

# 911 Analysis: Methodology and Limitations

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## Introduction

In the fall of 2020, the Vera Institute of Justice (Vera) released a multicity mixed-methods report that explored many aspects of the 911 system, from staff training and data collection to the landscape of the 911 system as a whole.<sup>1</sup> Since that report’s release, communities across the country have made increasing demands for systemic changes to policing and public safety. Vera felt it was important to add to its previous work by conducting deeper analyses into the potential to divert 911 call responses from armed police officers to other, unarmed first responders. Vera researchers collected and standardized 911 data from nine cities into a single dataset, spanning January 2019 to November 2021. Analysis of this dataset was reported by Vera in two short reports on call data that shows [we can rely less on police](#) and [how civilian crisis response programs can divert behavioral health calls from police](#).

911 datasets contain varying amounts of information and supplementary data. While consolidating a single 911 dataset poses many challenges during the process of cleaning, restructuring, and examining the data, doing so across multiple datasets for the purposes of comparative analysis is all the more complex.

This document offers an overview of the methodology for, and limitations to, this multicity 911 analysis.

## Background

Vera researchers collected data from publicly available datahubs—centralized web-based locations where departments and governments make their data accessible to the public—which contained varying types of information related to 911 calls with varying levels of detail. As researchers cleaned and standardized many of the variables, they had to resolve discrepancies in the type and depth of information contained in each set. This methodology provides more information on why and how Vera constructed variables for the purpose of this analysis.

## Site selection and time frame

Although there are over 18,000 law enforcement agencies across the country, a majority of them do not release publicly available data and very few release any 911 data at all, much less incident-level data. As a result, there were a limited number of cities from which to pull data. Vera researchers selected the nine cities featured in this analysis due to their sizes, availability of incident-level data, and inclusion of specific variables—including priority levels (that is, codes that describe the urgency of response needed) and variables related to call origin.

Vera chose January 2019 as the data starting point. Vera considered this start date to be meaningful when taking into account the many events that happened during 2020 and 2021 that could drastically change how people were using 911, including: the COVID-19 pandemic, shelter in place requirements, loss of employment, and the national protests and demands for police reform following the murder of George Floyd. The end date for each city’s dataset varies as researchers included the most recent data available as of November 11, 2021, and there is variation in the time it takes for each jurisdiction to upload data.

Figure 1

### Timeline and Scope of Nine Cities Analyzed

City	Agency	Timeline
Baltimore, MD	Baltimore Police Department	January 2019 to November 10, 2021
Burlington, VT	Burlington Police Department	January 2019 to November 10, 2021
Cincinnati, OH	Cincinnati Police Department	January 2019 to November 10, 2021
Detroit, MI	Detroit Police Department	January 2019 to November 10, 2021
Hartford, CT	Hartford Police Department	January 2019 to March 11, 2021
New Orleans, LA	New Orleans Police Department	January 2019 to November 10, 2021
New York, NY	New York City Police Department	January 2019 to September 29, 2021
Seattle, WA	Seattle Police Department	January 2019 to November 10, 2021
Tucson, AZ	Tucson Police Department	January 2019 to October 30, 2021

## Priority levels

“Priority levels” are levels assigned by call-takers that lend insight into the risk and urgency of a specific call. Priority levels help dispatchers determine the number of officers needed and how quickly they need to respond to a call, giving them the ability to prioritize the many calls in the dispatch queue. Priority levels differed across the jurisdictions featured in this analysis as some places used colors, numbers, letters, or a combination of the three to assign the priority of a call. Nonetheless, each city shared at least one priority level with the classification “emergency,” or language similar to that.

With the inclusion of these priority types in every jurisdiction, Vera researchers produced a new *top priority* variable. This allowed for direct comparison of the most urgent and severe calls. Assuming that these calls will always require a police response, Vera could then remove them from estimates of the percentage of calls in each jurisdiction that could likely be diverted. When some degree of ambiguity existed as to whether a jurisdiction's code related to an immediate threat to life or imminent danger, researchers assumed greater risk and severity. This conservative approach resulted in a possible overestimation of the number of calls ineligible for diversion from police response.

## Call origin

All the datasets in Vera's analysis contain 911 calls initiated by the public, officer-initiated events, and logistical or system-related calls. As such, researchers had to filter out the latter two categories to focus on how community members are using 911. In many places, officers report their actions and movements to the 911 communications centers. As a result, these events are recorded in the same datasets as 911 calls for service. Six of the nine city datasets had a dedicated tag that captured the origin of the call, and three cities did not. Fortunately, other variables in these three locations' datasets contained supplementary information that made it possible to determine if the call came via 911.

Researchers utilized two approaches to remove suspected officer-initiated instances.

