The association between suicide deaths and putatively harmful and protective factors in media reports

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ABSTRACT

BACKGROUND: Exposure to media reporting on suicide can lead to suicide contagion and, in some circumstances, may also lead to help-seeking behaviour. There is limited evidence for which specific characteristics of media reports mediate these phenomena.

METHODS: This observational study examined associations between putatively harmful and protective elements of media reports about suicide in 13 major publications in the Toronto media market and subsequent suicide deaths in Toronto (2011–2014). We used multivariable logistic regression to determine whether specific article characteristics were associated with increases or decreases in suicide deaths in the 7 days after publication, compared with a control window.

RESULTS: From 2011 to 2014, there were 6367 articles with suicide as the major focus and 947 suicide deaths. Elements most strongly and independently associated with increased suicides were a statement about the inevitability of suicide (odds ratio [OR] 1.97, confidence interval [CI] 1.07–3.62), about asphyxia by a method other than car exhaust (OR 1.72, CI 1.36–2.18), about suicide by jumping from a building (OR 1.70, CI 1.28–2.26) or about suicide pacts (OR 1.63, CI 1.14–2.35), or a headline that included the suicide method (OR 1.41, CI 1.07–1.86). Elements most strongly and independently associated with decreased suicides were unfavourable characteristics (negative judgments about the deceased; OR 1.85, CI 1.20–2.84), or mentions of railway (OR 1.61, CI 1.10–2.36) and cutting or stabbing (OR 1.59, CI 1.19–2.13) deaths, and individual murder-suicide (OR 1.50, CI 1.23–1.84).

INTERPRETATION: This large study identified significant associations between several specific elements of media reports and suicide deaths. It suggests that reporting on suicide can have a meaningful impact on suicide deaths and that journalists and media outlets and organizations should carefully consider the specific content of reports before publication.
public’s right to be informed.30 A detailed understanding of the specific aspects of media reports that may provoke suicide contagion is needed to help the media make these decisions; however, evidence identifying the “active ingredients” in media reporting that may mediate suicide contagion or adaptive behaviour remains limited. The studies above have established an evidentiary starting point from which the relative harmful or protective contributions of specific elements in media reports may begin to be unpacked. However, replication of findings across regions and cultures is also needed. The aim of this study is a comprehensive examination of the impact of putatively harmful and protective content of suicide reporting in print and online media on suicide death in Toronto, Canada’s largest urban centre.

Methods

Media data
Print and online media reports relating to suicide in the Toronto media market from 2011 to 2014 were the exposure of interest. We identified the 12 major Canadian publications that account for the large majority of traditional news circulation in the Toronto market, and 1 US newspaper with high circulation in Toronto (Box 1). Because of the large volume of articles, we hired Infomart, Canada’s leading media consultancy; the study investigators trained Infomart personnel to identify and code articles using an electronic database (for full details, see Appendix 1, available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.170698/-/DC1).

Coding and abstraction strategy
Articles were coded for content (Appendix 1). We explicitly derived putatively harmful and protective elements from 2009 Canadian Psychiatric Association reporting guidelines for media.29 We coded all variables independently of each other. That is, an article could be coded as being about suicide in both men and women if both were described. Likewise, an article that included both a statement of approval of suicide and a message of hope would have been coded as having both. Given the potential subjectivity inherent to some of these categorizations (e.g., whether an article included glorified or romanticized reasons for the suicide), we conducted inter-rater reliability tests, all of which included both a scientific content expert and an expert in journalism. We corresponded and held regular meetings throughout the process of abstraction to clarify points of uncertainty. We performed reliability tests initially, after every approximately 1000 articles coded, and at completion (for Κ values, see Appendix 2, available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.170698/-/DC1).

Suicide deaths
The population of suicide deaths includes a consecutive list of people whom the Office of the Chief Coroner of Ontario determined to have died by suicide in the city of Toronto between Jan. 1, 2011 and Dec. 31, 2014, inclusive. Detailed methods of data abstraction of the Office of the Chief Coroner have been published previously (Appendix 1).31

Statistical analysis
We conducted analyses only on “major focus” articles (Appendix 1) from 2011 to 2014. The primary outcome variable of interest was the difference (Δ) between the number of suicide deaths in the week after publication (this post-item period included the date of publication — “day 0” — and 6 subsequent days) compared with a pre-item control window with a 1-week lag (d −14 to −8) to ensure separation from other media reports of the same event that might have occurred just before day 0. We tested the impact of the volume of reports by including a continuous variable — a count of all articles relating to suicide published between day −14 and day 0.

We first conducted bivariate analyses under 2 conditions. Following previously established methods,5,6 article characteristics were compared for Δ > 0 (i.e., periods in which there were more suicide deaths after the article) versus Δ ≤ 0 (i.e., periods where there were the same number or fewer deaths after the article). We did this to test for a potential harmful effect. We conducted a second set of bivariate comparisons to test for a potential protective effect, this time comparing Δ < 0 to Δ ≥ 0, to identify article characteristics associated with fewer suicide deaths subsequent to publication.

The primary analyses involved 2 multivariable logistic regressions to determine the independent predictive contributions of media content characteristics on bivariate change in suicide deaths, the first for harmful and the second for protective associations. We included the variables that were significant in their respective bivariate analyses. We determined multicollinearity via tolerance (< 0.40) and variance inflation factor (< 2.5) values. We performed sensitivity analyses to test the impact of print versus online publications, as well as early (2011–2012) versus late (2013–2014) publication.

