A public safety answering point (PSAP) refers to the call center where emergency calls for the police, fire department, or EMS are received from mobile or landline callers/subscribers. For about 23 years, NFPA 1221: Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems (now combined into NFPA 1225 (2022 edition): Standards for Emergency Services Communications) has had performance standards (NFPA 1221, 2019 edition, section 7.4) for the time it takes to answer an emergency call and the time it takes to interrogate the caller and notify the appropriate responders. NFPA 1225 (second draft of 2022 edition) requires two time-standards for dispatch: (1) answer requests for emergency assistance within 15 seconds 90% of the time. (2) Process the request for emergency assistance within 60 seconds 90% of the time. These time requirements are based on the experience of the technical committee members and not on any analytical research. There is no research that suggests that these times fit the physical limitations of a communication center. Authority having jurisdictions (AHJ) question the validity of these time requirements, and many are not accepting the standard because of this one section.

This study identified staffing limitations, insufficient funding, and technological issues/limitations as the common concerns for PSAPs. There are over 6,000 actively functioning PSAPs in the United States. 52 organizations submitted data on public safety call answering and processing times and 47 of those datasets are in a format consistent with the needs of this study. The limited dataset (less than 1 percent of PSAPs) does not allow for a holistic evaluation of determining if PSAPs meet the time requirements specified in NFPA 1225 for public safety call answering and processing times. However, an analysis of the existing data of this study reveals that PSAPs are generally unable to process calls within the time prescribed by NFPA 1225. In this study, PSAPs were only able to achieve the minimum time standards set by NFPA 1225 40-50% percent of the time. It was noted that PSAPs who stated that they follow a written standard were compliant significantly more often than those who did not. Specifically, agencies that stated they follow the times described in NFPA 1225 or 1221 had 65% of their calls found to be compliant, versus only 27% compliance in the calls processed by agencies not following an NFPA standard. Analyzing these records, the 90th percentile for call processing times is more than twice the recommended time specified in NFPA 1225. However, records from agencies that follow written standards were compliant more than twice as often as the records from agencies without a standard. Agencies following NFPA standards were identified to be most successful in this study.

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The content, opinions, and conclusions contained in this report are solely those of the authors and do not necessarily represent the views of the Fire Protection Research Foundation, NFPA, or Technical Panel. The Foundation makes no guarantee or warranty as to the accuracy or completeness of any information published herein.
About the Fire Protection Research Foundation

The Fire Protection Research Foundation plans, manages, and communicates research on a broad range of fire safety issues in collaboration with scientists and laboratories around the world. The Foundation is an affiliate of NFPA.

About the National Fire Protection Association (NFPA)

Founded in 1896, NFPA is a global, nonprofit organization devoted to eliminating death, injury, property, and economic loss due to fire, electrical and related hazards. The association delivers information and knowledge through more than 300 consensus codes and standards, research, training, education, outreach, and advocacy; and by partnering with others who share an interest in furthering the NFPA mission.

All NFPA codes and standards can be viewed online for free.

NFPA’s membership totals more than 65,000 individuals around the world.

About Public Consulting Group LLC (PCG)

Public Consulting Group LLC (PCG) is a national consulting firm with over 36 years of experience working in the public sector. PCG’s Public Safety Consulting Services research team has broad fire and EMS experience conducting feasibility studies, data analysis, strategic and master planning, operational reviews, cost reporting analysis, ambulance supplemental payment program design, and professional recommendations for public safety agencies.

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SECTION 1: EXECUTIVE SUMMARY

Public Safety Answering Points (PSAPs) across the nation are responsible for ensuring that when the public calls 9-1-1, there is someone responding in their time of need. Answering the call, processing the information that the caller can provide, and dispatching an Emergency Response Unit (ERU) are only some of the tasks that PSAPs contend with every day.

This study was conducted by Public Consulting Group, LLC (PCG), in collaboration with the Fire Protection Research Foundation (FPRF) and a project technical panel (PTP). The purpose of this study was to conduct an evaluation of the current NFPA 1225: Standard for Emergency Services Communications call answering and call processing times to help determine the feasibility of the times listed in the current standard. On the topic of call answering, NFPA 1225 Section 15.4.1 states that calls to emergency phone lines should be answered within 15 seconds 90% of the time and within 20 seconds 95% of the time for all calls received by the PSAP. The standard goes on to recommend that calls are processed within 60 seconds 90% of the time if they are deemed to be high priority in nature. There are multiple examples of “high priority” calls listed in the standard, but the authority having jurisdiction is ultimately responsible for determining which calls meet that criterion in their coverage area.

This study was conducted via several steps. First, a literature review was completed to help provide background on the most common issues facing PSAPs when dealing with call answering and call processing times. Concurrently, a survey was drafted by the PCG research team with support and direction from the PTP. Once the survey was created, it was sent out via multiple outreach mechanisms. As data was submitted by various PSAPs, it was reviewed by a subject matter expert on the research team for completeness and standardization. If there were any questions or concerns, contact was made with the submitting agency prior to the data being analyzed. There were periodic meetings between the research team and the PTP to ensure the correct direction of the project.

The most important aspect of this project was obtaining data from a large enough sample of PSAPs that the results would be representative of the industry. There were multiple discussions throughout the start of the study, as well as during the data collection process, specifically on the topic of what a “representative” or “statistically relevant” sample would look like. Professional organizations as well as personal networks were utilized in attempts to increase the exposure of the study.

Overall, 52 organizations submitted data and approximately 47 of those datasets were in a format consistent with the needs of the study. A map showing participation across the country can be seen in Appendix B. Staffing limitations, insufficient funding, and technological issues/limitations were noted repeatedly as topics of concern identified by PSAPs throughout the course of the literature review and subsequent study.

The findings showed that the study was more beneficial as a tool to guide future research versus providing results that would be reliably representative of the total population of PSAPs. Almost universally there was an issue collecting data across PSAPs in a standardized format. One significant example was the data related to call answering times. Very few of the participating PSAPs routinely collect the call answering times and attach those times to the unique incident numbers within their dispatching software. Most of the PSAPs were able to provide a generalized
statement as to the timeframes within which their calls were answered, but due to the study only requesting fire and EMS calls, most of this data was excluded due to its format.

Once the data was analyzed, most PSAPS reported that they could meet the call answering standard, but few could present the data to substantiate those claims. Anecdotally, based on the self-reported call answering times many PSAPs could provide, it appears that the standard call answering time is achievable by most organizations. Many of these organizations were unable to provide the data in a format that allowed inclusion into the study. These issues are discussed in detail later in the report. The data which was able to be analyzed painted the picture that these times are only achieved across roughly 70% of the records reviewed. PSAPs were generally much less successful with the call processing times listed in the standard. Across the sample of data, the research team identified ten key findings:

- A small sample size was present in comparison to the number of PSAPs across the nation, which could impact the external validity of this study
- Almost all PSAPs reported that call answering and call processing times are tracked
- Obtaining the data for call answering times was challenging, though most agencies anecdotally reported that their answering times were provided by their phone providers and met standards
- Call answering compliance appeared to negatively correlate with the presence of known transient call volume increases
- PSAPs are generally unable to process calls within the time prescribed by NFPA 1225
- Multiple administrative and technical barriers are present that challenge the appropriate collection and analysis of the specific data in question
- Records from agencies that follow written standards were compliant more than twice as often as the records from agencies without a standard. Agencies following NFPA standards were the most successful
- Across the records analyzed, the 90th percentile for call processing times was more than twice what is recommended in the standard for those agencies that reported that they follow the NFPA 1225 standard recommendations
- The 90th percentile call processing time for records from agencies that do not follow the NFPA standard was roughly 500% of the NFPA standard
- Multiple factors appeared to impact times statistically such as CAD Vendors used, rural versus urban populations, and self-perceived environmental, facility, technological, or staffing limitations

There were multiple limitations for this study. Lack of participation and issues with data standardization were the two more impactful issues. When representatives of the PSAPs or contacts referenced a clarification of their data, almost all those contacts reinforced the concern that accurate call processing takes more time than what is allotted in the standard. Although this study represents a small sample of a much larger industry, the results lean heavily toward the
need for additional research on this topic to ensure an accurate depiction of the needs that the PSAP industry is achieved.
SECTION 2: PROJECT BACKGROUND

When members of the public use their phones to call for help, the first contact they usually have will be a Public Safety Answering Point (PSAP) telecommunicator. There are multiple organizations that provide “consensus standards” to help establish performance criteria for these PSAPs. Consensus standards are generally defined as guidelines that have been established by a group of industry and other professional stakeholders, which have been reviewed by external entities, and finally accepted as standards that organizations across the world can use to benchmark their performance. Examples of these standards include those published by the National Fire Protection Association (NFPA), the American National Standards Institution (ANSI), the Association of Public-Safety Communications Officials (APCO), and the National Emergency Number Association (NENA).

Each one of the previously listed organizations has standards that directly address the handling of calls received by PSAPs. The standards created by these organizations may or may not be adopted by the authority having jurisdiction (AHJ) representing each PSAP. AHJs have the option of adopting all, or portions of, each standard, but the choice to adopt these standards is completely independent of any external party being able to hold them legally liable for the entire content of the standards. Regardless of the adoption status of a particular standard by the AHJ, many of the standards created by these organizations are “industry standards” because of the process required for their adoption. As such, lawyers can, and likely will, hold an AHJ to the industry standards presented, regardless of whether the AHJ has chosen to adopt them or not (Varone, 2019). This makes it imperative for the industry standards organizations creating these standards to have objective data that supports the decisions made so that PSAPs can realistically meet these standards based on evidence-based research.

This study focuses on NFPA 1225: Standard for Emergency Services Communications (NFPA 1225, 2022.ed). This standard combined two previous standards, NFPA 1061: Standard for Public Safety Telecommunications Personnel Professional Qualifications and NFPA 1221: Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems, into a single comprehensive document. While a consensus standard was achieved, there has not been any research to validate the 9-1-1 call answering and 9-1-1 call processing times conducted by the NFPA or the other national standards organizations.

Call answering time is defined by NFPA 1225 as the amount of time it takes for a telecommunicator to answer the phone following its receipt at the PSAP. Per NFPA 1225 Section 15.4.1, all to emergency phone lines should be answered within 15 seconds 90% of the time and within 20 seconds 95% of the time for all calls received by the PSAP. It is important to note that there are several steps in the process of a call being answered, processed, and an emergency response unit being dispatched. First, a call, or text in some jurisdictions, needs to be placed to 9-1-1. Once the call is answered, the call needs to be processed by a trained telecommunicator. During this phase, the person who answers the phone, frequently known as a “call-taker,” is responsible for confirming the address and nature of the emergency. Once the nature of the emergency is known, the PSAP can prioritize the call in an appropriate manner. Many PSAPs use some form of emergency dispatch, i.e., Emergency Medical Dispatch (EMD) and/or Emergency Fire Dispatch (EFD) system for the purposes of prioritizing calls.

Although the products vary, the purpose of these priority dispatch systems is to allow a call-taker to follow a structured line of questioning that leads to appropriate resources being sent to the
scene of an emergency. Depending on the priority dispatch program used, PSAPs have the ability to determine what calls are classified as “high priority”, and what calls fall under lower priority categories. Some of these systems can provide the call-taker with the ability to provide guidance to the caller so that basic bystander care can be rendered prior to the arrival of first responders. Further complicating the topic, PSAPs are not required to follow any one of the priority dispatch protocols, and some choose to prioritize their calls based on internally created standards.