1. **Removal of call types that clearly cannot be initiated by the public.** Examples of this include calls that are identified in the system as being related to proactive or hotspot policing, routine officer activities (such as officer use of latrine), system tests, administrative duties, and audits.
2. **Timestamp analysis.** Datasets in many jurisdictions include timestamps for call-related events. For jurisdictions with data that did not include a call initiation variable, researchers looked at patterns in these timestamps to identify which calls were officer-initiated. These patterns included, for example, instances for which the data was missing timestamps for call origin and dispatch but that had values for arrival and event closure times.

## Call dispatch

For their analysis, Vera researchers needed to delineate which calls resulted in a police dispatch. However, only one city in Vera's nine-city analysis shared data that included a specific variable indicating whether an officer was "dispatched" in response to a call. To resolve this, Vera researchers looked for calls with both a dispatch timestamp and an arrival timestamp, which provided confirmation of both dispatch and officer arrival. While a dispatch timestamp alone may have initially indicated that an officer was dispatched, many calls did not have an arrival stamp, and many others had a dispatch and closure time that were the same. Researchers assumed that an officer was not dispatched in these instances. This approach allowed researchers to identify calls that resulted in officer dispatch in four additional sites.

## Call Types and Call Categorization

Call types and call descriptions give researchers invaluable insight into the specifics of situations that people are bringing to the attention of 911 operators. Similar to all other variables, there is a lack of consistency across sites. To standardize call description variables, Vera researchers created new call type categorization variables. Through this process, the researchers assigned more than 10,000 call description variables from nine cities to seven general categories: violent crime, property crime, traffic, other crimes, non-criminal, mental health, and expansive behavioral health. Placing calls into these categories streamlined researchers' ability to examine the circumstances for which community members called 911.

Two call types were particularly important to Vera’s analysis: calls relating to violent crimes and those relating to mental and behavioral health issues.

### Violent crime

Researchers relied in part on the FBI’s Uniform Crime Report (UCR) definition of violent crime to determine the 911 calls that belong in this category.<sup>2</sup> Although call-takers do not use the exact categories of UCR, the FBI UCR definition of violent crime serves as a framework for standardization across law enforcement agencies nationally. As such, Vera researchers assigned calls related to homicide, robbery, aggravated assault, and rape to this category. Since 911 call-takers use scales of assault severity rather than simple assault or aggravated assault, Vera researchers included some assaults that are not specifically labeled as aggravated assaults within the category of “violent crime.” Vera researchers also included within the category of violent crime any incidents of domestic violence that involved one of the aforementioned UCR-identified violent crimes, as these would be ineligible for a non-police response.

### Mental health and expansive behavioral health

For the analysis presented in “911 Analysis: How Civilian Crisis Responders Can Divert Behavioral Health Calls from Police,” Vera researchers relied on two categories in particular: “mental health” and “expansive behavioral health.”

Figure 2

**Call Types Related to Mental Health and Expansive Behavioral Health Categories**

A. Mental Health	B. Expansive Behavioral Health
<ul style="list-style-type: none"> <li>• Mental Health</li> <li>• Mental Illness</li> <li>• Mentally Disturbed</li> <li>• Suicidal</li> <li>• Disturbed Individual</li> <li>• Emotionally Disturbed Individual</li> </ul>	<p>All mental health categories in column A, plus:</p> <ul style="list-style-type: none"> <li>• Assist/Assistance Needed</li> <li>• Trespass</li> <li>• Disturbance</li> <li>• Indecent Exposure and Lewdness</li> <li>• Unwanted Person</li> <li>• Intoxicated Person</li> <li>• Alcohol and Drunkenness</li> <li>• Disorderly</li> <li>• Wellbeing</li> <li>• Welfare Check</li> <li>• Check</li> </ul>

The first mental health category only includes call types that are directly coded as related to mental health (see Figure 2). Some researchers have used only this category in their analyses of 911 calls and, as a result, have concluded that the introduction of non-police emergency responders for people experiencing mental health crises would have a minimal effect on the number of 911 calls that require a police response. However, civilian crisis responders can attend to a range of calls related to mental health or behavioral health needs, including situations that may be classified as other call types due to the presenting behavior of people in need of support.

Vera researchers constructed the “expansive behavioral health” category by looking at crisis response programs that respond to numerous call types outside of the narrow “mental health” category. For example, the Support Team Assisted Response (STAR) program in Denver, Colorado, dispatches teams of EMTs and mental health clinicians to “assist,” “intoxicated person,” “welfare check,” “indecent exposure,” “trespass unwanted person,” and “syringe disposal – HRAC” calls.<sup>3</sup> Additionally, the longstanding CAHOOTS program in Eugene, Oregon, is often called upon to handle calls involving “disorderly subjects” as well, so these are also included in the expansive behavioral health category.<sup>4</sup> It is worth noting that the label of “disorderly” implies criminal behavior while obscuring underlying behavioral health issues that civilian responders are better equipped than police to address.