Significance was determined at a threshold of 0.05 for all variables.

Ethics approval
This study was approved by the Sunnybrook Health Sciences Centre research ethics board (ID# 199–2012).
Results

From 2011 to 2014, there were 16 845 articles relating to suicide across the 13 publications, including 6367 (37.8%) in which suicide was the major focus of the article (41.9% of these were online). Of the major focus subset, 314 (4.9%) appeared on the front page and 1736 (27.3%) included the word “suicide” in the headline. Over the same span, there were 947 suicide deaths (mean deaths per year ± standard deviation: 236.8 ± 22.6) in Toronto (demographic and suicide-specific characteristics shown in Table 1).

Bivariate comparisons

Tables 2 and 3 show bivariate analyses testing for increases and decreases in suicide frequencies in the week following publication of articles with different general content and putatively harmful or protective elements, respectively, from 2011 to 2014. Elements associated with more suicides in both harmful and protective comparisons were articles that focused on older adults, suicide pacts, jumping from a building, firearm death, and asphyxia other than by car exhaust, as well as those that identified the deceased as a celebrity. Mention of the suicide method in the headline and in the text, as well as a statement that suicide is inevitable, were all associated with increased suicides in the harmful effect analysis.

A higher number of recent articles related to suicide was associated with decreased suicides in both the harmful effect (odds ratio [OR] 0.9995, 95% confidence interval [CI] 0.994–0.9996) and protective effect (OR 0.9997, 95% CI 0.995–0.998) analyses. Other elements associated with fewer suicides in both comparisons were articles that focused on youth, a specific person’s suicidality or death, public policy, railway deaths and cutting or stabbing deaths. Articles about a specific person’s suicide death, articles about murder-suicide, articles with monocular explanations for suicide, articles highlighting unfavourable characteristics of the deceased (i.e., characterological or personal flaws or criminality) and articles including interviews with bereaved people were all associated with a subsequent decrease in suicides in the protective effect analysis.

Regression analyses

For multivariable logistic regression, Hosmer–Lemeshow tests showed good model fit ($p < 0.05$) for the protective effect regression model with all variables included and for the harmful effect model only if the continuous measure of number of articles was removed. Independent predictors in the harmful and protective models are shown in Table 4 and Table 5, respectively. Elements significantly independently associated with increased suicides in the harmful effect model were articles that contained a statement that suicide is inevitable (OR 1.97, CI 1.07–3.62); that were about asphyxia other than by car exhaust (OR 1.72, CI 1.36–2.18), suicide by jumping from a building (OR 1.70, CI 1.28–2.26), suicide pacts (OR 1.63, CI 1.14–2.35), firearm suicide (OR 1.28, CI 1.08–1.51), or older adults (OR 1.25, CI 1.03–1.52); that included the suicide method in the headline (OR 1.41, CI 1.07–1.86); or that identified the deceased as a celebrity (OR 1.27, CI 1.08–1.49). Elements significantly independently associated with decreased suicides in the protective effect model were unfavourable characteristics (OR 0.54, CI 0.35–0.83), railway (OR 0.62, CI 0.42–0.91) and cutting or stabbing (OR 0.63, CI 0.47–0.84) deaths; individual murder-suicide (OR 0.67, CI 0.54–0.82); or articles about a specific person’s suicide or suicidality (OR 0.77, CI 0.66–0.89), public policy (OR 0.84, CI 0.72–0.97) and youth (OR 0.85, CI 0.75–0.96).

Sensitivity analyses stratifying by media type and publication era are presented in Appendices 3 and 4 (available at www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.170698/-/DC1). Although these yielded some variability in elements that met the threshold for statistical significance, odds ratios were generally similar in direction and size between print and online articles, as well as 2011–2012 and 2013–2014 articles. An exception was articles about jumping from a building, which in 2011–2012 were associated with increased suicides in the harmful effect analysis (OR 2.47, 95% CI 1.71–3.57), but not in 2013–2014 (OR 0.83, 95% CI 0.51–1.34).

Interpretation

This study of the association between media reporting and suicide death found that several media item characteristics were associated with changes in suicides. Consistent with previous literature, articles about suicide in celebrities; by asphyxia other than by car exhaust (i.e., by plastic bag or helium gas, but not hanging or car exhaust) or by jumping; suicide pacts; and that included the method in the headline were each independently associated with post-item increases in suicides. It is

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**Table 1: Suicide deaths in Toronto by age and gender (2011–2014 combined)**

| Characteristic                  | Total suicides | No. of men (%) | No. of women (%) |
|--------------------------------|----------------|----------------|------------------|
| **Age, yr**                     |                |                |                  |
| 10–24                          | 74 (7.8)       | 24 (2.5)       |                  |
| 25–44                          | 205 (21.6)     | 80 (8.4)       |                  |
| 45–64                          | 261 (27.6)     | 123 (13.0)     |                  |
| 65+                            | 130 (13.7)     | 50 (5.3)       |                  |
| **Total**                      | 670 (70.7)     | 277 (29.3)     |                  |
| **Method of suicide**          |                |                |                  |
| Hanging                        | 251 (26.5)     | 73 (7.7)       |                  |
| Non-hanging asphyxia           | 58 (6.1)       | 14 (1.5)       |                  |
| Fall or jump from height       | 158 (16.7)     | 76 (8.0)       |                  |
| Overdose                       | 96 (10.1)      | 88 (9.3)       |                  |
| Subway, train or car collision | 38 (4.0)       | 11 (1.2)       |                  |
| Firearm                        | 30 (3.2)       | –*             |                  |
| Cutting or stabbing            | 20 (2.1)       | –*             |                  |
| Drowning or hypothermia        | 14 (1.5)       | –*             |                  |
| Fire, burns or electrocution   | –*             | –*             |                  |
| Poisons: toxins                | –*             | –*             |                  |
| Unknown                        | –*             | –*             |                  |

*Values suppressed owing to small numbers (< 5 deaths).
particularly noteworthy that articles emphasizing the inevitability of suicide were associated with increased subsequent deaths.

