National Case Closed Project:

Solvability Calculator for Nonfatal Shooting Investigations User Guide

Description of Tool

Assessments of how law enforcement agencies investigate nonfatal shootings, including those conducted as part of the National Case Closed Project (NCCP), have shown that many agencies lack the resources to thoroughly investigate every shooting incident. Because of the large volume of nonfatal shootings and the staffing shortages faced by many agencies, individuals who investigate nonfatal shootings are often limited in the amount of time they can spend on a case. Nonfatal shooting incidents also vary in their inherent "solvability," which is defined as the probability that the case will be cleared, either by arresting a suspect or by exceptional means.

Some investigative units use "solvability factors," or incident characteristics that are believed to increase the probability of case clearance, to determine the time and resources that will be dedicated to an investigation. Although there are agencies that have formalized the use of solvability factors, more commonly this process is informal and does not have a defined set of evidence-based solvability factors or consistency in how the solvability factors are used to make investigative decisions. To address these needs, the NCCP team developed a solvability calculator to aid law enforcement agencies in formalizing the triaging of nonfatal shooting incidents based on case solvability. The nonfatal shooting solvability calculator is designed to increase consistency, transparency, and accuracy in investigative decision-making.

This document describes how the NCCP team developed the nonfatal shooting solvability calculator, its intended uses, and limitations and considerations for law enforcement agencies that choose to use the tool. It also describes how to use the calculator and how to interpret its results. Finally, it provides considerations for future directions for using and improving the solvability calculator to increase nonfatal shooting clearance rates. It is important to note that the tool has not yet been formally evaluated. We encourage law enforcement agencies to provide us with feedback on how the tool performs and what could be done to improve its function and effectiveness.

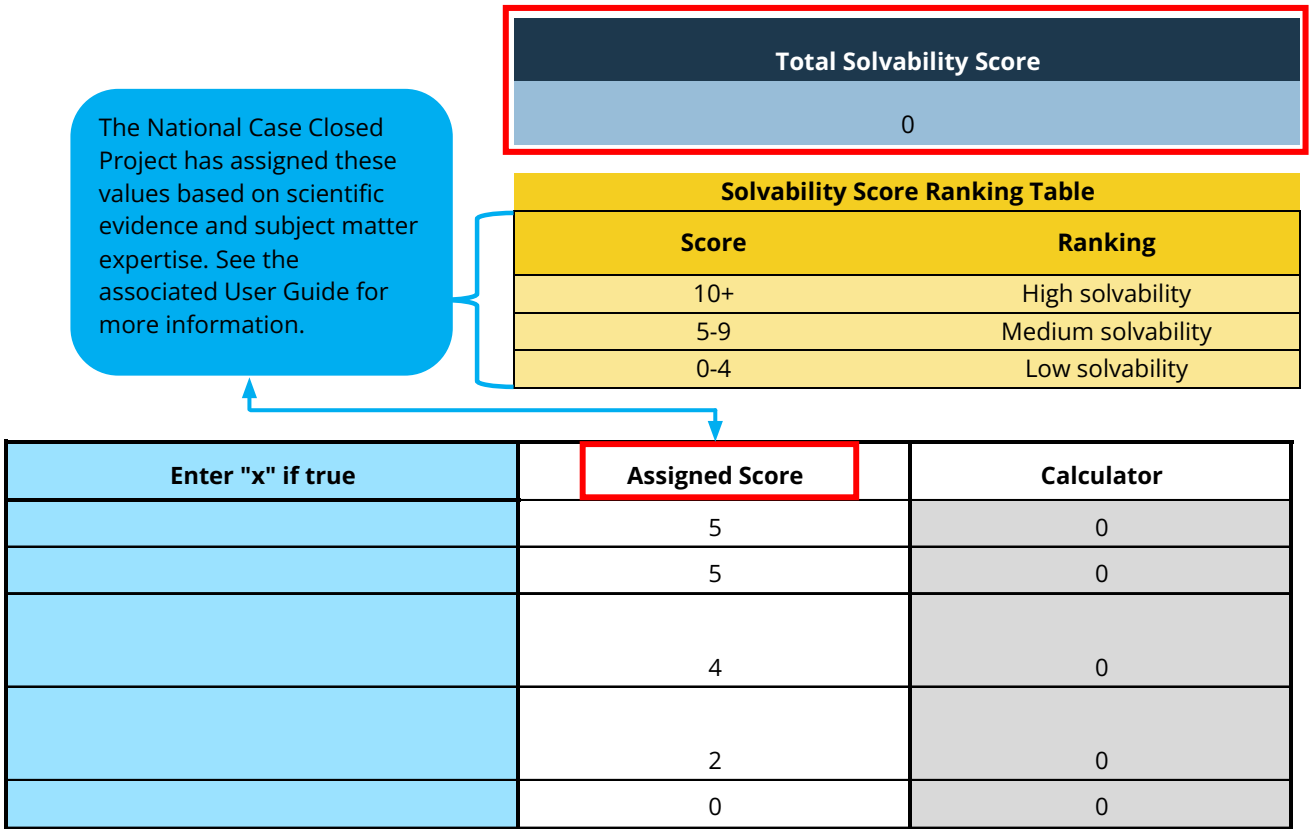
The NCCP team developed a solvability calculator to aid law enforcement agencies in formalizing the triaging of nonfatal shooting incidents based on case solvability.