NFPA 1225: Standard for Emergency Services Communications recommends that calls are processed within 60 seconds 90% of the time if they are deemed to be high priority in nature. Per NFPA 1225 Section 15.4.4.1 and Section 15.4.4.2, high-priority calls are those where there is an “imminent threat to life” and/or where “significant property loss/damage is likely or actively occurring” i.e.:

- Trauma (penetrating chest injury, GSW, etc.)
- Neurologic emergencies (stroke, seizure)
- Cardiac-related events
- Unconscious/unresponsive patients
- Allergic reactions
- Patient not breathing
- Choking
- Fire involving or potentially extending to a structure
- Explosion
- Other calls as determined by the AHJ

The standard also recommends that calls transferred from a primary PSAP to a secondary PSAP do so within 30 seconds, 90% of the time. The Federal Communications Commission (FCC) defines primary and secondary PSAPs as follows:

“A primary PSAP is defined as a PSAP to which 9-1-1 calls are routed directly from the 9-1-1 Control Office, such as, a selective router or 9-1-1 tandem. A secondary PSAP is defined as a PSAP to which 9-1-1 calls are transferred from a primary PSAP. The PSAP database serves as a tool to aid the Commission in evaluating the state of PSAP readiness and E9-1-1 deployment” (911 Master PSAP Registry, 2022).

The FCC has been tracking PSAPs and has worked to build a complete registry since 2003. The most recent database shows a count of approximately 8,777 individual PSAPs, including backup facilities, across the United States. For the scope of this project, the Fire Protection Research Foundation estimated that there are up to 6,000 active PSAPs currently operating across the United States. The goal of this research was to collect data from a statistically significant portion of those PSAPs. Barriers to that data collection, and other limitations of the study, are discussed in SECTION 6. The time standards listed in NFPA 1225 have proven to be challenging to meet for many PSAPs across the nation. The primary reason for this research was that there has not been any known research conducted on the validity of the times set forth in the standard. There
is also concern that the inability to meet one portion of the standard, i.e., the times, may lead organizations to ignore the entire standard. This would be particularly problematic due to the reorganizing of NFPA 1061 and NFPA 1221 into NFPA 1225.
SECTION 3: LITERATURE REVIEW

Introduction

As part of the scope of work for the Fire Protection Research Foundation’s (FPRF), NFPA’s research affiliate, call answering and call processing study, Public Consulting Group, LLC (PCG) conducted a literature review of previous studies, industry articles, and other sources of information regarding this subject. After identifying relevant information, PCG has provided a synopsis of the information and data reviewed for this study.

Prior Research Studies and Articles

In July 2019, a research article focusing on the 9-1-1 call processing system was published, taking a close look at call processing times across the nation. This article reviewed call processing from start to finish, including how a call is initiated, how the call is routed to a PSAP (Public Safety Answering Point), and what happens once the call is processed. Technology has brought telephones far, but in their advancement, it is noted that wireless calls can create serious issues when the signal must be transmitted to the nearest PSAP (Neusteter et al., 2019).

A lack of location data provided by a wireless phone can result in sending 9-1-1 calls to the wrong PSAP, causing a delay in the call being correctly routed, and a delay in dispatching potentially life-saving services. Once the call is correctly connected to a PSAP, the dispatcher must quickly evaluate the situation and how to manage it, taking down information such as the correct address or location and the type of emergency. All this affects the time taken to process the call, including determining whom to dispatch.

As the article states, there is no standardized data collection process since PSAPs are locally operated and monitored. This makes the process of analyzing call times difficult, as the data must be voluntarily shared, and the data may not be tracked or organized in similar ways across various PSAPs. The researchers explain this is partially due to technical differences such as different CAD (computer-aided dispatch) systems, and partially due to politics, stating: “no central authority or database exists where this data can be analyzed on a national level” (Neusteter et al., 2019, p. 11).

The study also reviewed response times, starting when the call was received by the PSAP and ending when responders arrive. The results reinforced the anecdotal belief that response time is critical in the setting of certain emergencies. This study focused extensively on law enforcement situations and found the response time was not as critical when dealing with criminal activity. One outcome of the research article was that they revealed a common point brought up by similar research projects over the years: the data on call processing times can be used to find hot spots for calls and times of predictably high call volumes, which would give PSAPs the foresight to add more staffing during those times.

In conclusion for this report, it is noted that call processing systems have changed in a positive way since they started being tracked in the 1960s, however, as wireless phones advance, technology such as Next Generation 9-1-1 (NG911) and CAD systems need to continue to advance as well. Since many PSAPs are separate entities, and there is no standardized way to track data for each one, continuing to research and analyze available call processing data is critical to further improvements of the call processing standards.
Anne Arundel County

In 2013, Anne Arundel County in Maryland decided to find a cost-effective solution to shorten their 9-1-1 call processing times. The County, at the time, had a population of 522,000 people over a 420 square mile radius and were not able to meet the provisions of the 2013 edition of NFPA 1221 standards. The new County Executive, Laura Neuman, started a working group in the Fire Department Communications Center to tackle this issue. Shortly after, the New Rapid Dispatch Protocol was created. This protocol had three main objectives (Cox, 2013, para. 7):

1. Develop strategies that would: (a) decrease call-processing times; (b) provide scripted 9-1-1 instructions that meet all national and state standards; (c) shorten the arrival time of medical providers; and (d) effectively manage departmental resources.

2. Review all call-processing and response data from the department, as well as from other emergency response agencies around the region and across the nation; and

3. Learn from and apply innovations from the call-processing workflows available from fire dispatch centers nationwide.

The previous system used by Ann Arundel County had the call takers ask a set of predetermined questions until they could decide who/what to dispatch. The New Rapid Dispatch Protocol (RDP) allowed call takers to confirm the address, phone number, and reason for calling, then dispatch the closest units available while staying on the phone to collect more information. This process allowed the call taker to be available to the caller in case additional information was made available. The end result was that appropriate apparatus were dispatched, and information was relayed, in a more timely fashion. The County stated the call processing time is now faster, along with dispatching being a faster event as well.

Washington D.C.

A 2021 audit for Washington D.C.’s emergency call system found call takers were struggling to pinpoint a caller’s exact location, along with failing to meet national call standards (Schweitzer, 2021). The audit, conducted by Federal Engineering, Inc., focused on call answering and processing data from 2019-2020, and found dispatch times in two wards of D.C. were 20% longer than other wards between May and October, while also peaking in July both years; this was linked to summer months having increased 9-1-1 calls. Auditors looked closely at the locations call takers provided to dispatched teams, as the call takers had sent rescuers to an incorrect location for a boating incident in 2020, leading to three men drowning.

The auditors found that the call takers did not always trust the locations provided by their technology: “the technology doesn’t rebid or retransmit cell callers’ locations for better accuracy, so call-takers often assume it’s giving them bad information and rely on locations provided by callers instead” (Schweitzer, 2021, para. 8). With a lack of trust in their technology, protocol at the time of the report required call takers to ask for the location twice during each call, which lengthened the call processing time and delayed dispatch. To address this, the Chief Information Officer said the agency would plan to obtain RapidSOS™ technology, which would provide much more accurate location information. Auditors also noted call takers were not meeting call processing standards set by the NFPA and NENA. While their call answering times were reasonable, with times averaging 5.2 seconds, staff were averaging call processing times of 111.2 seconds. It was recommended that the Office of Unified Communications (OUC) adopt an
automated dispatch system to shorten the call processing time and hire more staff to cut down on the call answering time.

**National 911 Annual Report**

Since 2011 the National 9-1-1 program has worked with the National Association of State 9-1-1 Administrators (NASNA) to maintain a database of several key data points relating to 9-1-1 systems. The collection of this data is meant to help 9-1-1 systems plan for the future while allowing them to benchmark their performance against PSAPs of similar size and call volumes. A report containing the yearly data is created once experts have a chance to review the data, identify any trends, and summarize their findings (National 911 Program, 2022). The most recent report was for the 2020 calendar year, released in February of 2022.

The 2020 National 9-1-1 Progress Report looked at 9-1-1 call data from forty-eight states, territories, and the District of Columbia (which are all referred to as states throughout their report) who willingly participated; the survey was designed to collect data and was offered to all fifty states plus the District of Columbia and five US territories. Collecting this data allowed the National 9-1-1 Profile Database to reveal several key facts regarding 9-1-1 calls, such as approximately how many 9-1-1 calls are answered each year, which states have minimum training requirements, and what the progress is towards NG911 in each state. To obtain this data, the National 9-1-1 Program emailed state designees on a weekly basis for two months to provide helpful resources on how to provide data (National 911 Program, 2022). This created more cohesive data for the National 9-1-1 Program to analyze for their final report.

While analyzing call data was the top priority of this study, other crucial factors became known, such as the growth and implementation of NG911, and more states now use text-to-911 capabilities. In studying the data on wireless calls made to 9-1-1, it has become clear that the number of wireless calls versus wireline calls is much greater and will continue to grow as landlines become less common. What this means for 9-1-1 calls is a need for up-to-date technology so call processing times can be as short as possible. A landline provides a definite location, whereas a wireless device may not provide the most accurate location, especially if location permissions are not in place.

Major highlights from this study include compliance standards across the nation: is there enough equipment to manage call volumes; do the PSAPs have formal protocols to follow; are there call-handling protocols for EMD; is minimum training offered for PSAPs, EMD, or firefighters; and does the state have an NG911 implementation plan? Most questions for each state are answered with a yes or no answer, and while this report is focused on standards, protocols, and what resources each PSAP has, it is important to note that each category can play a part in how well and how quickly a 911 call can be processed. These categories determine whether a PSAP can meet NFPA call processing standards. Three data categories to highlight are Quality Assurance (QA) requirements for call-handling protocols for EMD, QA requirements for fire, and training requirements for telecommunicators. When asked if their state had QA requirements for compliance with call-handling protocols for EMD, seventeen states said yes, and twenty-nine states said no. When asked if their state had QA requirements for compliance with call-handling protocols for fire, eleven states said yes, and thirty-four states said no. And finally, when asked if minimum training requirements for telecommunicators exist statewide, thirty-eight states said yes, and ten states said no (National 911 Program, 2022, pp. 28-29, 31).
The 2020 National 9-1-1 Progress Report also helps to provide context to many of the data points collected in this study. They revealed an estimated total 9-1-1 call volume of 209,024,988 calls across 44 reporting states. Four states were unable to provide data, and the additional eight did not respond to the survey. The 48 responding states identified a total of 4,627 primary PSAPs and 774 secondary PSAPs.

The Fire Protection Research Foundation

This research project, *Quantitative Evaluation of Fire and EMS Mobilization Times*, sponsored by the NFPA, focused on overall mobilization of emergency response agencies, and included the time segments for *alarm handling time* and *turnout time* for first responders. Although *alarm processing time* was analyzed and statistical data is presented, the research was primarily dedicated to *turnout time* and the factors influencing *turn out times* that includes *alarm processing times*.

The study included a survey and submission of CAD data that was analyzed and reported in relation to compliance with NFPA 1221. There were only 14 fire departments that participated and answered all or some of the survey questions and submitted all or some CAD data that was analyzed. *Alarm handling times* were reviewed for both fire and EMS calls. The study evaluated several aspects of *turnout time* that is not summarized in this report.