Researchers removed calls from the “mental health” and “expansive behavioral health” categories if they *also* had a “top priority” designation. Although researchers removed calls categorized as “suicidal” if they involved violent action or weapons possession, suicide-related calls that did not pose an immediate safety risk to others were included, even when they were categorized as “top priority,” because civilian crisis responders are specially trained in de-escalation and are better equipped than police to intervene when these situations arise.<sup>5</sup>

The names and naming conventions of similar call types often differ across jurisdictions, and because 911 operators may be inconsistent in labeling similar call types, Vera researchers included many variations of key call types to ensure they were included in the analysis. This variability along with limited additional information, such as a lack of call subcategories or call notes, resulted in only the most apparent summary call types being included, which means the number of calls to which a civilian crisis response team could respond may be underestimated in this analysis.

## Calculating sample averages

All averages displayed in Vera’s analyses are averages of site values; they are not a total population mean. Vera researchers did this to avoid skewed results based on different volumes of 911 calls across the cities. If researchers used a total population mean, data from larger cities like New York City would bias the statistics toward the characteristics of the largest locales.

## Limitations

The majority of the limitations researchers saw in the data resulted from inconsistencies in data collection practices and human error. While many 911 variables are tied to automated systems—such as GIS (geographic information system) mapping—priority levels, call types, and certain timestamps are assigned by call-takers and are therefore informed by their training and situational understanding, which varies greatly from person to person. This can result in the assignment of priority levels or call types that do not accurately capture the nature of the situation. More specific data-related limitations are highlighted below.

## Call types

The information that call-takers receive and collect varies. This can lead to different call type classifications for similar calls. This variation makes it difficult to consistently capture all calls related to mental health or behavioral health. Many behavioral health-related calls are classified under other call types such as disturbance calls, wellbeing checks, or trespassing. While Vera included many of these calls within the “expansive behavioral health” category, it is not possible to capture every call related to behavioral health needs. As a result, Vera researchers are confident that this analysis undercounts the number of calls that are mental health or behavioral health related.

## Timestamp related construction, dispatch, and call source

Only six of the nine cities in Vera’s sample had a call source variable (indicating if a call was officer-initiated or a 911 call), and five had dispatch variables (indicating whether an officer was dispatched). In the remaining cities, it was necessary for Vera to construct these variables using timestamp variables, as described above. The construction of these new variables

can only be as valid as the data provided, and system glitches or police department policies for assigning timestamps may have skewed the data.

It is possible that the researchers erroneously removed some 911 calls from the datasets after incorrectly identifying them as being officer-initiated. Researchers selected calls for removal when they had identical time stamps; however, identical time stamps may have been the result of missing information or system errors. Thus, the sample may underrepresent the true number of 911 calls.

## About

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The Vera Institute of Justice is powered by hundreds of advocates, researchers, and community organizers working to transform the criminal legal and immigration systems until they're fair for all. Founded in 1961 to advocate for alternatives to money bail in New York City, Vera is now a national organization that partners with impacted communities and government leaders for change. We develop just, antiracist solutions so that money doesn't determine freedom; fewer people are in jails, prisons, and immigration detention; and everyone is treated with dignity. Vera's headquarters is in Brooklyn, New York, with offices in Washington, DC, New Orleans, and Los Angeles. For more information, visit [vera.org](http://vera.org).

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## Endnotes

<sup>1</sup> S. Rebecca Neusteter, Megan O'Toole, Mawia Khogali et al., *Understanding Police Enforcement: A Multicity 911 Analysis* (New York: Vera Institute of Justice, 2020), <https://perma.cc/S48V-NYUN>.

<sup>2</sup> FBI Uniform Crime Report, "Crime in the United States 2018: Violent Crime," 2018, <https://perma.cc/WO47-Y9DM>

<sup>3</sup> Brian Blick, Vinnie Cervantes, Blake Christianson et al., *Star Program Evaluation* (Denver, CO: Denver Police Department, 2021), <https://perma.cc/C9KA-5289>.

<sup>4</sup> Eugene Police Department Crime Analysis Unit, *CAHOOTS Program Analysis* (Eugene, OR: Eugene Police Crime Analysis Unit, 2020), <https://perma.cc/MN3F-DD2R>.

<sup>5</sup> SAMSA, "National Guidelines for Behavioral Health Crisis Care – Best Practice Toolkit," (Rockville, MD: SAMSA, 2020), <https://perma.cc/F9AY-QE3V>.