You can access the calculator here: NCCP Solvability Calculator

Development of the Tool

To develop the solvability calculator, the NCCP team reviewed past research on the solvability factors of homicide, aggravated assault, nonfatal shooting, and robbery cases. We identified an initial set of solvability factors by assessing how often (i.e., the frequency) and the extent to which (i.e., the magnitude) various factors predicted case solvability. Next, we combined the frequency and magnitude to determine how much impact (i.e., weight) each of these factors should be assigned within the calculator (see the Assigned Score in **Figure 1**). We used these assigned scores to determine thresholds for high, medium, and low solvability designations (see Solvability Score Ranking Table in **Figure 1**). Finally, the NCCP team asked experts, including experienced violent crime investigators and researchers, to review and provide feedback on the calculator, which were incorporated into the tool.

Figure 1. Total Solvability Score and Assigned Score from the Solvability Calculator



Although most evidence on solvability factors is based on homicide cases, nonfatal and fatal shootings, which make up the bulk of homicides, share many of the same incident characteristics (Cook et al., 2019; Hipple & Magee, 2017; Scott et al., in press). Additionally, law enforcement agencies often dedicate extensive resources to solving active homicides, regardless of the likely solvability of a given case. Therefore, the NCCP team designed its solvability calculator to be used in nonfatal shooting investigations. Law enforcement agencies may evaluate whether the tool is appropriate for use in other criminal investigations. However, we caution that property crimes and more minor violent offenses (such as simple assault) likely have solvability factors that differ from those of the most serious violent crimes.

Intended Use of the Tool

The solvability calculator is intended for use in nonfatal shooting investigations by law enforcement agencies that want to develop a data-driven process for determining how much time and effort should be dedicated to an investigation. Because investigations develop and new information is discovered over the course of an investigation, the solvability calculator should be used multiple times during an investigation. Using the tool repeatedly to incorporate new information will provide an accurate determination of a case's solvability. See an example procedure for incorporating the solvability tool into a nonfatal shooting investigation on the NCCP Solvability Calculator web page.

Importantly, the use of the solvability calculator should accompany a thorough investigation.[1] Without a thorough investigation, it is impossible to assess the factors included in the solvability calculator. For instance, without a comprehensive effort to obtain victim or witness participation, a potentially solvable

[1] See this National Case Closed Project resource that defines a thorough nonfatal shooting investigation: National Case Closed Project: Core Standards for Fatal and Non-fatal Shooting Investigations

case may appear to be unsolvable. Likewise, if sufficient effort is not dedicated to searching for video evidence at the scene of a nonfatal shooting, a case could be misclassified as having low solvability due to the lack of sufficient evidence. The solvability tool is designed to supplement an investigation by providing guidance to lead investigators and their supervisors about the solvability of a case and the amount of time and resources that should be dedicated to developing new leads once open leads have been investigated and case momentum begins to stall. Additionally, even if a case is determined to have low solvability, the NCCP believes that this fact does not justify leaving an open lead uninvestigated.