At the time of the study, the NFPA 1221 standard specified that *alarm handling time* should be 60 seconds 90% of the time or 90 seconds 99% of the time. The results of the study showed that alarm processing times for fire incidents was 92 seconds 79% of the time and 315 seconds 90% of the time. The time required for alarm handling of 90% of the calls was 92 seconds for fire (slightly over one and one-half times the standard). For EMS calls, alarm handling time was 84 seconds 80% of the time and 182 seconds 92% of the time. The time required for alarm handling of 90% of the calls was 84 seconds for EMS (slightly less than one and one-half times the standard).

Technical Reports

Modern-day technology promises faster speeds, but any technology can overheat, crash, force restarts, or have connection failures. This rings true even for 9-1-1 CAD systems and can have a major effect on call processing times. In March 2022, there was an apartment fire in Waukesha, WI where two residents died because of burn injuries. The first call to 9-1-1 was made at 1:25 AM, but the computer system failed to activate the fire department's automatic alert system. Due to this system failure, police who arrived on scene had to radio the fire department, and the alert system had to be manually activated, causing firefighters to arrive 10 minutes after the first 9-1-1 call was made (Software malfunction, 2022). During the 10-minute gap, the fire continued to grow and resulted in two fatalities. The Waukesha Police Department investigated why the alert system did not activate, and a Comprehensive Review released in April 2022 revealed: “there was no error on behalf of... station alerting software. The error stemmed from the... CAD software” (Oremus, 2022, p. 1).

The Comprehensive Review lists this CAD system failure as the main cause of delaying proper dispatch, however, it should be noted that the investigation found there were protocol failures that impacted the delay along with potentially adding harm to the dangerous situation at hand. Focusing on the CAD system, the Comprehensive Review noted five issues, summarized as follows:
1) The “fire” code entered into the system generated five calls for service – one for police, and four for fire – when it should have only generated two calls – one for police, and one for fire.

2) The system did not send the file to the station alerting system, which is the software that controls station alerting. The CAD vendor stated this is due to the calls for service being linked improperly.

3) The system automatically acknowledged fire apparatus by producing an “AC” (Acknowledge Call) on the CAD screen 30 seconds after the call was dispatched. “Unlike for the Police units, the ‘AC’ for the Fire apparatus is not verification that fire department personnel have acknowledged the call. A dispatcher must wait for Fire personnel to acknowledge the call via the fire radio channel as verification personnel are aware of the fire call” (Oremus, 2022, p. 7).

4) The CAD software reportedly froze for a few seconds.

5) Two weeks prior to the implementation of a new interface, it was revealed the CAD software purchase did not include Emergency Fire Dispatch (EFD). The CAD provider agreed in July 2021 to upgrade to a computerized system of handling and dispatching fire-related calls, but by the time of the Comprehensive Review, EFD had not yet been computerized.

In reviewing the non-technical issues of this situation, the 9-1-1 dispatcher created the call in the system and should have waited to ensure the information for the call was sent through to the GARi (the computer-generated voice that plays on the fire radio channel). This should automatically activate the alarms at the fire station. “In the case of a structure fire, this would activate all station alarms. If the dispatcher does not hear the GARi over the fire radio channel and a response from fire department personnel within one minute on the fire radio channel, the dispatcher must manually activate the system” (Oremus, 2022, p. 9). According to the performance review, the GARi did not send, the dispatcher did not get a response from fire personnel within a minute, nor did they manually activate the alarm until notified by fire personnel that the station alerting did not activate, which was 4 minutes and 49 seconds after the first call was made. Through this Comprehensive Review, there are several other performance and procedure points made about slight human errors, though the ultimate consensus is this tragedy happened due to the CAD system failing and affecting the 9-1-1 call processing procedure and timeframe.

Cincinnati, OH is another city affected by a technical error, but unfortunately, their issue was not just overnight. Starting in June 2016 a subcontractor for (the city’s 911 service provider), started to have frequent issues with their servers and routers, causing 9-1-1 blackouts. Between June 26, 2016, and July 18, 2017, there were nine reported blackouts equaling more than seven hours without 9-1-1 service. While each blackout lasted a different length of time, the most common issues were memory problems with the network, router failures, switch failures, and forced software updates.

The worst blackout was on July 18, 2017, with a 210-minute failure of 9-1-1 call services. It was determined the ingoing and outgoing calls could not be heard because calls were not being processed by a switch in the network (Knight et al., 2017). The City of Cincinnati is required by federal regulations to be in contract with the network provider, though after several formal complaints, the provider agreed in March 2017 to let the city run its own system. Adding to blackouts, the City reported call wait times increased from nineteen seconds to more than half a
minute from January 2017 to June 2017. At the time the article was written, the city was preparing to switch to a new system which would help reduce wait times but would have to wait at least another twelve weeks for the blackouts to end.

Also facing technical difficulties as of March 2022 is Anne Arundel County in Maryland. What started as a possible fluke of being put on hold is now speculated to be an ongoing issue with the County’s 9-1-1 call centers. A woman was on hold, then disconnected, then placed on hold again by 9-1-1, while her four-year-old daughter had a seizure (Munro et al., 2022). She was able to get through to 9-1-1 after five minutes of waiting, and an ambulance was sent to her house. The police department said this happened due to a car crash happening nearby, with callers flooding the 9-1-1 lines available, and the closest ambulance called to the crash site.

The woman placed on hold took to social media and discovered other citizens experiencing the same issue, but on different days. County Councilwoman Amanda Fiedler acknowledged the call centers have a high turnover of personnel. Consolidating the call centers is a potential solution that the County is considering, which would entail calls going to the police first, with call takers rerouting to fire and ambulance if necessary. Current state law for Maryland requires 9-1-1 call centers to be equipped to answer calls within a daily average of ten seconds, which is usually a goal met by the County call centers, as most are reportedly answered within five to six seconds. To continue compliance with the state law, the police departments have asked citizens with non-emergency situations to use the non-emergency line, keeping the 9-1-1 line open for life-threatening emergencies.

A common theme among newer dispatch systems is occasional “crashing;” the Fire Department of New York (FDNY) started using a new CAD system in August 2021, and at the time of reporting the issue in February 2022, the system had gone off-line three times. According to union officials, the FDNY EMS dispatch system has been in use for decades, and it also crashed three times between August 2021 and February 2022 (Tracy, 2022). The CAD system was down for a total of one hour and 13 minutes on three separate occasions, thankfully not resulting in any missed calls or losses of life or property. However, union officials are aware that it is possible to face these issues if another outage occurs.

Another point of frustration with the CAD system was the lack of data importation from the previous system, causing a challenging time when the Bureau of Investigations needed to check information in the new system; this has since been resolved but required additional training. An FDNY spokesperson noted “in the event of outages, the highly trained dispatchers switch to the protocols they are trained on to ensure quick, seamless transition for dispatch and that every call receives a quick emergency response” (Tracy, 2022, para. 14). While the dispatchers have been able to find workarounds for these rare cases, there is cause for concern that the older system may worsen the situation. During this system’s three outages, it was offline for a total of four hours and thirty minutes. This at times led to multiple units being sent to the same location, causing a delay in resources, with some emergency calls delayed by up to an hour. The FDNY is still confident, despite these setbacks, that they can process calls in a timely manner and help their community.

While the advancement of technology has its flaws, the delay in replacing it has proven to create major setbacks for call processing. A Park Police dispatch center in Washington, D.C. was investigated after several red flags regarding the physical state and management of the dispatch center were raised, one instance being when an alarm went off for a broken sprinkler pipe in a
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Fire Protection Research Foundation (FPRF)

A historic building, and the alarm was missed due to no one hearing it in the dispatch center. According to the report:

The dispatch center receives security alarms on a separate computer in a closed room adjacent to the dispatchers, and no one heard it. Instead of notifying the fire department and cemetery staff, no one was alerted, resulting in flooding which damaged the building and historical artifacts. (Jackman, 2022, para. 1)

During the investigation, it was noted that birds were flying into the dispatch center and had easy access to furniture and electronics. The roof leaked when it rained, and black mold was present. The electrical circuits were overloaded daily, which at times caused temporary failures to the radio and computer equipment. There was also no emergency backup location in the event of a power outage or other need to relocate. Along with structural and integral building issues, there were no formal agreements between local jurisdictions and the Park Police on defining how calls were to be transferred to them, even though their policy requires it, signaling a lack of organization with policies and procedures. It also became common for Park Police to be pulled off the streets to help with dispatch duties, and some dispatchers either never received formal training or had expired certifications.

The technology in the dispatch center was found to be outdated, with older phone equipment unable to use enhanced caller ID, have multiparty calls, or determine the location of public callers. The officers’ radios all had emergency buttons, but pressing the button only gave dispatchers a numerical radio identifier, which they had to manually look up on a list. The list of technological issues and lack of advancements is unfortunately long for this dispatch center, which may be due to the noted longstanding lack of funding, it is further complicated by the staffing issues and lack of training opportunities seen by dispatchers across the nation. The report listed several complaints by dispatch center employees made to Park Police commanders, with the complaints being ignored. The inspector concluded, “these issues jeopardize the safety of officers and the public and create liability risks for the USPP [Park Police]” (Jackman, 2022, para. 2).

Monthly Performance Data

Some larger cities have made their call performance data available online, allowing anyone to see their call answering and processing times and how they compare to industry standards. San Francisco, CA places this information on its city website, tracking four years’ worth of data, starting in July 2018. Viewers can see their percentage of calls answered within fifteen seconds per month, and the average number of daily calls each month. Prior to 2019, the City was using standards set by NENA, aspiring to answer 90% of all calls within ten seconds, but switched to a newer national standard in 2019, with a new goal to answer 95% of all calls within fifteen seconds. The City has only achieved this new goal twice: in January 2020 and April 2020, though they were able to stay above 90% until February 2022, dropping to 86% of all calls answered within fifteen seconds (911 Call Volume, 2022).

Memphis, TN is currently following the NENA standard of answering 90% of calls within fifteen seconds and 95% of calls within twenty seconds and has met this standard several times since November 2017. After notably having call answering issues in 2015 and 2016 due to being understaffed, the City has not fallen below 80% of all calls answered within twenty seconds since November 2017 (Answer 95%, 2022). The City’s website lists this data publicly in a table format, along with 9-1-1 Call Success vs. Abandonment Rate, and 9-1-1 Call Volume.
In an article dated January 2022, it was reported that “in the last three years, the Healdsburg Police Department Dispatch Center, in California, successfully answered at least 95% of its incoming calls within fifteen seconds” (Minkiewicz-Martine, 2022). The Governor’s Office of Emergency Services set the standard of 95% of all calls answered within fifteen seconds for the State of California, with this city able to continue to meet these standards each month.

Austin-Travis County EMS in Austin, TX has also made its call processing data available to the public, although the call processing page does not list what standard the team is trying to meet. Rather, it lists the percentage of incidents by month, and the percentage of call processing compliance percentage compared to its call processing compliance target of 90% (Call Processing, 2022). On a PDF linked to this site, one can find the call processing time standard set by County EMS; their goal is to have an average call processing time of seventy-five seconds each month. The team has been transparent with their data, even with a steady decline in call processing compliance since 2016. It should be noted the Austin-Travis County EMS has been able to stay above 70% for call processing time goals.

New York City offers an extensive look at their response time from November 2013 to the present day. Their site includes a broad data chart called “End-to-End Response Time” looking at the total time from call pickup to the length of travel time, allowing viewers to select any week’s worth of data from that timeframe. It also includes an End-to-End detail tab with the same information in a table format, and a page on Response Time Trends. Focusing on call answering times, the City averaged answering EMS and fire calls within four seconds. For call processing times, it varied depending on the type of call. EMS call processing times averaged seventy-six seconds in a non-life-threatening emergency and sixty-five seconds in a life-threatening emergency. FDNY medical emergency call processing times averaged three minutes and thirty-four seconds, and non-medical emergency call processing times averaged two minutes and forty-one seconds (End-to-End, 2022).

