

Systematic review: The reliability of indicators that may differentiate between suicidal,  
homicidal, and accidental sharp force wounds

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### **Abstract**

This protocol aims to address two metaresearch questions: what do we know about the science underlying impactful legal decisions and how can we assess this evidence efficiently and accurately, such that it is usable for courts? To do so, this protocol describes our plan for a systematic review of the literature underlying whether there are reliable indicators of the manner of death in stab wound cases. Evidence of nature was recently found admissible at the High Court of Australia in *Lang v The Queen*. However, despite the High Court uncritically accepting this evidence, there has never been a systematic review that critically appraises the relevant literature. Beyond the review itself, we will fully document our process and all of the time-saving tools we rely on to provide knowledge about whether systematic reviews of this nature can be efficiently deployed in legal proceedings.

### **Keywords**

sharp force wound, sharp force injury, sharp force fatality, manner of death, forensic pathology, homicide, suicide

## Introduction

### Rationale

This systematic review will identify and synthesise research that examines indicators that may be used to distinguish between suicidal and homicidal sharp force wounds (e.g., presence of defensive injuries, anatomical site of the wound).<sup>1</sup> It will also preliminarily assess the quality of this research. Although our search strategy (see below) is focused on homicidal and suicidal wounds, we will also include literature we find about fatal accidental sharp force wounds and cases where the manner of death was undetermined. We do this to provide a more complete resource for users.

We have undertaken this review in response to expert opinion evidence admitted in a murder trial (*R v Lang*), where a forensic pathologist opined that a stab wound to the torso was more likely homicide than suicide.<sup>2</sup> The testimony and several factors advanced in favour of the opinion were supported by oral references to experience and research.<sup>3</sup> This review is an attempt to determine what support there is in the biomedical research literature for the expert opinion in *Lang* regarding factors that may reliably distinguish between stab wounds that are self-inflicted or inflicted by others.

Moreover, the broader question of whether admissible expert opinion is supported by mainstream biomedical research might cast light on admissibility rules and legal practice.

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<sup>1</sup> ‘Commonly used characteristics for differentiation between self-inflicted and third-party-inflicted injuries are the anatomical site, the number and arrangement of injuries, damage of clothing, the presence of hesitation or defense wounds, and the direction of the stabbing wound canal.’: Julia Schädler et al, ‘Singular stab wounds to the trunk: Is this suicidal or homicidal?’ (2024) 68 *Legal Medicine* 102430.

<sup>2</sup> *Lang v The Queen* [2023] HCA 29.

<sup>3</sup> *Ibid* [21], [456], [466].

Specifically, there are ongoing discussions about whether forensic pathologists and medical examiners should be permitted to provide manner of death conclusions for legal proceedings (as opposed to only making such conclusions for statistical purposes, which has not attracted critique).<sup>4</sup> In short, external commentators<sup>5</sup> and forensic professionals<sup>6</sup> have argued that manner of death determinations, in many cases, are not reliable enough to be presented in court. Some have also argued that these determinations go beyond the expertise of forensic medical practitioners and encroach on the role of the judge or jury (i.e., the factfinder).<sup>7</sup> Therefore, a systematic review evaluating the research basis for manner of death determinations in sharp force wound cases may provide broader insights into the risks and benefits of forensic pathology in the legal system. As we discuss below, existing systematic reviews on this topic made no attempt to assess the quality of the underlying research.<sup>8</sup>

Finally, we aim to provide practical guidance about conducting systematic reviews for legal proceedings. To help assess the practicality of such work, we will conduct this review with time-saving tools and carefully document the time this review takes, as well as any hurdles we

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<sup>4</sup> Note that such practices vary by jurisdiction.

<sup>5</sup> Dan Simon, 'Minimizing Error and Bias in Death Investigations' (2019) 49 *Seton Hall Law Review* 255; Keith A Findley and Dean A Strang, 'Ending Manner-of-Death Testimony and Other Opinion Determinations of Crime' (2022) 60 *Duquesne Law Review* 302.