Limitations and Considerations in Using the Tool

Agencies choosing to use the solvability calculator should develop written policy that provides clear and detailed guidance to agency personnel who will use the solvability calculator on their roles and the intended use of the tool. The policies should be used to train everyone involved in the identification and documentation of solvability factors in a case. Applicable personnel may include patrol officers, crime scene investigators, forensic technicians, victim advocates, and investigators. The lead detective, under the supervision of their sergeant, should ensure that the solvability calculator is completed accurately and is updated when relevant new case information arises.

Importantly, law enforcement agencies may want to supplement the solvability calculator with expert judgment about the amount of effort and resources to put into a nonfatal shooting investigation. For instance, if a young child is shot or if the incident is part of an escalation in violence between groups, agencies may prioritize these investigations regardless of the case's level of solvability. Any room for discretion in the use of the tool should be clearly documented in policy and be included in training.

Finally, there may be other options to consider in managing resources in the investigation of nonfatal shootings that do not involve case triaging, such as reassigning detectives from less severe crime assignments like burglary or larceny to nonfatal shooting investigations and/or assigning some number of patrol officers to investigations. See resources on the NCCP website, including published site assessment reports, for guidance on increasing the effectiveness and efficiency of shooting investigations: Products developed by the National Case Closed Project.

Instructions for Using the Tool

To use the NCCP solvability calculator, the lead investigator should ensure that all relevant information concerning the investigation has been obtained and is current. The investigator should also assess whether sufficient effort was dedicated to certain investigative activities, such as searching for video evidence or obtaining witness participation, to ensure that the solvability score is as accurate as possible. Once these steps are completed, the user should move down the Solvability Factor Topic list in the solvability calculator (columns A and B) from top to bottom and pick **one response option** from the Solvability Factor Types list (column C) **within each Solvability Factor Topic** that describes the facts of the case (see **Figure 2**). The Solvability Factor Type values are mutually exclusive within each Solvability Factor Topic. Therefore, the user will receive an error message if they try to select more than one Solvability Factor Type value within a given Solvability Factor Topic.

Figure 2. Solvability Factor Topic and Factor Type from the Solvability Calculator

AGENCY CASE NUMBER:		
Solvability Factor Topic		**Solvability Factor Type**
1	Participation in the investigation by one or more victims or witnesses	Forthcoming, provides excellent suspect evidence (e.g., suspect name)
		Not forthcoming, provides excellent suspect evidence (e.g., suspect name)
		Forthcoming, provides limited suspect evidence or other evidence (e.g., suspect description; possible motive)
		Not forthcoming, provides limited suspect evidence or other evidence (e.g., suspect description; possible motive)
		Can provide no evidence or declines to participate
2	Physical/digital evidence recovered	Multiple types of evidence believed to belong to the suspect
		One type of evidence believed to belong to the suspect: identifying evidence (DNA; fingerprints; registered vehicle; cell phone; social media admission)
		One type of evidence believed to belong to the suspect: not identifying evidence (e.g., jewelry; clothing)
		One or more types of evidence belonging to victim that could aid investigation (e.g., firearm; cell phone)
		None of the above
3	Video evidence recovered	Suspect clearly identified on video (e.g., face; license plate)
		Some identifying attributes of suspect caught on video (e.g., unique clothing; tattoos; vehicle color and make)
		None of the above
4	Lead provided by resident or confidential informant about suspect identity	Lead from multiple residents and/or confidential informants about suspect identity
		Lead from one resident and/or confidential informant about suspect identity
		None of the above
5	Location of shooting	Shooting occurred indoors
		Shooting occurred outdoors
6	NIBIN shows firearm was used in another crime under investigation	NIBIN shows firearm was used in another crime under investigation
7	Suspect taken into custody or present at crime scene	Suspect taken into custody or present at crime scene

Note: NIBIN = National Integrated Ballistic Information Network.

When the user is finished entering values into the calculator, there should be between five and seven "x" values in column D (see **Figure 3**). There may be fewer than seven values as the last two Solvability Factor Topics will not have an "x" value if they are not true for the case. There should be at least 5 "x" values because at least one Solvability Factor Type value (see **Figure 2**) must exist for the first five Solvability Factor Topics (columns A and B). As mentioned, the Solvability Factor Type response options are mutually exclusive within each Solvability Factor Topic.