**Summary**

In summary, the literature review revealed multiple known issues in the field of PSAP operations and research. The most prevalent issue is that there has been no standardized data collection process instituted. It is presumed that this is because most PSAPs are locally operated and monitored, so enforcing standardized collection processes would be challenging if not impossible. Another issue identified is that there are presumed issues with lengthy call processing times for many agencies across the nation, but that some of the causes for these times are beyond the control of the PSAPs. Issues including the inability to rapidly determine caller locations, a constantly evolving field of wireless technology, and the inability to troubleshoot technological problems when they arise have plagued many PSAP centers. Previous research has reinforced the need for a systematic review of call answering and processing times. Issues with understaffing, outdated facilities, new technologies, and lack of funding can all negatively impact the ability of a PSAP to handle calls in a timeframe consistent with the consensus standards. Researching PSAP issues at the national level is a solid first step to addressing problems that these organizations are facing on a more inclusive scale.

Some organizations have opted to make their performance data publicly available. This step towards transparency can assist in PSAPs remaining accountable to their stakeholders, while potentially increasing the justifications for future funding. This transparent approach also allows other PSAPs a method to benchmark their performance based on the performance of their peers.
A united front will enable PSAPs to seek funding and research that could have an impact at a national level. Memphis, TN has one of the most inclusive PSAP data dashboards found. Dashboards providing both the data, as well as potential reasons for substandard results, can help the public and responders understand where the key areas for improvement exist. None of the literature reviewed provided justification for the current standards identified by agencies such as the APCO, NFPA, NENA, or ANSI. The lack of statistical justification proves that there is a need for a study that encompasses the diversity of PSAPs present.
SECTION 4: METHODOLOGY

Initial Meeting and Follow-up Meetings

This study started with a meeting between the PCG Public Safety Consulting Services research team, NFPA FPRF staff, and the Project Technical Panel (PTP). The meeting focused on defining key topics, strategizing how to thoroughly study and analyze each topic, and outlining a detailed timeframe for the overall project. Through consistent follow-up meetings, each phase of this study was addressed by the PCG research team and the PTP representatives to ensure deadlines were met and the content of this study met the set expectations. The PTP helped to guide expectations of the project as limiting factors arose, such as lack of participation. Collaboration between the PCG research team staff, the PTP, and the FPRF staff allowed for a well-targeted project.

Summarizing NFPA Standards, and Reviewing Literature and Other Standards

After the kickoff meeting, the PCG research team diligently researched the history of call answering and processing times. A thorough literature review was completed to truly understand some of the issues facing PSAPs today. These efforts also helped to provide context as to why the study is needed. The literature review showcases examples of recent events where call times may not have been met due to staffing issues, outdated technology, lack of resources, etc. One of the most impactful findings was the lack of previous research data noted in the field of call answering and processing times, further necessitating these research efforts.

To thoroughly study call times across the nation, the first step was to summarize current NFPA Standards, which entailed creating a simplified visual display of expected call answering and processing times set by the NFPA as shown in Figure 4.1.

<table>
<thead>
<tr>
<th>NFPA 1225 Standards for Call Answering and Processing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Call Answering:</strong></td>
</tr>
<tr>
<td>Timeframe</td>
</tr>
<tr>
<td>≤ 15 seconds</td>
</tr>
<tr>
<td>≤ 20 seconds</td>
</tr>
<tr>
<td><strong>Call Processing:</strong></td>
</tr>
<tr>
<td>For High Priority Calls</td>
</tr>
<tr>
<td>Timeframe</td>
</tr>
<tr>
<td>≤ 60 seconds</td>
</tr>
</tbody>
</table>

*Call Answering: The time from when the call is initiated by the caller to when it is answering by a PSAP
**Call Processing: The time from when the call is answered to when the first Emergency Response Unit (ERU) is dispatched.

These standards were later compared to the CAD data received from survey results provided by PSAPs nationwide. Once the NFPA summary was created, a review of other call time standards was performed, which focused on nationally recognized standards along with any other standards that were locally or regionally applicable. Some of the standards reviewed included the NENA standard for answering 9-1-1 calls. It was found that this standard was very similar to the NFPA 1225 standard, requiring PSAPs to answer 9-1-1 calls in the same intervals of time required by NFPA 1225.
Reviewing an array of standards provided an opportunity to compare the different standards and expectations next to actual recorded call answering and processing times. Across the NFPA standards, times requirements are very common because they are an easily quantifiable measure that can be documented and, typically, improved upon. Other common NFPA standards with time requirements include NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*, and NFPA 1720, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments*, which is a standard that mirrors 1710, but has relaxed requirements as it applies to volunteer departments.

While there is evidence of call answering and processing standards being met, there are also many PSAPs unable to meet these standards; reviewing previous research studies and articles provided a look into the causes behind this issue for this study. After reviewing all relevant call answering and processing time standards and recent events related to the topic, a survey questionnaire was developed and implemented by the research team in consultation with the PTP to gain information from PSAPs around the country.

**Developing and Implementing a Survey Questionnaire**

The survey mainly focused on time intervals for receiving calls, call processing, and notification of first responders, but also addressed the common issues of PSAP limitations such as lack of staffing, outdated technology, inadequate training, and more. Survey questions also included demographic information specific to each PSAP for further analysis of PSAPs. PSAPs were asked to share their CAD data for analysis, which allowed a closer look at actual call answering and processing times for this study.

There was a significant outreach effort to involve as many PSAP agencies across the nation. Professional associations and organizations were utilized to communicate that the data collection process was open and to encourage the participation of their members. The organizations and associations contacted include:

- National Emergency Number Association (NENA)
- Association of Public-Safety Communications Officials, International (APCO)
- International Association of Fire Chiefs (IAFC)
- IAFC Metropolitan Fire Chiefs Association
- National Volunteer Fire Council (NVFC)
- National Association of EMTs (NAEMT)
- National EMS Managers Association (NEMSMA)
- Center for Public Safety Excellence (CPSE)

To ensure as much participation as possible, the survey was made available to the existing 500+ fire and EMS providers served by PCG and was announced through industry blogs, websites, and other industry-sharing platforms. Members of the NFPA technical panel also used their professional networks to reach out to various fire and EMS agencies in an attempt to collect data
from as many PSAPs as possible. The data collection process was extended twice, with each extension resulting in a handful of additional data sets collected. A review of the project status with the PTP occurred on September 12th; at which time it was determined that additional efforts to collect data would likely yield similar results. It was decided at that time that the data collection would end, and the final data analysis could begin.

After the data was collected, it was reviewed by a subject matter expert (SME) from the PCG research team. The SME ensured that the data was from the correct year, 2019, and that the requested metrics were provided by the respondents. If the data was incomplete, or there were any questions regarding the data, an email was sent to the contact information listed when the data was first submitted. Within two weeks of the email being sent, if there was no response, the representative for the data submission was called via phone. Multiple PSAPs were successfully contacted via email or phone and clarification on the data submitted was provided. Every PSAP that submitted data with no call answering times was contacted to see if they would be able to provide those additional data points unless they noted on the initial survey that they did not collect that data. If no response was received from the agency, the data was included or excluded based on the information available.

**Statistical Analysis**

After the survey questionnaire was developed and distributed, the responses collected, and the data prepared, it was given to a data analyst for further analysis. The data analyst reviewed the data for quality and was in constant communication with the research team to ensure that the intended scope of work was successfully accomplished. The results were analyzed to provide information relating to call answering and processing time averages and percentiles. It is important to reiterate that the average, or median, is the sum of all the times in a particular set of data divided by the number of instances summated in the first step. The 90th percentile, a value typically recognized more readily by national standards and accrediting bodies, represents the value in which 90% of the values in a set of data are less than or equal to. The benefit of using the 90th percentile is that it is considerably more representative of a value that the end user should expect to receive. The 90th percentile also does a better job of accounting for unusually high outlier values than the average values. The call answering and processing times were further analyzed to distinguish variables such as rural versus urban systems, population differences, and other useful metrics. The analysis also provided insight into which call answering and processing time standards are utilized by different PSAPs, which CAD systems are utilized, and more.

There were significant limitations present in the analysis of the data, which are discussed in more detail in **SECTION 6**. The available data was compared against the current NFPA 1225 standard to determine how many of the overall records were deemed to be in compliance with the previously established time standards, and 90th percentiles were provided to quantify exactly where the current times are for participating departments. Lastly, the number of records excluded from the study was noted.
SECTION 5: RESULTS

A total of 52 individual PSAPS responded to the survey and provided CAD data for the study. Of those 52 responses, five of the respondent’s data sets were excluded from the study due to either incomplete data, inability to clarify terms to a reasonable degree with the PSAP personnel, or incorrect data being sent. This resulted in approximately 135,046 responses being excluded from the final analysis. The following results, unless otherwise specified, focus solely on the 47 usable sets of data. As a condition of participating in the study, data that was submitted by PSAPs was kept anonymous and no organizations were specifically identified in the results or study limitation sections. The purpose of this research was to review PSAPs, and their performance, not to specifically identify organizations.

Demographics

The survey completed by participating PSAPs requested demographic data about each agency in addition to the CAD data. The survey tool that was used can be seen in Appendix D. These questions were used to describe the sample collected, allowing researchers to compare the sample against national statistics, like those compiled in the 2020 National 9-1-1 Progress Report. These questions were utilized by the research team to help compare PSAPs and to gauge how representative of a sample was present. PSAPs were asked to classify themselves as “urban,” “rural,” or “unsure.” Only one agency was classified as rural, while roughly 85% were classified as urban, and 13% of respondents classified themselves as unsure. 28% of PSAPs were noted to be “secondary” while the remaining 72% were primary centers based on the definitions provided to the respondents in the data collection tool.

There was a broad representation of PSAPs who responded to the data collection survey. Call volumes ranged from roughly 7,000 fire and EMS calls in the 2019 calendar year, to almost 400,000, with staffing levels varying from less than 10 staff to more than 350 personnel. As seen in Figure 5.1, there were a variety of CAD vendors identified, with most providers using one of the platforms offered by Vendor A. CAD vendor names where genericized for the purpose of data analysis.

![Figure 5.1: Common CAD Vendors](image)
An interesting finding was that six of the responding PSAPs reported that they do not provide any type of prioritization system to determine which calls are of a higher priority. Five of those six agencies reported that they do follow NFPA and/or NENA guidelines for call answering and processing. Half of those six agencies identified as secondary PSAPs while all six appeared to handle a relatively large number of calls annually (an average of 147,000 calls per PSAP in 2019).

Governance of the PSAPs resulted in varied answers. Forty-two percent (42%) responded that they were operated by a city government, while 34% are operated by a county government and the remaining 24% reported that they were operated by various entities. A common model across the US, 31% of PSAPs reported that they are primarily operated by law enforcement, with a surprising 36% answering that they are operated by independent or private agencies. Several of the PSAPs operated by independent agencies provide services to a significant number of emergency services agencies. More than half reported that they service more than one agency, with one PSAP reporting that they serve greater than 40 different emergency services agencies.