<sup>6</sup> William Oliver et al, 'Cognitive Bias in Medicolegal Death Investigation' (2015) 5(4) *Academic Forensic Pathology* 548, 552 'it is a matter of weighing information for which there may not be much certainty'; William R Oliver, Manner Determination in Forensic Pathology (2014) 4(4) *Academic Forensic Pathology* 480.

<sup>7</sup> Findley and Strang (n 5).

<sup>8</sup> Systematic reviews that seek to appraise quality appear to be rare, see Stephen Cordner et al, 'Suicidal ligature strangulation: a systematic review of the published literature' (2020) 16 *Forensic Science, Medicine and Pathology* 123, 130: 'As far as we are aware there is no critical appraisal instrument available to determine the quality of a medico-legal death investigation as presented in a case report.'; However, we are aware of one attempt to adapt an existing appraisal tool: Niels Lynøe et al, 'Insufficient evidence for 'shaken baby syndrome' – a systematic review' (2017) 106 *Acta Paediatrica* 1021, 1023.

encounter.<sup>9</sup> Indeed, and as discussed below, previous reviews in forensic pathology have noted challenges in reviewing the literature due to a lack of guidance<sup>10</sup> and reporting standards.<sup>11</sup>

*Prior reviews of research on manner of death in sharp force injury cases*

Preliminary searches found two systematic reviews of the relevant literature (Appendix A). First, De-Giorgio and colleagues performed a systematic review that included 78 articles (672 cases) describing purported suicidal sharp force injuries and 52 articles (2,670 cases) describing purported homicidal sharp force injuries.<sup>12</sup> Their review covered both English and non-English language articles. The review authors noted their efforts to review the literature were hindered by poor reporting:

the data available in the literature are often not detailed, clear, or homogenous enough to perform a meaningful comparison between different studies. Thus, it was not possible to identify one or more parameters that are sufficient for making an absolute differential diagnosis between suicide and homicide.’<sup>13</sup>

For example, only about a fifth of the cases provided the localisation of the injuries and their number.<sup>14</sup>

While De-Giorgio and colleagues were critical of the reporting of the articles included in their sample, they did not comment on other aspects that may increase risk of bias. For instance,

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<sup>9</sup> Justin Clark et al ‘A full systematic review was completed in 2 weeks using automation tools: a case study’ (2020) 121 *Journal of Clinical Epidemiology* 81.

<sup>10</sup> Cordner et al (n 8).

<sup>11</sup> Fabio De-Giorgio et al, ‘Suicidal or Homicidal Sharp Force Injuries? A Review and Critical Analysis of the Heterogeneity in the Forensic Literature’ (2015) 60(S1) *Journal of Forensic Sciences* S97, S105: ‘Nevertheless, the data available in the literature are often not detailed, clear, or homogenous enough to perform a meaningful comparison between different studies. Thus, it was not possible to identify one or more parameters that are sufficient for making an absolute differential diagnosis between suicide and homicide.’.

<sup>12</sup> Ibid.

<sup>13</sup> Ibid S105.

<sup>14</sup> Ibid S100.

they did not scrutinise or themselves provide any detail about how the manner of death was determined in the included cases (e.g., through eyewitness accounts, video footage). Considering that they set out to provide a critical analysis of the literature, this was surprising.

The second review is a scoping review performed by AlGheryafi and colleagues.<sup>15</sup> This review included six studies because, unlike Di-Giorgio et al, it included only retrospective studies (excluding case reports and case series). This review also set out to be a critical review<sup>16</sup> but did not appraise the methodology of included studies. Its conclusions about indicators of suicidal versus homicidal sharp force wounds were:

According to the results, these **parameters ranged from being strongly predictive to less predictive, and no single parameter was conclusive in differentiating suicide from homicide.** Some of the important predictors of the homicidal manner of death in sharp-force fatalities include clothing damage, presence of defense injuries, presence of injuries caused by another type of violence other than sharp-force, vertically oriented chest stabs, and sharp-force injuries in the head and back anatomical sites. Some of the important predictors of the suicidal manner of death in sharp-force fatalities include the presence of tentative injuries, sharp-force injuries to the wrist, and the presence of a suicide note [...] **the findings related to individual parameters should be integrated with findings related to other parameters and collectively the manner of death should be determined for a more accurate diagnosis of the manner of death.**<sup>17</sup>

AlGheryafi and colleagues listed some limitations.<sup>18</sup> This included heterogeneity in the included cases (i.e., variance in their factual circumstances) and the restrictiveness of their own search strategy.<sup>19</sup>

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<sup>15</sup> Zainab Fathi AlGheryafi et al, 'Differentiating suicide from homicide in sharp-force fatalities with stab and/or incised wounds: A scoping review' (2024) 67 *Legal Medicine* 102388.