Articles describing suicide in older adults were also positively associated with subsequent suicides. This may be because this population is more likely to be exposed to and therefore influenced by newspaper reports. Older adults are also over-represented among suicide deaths, accounting for nearly twice as many as youth (see Table 1), which may make a media effect easier to detect.

Reporting of firearm suicides, among the methods with the highest lethality, was associated with increased subsequent suicides, consistent with previous findings. Notably, although firearm suicides account for less than 5% of all deaths in Toronto, firearms were described as a method of suicide in 13% of articles. Furthermore, emerging evidence suggests that novel methods of asphyxia, such as helium inhalation, may be particularly prone to contagion, and the results here would seem to support that.

Table 2: Characteristics of articles focusing on suicide in major publications in Toronto media (2011–2014) and their association with increases or decreases in suicides after publication

| Characteristics of media item | Total (%) | No. of articles followed by increased suicides (%) | No. of articles followed by no change in suicides (%) | No. of articles followed by decreased suicides (%) | Harmful effect analysis* | Protective effect analysis† |
|------------------------------|-----------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|------------------------|--------------------------|
| **Item location**            |           |                                                 |                                                 |                                                 |                        |                          |
| Front page                   | 314 (4.9) | 134 (42.7)                                      | 50 (15.9)                                       | 130 (41.4)                                      | 0.95 (0.76–1.20)       | 1.03 (0.82–1.30)       |
| Online                       | 2667 (41.9) | 1191 (44.7)                                    | 367 (13.8)                                      | 1109 (41.6)                                     | 1.06 (0.96–1.18)       | 1.04 (0.94–1.15)       |
| **Age focus**                |           |                                                 |                                                 |                                                 |                        |                          |
| Youth                        | 2014 (31.6) | 836 (41.5)                                     | 268 (13.3)                                      | 910 (45.2)                                      | 0.87 (0.79–0.97)       | 0.83 (0.75–0.93)       |
| Adult                        | 2029 (31.9) | 913 (45.0)                                     | 288 (14.2)                                      | 828 (40.8)                                      | 1.08 (0.97–1.20)       | 1.08 (0.97–1.21)       |
| Older adults                 | 458 (7.2)  | 232 (50.7)                                     | 67 (14.6)                                       | 159 (34.7)                                      | 1.35 (1.11–1.63)       | 1.40 (1.15–1.71)       |
| **Gender focus**             |           |                                                 |                                                 |                                                 |                        |                          |
| Male                         | 3417 (53.7) | 1465 (42.9)                                    | 438 (12.8)                                      | 1514 (44.3)                                     | 1.05 (0.94–1.16)       | 0.94 (0.85–1.04)       |
| Female                       | 2501 (39.3) | 1076 (43.0)                                    | 360 (14.4)                                      | 1065 (42.6)                                     | 0.95 (0.86–1.05)       | 0.97 (0.88–1.08)       |
| **Suicide focus**            |           |                                                 |                                                 |                                                 |                        |                          |
| Ideation                     | 1547 (24.3) | 659 (42.6)                                     | 244 (15.8)                                      | 644 (41.6)                                      | 0.94 (0.84–1.05)       | 1.03 (0.92–1.16)       |
| Attempt                      | 1079 (16.9) | 467 (43.3)                                     | 158 (14.6)                                      | 454 (42.1)                                      | 0.98 (0.86–1.11)       | 1.00 (0.88–1.15)       |
| Death                        | 4764 (74.8) | 2062 (43.3)                                    | 650 (13.6)                                      | 2052 (43.1)                                     | 0.92 (0.83–1.04)       | 0.86 (0.77–0.97)       |
| **Article focus**            |           |                                                 |                                                 |                                                 |                        |                          |
| Specific person’s death or   | 5199 (81.7) | 2245 (43.2)                                    | 708 (13.6)                                      | 2246 (43.2)                                     | 0.88 (0.77–1.00)       | 0.79 (0.69–0.90)       |
| suicidality                  |           |                                                 |                                                 |                                                 |                        |                          |
| Suicide research             | 1220 (19.2) | 549 (45)                                       | 176 (14.4)                                      | 495 (40.6)                                      | 1.06 (0.94–1.21)       | 1.08 (0.96–1.23)       |
| Suicide public policy        | 1050 (16.5) | 412 (39.2)                                     | 155 (14.8)                                      | 483 (46)                                       | 0.80 (0.70–0.92)       | 0.83 (0.73–0.95)       |
| Assisted death               | 1123 (17.6) | 519 (46.2)                                     | 169 (15.0)                                      | 435 (38.7)                                      | 1.13 (0.99–1.28)       | 1.19 (1.04–1.36)       |
| Individual murder-suicide    | 483 (7.6)  | 202 (41.8)                                     | 40 (8.3)                                        | 241 (49.9)                                      | 0.92 (0.76–1.11)       | 0.71 (0.59–0.86)       |
| Mass murder-suicide          | 131 (2.1)  | 63 (48.1)                                      | 24 (18.3)                                       | 44 (33.6)                                       | 1.19 (0.85–1.69)       | 1.45 (1.01–2.09)       |
| Suicide pact                 | 131 (2.1)  | 75 (57.3)                                      | 18 (13.7)                                       | 38 (29.0)                                       | 1.74 (1.23–2.47)       | 1.81 (1.23–2.64)       |
| Legal issues related to suicide | 2929 (46.0) | 1298 (44.3)                                   | 452 (15.4)                                      | 1179 (40.3)                                     | 1.04 (0.94–1.15)       | 1.16 (1.05–1.28)       |
| Suicide as institutional protest | 80 (1.3) | 36 (45)                                       | 14 (17.5)                                       | 30 (37.5)                                       | 1.05 (0.68–1.64)       | 1.22 (0.77–1.92)       |
| Suicide in fiction           | 289 (4.5)  | 128 (44.3)                                     | 48 (16.6)                                       | 113 (39.1)                                      | 0.90 (0.68–1.19)       | 1.07 (0.81–1.41)       |
| **Article type**             |           |                                                 |                                                 |                                                 |                        |                          |
| Opinion column               | 952 (15.0) | 434 (45.6)                                     | 144 (15.1)                                      | 374 (39.3)                                      | 1.09 (0.95–1.25)       | 1.15 (1.00–1.32)       |
| Advice column                | 28 (0.4)  | 10 (35.7)                                      | 1 (3.6)                                         | 17 (60.7)                                       | 0.71 (0.33–1.55)       | 0.47 (0.22–1.01)       |

