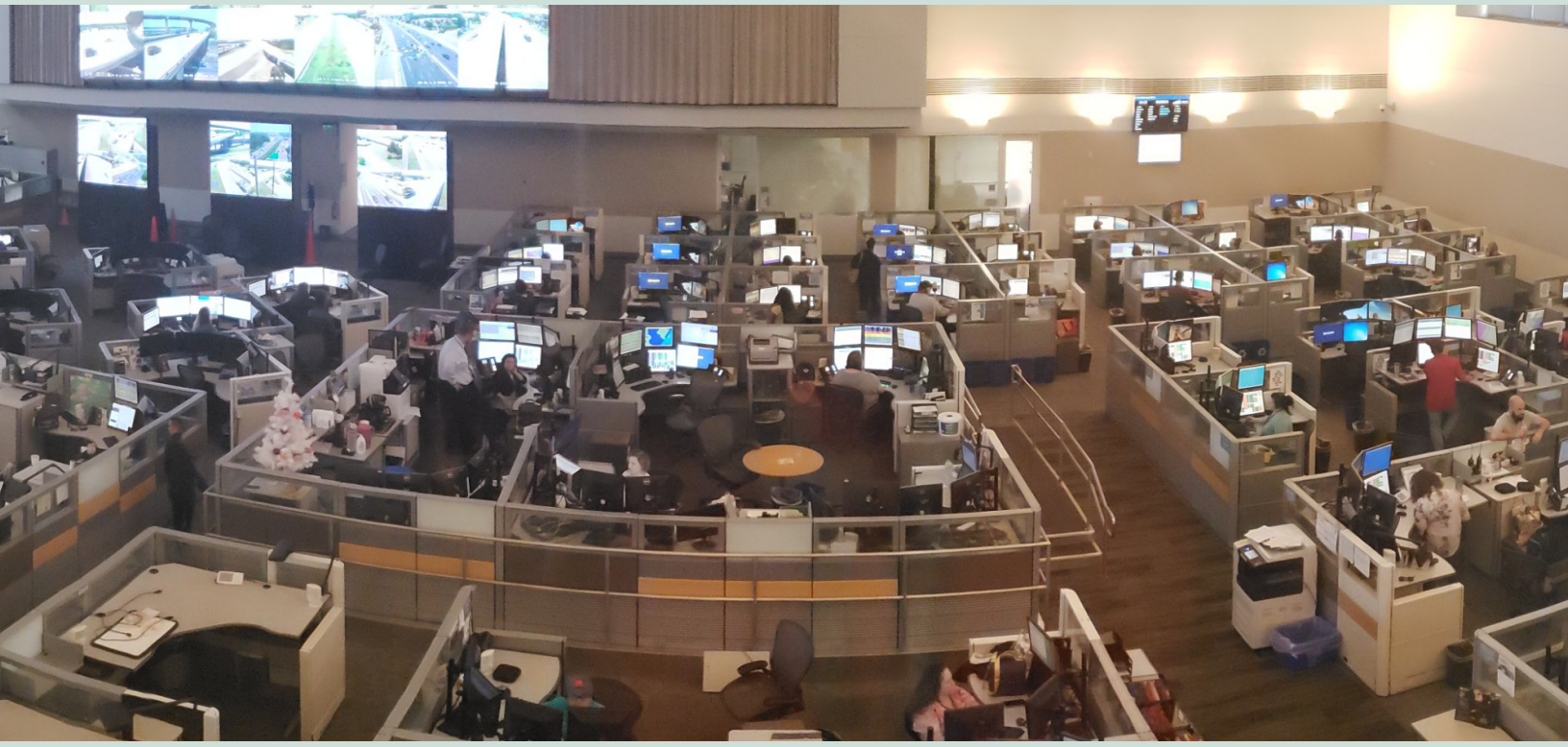
City of Austin
Office of the City Auditor

Special Report

911 Call Taking During High Demand

March 2024



The Austin Police Department (APD) does not have a defined threshold for high 911 call volumes or different procedures to respond to high volumes. Other cities' practices were generally similar to APD's; however, we identified a couple of cities that have implemented practices to respond to high call volumes. APD call volumes generally increased in 2023 with more high call volume days and more days with significant spikes in call volume. Call volumes were within a "normal" range most days, although call volumes exceeded this range on 30 days in the last two years. In general, higher call volumes resulted in longer wait times for callers, but lower call volumes did not ensure faster answering times.

Contents

Photo Credit: 911 Dispatch, City of Austin.