<sup>16</sup> Ibid 3.

<sup>17</sup> Ibid 8 [**emphasis added**].

<sup>18</sup> Ibid 8.

<sup>19</sup> Ibid 8.

Both previous reviews were helpful in allowing us to identify a variety of research relevant to our research question (see Table 1). They include a spread of article types (case studies, case series, retrospective studies). These articles helped us develop our methodology, as described below.

**Table 1. Known articles**

Authors	Year	Title	Type	Note
AlGheryafi et al	2024	Differentiating suicide from homicide in sharp-force fatalities with stab and/or incised wounds: A scoping review	Scoping review	Not to be included in eventual review, but title includes useful keywords
Brunel et al	2010	Homicidal and suicidal sharp force fatalities: Autopsy parameters in relation to the manner of death	Retrospective study	
De-Giorgio et al	2015	Suicidal or homicidal sharp force injuries? A review and critical analysis of the heterogeneity in the forensic literature	Systematic review	Not to be included in eventual review, but title includes useful keywords
Di Nunno	2001	Suicide by hara-kiri: a series of four cases	Case series	
Ito et al	2009	Traumatic ventricular septal defect following a stab wound to the chest	Case study	
Karlsson	1998	Homicidal and suicidal sharp force fatalities in Stockholm, Sweden. Orientation of entrance wounds in stabs gives information in the classification	Retrospective study	
Racette et al	2008	Suicidal and homicidal sharp force injury: a 5-year retrospective comparative study of hesitation marks and defense wounds	Retrospective study	
Schädler et al	2024	Singular stab wounds to the trunk: Is this suicidal or homicidal?	Retrospective study	
Scolan et al	2004	Homicide-Suicide by Stabbing Study Over 10 Years in the Toulouse Region	Retrospective study	
Terranova et al	2020	Criminological and Medico-legal Aspects in Homicidal and Suicidal Sharp Force Fatalities	Retrospective study	
Thomsen et al	2020	Sharp Force Homicide in Denmark 1992–2016	Retrospective study	
Von linde et al	2024	A Swedish nationwide forensic study of the manner of death in single stab injuries to the trunk	Retrospective study	

See Appendix B for full citations to these articles



## Objectives

Our primary objective is to systematically review and critically appraise the literature identifying indicators of fatal self versus other-inflicted (i.e., suicidal versus homicidal) sharp force wounds (including stabbed and incised wounds). If there is literature regarding accidental sharp force wounds, we will also include that research. Secondly, we will describe other aspects of this literature, such as the proportion of case reports following reporting guidelines (e.g., CARE)<sup>20</sup> and the proportion of studies that are open access.

## **Methods**

### Overview of methodology and description of preliminary searches

We identified two prior systematic reviews (those reviewed above). These reviews helped reveal further articles within the present review's scope (Table 1). We used these articles to refine the search strategy described below.

### *Transparency of this review*

The final version of this protocol will be prospectively registered on the Open Science Framework (link: XXX). Our PRISMA-P checklist is openly available (<https://osf.io/efhzn>). Any data we extract from articles will also made openly available on the Open Science Framework (<https://osf.io>). Deviations from this protocol will be explicitly acknowledged in the final manuscript. We did not seek ethics board approval because this is a review of existing research.

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<sup>20</sup> <https://www.care-statement.org/>.

### Eligibility criteria

**Inclusion criteria:** We will include case studies, case series, and retrospective studies of participants of any age and sex. The primary outcome of interest is whether the fatal wound(s) was or were inflicted by the person themselves (i.e., suicidal), another party (i.e., homicidal), or by accident. As a result, we will only include articles that record a fatal outcome in which a determination of manner of death was attempted. We will also only include cases in which the cause of death appears to be a sharp force wound (including stabbed and incised injuries). We will not restrict based on date.