Figure 3. X Value, Assigned Score, and Calculator Score from the Solvability Calculator

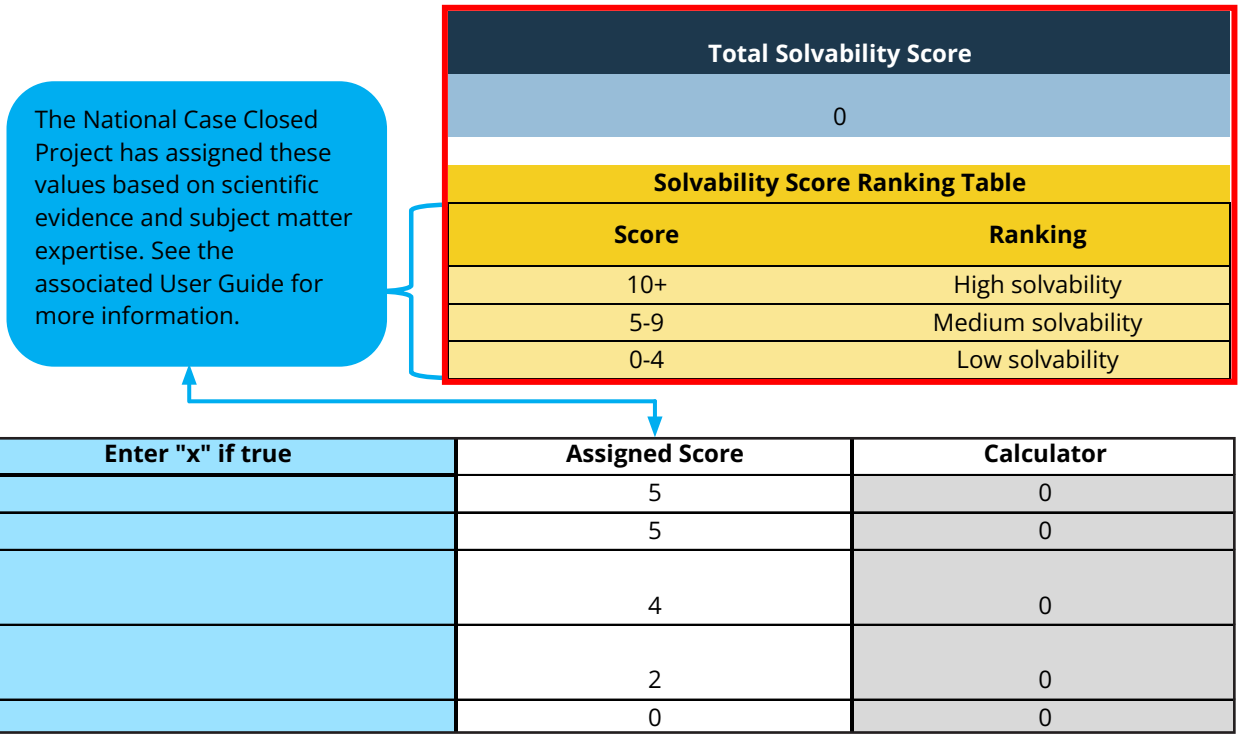
Enter "x" if true	Assigned Score	Calculator
	5	0
	5	0
	4	0
	2	0
	0	0

The only column that a user should modify is the Enter "x" if true column (column D), which is the column used to enter an "x" value if the Solvability Factor Type value is accurate. Based on the score assigned to each solvability factor type value (see the calculator column E for assigned scores), the calculator will evaluate the "x" response options and produce a score indicating the case's total solvability value. It is this value that a law enforcement agency should use in its decision-making about the level of resources to apply to a nonfatal shooting investigation based on the case's solvability.

Interpreting Results from the Tool

After a total solvability score has been calculated, the user should compare the case's value to the Solvability Score Ranking Table to determine whether the case has a low, medium, or high solvability level (see **Figure 4**).