Note: CI = confidence interval, OR = odds ratio.

*Harmful effect = comparisons of proportion of articles followed by increased suicides v. proportion of articles followed by no change or decreased suicides; ORs > 1 show a harmful effect.

†Protective effect = comparisons of proportion of articles followed by decreased suicides v. proportion of articles followed by no change or increased suicides; ORs < 1 show a protective effect.
Table 3: Putatively harmful and protective characteristics of articles focusing on suicide in major Toronto publications (2011–2014) and their association with increases or decreases in suicides after publication

| Characteristics of media items | Total (%) | No. of articles followed by increased suicides (%) | No. of articles followed by no change in suicides (%) | No. of articles followed by decreased suicides (%) |
|-------------------------------|-----------|--------------------------------------------------|---------------------------------------------------|-----------------------------------------------|
|                               | \(n = 6367\) |                                                   |                                                   |                                               |
| **Putatively harmful**        |           |                                                  |                                                   |                                               |
| Word “suicide” in the headline | 1736 (27.3) | 754 (43.4)                                       | 234 (13.5)                                        | 748 (43.1)                                    |
| Suicide method (in headline)  | 225 (3.5)  | 115 (51.1)                                       | 29 (12.9)                                         | 81 (36)                                       |
| Suicide method (in text)      | 3153 (49.5)| 1420 (45.0)                                      | 439 (13.9)                                        | 1294 (41.0)                                   |
| Hanging                       | 758 (11.9) | 328 (43.3)                                       | 130 (17.2)                                        | 300 (39.6)                                    |
| Self-poisoning                | 590 (9.3)  | 265 (44.9)                                       | 74 (12.5)                                         | 251 (42.5)                                    |
| Jumping (from building)       | 219 (3.4)  | 123 (56.2)                                       | 28 (12.8)                                         | 68 (31.1)                                     |
| Jumping (from bridge)         | 248 (3.9)  | 110 (44.4)                                       | 41 (16.5)                                         | 97 (39.1)                                     |
| Railway                       | 113 (1.8)  | 39 (34.5)                                        | 15 (13.3)                                         | 59 (52.2)                                     |
| Asphyxia by car exhaust       | 30 (0.5)   | 9 (30)                                            | 9 (30)                                            | 12 (40)                                       |
| Asphyxia other than by car exhaust | 346 (5.4) | 183 (52.9)                                       | 58 (16.8)                                         | 105 (30.3)                                    |
| Firearm                       | 824 (12.9)| 404 (49.0)                                       | 99 (12.0)                                         | 321 (39.0)                                    |
| Cutting or stabbing           | 201 (3.2)  | 74 (36.8)                                        | 23 (11.4)                                         | 104 (51.7)                                    |
| Drowning                      | 78 (1.2)   | 26 (33.3)                                        | 11 (14.1)                                         | 41 (52.6)                                     |
| Burning or electrocution      | 126 (2.0)  | 52 (41.3)                                        | 23 (18.3)                                         | 51 (40.5)                                     |
| “Suicide by cop”              | 27 (0.4)   | 13 (48.1)                                        | 6 (22.2)                                          | 8 (29.6)                                      |
| Assisted death                | 132 (2.1)  | 62 (47.0)                                        | 10 (7.6)                                          | 60 (45.5)                                     |
| Other                         | 212 (3.3)  | 100 (47.2)                                       | 23 (10.8)                                         | 89 (42.0)                                     |
| Method described in detail    | 812 (12.8)| 377 (46.4)                                       | 100 (12.3)                                        | 335 (41.3)                                    |
| Photo (deceased)              | 1220 (19.2)| 525 (43.0)                                       | 162 (13.3)                                        | 533 (43.7)                                    |
| Photo (of someone looking sad)| 257 (4.0)  | 118 (45.9)                                       | 40 (15.6)                                         | 99 (38.5)                                     |
| Favourable characteristic (deceased)‡ | 669 (10.5)| 296 (44.2)                                       | 95 (14.2)                                         | 278 (41.6)                                    |
| Identifies deceased as a celebrity | 747 (11.7)| 367 (49.1)                                       | 102 (13.7)                                        | 278 (37.2)                                    |
| Statement that suicide is inevitable | 44 (0.7)  | 26 (59.1)                                        | 4 (9.1)                                           | 14 (31.8)                                     |
| Exciting reporting             | 151 (2.4)  | 60 (39.7)                                        | 19 (12.6)                                         | 72 (47.7)                                     |
| Glorified or romanticized suicide | 47 (0.7)  | 16 (34.0)                                        | 6 (12.8)                                          | 25 (53.2)                                     |
| Monocausal explanation for suicide | 941 (14.8)| 386 (41.0)                                       | 128 (13.6)                                        | 427 (45.4)                                    |
| Statement of approval of suicide | 164 (2.6) | 75 (45.7)                                        | 23 (14.0)                                         | 66 (40.2)                                     |
| Interview with the bereaved   | 1199 (18.8)| 499 (41.6)                                       | 152 (12.7)                                        | 548 (45.7)                                    |
| **Putatively protective**     |           |                                                  |                                                   |                                               |
| Unfavourable characteristic (deceased)‡ | 91 (1.4) | 32 (35.2)                                        | 7 (7.7)                                           | 52 (57.1)                                     |
| Alternatives to suicide       | 1194 (18.8)| 502 (42.0)                                       | 196 (16.4)                                        | 496 (41.5)                                    |
| Community resources           | 123 (1.9)  | 48 (39.0)                                        | 14 (11.4)                                         | 61 (49.6)                                     |
| Positive outcome of a suicide-related crisis | 85 (1.3)  | 37 (43.5)                                        | 11 (12.9)                                         | 37 (43.5)                                     |
| Warning signs of suicidal behaviour | 67 (1.1) | 32 (47.8)                                        | 9 (13.4)                                          | 26 (38.8)                                     |
| How to approach someone       | 13 (0.2)   | 7 (53.8)                                         | 1 (7.7)                                           | 5 (38.5)                                      |
| Message of hope               | 282 (4.4)  | 119 (42.2)                                       | 46 (16.3)                                         | 117 (41.5)                                    |