**Exclusion criteria:** We will exclude non-English language articles due to a lack of non-English language proficiency among the review team.

### Search strategy and information sources

Review author JC designed the search strategy and will perform the search (Appendix A). We will search MEDLINE via Ovid, Scopus, and Web of Science with no date restriction. We will record the date of the search. JC will perform backwards and forwards citation analysis using SpiderCite (<https://sr-accelerator.com/#/help/spidercite>). For articles that SpiderCite is not able to search, we will generate those citations manually. JC will also deduplicate the result using Endnote.

The search string was generated using reference articles from preliminary searches (Table 1) and the search strings of two prior systematic reviews (see Appendix A). An information specialist (KH) and subject matter specialists (BI, SC) helped in the design of the search.

In terms of grey literature, the authors will contact the mailing lists for the U.S. National Association of Medical Examiners and the Medicolegal Death Investigation Subcommittee of the Organization of Scientific Area Committees (OSAC) for Forensic Science.

### Study records

#### *Selection process*

Search results (title and abstract) will be screened for eligibility by two authors independently. One review author (JC) will retrieve full-text articles. Two authors will screen full texts for inclusion. The forward and backwards citation search will be screened by one author (JC). Discrepancies will be recorded and resolved through discussion.

#### *Data management*

We will use Endnote to manage the library of articles. Data will be extracted into spreadsheets, which will be made openly available on the Open Science Framework.

#### *Data collection process*

A standardised form (initially piloted on five included studies) will be used for data extraction of characteristics of studies, key variables, outcomes, and risk of bias. Two review authors will independently extract and code these items, with discrepancies recorded and resolved through discussion.

#### *Data items*

We will record the following variables. Article-level variables will be recorded using a Google form. Case-level variables will be recorded in spreadsheets (one spreadsheet for case studies and one spreadsheet for articles describing multiple cases).

**Article variables – general**

- Full name of corresponding author
- DOI
- Article title
- Year of publication
- Journal title
- Country of corresponding author
- Email address of the corresponding author
- Affiliations of all authors (e.g., university, law enforcement) – select all that apply
- Type of article (case study, case series, retrospective study, systematic review)

**Article variables – transparency and openness**

- Data available and, if so, where?
- Code available and, if so, where?
- Prospectively registered and if so where?
- Purports to follow a reporting guideline (e.g., CARE)?
- Open access with publisher (gold open access)?
- Open access elsewhere (i.e., green open access) (e.g., ResearchGate)?
- Funding sources declared or no statement
- Conflicts of interest declared or no statement

**Case(s) – Background variables**

- Number of cases
- Date or date range of included cases (or for each case if reported individually)

- Geographic location of cases (as specific as possible, City, State, Nation)
- Reported gender/sex of deceased (for each case if reported individually)
- Age of deceased (for each case if reported individually)
- Was there a formal recording of the death scene by a forensic pathologist or medical examiner? (for each case if reported individually)

**Case(s) – Focal Injury/Injuries**

- Number of wounds
- Type of wound (for each wound)
  - If bone or cartilage wounds, method of determining this (visual, VT, Xray)
- Site of wound (for each wound)
- Orientation of wound (for each wound)
- Severity of wound (for each wound)
  - Using Injury severity score
- Track marks within single wound? (for each wound)
- Turn and reinsertion? (for each wound)

**Case(s) – Other injury/injuries (number, location, healing/fresh)**

- Hesitation/tentative injuries and description (for each case if reported individually)
- Defensive injuries and description (for each case if reported individually)
- Bruises and description (for each case if reported individually)
- Lacerations and description (for each case if reported individually)
- Abrasions and description (for each case if reported individually)

- Other (e.g., post mortem injuries, associated injuries, including petechiae in neck compression cases which might have occurred alongside the sharp force injury)

#### **Case(s) – Other variables**

- Toxicology (for each case if reported individually)
- Psychiatric history, including source of history (e.g., deceased's general practitioner) (for each case if reported individually)
- Other pre-existing illnesses (for each case if reported individually)
- Damage to clothing (for each case if reported individually)
- Suicide note (for each case if reported individually)
- Weapon found (for each case if reported individually)
  - Weapon type (if found)

#### **Risk of Bias**

- Risk of bias will be assessed as described below.