**Call Answering Times**

The primary purpose of this study was to evaluate call answering times and call processing times across multiple PSAPs. Previously defined, the call answering times were recorded as the amount of time that passed from the first ring until the call was answered by PSAP staff. All the PSAPs, except for one, reported that they track their call answering times, with more than 60% of the agencies responding that the call answering and processing times are published. Identified later in this report as one of the limitations of the study, few agencies were able to provide call answering times. Most of the agencies which could not provide the call-answering data reported that their phone systems were not linked to their CAD systems in a way that the data could be meaningfully reported or connected to individual incident numbers. Anecdotally, agencies that could not provide their call answer times typically reported that they receive monthly feedback from their telephone providers and did not believe call answering to be an issue.

Data collected from Question 8 of the survey found PSAPs that identified their operating agency as being “private” or “independent” had substantially slower answering times overall (see Table 5.1). PSAPS that identified as being operated by a fire department, or as being operated by a combination of emergency response agencies, reported their 90th percentile times of 12 seconds and 13 seconds, respectively.

**Call Answering Values by Operating Entity**

<table>
<thead>
<tr>
<th>PSAP Operated Primarily Under:</th>
<th>Avg. Answer Time (Seconds)</th>
<th>90th Percentile (Seconds)</th>
<th>Number of Records</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire Department</td>
<td>9</td>
<td>12</td>
<td>122,484</td>
</tr>
<tr>
<td>Independent Agency</td>
<td>23</td>
<td>53</td>
<td>86,794</td>
</tr>
<tr>
<td>Law Enforcement</td>
<td>19</td>
<td>38</td>
<td>29,836</td>
</tr>
<tr>
<td>Combination (Law, fire, and EMS)</td>
<td>7</td>
<td>13</td>
<td>46,639</td>
</tr>
<tr>
<td>Private Agency</td>
<td>36</td>
<td>59</td>
<td>38,879</td>
</tr>
</tbody>
</table>

*Table 5.1: Average and 90th Percentile Answering Times*
Not surprisingly, the research team found that there were not very many factors that appeared to correlate with an obvious impact on call answer times. As seen below in Figure 5.2, when call volumes increase, it appears more challenging for PSAP staff to meet the 15-second mark identified in NFPA 1225. This data is shown in the figure as the total percent of records, or individual calls, that met the standard versus the percent of records that did not meet the standard.

![Calls Answered Under 15 Seconds by Hour of Day](image)

**Figure 5.2: Hour of The Day Versus Call Answering Compliance**

Figure 5.3 reinforced this finding. Shown below, Figure 5.3 compares the percent of calls successfully answered in the 15-second timeframe versus those that exceeded 15 seconds in PSAPs that reported that they see transient call volume increases of some type. The increases were separated by Daily (typically due to commuter traffic, etc.), Event (due to concerts, sporting events, etc.), or Seasonal (traditionally due to tourism or other seasonal changes).

![Percent of Calls Answered Under 15 Seconds By Transient Increase Type](image)

**Figure 5.3: Transient Call Volume Increase Versus Call Answer Times**
Likewise, when the percent of calls answered in the 15-second timeline was reviewed in agencies that reported that they do not have transient increases, they were noted to be more successful on average. This again reinforces the finding that increased call volume likely strains the available resources, leading to increased call answering times. Figure 5.4 serves as a visual representation of the increased level of success when no transient call volume increase was indicated.

Figure 5.4: Call Records From Agencies Without Transient Call Volume Increases

Multiple factors not expected to impact call answering times, such as the call type and whether there was a prioritization policy in place, did not have an obvious impact on call answering times when assessing the available records. It should be noted that with the small number of records present, correlations may appear stronger than they are. This is because an individual agency’s performance, especially if it is one of the larger agencies with a significant number of records, can have a much more significant impact on the data when there are fewer records versus if there was more substantial participation in the study.

Call Processing Times

Call processing times were also assessed as part of the study. Records from the 47 agencies that submitted the applicable data were reviewed for their call processing times. Call processing was defined as the amount of time that passed from the call taker answering the phone until the initial unit is dispatched. The research team had much more success requesting these times from PSAPs as most modern CAD systems are able to capture this data. The only agencies that were excluded from this analysis were agencies that were unable to provide their time stamps to the second (some were only able to provide hour and minute) or those agencies that provided the data in a format that made it not feasible to reorganize it into a useable format.
When the agencies were classified based on their self-reported population density in Table 5.2, the PSAPs identifying as “rural” performed much better than those who were classified as “urban.”

<table>
<thead>
<tr>
<th>Classification</th>
<th>Avg. Processing Time (Seconds)</th>
<th>90th Percentile (Seconds)</th>
<th>Number of Records</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural EMS</td>
<td>47</td>
<td>77</td>
<td>2,039</td>
</tr>
<tr>
<td>Rural Fire</td>
<td>45</td>
<td>81</td>
<td>167</td>
</tr>
<tr>
<td>Rural N/A</td>
<td>78</td>
<td>95</td>
<td>3</td>
</tr>
<tr>
<td>Unsure EMS</td>
<td>68</td>
<td>118</td>
<td>241,285</td>
</tr>
<tr>
<td>Unsure Fire</td>
<td>67</td>
<td>129</td>
<td>37,866</td>
</tr>
<tr>
<td>Unsure N/A</td>
<td>43</td>
<td>83</td>
<td>72,910</td>
</tr>
<tr>
<td>Urban EMS</td>
<td>327</td>
<td>241</td>
<td>731,770</td>
</tr>
<tr>
<td>Urban Fire</td>
<td>139</td>
<td>175</td>
<td>166,231</td>
</tr>
</tbody>
</table>

Table 5.2: Population Density Versus Processing Times

Overall, most calls were not able to be processed within the 60 seconds described by NFPA 1225. Figure 5.5 shows this based on the month of the year, while Figure 5.6 shows this data based on the hour of the day.
Over the entire sample, the percent of calls successfully processed under 60 seconds does not appear to significantly change from month to month.

Surprisingly, when the data is broken down by the hour of day and when call volume increased, the percent of calls successfully processed within the 60-second window also increased. This is likely due to an increased number of staff present at that time of day but could also be due to other factors such as characteristics of the caller, and likely sources of 9-1-1 calls at those hours of the day. This is contradictory to the previous findings that increased call volume increased call answering times.

Two of the most significant factors that were correlated with faster processing times were the CAD vendor used by the PSAP, and whether the PSAP followed a written standard for call answering and processing times. As shown in Figure 5.7, the CAD vendor utilized by the PSAP appeared to correlate with substantial variances in success with processing calls in the 60 second timeframe.
It should be noted that few agencies reported using CAD systems E or H, but most of the providers use some form of the platform offered by CAD system A.

Intuitively, it makes sense that the PSAPs that have a written standard in place for call answering and processing times are more likely to meet that standard. To enforce standards, such as NFPA 1225, PSAPs need to not only have a means of measuring their times, but they must also have the ability to report on those times. **Figure 5.8** highlights the significant difference in the agencies with a written standard, versus those without one.

**Figure 5.8: Agencies with Written Standards versus Agencies Without**

Those agencies using an NFPA standard to guide their call answering and processing times, presumably 1225 or 1221, (**Figure 5.9**) showed an enhanced ability to process their calls versus those agencies that do not. Intuitively, it makes sense that the agencies who reported that they
use the NFPA standard are more likely to have a greater percentage of calls processed within the 60-second window, but it is surprising the amount of calls that still fail to meet the standard.

Unsurprisingly, PSAPs who reported that they utilize a call prioritization system to determine the higher priority calls had a lower percentage of “compliant calls.” This was consistent with the sentiment verbalized by multiple PSAP contacts who stated the concern that “accuracy takes time” and that call takers were not readily able to successfully improve one of those variables without increasing the other. Among those agencies that use the NFPA standards, an average processing time of 78 seconds was noted with the 90th percentile of 136 seconds among the records collected (see Table 5.3).

<table>
<thead>
<tr>
<th>PSAP Uses NFPA Standard?</th>
<th>Avg. Process Time (Seconds)</th>
<th>90th Percentile (Seconds)</th>
<th>Number of Records</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>78</td>
<td>136</td>
<td>528,958</td>
</tr>
<tr>
<td>No</td>
<td>414</td>
<td>296</td>
<td>745,067</td>
</tr>
</tbody>
</table>

Table 5.3: Average and 90th Percentile Call Processing Values for Agencies Using NFPA Standards

Concerns of statistical outliers, incidents with time values that significantly impact the analysis and are likely due to extenuating factors, are discussed in depth in SECTION 6. Another finding regarding processing time was that as the population served increased, usually the average and 90th percentile call processing times did as well. Consistent with the understanding that greater populations will likely yield a higher call volume, it was expected by researchers that the additional staffing of the PSAPs serving larger populations would offset the increased call volume, yielding little to no increase in times. Table 5.4 shows that to be a likely inaccurate belief.

<table>
<thead>
<tr>
<th>Population Served</th>
<th>Avg. Processing Time (Seconds)</th>
<th>90th Percentile (Seconds)</th>
<th>Number of Records</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 100,000</td>
<td>71 (277)</td>
<td>132 (133)</td>
<td>37,489</td>
</tr>
<tr>
<td>Between 100,000 and 300,000</td>
<td>77 (89)</td>
<td>162 (162)</td>
<td>254,814</td>
</tr>
<tr>
<td>Between 300,000 and 800,000</td>
<td>92 (118)</td>
<td>180 (180)</td>
<td>520,412</td>
</tr>
<tr>
<td>Greater than 800,000</td>
<td>101 (558)</td>
<td>177 (3,648)</td>
<td>398,390</td>
</tr>
</tbody>
</table>

*These calculations were made only including calls with a processing time greater than 0 seconds, and less than one hour. The values obtained without removing the outliers are noted in the parenthesis. A total of 62,920 calls did not meet the above mentioned parameters.

Table 5.4: Average and 90th Percentile Call Processing Values Versus Population Served

Summary of the Key Results

- A small sample size was present in comparison to the number of PSAPs across the nation, which could impact the external validity of observations from this study
- Almost all PSAPs reported that call answering and call processing times are tracked
- Obtaining the data for call answering times was challenging, though most agencies anecdotally reported that their answering times were provided by their phone providers and met standards
- Call answering compliance appeared to negatively correlate with the presence of known transient increased call volume
• PSAPs are generally unable to process calls within the time prescribed by NFPA 1225

• Multiple administrative and technical barriers are present that challenge the appropriate collection and analysis of the specific data in question

• Records from agencies that follow written standards were compliant more than twice as often as the records from agencies without a standard. Agencies following NFPA standards were the most successful

• Across the records analyzed, the 90th percentile for call processing times was more than twice what is recommended in the standard for those agencies that report using the NFPA standard

• The 90th percentile call processing time for records from agencies that do not follow the NFPA standard was roughly 500% greater than the timeframe specified in NFPA 1225

• Multiple factors appeared to impact times statistically such as CAD Vendors used, rural versus urban populations, and self-perceived environmental, facility, technological, or staffing limitations

An important note about this finding is that the sample size of the data may allow for a single agency to exhibit significant influence on the data set as a whole
SECTION 6: STUDY LIMITATIONS

This study had some key limitations noted during the data collection and subsequent analysis. As with any study targeting a national audience, it was assumed that there would be challenges related to standardizing responses, but examples were provided to the participants, as well as readily accessible assistance for those who had questions or concerns.

Due to the nature of the research, a self-reporting study regarding potential limitations of one’s own PSAP, there are potential internal validity issues noted. Internal validity is the measure to which the observed results of a study truly represent the topic being studied. While there is no way to track the exact number of PSAPs that reviewed the survey and decided not to submit data, there is an above-average chance that those departments who willingly submitted their data differed from those who did not in a statistical manner, otherwise known as a self-selection bias. If anything, it is assumed that the results of this study were likely more favorable than the results would have been if given access to the data at a national level. Agencies that are better at tracking their data and results were likely more willing and able to participate in the study versus those agencies that do not. Nonetheless, lack of participation, standardization issues, technology concerns, and lack of a national database were all significant limitations to the study.