Note: CI = confidence interval, OR = odds ratio.
*Harmful effect = comparisons of proportion of articles followed by increased suicides versus proportion of articles followed by no change or decreased suicides; ORs > 1 show a harmful effect.
†Protective effect = comparisons of proportion of articles followed by decreased suicides versus proportion of articles followed by no change or increased suicides; ORs < 1 show a protective effect.
‡Favourable and unfavourable characteristics refer to statements in an article expressing positive or negative value judgments, respectively, about a person’s character, personality or behaviour.
with some studies supporting contagion and others showing protective effects of reports about cutting and railway suicide. Perhaps because they are painful or gruesome, which may explain the show that some may be dissuaded by depictions of certain methods, cutting is a relatively low-lethality method of suicide. Therefore, contagion may be less likely to result in death, and possibly more likely to result in injuries that lead to accessing care. Interviews with people who have attempted suicide show that some may be dissuaded by depictions of certain methods, perhaps because they are painful or gruesome, which may explain the protective effects of reports about cutting and railway suicide.

The literature on media contagion of suicide in youth is mixed, with some studies supporting contagion and others showing a weaker association. The protective effect model confirmed previous findings that describing the suicide deceased negatively, via unfavourable characteristics or as the perpetrator of murder-suicide, was associated with fewer subsequent suicides. Cutting is a relatively low-lethality method of suicide. Therefore, contagion may be less likely to result in death, and possibly more likely to result in injuries that lead to accessing care. Interviews with people who have attempted suicide show that some may be dissuaded by depictions of certain methods, perhaps because they are painful or gruesome, which may explain the protective effects of reports about cutting and railway suicide.

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The protective effect model showed that reports related to youth, as well as a specific person’s suicidality or suicide and public policy, were independently associated with fewer suicide deaths. We speculate that articles about each may be more likely to contain positive messages about awareness and protective effects.

A difference between the findings of this study and previous research relates to suicidal ideation. The 2 large previous studies conducted in Austria and Australia found that articles about suicidal ideation were negatively associated with subsequent suicide, whereas no such relationship was seen here. None of the putatively protective factors we measured were significantly associated with suicidal ideation. This is a large, uncontrolled experiment, we cannot rule out the possibility that the observed associations are a proxy for another kind of exposure. For example, we would expect newspaper reports of suicide to be frequently associated with television news reports or social media activity about the same stories that were not examined as part of this study. Therefore, the relative contribution of each of these exposures is unknown. Additionally, although stories that resulted in more articles were reflected in a larger sample size in the analysis, the study design did not identify or distinguish specific suicide narratives or clusters of articles that may have had more impact. Media recommendations generally emphasize an itemized list of elements that should and should not be included in suicide-related reports. Accordingly, this study was designed to identify the

### Limitations

This study had several key advantages in that it examined both a large number of media articles (nearly 17 000 across 13 publications over 4 years) and suicide deaths within a geographically small area with a large population and a well-defined media market. It also tested for both harmful and protective effects. This makes it one of the largest studies to date.