Figure 4. Total Solvability Score from the Solvability Calculator



Enter "x" if true	Assigned Score	Calculator
	5	0
	5	0
	4	0
	2	0
	0	0

Again, this is a tool designed to help guide decision-making, and discretion can be used to determine how scores are interpreted. In other words, law enforcement agencies can decide how they want to interpret the scores based on their own circumstances. For example, an agency facing more severe labor or resource shortages may wish to be more conservative by considering total solvability scores of 5 or 6 as indicating low solvability instead of medium solvability. That said, NCCP has determined that these ranking thresholds appear to accurately indicate the solvability level of a case. We welcome feedback from law enforcement agencies that decide to use the tool and evaluate its solvability rankings against their judgment of a case's solvability.

In using the tool, the most challenging decision for a law enforcement agency to make is what the solvability rankings will mean for the department in terms of actions taken and resources expended. As previously mentioned, **the NCCP does not in any way suggest that a nonfatal shooting investigation should stop when active leads have not been investigated just because the case's solvability score is low**. However, the solvability tool can be used by law enforcement agencies to conserve resources and maximize efficiency in their response to nonfatal shootings. One example of using the solvability rankings to assign investigative resources could be setting thresholds for the number of hours, amount of resources, or the length of time dedicated to a nonfatal shooting investigation, which would correspond to the solvability rankings. Another way to assign resources based on case solvability rankings includes prioritizing investigative resources like technologies or support personnel for cases with higher solvability rankings. As mentioned in the Limitations and Considerations section on page 3, once the decision is made about how solvability rankings will be incorporated into nonfatal shooting investigations, this information should be translated to relevant agency personnel via policy and training.

Future Directions in the Use of the Tool

Law enforcement agencies that use this tool for case solvability triaging will be in a position to evaluate its performance, including its accuracy in assessing case solvability. Any feedback or recommendations on the use of the solvability tool, including recommendations for improvement, can be sent to the NCCP team at caseclosed@rti.org. We also encourage law enforcement agencies interested in evaluating the tool to partner with researchers who can help ensure that the tool undergoes a rigorous evaluation. Policing researchers Kent McFadzien and Lawrence Sherman (2021) provide an example of how a solvability tool and investigative procedures can be evaluated to assess its accuracy and value to an agency.

Nonfatal shootings are a serious crime that ideally would receive the same investigative attention and thoroughness that is typically reserved for homicide cases. The NCCP's website has resources available to support law enforcement agencies in improving their response to nonfatal shootings. To learn more about this tool or the NCCP, visit the project's website at National Case Closed Project (NCCP) or email the project at caseclosed@rti.org.

Technical Reporting

Version 1, February 2025

References

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Hipple, N. K., & Magee, L. A. (2017). The difference between living and dying: Victim characteristics and motive among nonfatal shootings and gun homicides. *Violence and Victims, 32*(6), 977–997.

McFadzien, K., & Sherman, L. W. (2021). "Hold them or fold them": Evidence-based decisions to discontinue investigations of non-domestic minor violence. *Policing: An International Journal, 44*(4), 643–654.

Scott, T., Johnson, N., Martin, K., Pope, M., & Strom, K. (in press). Leveraging the National Incident-based Reporting System to compare fatal and nonfatal shooting incidents. *Journal of Crime and Justice.*

Relevant NCCP Resources

National Case Closed Project: Tracking Nonfatal Shootings and Other Violent Gun Crimes in Your Law Enforcement Agency

Flow Model: Agency and Investigative Factors Leading to Case Clearance

National Case Closed Project: Core Standards for Fatal and Non-fatal Shooting Investigations

More Information

If you have questions or want more information on the National Case Closed Project, please contact us.

NCCP Helpdesk

NCCP Website

This project is supported by Grant No. 15PBJA-21-GK-04008-JAGP awarded by the Bureau of Justice Assistance. The Bureau of Justice Assistance is a component of the Department of Justice's Office of Justice Programs, which also includes the Bureau of Justice Statistics, the National Institute of Justice, the Office of Juvenile Justice and Delinquency Prevention, the Office for Victims of Crime, and the Office of Sex Offender Sentencing, Monitoring, Apprehending, Registering, and Tracking. Points of view or opinions in this document are those of the author and do not necessarily represent the official position or policies of the U.S. Department of Justice.