Lack of Participation

The research was initiated with the bold goal of collecting data from a statistically significant number of PSAPs. The project technical panel (PTP) and research team had established early in the research that the initial request for proposal requirement of a “statistically significant” number of PSAPs being sampled would likely be fluid, as this caliber of research had yet to be completed on this topic. As discussed later in this section, the lack of a substantial database prevented researchers from being able to confirm receipt of survey materials. The data collection survey was sent out via multiple outlets, but there was no requirement for any PSAP to provide notification that they had received the communications and were not going to participate. There is also the issue of staffing for many PSAPs as noted below.

Throughout the data collection survey, and subsequent clarifying discussions with some of the PSAPs, it was noted that having enough staff was a substantial issue for most of their organizations. As such, it may be challenging for the already stressed staff of most centers to take the time to answer the survey questions, pull the data, and submit it for a voluntary study. Lastly, the small sample size of approximately 52 organizations did not match well with a statistically significant sample of all PSAPs, based on the demographics provided. As such, the external validity of this study is worth questioning as a repeat study may show differing results.

Standardization Issues

Standards exist in the form of guidance from multiple agencies/organizations, but there is still a lack of standardization across many terms and practices. There is no standardized data collection tool required of PSAPs across the nation, so trying to request standardized data was not a simple task. When departments were able to provide a selection of data, there were issues involved in nomenclature differences across PSAPs. The desired data was well defined in the survey provided to participants, yet terms such as “time received” resulted in data representing times including: when the call was received at the PSAP, when the call was answered by call takers, when the call was transferred from a primary PSAP or call-taker, or even when the call was automatically answered by an automated system and placed in a “holding state.” Due to the
perceived differences in capabilities across PSAPs, participants were not required to enter their data into a standardized form. Instead, they were provided a template to use if desired, and were welcomed to enter the data however possible.

Several of the participating agencies appeared to have pulled the raw data directly from their systems and submitted it directly. Attempting to collect this data across organizations with such diverse populations and capabilities proved to be challenging due to these standardization issues. There was a significant amount of interpretation, and some assumptions, entailed trying to allow for an appropriate data analysis to occur. Calls were classified with greater than 2,000 unique codes/terms when they were originally received from PSAPs. The project team went to great lengths to classify these terms as fire, EMS, or N/A (i.e., a code presumed to be used for a law enforcement call, maintenance, or other non-fire or EMS use).

One of the issues with the raw data submitted from the PSAPs was that there were no standards set by the PTP or research team as to what should be designated as an outlier. These records were dealing with time frames that were typically between 0-180 seconds in length. There are multiple incidents where the timeframes listed in Section 15.4.4 of NFPA 1225 should be exempted, including (but not limited to):

- Calls where language translation was needed
- Calls where there is incomplete location data
- Calls received during significant disasters where resources have been depleted and there have been substantial impacts to local infrastructure
- Hazardous materials and technical rescue calls

Several of the PSAPs specifically identified language barriers and incomplete location data as being significant hindrances to being able to process calls in a timely manner. The literature review also supported this conclusion. Without specifically “flagging” these calls prior to submitting the data to the research team, there is no way to exclude them. Even across one million calls, having a handful of calls that sat in a “pending” or “holding” state for a few hours or days due to a natural disaster, etc., could have significant impacts on the data analysis.

**Technology Concerns**

Another substantial issue found was that the technology most PSAPs utilize was not able to provide the data requested by the study. A good example is the data point for “time received.” All the study participants, except for one, noted that they track their call answering times, or the time between the call being received at the PSAP versus when the call is answered, but only 25% of the records submitted by PSAPs provided call answering times.

Most of the organizations noted that their telephone company was able to keep track of their call answering data, but they were unable to connect individual times with the individual calls in their CAD system. These agencies were generally able to provide their overall call-answering statistics, by making statements like “90% of calls are answered within 8 seconds” but were unable to provide the times in a manner that allowed analysis with the current set of data. Anecdotally, the data provided by most of these organizations showed that call answering did not appear to be an issue. Several of the PSAPs noted that they now use an automated answering system, which allows the call to be automatically connected to a call-taker when placed.
A similar limitation was the inability for many call centers to identify “high priority” calls only. Most of the CAD systems were able to separate the specific type of service that was associated with the call (fire, EMS, or law enforcement), but few of the data files submitted had obvious identifiers that suggested the data had been limited to the high-priority calls as requested. To further complicate the issue, many jurisdictions classify hazardous materials and technical rescue calls as “fire” calls. Mentioned above, these calls should be excluded due to their nature, but this is not always possible based on how the CAD technology is used by the PSAP.

**Lack of State or National Database**

While there have been efforts to bring together data at the national level, such as the National 9-1-1 Program’s progress reports, participation is voluntary. There are no federal or state mandates that require PSAPs to participate in, or send data to, these national-level progress reports. A previously established database at the state, or national, level would allow for future research to target and communicate with all applicable PSAPs. The FCC database provides the approximate number of individual PSAPs in the nation but fails to provide any meaningful contact information.

This presented as a significant limitation to the study as communication about the study and data needs was limited to communication networks traditionally used for other purposes. Noted in the methodology section of this report, much of the communication about the study was completed using professional networks and organizational email groups. Each time information about the study was sent out via the available channels it did yield additional sets of data, but these were usually between 1 and 5 sets, and the amount of data gathered was frequently not comparable with the effort to obtain the data.

Anecdotally, it was found that there was a high level of cooperation and engagement noted from PSAPs who submitted data for the study. They cited the need for “justifications of previously established standards” while reporting that “issues with staffing” and “lack of financial resources” made improvements difficult to accomplish. This, as well as the participation noted in the National 9-1-1 Progress reports, suggests that with better communication and awareness, future studies could have greater participation, and thus, more statistical significance.
SECTION 7: CONCLUSIONS

The research, as well as anecdotal evidence collected while speaking with PSAP representatives, suggests that most PSAPs can meet the call answering standard presented by NFPA 1225, but that they are unable to meet the call processing times listed in that same standard. Out of more than 6,000 actively functioning PSAPs, it is unreasonable and likely impossible, to make any substantial inferences about the effectiveness of the time standards presented in NFPA 1225 based on the self-reported data of 47 departments, or less than 1 percent of known PSAPs.

Consistent with the data analysis above, there is a need for more in-depth research on the topic of PSAP call answering and processing time. Future research should focus on obtaining a greater sample size through more effective methods of promoting the study, but those efforts should be in collaboration with education about the data collection methods. One of the most challenging aspects of this study was the lack of standardized data reporting across PSAPs. Many agencies reported having a portion of the requested data, not all of it, or that their data was in a different format than requested.

A potential issue identified in subsequent discussions between the research team and the project technical panel was the concern that PSAP administrators may have looked at the survey and not submitted data because they were unable to provide a complete set, or they were unsure of the relevant data based on the terminology used. Research of this caliber would be well suited to have a support team ready to assist any agencies that are attempting to submit data. While efforts were made to communicate that support was available for this study, future research should emphasize the available support during educational sessions about the data collection tool.

The inability to provide the time that a call was initially received by the PSAP, and then connect that time to the individual dispatch record in a meaningful manner, was nearly universal. Most of the PSAP administrators contacted remarked that their phone systems could report their call answering times, but they were not integrated with the CAD system. This data could have been used in the context of the study, but there would have been no way to separate calls that were not fire or EMS calls. Because of the large number of PSAPs that are operated by law enforcement agencies, collecting call answering time for only EMS and fire-based calls may be an unrealistic goal. If the PSAPs can keep their call-answering times under the established time frames in the NFPA standard, future research should consider whether it is important to separate the incidents which are not covered by the standard. The concern of possibly including incidents not covered by the standard may have attributed to the low participation rate of PSAPs for this study.

Call processing time analysis was hampered by the fact that many PSAPs had different interpretations of what consisted of call processing. A clear definition was provided in the context of the research that call processing consists of the time from the call being answered until the first unit is dispatched, but that is not what is always captured by the CAD systems. Many of the PSAP operators were unable to describe exactly which time was being captured for each timestamp. Some PSAPs had calls “dump” from a call-taking system into a dispatching system, while other PSAPs had multiple timestamps where various transitions occurred within their systems. A less common complication was that some of the centers were only able to provide times in an hour and minute format, not in seconds. They reported that they could pull reports which gave them averaging processing times, but that those times would be across all calls versus the calls targeted by NFPA 1225.
In the context of this research, the limitations faced by the study may be more impactful than the data collected and subsequent analysis. Data collected for this study was from 2019. The emergency response community was faced with the unique challenge of navigating the COVID-19 pandemic starting in January of 2020. It is assumed that if this study was replicated using data from 2020 or later, that staffing, dispatch requirement, and other complications would likely show that call processing times have increased. Many organizations integrated additional COVID-19 screening questions into their normal dispatching processes to increase responder safety, but there were no known instances of PSAPs increasing staffing to handle the additional workload. Conversely, many PSAP representatives reported that they have faced the same staffing and funding constraints that the rest of the emergency response community has dealt with throughout recent years. Almost 90% of the responding agencies cited staffing as one of the barriers directly related to being able to meet the call answering and processing standards. A unique, and pleasant, finding of the study was the number of agencies that reported that they publish their call answering and processing times. Only 38% of PSAPs reported that they either do not publicize their times or that they were unsure if they publicize their times. Accountability with the public that these agencies serve is incredibly important, and transparency is the number one way to increase that accountability.

Lastly, future research should consider looking at other aspects of call answering and processing times specified in NFPA 1225. One of those topics not targeted by this research was the amount of time it takes for a transfer from a primary to a secondary PSAP. More than a quarter of the responding PSAPs identified their agencies as secondary PSAPs. Their call processing times did not reflect the amount of time it takes from the call being answered at the initial PSAP until an initial unit was dispatched. The transfer process can be different from PSAP to PSAP with some agencies having direct access to the secondary PSAP’s CAD system and others simply transferring the phone call to the secondary agency so that their personnel could put the call into their own system. In these situations, there should be consideration that there was additional time in the overall call processing prior to the secondary PSAP. It is likely the case that, barring linked CAD systems, the ability to track these times will face similar issues as the call answering-data collection attempts. Without significant work to flag or mark transferred calls, it may not be possible to readily connect the time spent on the call by the primary PSAP with the unique call generated by the secondary PSAP. Given the prevalence of secondary PSAPs, this is a topic that should be considered for future research.