However, it also has several limitations. The most important is that the study could not control how many people were actually exposed to the media items in question; nor could we control the level of exposure. The broad circulation of these publications means we are able to assume that a large proportion of the entire population of Toronto was exposed. However, suicide is a highly complex phenomenon and because this is a large, uncontrolled experiment, we cannot rule out the possibility that the observed associations are a proxy for another kind of exposure. For example, we would expect newspaper reports of suicide to be frequently associated with television news reports or social media activity about the same stories that were not examined as part of this study. Therefore, the relative contribution of each of these exposures is unknown. Additionally, although stories that resulted in more articles were reflected in a larger sample size in the analysis, the study design did not identify or distinguish specific suicide narratives or clusters of articles that may have had more impact.

Media recommendations generally emphasize an itemized list of elements that should and should not be included in suicide-related reports. Accordingly, this study was designed to identify the

### Table 4: Independent associations of characteristics of media articles in major Toronto publications (2011–2014) with increased suicide deaths versus no change or decreased suicide deaths after article publication

| Characteristics of media items | OR (95% CI) |
|--------------------------------|------------|
| Statement that suicide is inevitable | 1.97 (1.07–3.62) |
| Asphyxia other than by car exhaust | 1.72 (1.36–2.18) |
| Jumping (from building) | 1.70 (1.28–2.26) |
| Suicide pact | 1.63 (1.14–2.35) |
| Suicide method (in headline) | 1.41 (1.07–1.86) |
| Firearm | 1.28 (1.08–1.51) |
| Identifies deceased as a celebrity | 1.27 (1.08–1.49) |
| Older adults | 1.25 (1.03–1.52) |
| Suicide public policy | 0.80 (0.70–0.94) |
| Specific person’s death or suicidality | 0.78 (0.68–0.90) |
| Cutting or stabbing | 0.70 (0.52–0.94) |

Note: CI = confidence interval, OR = odds ratio.

*Multivariable logistic regression.

### Table 5: Independent associations of characteristics of media articles in major Toronto publications (2011–2014) with decreased suicide deaths versus no change or increased suicide deaths after article publication

| Characteristics of media items | OR (95% CI) |
|--------------------------------|------------|
| Unfavourable characteristic† | 0.54 (0.35–0.83) |
| Railway | 0.62 (0.42–0.91) |
| Cutting or stabbing | 0.63 (0.47–0.84) |
| Individual murder-suicide | 0.67 (0.54–0.82) |
| Specific person’s death or suicidality | 0.77 (0.66–0.89) |
| Suicide public policy | 0.84 (0.72–0.97) |
| Youth | 0.85 (0.75–0.96) |
| No. of articles‡ (per additional 1) | 1.004 (1.002–1.005) |
| Legal issues related to suicide | 1.16 (1.03–1.31) |
| Firearm | 1.28 (1.09–1.51) |
| Older adults | 1.31 (1.05–1.63) |
| Identifies deceased as a celebrity | 1.32 (1.11–1.57) |
| Suicide pact | 1.71 (1.16–2.54) |
| Jumping (from building) | 1.78 (1.32–2.39) |
| Asphyxia other than by car exhaust | 1.93 (1.51–2.48) |

Note: CI = confidence interval, OR = odds ratio.

*Multivariable logistic regression
†Unfavourable characteristics refer to statements in an article expressing negative value judgments about a person’s character, personality or behaviour.
‡Number of articles refers to a count of all articles relating to suicide published between day –14 and day 6.
independent association of each specific element with suicides. This approach is scientifically valuable because it supports existing recommendations asserting that, for example, articles that include information about celebrity suicide or about suicide by firearm may be harmful irrespective of potentially harmful or protective elements within the same or other contemporaneous articles. However, a previous study has identified that certain overarching narrative arcs of an article may have differing impacts,5 and the same may be the case for clusters of stories about a specific news event.6,12,14,16,20,21,32 This study design did not test either phenomenon, both of which are relevant for future recommendations and should be the focus of further research in Canada. Moreover, the fact that sensitivity analyses that compared year of publication as well as print and online articles yielded subtle differences (Appendices 3 and 4) underscores the importance of format as well as other contextual factors, not all of which could be controlled for, and some of which may have influenced the results of this study.

Furthermore, most suicides are detected by the Office of the Chief Coroner, but coroner data are imperfect. It is likely that at least 10% of suicide deaths went unrecognized or were misclassified as being a result of accident or natural causes.10

The study examined a single, large Canadian city, and a question remains about the degree to which these results can be generalized to other cities or regions. Likewise, it did not test whether non–suicide-related articles had any association with suicide rates. Furthermore, this study examined the independent effects of specific media elements on suicide death, but it did not test for interactions between elements (e.g., whether having protective elements in an article might have attenuated the impact of harmful ones). Finally, this study examined only the impact of articles on deaths within 1 week of publication. We chose this method because it is the established standard in the literature6,8 and because it provides the best opportunity to observe a potential, acute cause-and-effect relationship. Nonetheless, it may be reasonable to postulate that media reporting could have an impact on suicide deaths months or even years later.51 Therefore, increases or decreases in suicides shown here may underestimate the full impact of these or other media reports. Likewise, it may be that some elements of the media reports do have effects on suicides, but that these effects are downstream and cannot be detected with this design. For example, it may be that putatively protective factors, such as messages of hope that suicidal thoughts can be overcome, do have a subsequent impact that is not detected within 1 week.