#### **Overall quality of evidence**

- Overall quality of evidence will be assessed as described below.

#### **Outcomes and prioritization**

The primary outcome we will assess is the conclusion that the fatal wound(s) were homicidal or suicidal.

### Data synthesis – Exploratory

We will attempt to quantitatively synthesise cases by first separating them into four groups: those classified by study authors as suicides, homicides, accidents or inconclusives.<sup>21</sup> Then, we will list the frequency with which the case variables listed above appear in each group. If we calculate a percentage for that variable, we will calculate that against the number of cases in which the authors specifically stated whether the variable was measured (e.g., the proportion of suicides with positive toxicology results will be calculated only on cases where it is explicitly stated that toxicology was taken). We may also provide separate tables for studies with high versus low risk of bias. The quantitative synthesis should be considered exploratory.

We will also perform article-level quantitative summaries, such as the frequency and percentage of that articles that are open access. For quantitative syntheses, we may apply a measure of uncertainty, such as confidence intervals.

Again, any conclusions drawn from this synthesis should be treated with caution and considered exploratory. This is because there is no existing guidance on meta-analysis for the type of research included in this review. Much of our analysis will be contingent on the data we can extract and the quality of that data, both of which are difficult to forecast.

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<sup>21</sup> See Table 5 in Thore Karlsson, 'Homicidal and suicidal sharp force fatalities in Stockholm, Sweden. Orientation of entrance wounds in stabs gives information in the classification' (1998) 93 *Forensic Science International* 21, 28.

### Risk of bias assessment – exploratory

We will adapt existing risk-of-bias tools<sup>22</sup> used for assessing medical interventions because we are not aware of any tools designed for forensic pathology. Indeed, in an earlier systematic review of the suicidal strangulation literature, Cordner and colleagues remarked on this lacuna: ‘As far as we are aware there is no critical appraisal instrument available to determine the quality of a medico-legal death investigation as presented in a case report’.<sup>23</sup> To begin to develop such an instrument, we identified three items from Cochrane’s risk of bias approach and tool,<sup>24</sup> and will adapted them. However, we may also develop other methods once we have read and reviewed the literature we identify.

First, we can adapt two sources of bias from Cochrane’s ‘information bias’<sup>25</sup> category. Cochrane notes that information biases (also referred to as measurement bias) can occur when intervention:

cases may be more likely than controls to recall potentially important events or report exposure to risk factors they believe to be responsible for their disease. Differential misclassification of intervention status can occur in cohort studies if it is obtained retrospectively. This can happen if information (or availability of information) on intervention status is influenced by outcomes: for example a cohort study in elderly people in which the outcome is dementia, and participants’ recall of past intervention status at study inception was affected by pre-existing mild cognitive impairment.<sup>26</sup>

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<sup>22</sup> Jonathan AC Sterne, ‘RoB 2: a revised tool for assessing risk of bias in randomised trials’ (2019) 366 *BMJ* i4898; Jonathan AC Sterne et al, ‘ROBINS-I: a tool for assessing risk of bias in non-randomised studies of interventions’ (2016) 355 *BMJ* i4919.

<sup>23</sup> Cordner et al (n 8) 130.

<sup>24</sup> Julian PT Higgins, *Cochrane Handbook for Systematic Reviews of Interventions* (version 6,3, 2023) Cochrane. <https://training.cochrane.org/handbook>.

<sup>25</sup> Ibid 25-2.

<sup>26</sup> Ibid 25-2-3.



In manner of death cases, some indicators may be recorded differently or only be recorded in cases where homicide or suicide is expected. Accordingly, studies should take steps to engage in some blinding or systematization when recording indicators of homicide or suicide (e.g., an author unaware of the determination is in charge of collecting and quantifying information about the number of wounds and their severity or there are standard items to record).