Overall, this study showed that the responding PSAPs are not regularly meeting the call processing standard as presented by NFPA 1225. The most common barriers noted were staffing issues as well as the generalized statement that the call can be processed “fast or accurately, but not both.” Call answering standards seemed to be easier for most PSAPs to accomplish, though the data was considerably more challenging to collect due to technological issues. There were multiple barriers to collecting the data in a meaningful manner, including the administrative constraints that many PSAPs face from being owned/operated by non-fire/EMS agencies. Given the study was reflecting on the times presented in NFPA 1225, non-fire/EMS agencies may have felt less compelled to participate. The lack of a standardized data reporting requirements across PSAPs, which lead to challenges in both the requesting and collecting of the data, was also a significant limitation. The small sample size should be cause for concern that the agencies who chose to respond likely differ in some statistical manner from those who did not respond, though future research could produce more vigorous recruitment techniques to have a larger, and more representative, sample size.
APPENDICES

Appendix A: Works Cited


About the program. 911.gov. (2022, May 5). Retrieved 2022, from https://www.911.gov/about/


Appendix B: Map of Participating States

States Who Submitted Data
Appendix C: Listing of Literature Review Articles


Swan, R. (2022, May 12). They called 911 in Oakland, Calif., and were told to wait. GovTech. Retrieved 2022, from https://www.govtech.com/em/safety/they-called-911-in-oakland-calif-and-were-told-to-wait?utm_campaign=Newsletter+-+GT+-+Emergency+Management&utm_medium=email&hs_email=213382604&_hsenc=p2ANqtz-UNEUdh0oXFkmB1cOgvr8UuMr4Wak8QVcm8fAUzWcPjsHRIXE9TsEG8ohOfgZMjG9kaSqrS57DbZvEvL3f1ZRJJSco7Q&utm_content=213382604&utm_source=hs_email


Appendix D: Survey

A copy of the data collection survey is provided in the following pages.
Welcome! You are invited to participate in a research study, “An Analysis of Public Safety Call Answering and Event Processing Times,” conducted by the Fire Protection Research Foundation (FPRF), NFPA's research affiliate. The research is performed by Public Consulting Group (PCG) for FPRF with the goal of collecting, analyzing, and summarizing the call answer and processing time interval data in response to the fire and EMS events (excluding law enforcement event data) from a wide spectrum of Public Safety Answering Points (PSAP) dispatch centers (i.e., large, small, urban, rural etc.) in the United States.

We strongly recommend collecting all information needed to complete the survey beforehand. Click here to access a PDF copy of the survey and view detailed instructions. Please note that most of the data requested in this survey is best provided by management personnel responsible for the agency's PSAP or dispatch center.

We want to thank you in advance for your participation in this important study! If at any point you have questions, please reach out to our team at publicsafetystudy@pcgus.com. We've included instructions for taking the survey below. To view, click the bar to expand it.

**Instructions**

**Survey Overview:** This questionnaire is designed to collect all relevant information necessary for data collection and analysis. The survey is structured into three sections:

1. CAD Data Collection - specific data elements to be collected and reported in an Excel sheet. You will upload your call center's Excel file onto our secure site.
2. PSAP/Communication Center Characteristics
3. Call Center Data

**Navigating and Accessing the Survey:** Our team strongly recommends collecting all information needed to complete the survey beforehand. To download a copy of the survey, you can visit this link.
To complete the survey, please fill out each item and click on the "Next" option as you progress. You will be asked to "Submit" the survey once you reach the final page. If you need to come back to the survey to finish at a later point, you can click the "Save" option at the bottom of the page. This will prompt you to create a password and will send a link to your provided email address so that you can finish the survey.

**Confidentiality and Use of Information:** Your participation in this research survey is voluntary. You will receive no payment for participating in this study. We encourage you to complete as much of the survey as possible, but you do not need to answer every question.

The information you provide through this survey will be anonymous and survey results will be aggregated for use in the final report. The researchers will not identify you or your organization. The contact information collected from the survey will only be used by PCG staff for follow-up purposes to obtain clarification on your data. The final report will be published publicly from the Fire Protection Research Foundation website (www.nfpa.org/foundation).

**Call Center CAD Data Request**

We are asking PSAPs to provide computer-aided dispatch (CAD) data to be analyzed and summarized to better understand public safety call answering and processing times in the United States and determine if the current call time provisions in NFPA 1225, Standard for Emergency Services Communications, are reasonable.

The CAD data uploaded should consist only of Fire and EMS 911 emergency responses for the **time period of January 1st, 2019 through December 31st, 2019**.

CAD data should contain the following fields in an **Excel file format:**

- **Unique Incident ID** (as defined by the agency - a way to identify each incident separately)
- **Call Date** (Date of incident)
- **Time Call was Received by PSAP**
- **Time Call was Answered by PSAP**
- **Time Emergency Response Unit (ERU) was Notified**
- **Incident/Call Type:** Fire/EMS/Other (only include high priority calls where there's an
imminent threat to life or significant property loss or damage - see definitions in NFPA 1225 below)

**Upload Instructions:** Use the secure file upload functionality below to submit your file (please name your file with your PSAP/Call Center info). By uploading this data you acknowledge voluntary participation in this study and give permission to FPRF and PCG to use the data provided for research purposes. Data will be aggregated for analysis. Individual agency data will not be included in the final report.

Please upload the CAD data file with all requested information listed above. *

Browse Files
Drag and drop files here

Please fill out the following fields with contact information that can be used to clarify any questions related to the data uploaded. The contact information collected from the survey will **only be used** by PCG staff for these follow-up purposes.

**Contact Name:** *

<table>
<thead>
<tr>
<th>First Name</th>
<th>Last Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Email Address:** *

example@example.com

**Phone Number:** *

(000) 000-0000

Please enter a valid phone number.

**Name of Agency:** *
The following excerpts from NFPA 1225, 2022 edition have been provided below with permission from NFPA. The existing provisions regarding public safety call answering and event processing times are:

**NFPA 1225: A.3.3.99 – Public Safety Answering Point (PSAP):** A PSAP is a facility at which emergency calls are first answered, assessed, triaged, classified, and prioritized. The FCC further defines a primary PSAP as a facility to which 9-1-1 calls are routed directly from the 9-1-1 control office. A secondary PSAP is defined as a facility to which 9-1-1 calls are transferred from a primary PSAP.

**NFPA 1225: 15.4.1: Ninety percent of events** received on emergency lines shall be answered within 15 seconds and 95% of events shall be answered within 20 seconds.

**NFPA 1225: 15.4.3: Call processing time** shall include the time from call answer to initial notification of the responding ERU(s).

**NFPA 1225: 3.3.58: Emergency Response Unit (ERU):** Personnel who respond to fire, medical, law enforcement, and other emergency situations for the preservation of life and safety.

**NFPA 1225: 15.4.4: Emergency event processing** for the highest prioritization level emergency events listed in 15.4.4.1 through 15.4.4.2 shall be completed within 60 seconds, 90% of the time.

**NFPA 1221 & 1225: 7.4.3.1 & 15.4.4.1:** The following types of calls where there is imminent threat to life shall be included in the highest prioritization level:

1. Trauma (penetrating chest injury, GSW, etc.)
2. Neurologic emergencies (stroke, seizure)
3. Cardiac-related events
4. Unconscious/unresponsive patients
5. Allergic reactions
6. Patient not breathing
7. Choking
8. Other calls as determined by the AHJ

**NFPA 1221 & 1225 7.4.3.2 & 15.4.4.2** The following types of calls where significant
property loss/damage is likely or actively occurring shall be included in the highest prioritization level:

1. Fire involving or potentially extending to a structure(s)
2. Explosion
3. Other calls as determined by the AHJ.

PSAP/Communication Center Characteristics

1. Classification of service area:  *
   - Urban
   - Rural
   - Unsure

2. What is the size of the population served by the Public Safety Answering Point (PSAP)?

3. What are the variations in the population served by the PSAP, if any? Select all that apply.
   - Daytime Increase
   - Seasonal Peak Increase
   - Event Peak Increase
   - None
   - Unsure
   - Other

4. What is the size of the peak population, due to variances, served by the PSAP?

5. Select the classification of your PSAP based on the definition provided below:  *
   - Primary
   - Secondary
6. PSAP Services Provided: *

- Call taking only
- Dispatching only
- Call taking and dispatching
- Unsure

7. Is the PSAP governed by: *

- Regional governance
- County Government
- City Government
- Private Agency
- Unsure
- Other

8. Is the PSAP operated by: *

- Law Enforcement (Police/Sheriff)
- Fire Department
- EMS Agency
- Independent Agency
- Private Agency
- Unsure
- Other

9. Agencies served by the PSAP: *

- Police, Fire, and EMS
- Fire and EMS
- Police only
- Fire only
- EMS only
- Unsure
10. Number of emergency service agencies served by the PSAP:

11. Types of calls answered by the PSAP: *
   - Emergency 9-1-1 only
   - Emergency 9-1-1 and Non-Emergency/Administrative
   - Unsure

12. Total number of ALL calls answered by the PSAP from January 1st, 2019 to December 31st, 2019:

13. Total number of fire and EMS emergency 9-1-1 calls answered by the PSAP from January 1, 2019 to December 31, 2019:

14. Total number of fire and EMS emergency events processed by the PSAP from January 1, 2019 to December 31, 2019:

15. Telecommunications staff numbers: *

<table>
<thead>
<tr>
<th>Input total below:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of call takers employed by the PSAP:</td>
</tr>
<tr>
<td>Total number of radio dispatchers employed by the PSAP:</td>
</tr>
<tr>
<td>Minimum number of call takers and radio dispatchers on duty during the DAY:</td>
</tr>
<tr>
<td>Maximum number of call takers and radio dispatchers on duty during the DAY:</td>
</tr>
<tr>
<td>Minimum number of call takers and radio dispatchers on duty during the NIGHT:</td>
</tr>
<tr>
<td>Maximum number of call takers and radio dispatchers on duty during the NIGHT:</td>
</tr>
</tbody>
</table>
16. Name of CAD system vendor: *

17. Emergency Response Unit (ERU) Notification Process (select all that apply): *

- [ ] Automated Station Alerting System
- [ ] Telephone
- [ ] Telephone App
- [ ] Text
- [ ] Radio (Mobile/handheld)
- [ ] Pager
- [ ] Unsure
- [ ] Other

NFPA Definitions

**NFPA 1225: A.3.3.99** – Public Safety Answering Point (PSAP): A PSAP is a facility at which emergency calls are first answered, assessed, triaged, classified, and prioritized. The FCC further defines a primary PSAP as a facility to which 9-1-1 calls are routed directly from the 9-1-1 control office. A secondary PSAP is defined as a facility to which 9-1-1 calls are transferred from a primary PSAP.

**NFPA 1225: 3.3.58: Emergency Response Unit (ERU)**: Personnel who respond to fire, medical, law enforcement, and other emergency situations for the preservation of life and safety.

**NFPA 1225: 15.4.3: Call processing time** shall include the time from call answer to initial notification of the responding ERU(s).
18. Do you monitor emergency 911 call answering times and emergency 911 call processing times? *
- Yes
- No
- Unsure

19. Do you have a written standard for call answering and call processing times? *
- Yes
- No
- Unsure

20. Do you use a call prioritization system to determine the highest prioritization level emergency events? *
- Yes
- No
- Unsure

21. Identify any Call Center limitations or barriers to meeting call answering and call processing standards (select all that apply): *
- Staffing
- Equipment
- Technology
- Environmental
- Facility
- Unsure
- Other

22. If you have any additional opinions or comments related to call answering and call processing times, please provide them here:
NFPA Definitions

**NFPA 1225: 15.4.1**: 90% of events received on emergency lines shall be answered within 15 seconds and 95% of events shall be answered within 20 seconds.

**NFPA 1225: 15.4.4**: Emergency event processing for the highest prioritization level emergency events listed in 15.4.4.1 through 15.4.4.2 shall be completed within 60 seconds, 90% of the time.