Finally, this study design did not address the question of whether different media reporting characteristics had differing effects on specific demographic groups. Overall associations are of much greater practical importance because journalists formulate their reporting for and disseminate it to the entire public. Nevertheless, investigating differences by subpopulation would add to our understanding and is an important avenue of further study.

Conclusion
Suicide is a complex phenomenon that is influenced by many factors, of which the media is only one. This large study augments an evolving literature showing that certain elements of media reports highlighted as harmful in Canadian guidelines are associated with increased suicide deaths. The content of media reports — particularly those relating to celebrity suicide, suicide by asphyxia other than by car exhaust, suicide by jumping, suicide pacts and suicide in older adults — may lead to suicide contagion. However, most putatively protective factors had low base rates in the media we analyzed and were not associated with fewer deaths in the following week. Media reporting guidelines have been developed in Canada29 and elsewhere23–27 to help journalists report respectfully and with attention to concerns about contagion. Future guidelines should take into account these results and those from similar studies in order to provide journalists with the best available evidence on which to base their decisions. Finally, physicians should be mindful of the importance of public messaging about suicide in their interactions with both journalists and patients.

References
1. Suicide. Geneva: World Health Organization; 2016 [updated 2018]. Available: www.who.int/mediacentre/factsheets/fs398/en/ (accessed 2017 Jan. 16).
2. Gould MS. Suicide and the media. Ann N Y Acad Sci 2001;932:200-21.
3. Hawton K, Williams K. Influences of the media on suicide. BMJ 2002;325:1374-5.
4. Niederkrotenthal T, Fu KW, Yip PS, et al. Changes in suicide rates following media reports on celebrity suicide: a meta-analysis. J Epidemiol Community Health 2012;66:1037-42.
5. Niederkrotenthal T, Voracek M, Herberth A, et al. Role of media reports in completed and prevented suicide: Werther v. Papageno effects. Br J Psychiatry 2010;197:234-43.
6. Pirkis J, Burgess PIM, Francis C, et al. The relationship between media reporting of suicide and actual suicide in Australia. Soc Sci Med 2006;62:2874-86.
7. Pirkis J, Blood RW. Suicide and the media. Part I: Reportage in fictional media. Crisis 2001;22:146-54.
8. Tousignant M, Mishara B, Caillaud A, et al. The impact of media coverage of the suicide of a well-known Quebec reporter: the case of Gaetan Girouard. Soc Sci Med 2006;62:1919-26.
9. Etzersdorfer E, Voracek M, Sonneck G. A dose-response relationship between imitation and suicide in newspapers and public discussion. Arch Suicide Res 2004;8:137-45.
10. Stack S. Media coverage as a risk factor in suicide. J Epidemiol Community Health 2003;57:238-40.
11. Stack S. Suicide in the media: a quantitative review of studies based on nonfictional stories. Suicide Life Threat Behav 2005;35:121-33.
12. Cheng AT, Hawton K, Lee C, et al. The influence of media reporting of the suicide of a celebrity on suicide rates: a population-based study. Int J Epidemiol 2007;36:1229-34.
13. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. Psychol Rev 1977;94:191-215.
14. Niederkrotenthal T, Till B, Kapusta ND, et al. Copycat effects after media reports on suicide: a population-based ecologic study. Soc Sci Med 2009;69:1085-90.
15. Till B, Strauss M, Sonneck G, et al. Determining the effects of films with suicidal content: a laboratory experiment. Br J Psychiatry 2015;207:72-8.
16. Fu KW, Chan CH. A study of the impact of thirteen celebrity suicides on subsequent suicide rates in South Korea from 2005 to 2009. PLoS One 2013;8:e53870.
17. Suh S, Chang Y, Kim N. Quantitative exponential modelling of copycat suicides: association with mass media effect in South Korea. Epidemiol Psychiatri Sci 2015;24:159-7.
18. Schäfer M, Quiring O. The press coverage of celebrity suicide and the development of suicide frequencies in Germany. Health Commun 2015;30:1149-58.
19. Kim JH, Park EC, Nam JM, et al. The Werther effect of two celebrity suicides: an entertainment and a politician. PLoS One 2013;8:e84876.
20. Ueda M, Mori K, Matsuayashi T. The effects of media reports of suicides by well-known figures between 1989 and 2010 in Japan. Int J Epidemiol 2014;43:623-9.
21. Gould MS, Kleinman MH, Lake AM, et al. Newspaper coverage of suicide and initiation of suicide clusters in teenagers in the USA, 1988-96: a retrospective, population-based, case-control study. Lancet Psychiatry 2014;1:34-43.
22. Zalsman G, Hawton K, Wasserman D, et al. Suicide prevention strategies revisited: 10-year systematic review. Lancet Psychiatry 2016;3:646-59.
23. Pirkis J, Blood W, Beaurrais A, et al. Media guidelines on the reporting of suicide. Crisis 2006;27:92-7.
24. Niederkrotenthal T, Sonneck G. Assessing the impact of media guidelines for reporting on suicides in Austria: interrupted time series analysis. Aust N Z J Psychiatry 2007;41:419-28.
25. Suicide contagion and the reporting of suicide: recommendations from a national workshop. United States Department of Health and Human Services. MMWR Recomm Rep 1994;43:9-18. Available: www.cdc.gov/mmwr/preview/mmwrhtml/00031539.htm (accessed 2016 Nov. 11).
26. Preventing suicide: a resource for media professionals — update 2017. Geneva: World Health Organization; 2017. Available: www.who.int/mental_health/suicide-prevention/resource_booklet_2017/en/ (accessed 2017 Oct. 11).