Another source of information bias is bias in the measurement of the outcome. For instance, there is a risk of circularity: indicators manners of death are taken to be reliable because they were used to determine manner of death in included cases. As a result, some independent and relatively objective assessment of ground truth is preferable. *A priori*, we can only speculate as to the safeguards studies may put into place. Therefore, bias in the measurement of the outcome will be done after assessing the included studies. Before fully viewing the literature, we can speculate that risk of bias may vary, with some cases including very clear manners of death (e.g., the deceased is found in a room locked from the inside or the death is viewed by several eyewitnesses) or very unclear manners of death (e.g., the manner of death is determined based on the same indicators recorded in the case).

Note that in their systematic review of shaken baby research, Lynøe et al used a similar approach:

Studies were assessed as having a low risk of bias when the study cases, namely shaken babies, were unequivocally confirmed as having been violently shaken and when the shaking preceded the symptoms associated with the triad, for example by a video recording or independent witness information. [...] Studies were assessed as having a moderate risk of bias when the shaken baby study cases were identified as the result of a detailed confession by the suspected perpetrator...<sup>27</sup>

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<sup>27</sup> Lynøe et al (n 8) 23.

Finally, both observational studies and randomised trials are at risk of reporting biases.<sup>28</sup> For instance, Cochrane notes that ‘it is difficult to imagine that [reporting biases] are any less serious’<sup>29</sup> for observational studies because many observational studies ‘do not have written protocols, and many are exploratory so – by design – involve inspecting many associations between intervention and outcome’.<sup>30</sup> A major way in which reporting biases are assessed is considering ‘Whether the trial was analysed in accordance with a pre-specified plan that was finalized before unblinded outcome data were available for analysis’. Accordingly, when available, we will record any divergences between pre-specified plans and the ultimate reporting. If the prespecified plan is not available, we will note this. We will also note whether articles purported to follow a reporting guideline (e.g., CARE).

To summarise, we will assess:

- Blinding
- Ground truth assessment
- Methods to control reporting biases

Using our assessment on those three criteria, we will provide a holistic risk of bias judgment for each article based on the levels of risk of bias in ROBINS-I.<sup>31</sup> Once again, given the lack of work in this area, this should be considered exploratory. Two members of the review teams will make these assessments independently, with disagreements adjudicated by discussion.

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<sup>28</sup> Ibid 25-2-4.

<sup>29</sup> Ibid 25-2-4.

<sup>30</sup> Ibid 25-2-4.

<sup>31</sup> Sterne et al (n 22).

### Confidence in cumulative evidence – exploratory

We will adapt GRADE (Grading of Recommendations, Assessment, Development, and Evaluation)<sup>32</sup> to provide an estimate of the general level of confidence in the evidence that there are reliable indicators of suicidal and homicidal sharp force wounds. GRADE consists of five factors: limits in study design or execution (risk of bias), inconsistency of results, indirectness of evidence, imprecision, and publication bias. Not all of these factors are applicable or will be easy to estimate concerning our research question and literature. However, we will be able to provide an assessment of the following factors:

- Study design by appraising the included studies as a whole by providing a holistic synthesis of the individual risk of bias assessments of included studies.
- Imprecision by considering the total number of included cases and associated measures of uncertainty (e.g., confidence intervals).

Two review authors will make these determinations independently and resolve disagreements through discussion. As with risk of bias, our confidence in cumulative evidence assessment should be considered exploratory due to the lack of existing guidance and protocols for this determination in forensic pathology. We will also provide comments and discussion about any other overall strengths and limits in the found literature.

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<sup>32</sup> Gordon Guyatt et al, 'GRADE guidelines: 1. Introduction – GRADE evidence profiles and summary of findings tables' (2011) 64 *Journal of Clinical Epidemiology* 383.

## Appendix A. Background on search strategy development

This appendix provides some background on how we developed our search strategy. In particular, we built off the strategies used by two previous systematic reviews: AlGheryafi et al and De-Giorgio et al.

