2). | Index case(s) were identified by date and location of death in the police narrative of case (3). Cases were described as friends. |
| Triad: The second (2) and third (3) person who were both exposed to the same index suicide (1). | Index case identified by date and location in police narrative of case (2) and case (3). Cases were described as friends. |
| Triad: The second (2) and third (3) person who were both exposed to the same index suicide (1). | First and last name of index case was identified in the coroner report of case (2) and case (3). Cases were described as friends and from the same friendship circle. |
| Triad: The second (2) and third (3) person were both exposed to the same index suicide (1). | The Index case was identified by date and location of death in the coroner report of case (2) and (3). Cases were described as friends. |
| Triad: The second (2) person was exposed to the index suicide (1). The third person was exposed to two suicides (1,2) | Index case(s) (1,2) were identified by date and location of death in the coroner report of cases (2) and (3). Cases were described as friends. |
| Triad: The second (2) person was exposed to the index suicide (1). The third person who died by suicide was exposed to two suicides (1,2) | Index case(s) (1,2) were identified by date and location of death in the coroner report of cases (2) and (3). Cases were described as friends and in a relationship. |
| Tetrad: The second person (2) was exposed to the index suicide (1). The fourth person (4) was exposed to two suicides (1,3). | The Index case (1) was identified by first and last name in the police report. Case (3) identified by date and location of death in police report. Cases were described as peers in the same grade and friends. |
| Tetrad: The second (2) person was exposed to the index suicide (1). The third person (3) was exposed to the second suicide (2). The fourth person (4) was exposed to the third suicide (3). | Index case(s) (1,2,3) were identified by date and location of death in the coroner report. Peers from the same community and were known to each other. |
| Tetrad: The second (2) person was exposed to the index suicide (1). The third person (3) was exposed to the second suicide (2). The fourth person (4) was exposed to two suicides (1,3). | Index case(s) (1,2,3) were identified by date and location of death in the police and coroner reports. Cases were described as relatives and friends. |
| Tetrad: The third (3) person was exposed to two index suicides (1,2). The fourth person (4) was exposed to the third person (3) who died by suicide. | Index case(s) (1,2,3) were identified by location and date of death and method of death in both the police and coroner reports. Cases were described as friends. |

**S3 Table**. Characteristics of clusters detected using the descriptive network analysis



*To protect the identity of cases the precise location and nature of the relationship among friends and relatives has been excluded*

**S4 Table.** The scan statistic: Demographic characteristics

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Cluster suicides (N=69) | |  | Non cluster (N=2958) | |  | *P* value |  |
|  |  | N | % |  | N | % |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Sex (male) |  | 47 | (68.1) |  | 2167 | (70.0) |  |  |  |
| Aged 18 years or less |  | 21 | (21.9) |  | 984 | (33.27) |  | 1.00 |  |
| Aboriginal or Torres Strait Island origins | | 24 | (34.8) |  | 434 | (14.67) |  | 0.00 | \* |
| Employed |  | 20 | (29.0) |  | 974 | (32.93) |  | 0.58 |  |
| Student |  | 18 | (29.4) |  | 861 | (29.11) |  | 0.68 |  |
| Residing in a remote location | | 28 | (40.6) |  | 207 | (7.00) |  | 0.00 | \* |
| Exposure to suicide |  | 7 | (11.29) |  | 199 | (6.73) |  | 0.38 |  |

\**P*<0.05

**S5 Table.** Coronial inquests: Demographic characteristics

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Cluster suicides (N=40) | |  | Non cluster suicides (N=2987) | |  |  |  |
|  |  | N | % |  | N | % |  | *P* value |  |
| Sex (male) |  | 27 | (67.5) |  | 2187 | (73.22) |  |  |  |
| Aged 18 years or less |  | 28 | (70) |  | 887 | (29.7) |  | 0.00 | \* |
| Aboriginal or Torres Strait Island origins | | 22 | (55) |  | 436 | (14.60) |  | 0.00 | \* |
| Employed |  | 9 | (22.5) |  | 985 | (33.00) |  | 0.22 |  |
| Student |  | 14 | (35) |  | 865 | (28.96) |  | 0.51 |  |
| Residing in a remote location | | 20 | (50) |  | 215 | (7.20) |  | 0.00 | \* |
| Exposure to suicide |  | 14 | (35) |  | 192 | (6.43) |  | 0.00 | \* |

\**P*<0.05

**S6 Table.** Descriptive network analysis

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Cluster suicides (N=37) | |  | Non cluster suicides (N=2990) | |  |  |  |
|  |  | N | % |  | N | % |  | *P* value |  |
| Sex (male) |  | 26 | (70.3) |  | 2188 | (73.18) |  |  |  |
| Aged 18 years or less |  | 23 | (62.2) |  | 892 | (29.83) |  | 0.00 | \* |
| Aboriginal or Torres Strait Island origins | | 8 | (21.1) |  | 450 | (15.05) |  | 0.40 |  |
| Employed |  | 12 | (32.4) |  | 982 | (32.84) |  | 1.00 |  |
| Student |  | 16 | (43.2) |  | 863 | (28.86) |  | 0.08 |  |
| Residing in a remote location | | 5 | (13.5) |  | 230 | (7.69) |  | 0.31 |  |
| Exposure to suicide |  | 24 | (64.9) |  | 182 | (6.09) |  | 0.00 | \* |

\**P*<0.05