27. Recommendations for suicide reporting. New York: American Foundation for Suicide Prevention; 2011. Available: http://afsp.org/wp-content/uploads/2016/01/recommendations.pdf (accessed 2016 Nov. 11).

28. Mindframe. Reporting suicide and mental illness: A Mindframe resource for media professionals. Newcastle (NSW): Hunter Institute of Mental Health; 2014. Available: www.mindframe-media.info/for-media/reporting-suicide?sa=10217 (accessed 2016 Nov. 11).

29. Nepon J, Fetti S, Katz LY, et al.; Swampy Cree Suicide Prevention Team. Media guidelines for reporting suicide [policy paper]. Ottawa: Canadian Psychiatric Association; 2009.

30. Sinyor M, Piriksi, J, Picard A, et al. Towards a shared understanding: perspectives from Toronto’s first media forum for suicide prevention. Can J Public Health 2016;107:e330-2.

31. Sinyor M, Schaffer A, Streiner D. Characterizing suicide in Toronto: an observational study and cluster analysis. Can J Psychiatry 2014;59:26-33.

32. Yip PS, Fu KW, Yang KC, et al. The effects of a celebrity suicide on suicide rates in Hong Kong. J Affect Disord 2006;93:245-52.

33. Chen Y, Tsai PC, Chen PH, et al. Effect of media reporting of the suicide of a singer in Taiwan: The case of by li. Soc Psychiatry Psychiatr Epidemiol 2010;45:363-9.

34. Cheng ATA, Hawton K, Chen THH, et al. The influence of media coverage of a celebrity suicide on subsequent suicide attempts. J Clin Psychiatry 2007;68:862-6.

35. Cheng ATA, Hawton K, Chen THH, et al. The influence of media reporting of a celebrity suicide on suicidal behavior in patients with a history of depressive disorder. J Affect Disord 2007;103:69-75.

36. Queinec R, Beitz C, Contrand B, et al. Copycat effect after celebrity suicides: results from the French national death register. Psychol Med 2013;41:668-71.

37. Gunnell D, Barnes J, Chang SS, et al. Searching for suicide methods: accessibility of information about helium as a method of suicide on the Internet. Crisis 2015;36:325-31.

38. Morii D, Yasusuke M, Nakamae N, et al. Japanese experience of hydrogen sulphide as a method of suicide on the Internet. Crisis 2015;36:325-31.

39. Marzuk PM, Tardiff K, Hirsch CS, et al. Increase in suicide by asphyxiation in New York City after the publication of Final Exit. N Engl J Med 1993;329:1508-10.

40. Gunnell D, Coope C, Fearn V, et al. Suicide by gases in England and Wales 2001–2011: evidence of the emergence of new methods of suicide. J Affect Disord 2015;170:90-5.

41. Thomas K, Chang SS, Gunnell D. Suicide epidemics: the impact of newly emerging methods on overall suicide rates — a time trends study. BMC Public Health 2011;11:314.

42. Newspapers: daily readership by age [2016]. Pew Research Centre [Washington (DC)] 2016 June 10. Available: www.journalism.org/chart/5802/ (accessed 2017 Mar. 31).

43. Community newspaper readership increases with age. Newsletters Canada [Toronto] 2017 Feb, 15. Available: http://newspaperscanada.ca/news/community-newspaper-readership-increases-age/ (accessed 2017 Apr. 13).

44. Zail DL, Hawton K. Media influences on suicidal behaviour: an interview study of young people. Behav Cogn Psychother 2004;32:189-98.

45. Gould MS, Greenberg T, Velting D, et al. Youth suicide risk and preventive interventions: a review of the past 10 years. J Am Acad Child Adolesc Psychiatry 2003;42:386-406.

46. Gould M, Jamieson P, Romer D. Media contagion and suicide among the young. Am Behav Sci 2003;46:129-84.

47. Gould M, Kramer R. Youth suicide prevention. Suicide Life-Threat Behav 2001;31(Suppl):6-31.

48. Gould M, Wallenstein S, Kleinman M, et al. Suicide clusters: an examination of age-specific effects. Am J Public Health 1999;89:211-2, February.

49. Shoval G, Zalman G, Polakевич J, et al. Effect of the broadcast of a television documentary about a teenager’s suicide in Israel on suicidal behavior and methods. Crisis 2005;26:20-4.

50. Tøllefsen IM, Helweg-Larsen K, Thiblin I, et al. Are suicide deaths under-reported? Nationwide re-evaluations of 1800 deaths in Scandinavia. BMJ Open 2015;5:e009120.

51. Fu KW, Yip PS. Long-term impact of celebrity suicide on suicidal ideation: results from a population-based study. J Epidemiol Community Health 2007;61:540-6.

52. Sinyor M, Schaffer A, Redelmeier DA, et al. Did the suicide barrier work after all? revisiting the Bloor Viaduct natural experiment and its impact on suicide rates in Toronto. BMJ Open 2017;7:e015299.