**NFPA 1221 & 1225: 7.4.3.1 & 15.4.4.1**: The following types of calls where there is imminent threat to life shall be included in the highest prioritization level:

1. Trauma (penetrating chest injury, GSW, etc.)
2. Neurologic emergencies (stroke, seizure)
3. Cardiac-related events
4. Unconscious/unresponsive patients
5. Allergic reactions
6. Patient not breathing
7. Choking
8. Other calls as determined by the AHJ

**NFPA 1221 & 1225: 7.4.3.2 & 15.4.4.2**: The following types of calls where significant property loss/damage is likely or actively occurring shall be included in the highest prioritization level:

1. Fire involving or potentially extending to a structure(s)
2. Explosion
3. Other calls as determined by the AHJ.
Appendix E: Detailed Survey Instructions

A copy of the data collection survey instructions provided with the survey is included in the following pages.
Thank you for your interest and participation in our Public Safety Call Answering and Event Processing Times study. Follow the instructions below for details on the computer-aided dispatch (CAD) data request and the additional information to be submitted.

Review the included instructions carefully. Once you have collected all the necessary information, you will upload your CAD data and complete the questionnaire at the following secure website: https://pcgus.jotform.com/221256327984058. Please note: Data will be aggregated for analysis; individual agency data will not be included in the final report.

Please submit the questionnaire and required data no later than August 8th, 2022. For any questions regarding the data request or questionnaire, contact the PCG Public Safety Support Team at publicsafetystudy@pcgus.com.

Survey Overview

The questionnaire is structured into three sections. In Section 1 you will upload your CAD data Excel file via secure file upload functionality (see CAD data request information below for details). The questions in Section 2 and Section 3 revolve around the characteristics of the PSAP/communication center and other information about your call center. Please note that most of the data requested in the survey is best provided by management personnel responsible for the agency's PSAP or dispatch center.

General Instructions:

1. Review the Data/Information to be Collected:
   a. Review the CAD data request information to understand how to collect the CAD data (provided in this document).
   b. Review the PSAP/Communication Center Characteristics and additional data/statistics to be collected (provided in this document).

2. Collect the Information:
   a. Collect the CAD data in an Excel file – see data collection tips.
   b. Verify that you have answers to the call center characteristics/statistics questions.

3. Submit CAD Data and Complete the Questionnaire:
   a. Go to PCG’s secure site: https://pcgus.jotform.com/221256327984058.
   b. Section 1: Upload your completed CAD Excel file.
   c. Section 2 and 3: Complete PSAP/Call Center questionnaire.

4. Saving Your Response:
   a. If at any time you need to save your response and come back to finish it later, there is a “Save” option at the bottom of the survey. Clicking this button will prompt you to enter an email address and password. Once you have done so, an email will be sent that will include a link. This link will allow you to return to the survey and complete the remaining questions within the form.
Section 1: Computer-Aided Dispatch (CAD) Data Request

The CAD data request consists of Fire and EMS 911 emergency responses for the time period of January 1, 2019 – December 31, 2019. CAD data should contain the following fields in an Excel file format:

- **Unique Incident ID** (as defined by the agency – a way to identify each incident separately)
- **Call Date** (Date of incident)
- **Time Call was Received by PSAP**.
- **Time Call was Answered by PSAP**.
- **Time Emergency Response Unit (ERU) was Notified**.
- **Incident/Call Type**: Fire/EMS/Other (only include high priority calls where there’s an imminent threat to life or significant property loss or damage – see definitions found in NFPA1225: CHAPTER 15.4.4.1; CHAPTER 15.4.4.2). Reference the excerpts from NFPA Standards here.

Sample CAD File (Microsoft Excel):

<table>
<thead>
<tr>
<th>Unique Incident ID</th>
<th>Call Date</th>
<th>Time Call Received by PSAP</th>
<th>Time Call Answered by PSAP</th>
<th>Time ERU Notified</th>
<th>Incident/Call Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>G2004561002</td>
<td>07/15/2019</td>
<td>4:02:30 PM</td>
<td>4:02:45 PM</td>
<td>4:04:05 PM</td>
<td>EMS</td>
</tr>
<tr>
<td>G2005410309</td>
<td>07/22/2019</td>
<td>08:08:00 AM</td>
<td>08:08:13 AM</td>
<td>08:09:55 AM</td>
<td>Other</td>
</tr>
</tbody>
</table>

**Tips:**

- If your agency’s fiscal year does not align with the FY2019 calendar year identified and it is not easy to separate out the data for this reporting period, you may submit data for two fiscal years that cover the requested time period.
- **Do not include** law enforcement incidents– we are only focusing on fire and EMS events.
- **Include only high-priority call types** as defined by NFPA 1225 standards identified above. If appropriate, submit incident priority type descriptions.
Section 2: PSAP/Communication Center Characteristics

Section 2 of the survey asks about PSAP/Communication Center Characteristics, while Section 3 asks about call center information and statistics. Please note that most of the data requested in the survey is best provided by management personnel responsible for the agency's PSAP or dispatch center.

A copy of the questions that will be asked in Section 2 is provided below for you to review in advance and collect the answers. Complete the questionnaire to the best of your ability – if you are not able to answer a question select “Unsure” or enter “N/A.” If needed, excerpts from NFPA 1225 are included at the end of this document.

1. Classification of service area: *
   - [ ] Urban
   - [ ] Rural
   - [ ] Unsure

2. What is the size of the population served by the Public Safety Answering Point (PSAP)?

3. What are the variations in the population served by the PSAP, if any? Select all that apply.
   - [ ] Daytime Increase
   - [ ] Seasonal Peak Increase
   - [ ] Event Peak Increase
   - [ ] None
   - [ ] Unsure
   - [ ] Other

4. What is the size of the peak population, due to variances, served by the PSAP?
5. Select the classification of your PSAP based on the definition provided below: *
   - Primary
   - Secondary
   - Unsure

6. PSAP Services Provided: *
   - Call taking only
   - Dispatching only
   - Call taking and dispatching
   - Unsure

7. Is the PSAP governed by: *
   - Regional governance
   - County Government
   - City Government
   - Private Agency
   - Unsure
   - Other

8. Is the PSAP operated by: *
   - Law Enforcement (Police/Sheriff)
   - Fire Department
   - EMS Agency
   - Independent Agency
   - Private Agency
   - Unsure
   - Other
9. Agencies served by the PSAP:  *
   - Police, Fire, and EMS
   - Fire and EMS
   - Police only
   - Fire only
   - EMS only
   - Unsure

10. Number of emergency service agencies served by the PSAP:
   
11. Types of calls answered by the PSAP:  *
   - Emergency 9-1-1 only
   - Emergency 9-1-1 and Non-Emergency/Administrative
   - Unsure

12. Total number of ALL calls answered by the PSAP from January 1st, 2019 to December 31st, 2019:
   
13. Total number of fire and EMS emergency 9-1-1 calls answered by the PSAP from January 1, 2019 to December 31, 2019:
   
14. Total number of fire and EMS emergency events processed by the PSAP from January 1, 2019 to December 31, 2019:
15. Telecommunications staff numbers: *

<table>
<thead>
<tr>
<th>Input total below:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of call takers employed by the PSAP:</td>
</tr>
<tr>
<td>Total number of radio dispatchers employed by the PSAP:</td>
</tr>
<tr>
<td>Minimum number of call takers and radio dispatchers on duty during the DAY:</td>
</tr>
<tr>
<td>Maximum number of call takers and radio dispatchers on duty during the DAY:</td>
</tr>
<tr>
<td>Minimum number of call takers and radio dispatchers on duty during the NIGHT:</td>
</tr>
<tr>
<td>Maximum number of call takers and radio dispatchers on duty during the NIGHT:</td>
</tr>
</tbody>
</table>

16. Name of CAD system vendor: *

17. Emergency Response Unit (ERU) Notification Process (select all that apply): *

- [ ] Automated Station Alerting System
- [ ] Telephone
- [ ] Telephone App
- [ ] Text
- [ ] Radio (Mobile/handheld)
- [ ] Pager
- [ ] Unsure
- [ ] Other
Section 3: Call Center Data

Section 3 of the survey asks about call center information and statistics. Please note that most of the data requested in the survey is best provided by management personnel responsible for the agency’s PSAP or dispatch center.

A copy of the questions that will be asked in Section 3 is provided below for you to review in advance and collect the answers. Some of the questions in this section include conditional logic. For example, if you answer “Yes” for question 18, another question will appear below it (18a). All possible questions are shown below.

Complete the questionnaire to the best of your ability – if you are not able to answer a question select “Unsure” or enter “N/A.” If needed, excerpts from NFPA1225 are included at the end of this document.

Once you complete this section, you will be able to “Submit” the responses for the entire survey (all of the sections).

18. Do you monitor emergency 911 call answering times and emergency 911 call processing times? *
   - Yes
   - No
   - Unsure

18a. Does your PSAP publish call answering and call processing times? *
   - Yes
   - No
   - Unsure

19. Do you have a written standard for call answering and call processing times? *
   - Yes
   - No
   - Unsure
19a. What written standards do you use for call answering and call processing times? Select all that apply. *

- [ ] NFPA
- [ ] APCO
- [ ] NENA
- [ ] CFAI
- [ ] ISO
- [ ] Internal
- [ ] Unsure
- [ ] Other

20. Do you use a call prioritization system to determine the highest prioritization level emergency events? *

- [ ] Yes
- [ ] No
- [ ] Unsure

20a. What software do you use to determine the highest prioritization level emergency events? Select all that apply. *

- [ ] IAED
- [ ] APCO
- [ ] Power Phone
- [ ] Internal
- [ ] Unsure
- [ ] Other
21. Identify any Call Center limitations or barriers to meeting call answering and call processing standards (select all that apply): *

☐ Staffing
☐ Equipment
☐ Technology
☐ Environmental
☐ Facility
☐ Unsure
☐ Other

22. If you have any additional opinions or comments related to call answering and call processing times, please provide them here:

Type here...
Excerpts from NFPA 1225

The following excerpts from NFPA 1225, 2022 edition have been provided below with permission from NFPA.

The existing provisions regarding public safety call answering and event processing times are:

**NFPA 1225: A.3.3.99 – Public Safety Answering Point (PSAP):** A PSAP is a facility at which emergency calls are first answered, assessed, triaged, classified, and prioritized. The FCC further defines a primary PSAP as a facility to which 9-1-1 calls are routed directly from the 9-1-1 control office. A secondary PSAP is defined as a facility to which 9-1-1 calls are transferred from a primary PSAP.

**NFPA 1225: 15.4.1:** Ninety percent of events received on emergency lines shall be answered within 15 seconds and 95% of events shall be answered within 20 seconds.

**NFPA 1225: 15.4.3:** Call processing time shall include the time from call answer to initial notification of the responding ERU(s).

**NFPA 1225: 3.3.58:** Emergency Response Unit (ERU): Personnel who respond to fire, medical, law enforcement, and other emergency situations for the preservation of life and safety.

**NFPA 1225: 15.4.4:** Emergency event processing for the highest prioritization level emergency events listed in 15.4.4.1 through 15.4.4.2 shall be completed within 60 seconds, 90% of the time.

**NFPA 1221 & 1225: 7.4.3.1 & 15.4.4.1:** The following types of calls where there is imminent threat to life shall be included in the highest prioritization level:

1. Trauma (penetrating chest injury, GSW, etc.)
2. Neurologic emergencies (stroke, seizure)
3. Cardiac-related events
4. Unconscious/unresponsive patients
5. Allergic reactions
6. Patient not breathing
7. Choking
8. Other calls as determined by the AHJ

**NFPA 1221 & 1225: 7.4.3.2 & 15.4.4.2:** The following types of calls where significant property loss/damage is likely or actively occurring shall be included in the highest prioritization level:

1. Fire involving or potentially extending to a structure(s)
2. Explosion
3. Other calls as determined by the AHJ.