### AlGheryafi et al

AlGheryafi et al used the following search string:

("suicide"[Title] OR "suicidal"[Title] OR "self harm"[Title] OR "self"[Title] OR "self injury"[Title]) AND ("homicide"[Title] OR "homicidal"[Title] OR "kill"[Title] OR "murder"[Title]) AND ("stab wound"[Title] OR "stab injury"[Title] OR "stab injuries"[Title] OR "stabbing"[Title] OR "incised wound"[Title] OR "incised injuries"[Title] OR "cut"[Title] OR "sharp wound"[Title] OR "sharp injury"[Title] OR "sharp injuries"[Title] OR "knife"[Title] OR "thrust"[Title] OR "sharp weapon"[Title] OR "scalpel"[Title] OR "sharp force"[Title])

This returns 25 articles as of July 24, 2024 (consistent with their reporting of 23) and catches 5/10 of the reference articles in Table 1. A major limitation is the lack of root expanders (e.g., substituting stab wound\* for stab wounds would catch an additional article) and a lack of the term 'manner'.

### De-Giorgio et al

De-Giorgio et al conducted two searches (in Medline), one for homicides and one for suicides.

#### *Suicides*

stab wound\* OR stab injur\* OR cut wound\* OR cut injur\* OR sharp injur\* OR sharp wound\*  
AND suicid\*

### *Homicides*

(stab wound\* OR stab injur\* OR cut wound\* OR cut injur\* OR sharp injur\* OR sharp wound\*  
**AND** murder) OR (stab wound\* OR stab injur\* OR cut wound\* OR cut injur\* OR sharp injur\*  
 OR sharp wound\* **AND** murder\*) OR (stab wound\* OR stab injur\* OR cut wound\* OR cut injur\*  
 OR sharp injur\* OR sharp wound\* **AND** homicid\*)

These are helpful, but appear to be missing some notation (quotation marks and parentheses).

### This review's search strategy

We combined many of the terms in these searches with keywords identified in our reference set using the WordFreq tool (<https://sr-accelerator.com/#/wordfreq>). We refined the search string using the SearchRefinery tool (<https://sr-accelerator.com/#/searchrefinery>), which helps identify terms that increase the total number of search results without finding relevant citations. The result of the process is the following search string (PubMed):

(suicid\*[tiab] OR "self harm"[ti] OR "self inflict"[ti] OR "self injury"[ti] OR herself[tiab] OR himself[tiab] OR homicid\*[tiab] OR murder\*[tiab] OR kill[ti] OR manner[ti] OR assault[tiab] OR accident\*[tiab]) **AND** ("sharp force"[tiab] OR "sharp wound"[tiab] OR "sharp injur"[tiab] OR "sharp weapon"[ti] OR stab[tiab] OR "stab wound"[tiab] OR stabbing[tiab] OR stabbed[tiab] OR "stab injur"[tiab] OR "cut wound"[tiab] OR cutting[ti] OR "cut injur"[tiab] OR incis\*[ti] OR knife[ti] OR scalpel[ti])

This results in 1587 total PubMed results on September 27, 2024, finding 10/10 reference articles.

We will search MEDLINE via Ovid, Scopus, and Web of Science. Those strings have been generated based the above PubMed string using Polyglot (<https://sr-accelerator.com/#/polyglot>):

### *MEDLINE via Ovid*

(suicid\*.tw. OR "self harm".ti. OR "self inflict".ti. OR "self injury".ti. OR herself.tw. OR himself.tw. OR homicid\*.tw. OR murder\*.tw. OR kill.ti. OR manner.ti. OR assault.tw. OR

accident\*.tw.) AND ("sharp force".tw. OR "sharp wound".tw. OR "sharp injur".tw. OR "sharp weapon".ti. OR stab.tw. OR "stab wound".tw. OR stabbing.tw. OR stabbed.tw. OR "stab injur".tw. OR "cut wound".tw. OR cutting.ti. OR "cut injur".tw. OR incis\*.ti. OR knife.ti. OR scalpel.ti.)