Objective

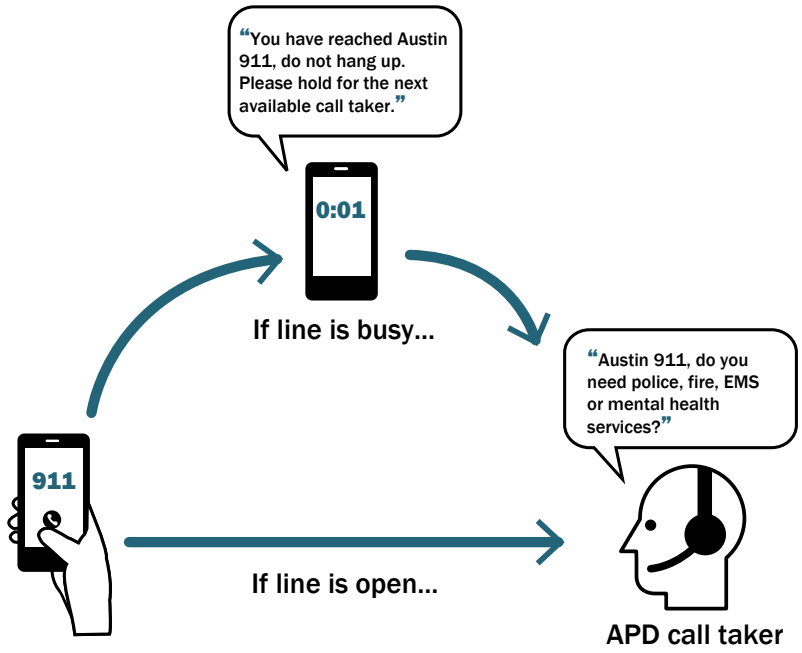
The objective of this special request was to answer the following questions about 911 call operations during high call volume events:

1. How often does Austin's 911 operations experience bulk arrival events or high demand?
2. What actions does Austin currently have in place to respond to bulk arrival events to meet high demand?
3. What actions do other cities and emergency communication centers use to scale operations and adjust capacity to meet high demand?
4. How do bulk arrival or high demand events impact wait times for callers?

Background

People expect a quick response when they call 911. Austin Police Department's (APD) 911 and Dispatch Basic Training Manual states, "All incoming calls should be answered as promptly as possible… In the case of an emergency, seconds seem like hours… To the caller needing emergency assistance each 'ring' of the telephone seems like an eternity." A quick response is also the national standard. The National Emergency Number Association (NENA) says 90 percent of calls should be answered in 15 seconds or less.

Exhibit 1: Initial call taking process



SOURCE: OCA analysis of APD's call taking process.

What We Learned

Summary

APD does not have a defined threshold for high demand call volumes. The number of people calling 911 fluctuates constantly. Call volumes generally increased from late 2021 through fall 2023. Call volumes most days were within a "normal" range of call volume fluctuation. However, call volumes on 30 days exceeded this "normal" day-to-day variation. APD's call taking process is the same regardless of call volume. Higher call volumes usually resulted in longer wait times for callers. More callers hung up as volumes increased. Most of the comparable cities we looked at similarly did not define or track high call volumes.

Question 1

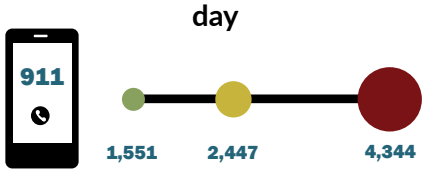
How often does Austin's 911 operations experience bulk arrival events or high demand?

Austin Police Department (APD) does not track the number of high demand events. Additionally, APD does not have a defined threshold for "high demand." The relative busyness of the 911 call center depends on the number of calls and the number of call takers on shift. Call volumes fluctuate hour-by-hour and day-by-day. APD received an average of 2,447 calls per day between Oct. 2021 through Sept. 2023. Daily call volumes ranged from as low as 1,551 and as high as 4,344.

Answering times generally slowed down as call volumes increased. However, not all increases in call volumes had a corresponding delay in answering time and some slower answering times were not associated with an increase in calls.

We found that while call volumes fluctuate, APD receives call volumes within a "normal" range from 1,772 to 3,122 daily calls most of the time.[1] In our sample of call volumes from Oct. 2021 to Sept. 2023, 30 days out of 729 days (about 4%) were above this normal range, indicating days with above-normal call volume. Some of the high-volume days were predictable, like New Years. Other significant spikes occurred during the February 2023 ice storm, on April 20, 2023, and on June 17, 2023. Call volumes generally increased in 2023. APD had more large spikes in demand in 2023 than the rest of the dates we looked at.[2]

Exhibit 2: Daily call volumes ranged from 1,551 to 4,344 calls. The average was 2,447 calls per day