### *Scopus*

(TITLE-ABS(suicid\*) OR TITLE("self harm") OR TITLE("self inflict") OR TITLE("self injury") OR TITLE-ABS(herself) OR TITLE-ABS(himself) OR TITLE-ABS(homicid\*) OR TITLE-ABS(murder\*) OR TITLE(kill) OR TITLE(manner) OR TITLE-ABS(assault) OR TITLE-ABS(accident\*)) AND (TITLE-ABS("sharp force") OR TITLE-ABS("sharp wound") OR TITLE-ABS("sharp injur") OR TITLE("sharp weapon") OR TITLE-ABS(stab) OR TITLE-ABS("stab wound") OR TITLE-ABS(stabbing) OR TITLE-ABS(stabbed) OR TITLE-ABS("stab injur") OR TITLE-ABS("cut wound") OR TITLE(cutting) OR TITLE-ABS("cut injur") OR TITLE(incis\*) OR TITLE(knife) OR TITLE(scalpel))

### *Web of Science*

((TI=suicid\* OR AB=suicid\*) OR TI="self harm\*" OR TI="self inflict\*" OR TI="self injury" OR (TI=herself OR AB=herself) OR (TI=himself OR AB=himself) OR (TI=homicid\* OR AB=homicid\*) OR (TI=murder\* OR AB=murder\*) OR TI=kill OR TI=manner OR (TI=assault OR AB=assault) OR (TI=accident\* OR AB=accident\*)) AND ((TI="sharp force" OR AB="sharp force") OR (TI="sharp wound" OR AB="sharp wound") OR (TI="sharp injur" OR AB="sharp injur") OR TI="sharp weapon" OR (TI=stab OR AB=stab) OR (TI="stab wound" OR AB="stab wound") OR (TI=stabbing OR AB=stabbing) OR (TI=stabbed OR AB=stabbed) OR (TI="stab injur" OR AB="stab injur") OR (TI="cut wound" OR AB="cut wound") OR TI=cutting OR (TI="cut injur" OR AB="cut injur") OR TI=incis\* OR TI=knife OR TI=scalpel)

## Appendix B. Citation information for Table 1

1. Zainab Fathi AlGheryafi et al, 'Differentiating suicide from homicide in sharp-force fatalities with stab and/or incised wounds: A scoping review' (2024) 67 *Legal Medicine* 102388.
2. Christophe Brunel et al., 'Homicidal and suicidal sharp force fatalities: Autopsy parameters in relation to the manner of death' (2010) *Forensic Science International* 150.
3. Fabio De-Giorgio et al, 'Suicidal or Homicidal Sharp Force Injuries? A Review and Critical Analysis of the Heterogeneity in the Forensic Literature' (2015) 60(S1) *Journal of Forensic Sciences* S97.
4. Nunzio Di Nunno et al, 'Suicide by Hara-kiri' (2001) 22(1) *The American Journal of Forensic Medicine and Pathology* 68.
5. Hideki Ito et al, 'Traumatic ventricular septal defect following a stab wound to the chest' (2009) 57 *General Thoracic and Cardiovascular Surgery* 148.
6. Thore Karlsson, 'Homicidal and suicidal sharp force fatalities in Stockholm, Sweden. Orientation of entrance wounds in stabs gives information in the classification' (1998) 93 *Forensic Science International* 21.
7. Stéphanie Racette 'Suicidal and homicidal sharp force injury: a 5-year retrospective comparative study of hesitation marks and defense wounds' (2008) 4 *Forensic Science, Medicine, and Pathology* 221.
8. Julia Schädler et al, 'Singular stab wounds to the trunk: Is this suicidal or homicidal?' (2024) 68 *Legal Medicine* 102430.
9. V Scolan et al, 'Homicide-Suicide by Stabbing Study Over 10 Years in the Toulouse Region' (2004) 25(1) *The American Journal of Forensic Medicine and Pathology* 33.
10. Cladio Terranova et al, 'Criminological and Medico-legal Aspects in Homicidal and Suicidal Sharp Force Fatalities' (2020) 65(4) *Journal of Forensic Sciences* 1184.
11. Asser H Thomsen et al, 'Sharp Force Homicide in Denmark 1992–2016' (2020) 65(3) *Journal of Forensic Sciences* 833.
12. Maria Berg von Linde et al, 'A Swedish nationwide forensic study of the manner of death in single stab injuries to the trunk' (2024) *Forensic Science International* 111910.

### **CRedit Statement**

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