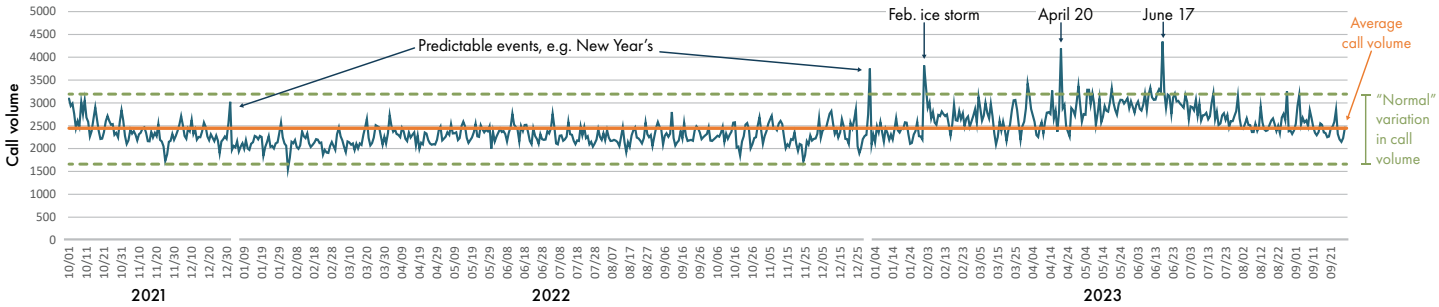


SOURCE: OCA analysis of Emergency Call Tracking System (ECaTS) data between Oct. 1, 2021 and Sept. 30, 2023.

[1] We defined normal as within two standard deviations from the mean as a way of determining the significance of call volume fluctuations.

[2] We did not look at call volumes prior to the pandemic. APD staff said the 2023 volumes were similar to 2019 numbers, adjusted for a higher population.

Exhibit 3: Daily 911 calls fluctuate but generally fall within a normal range. Calls increased in 2023



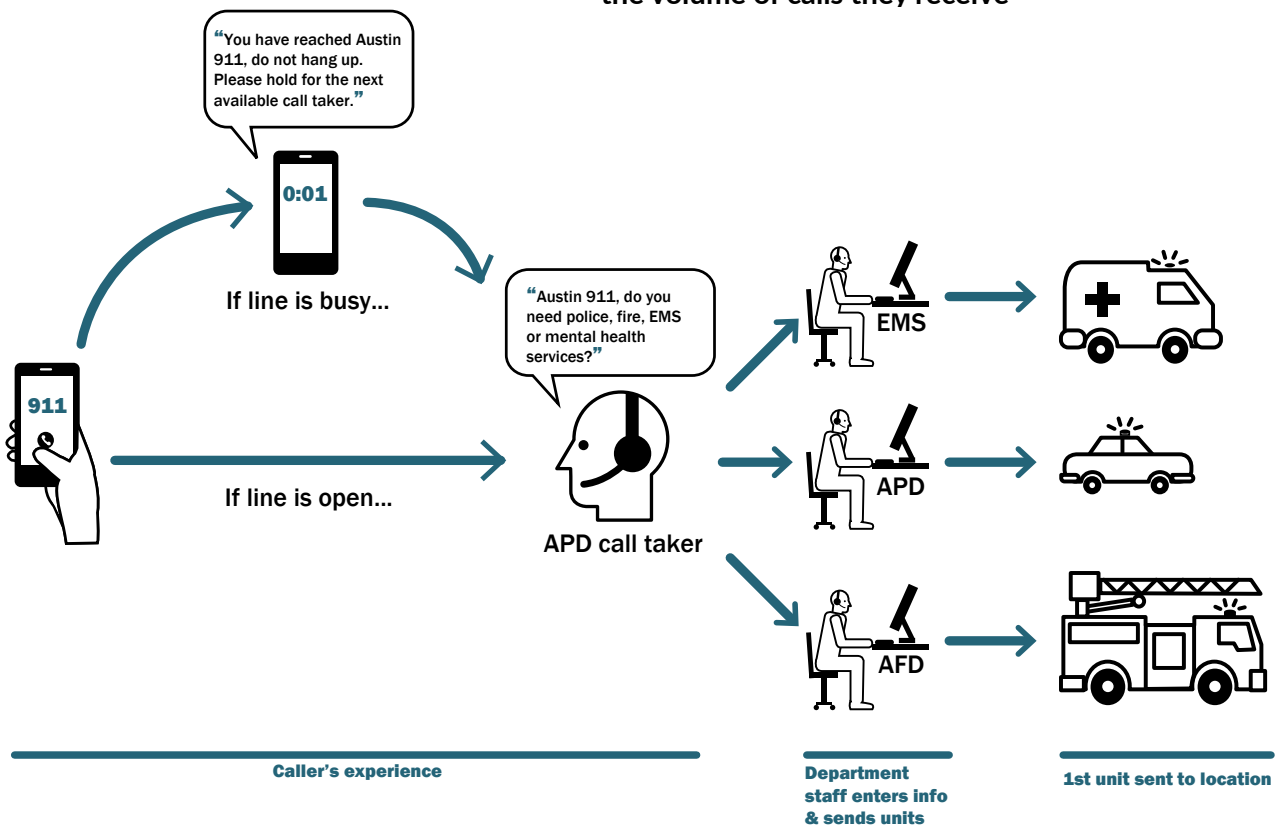
SOURCE: OCA analysis of Emergency Call Tracking System (ECaTS) data between Oct. 1, 2021 and Sept. 30, 2023.

Question 2

What actions does Austin currently have in place to respond to bulk arrival events to meet high demand?

APD's call taking and dispatch process is the same regardless of the volume of calls they receive. When someone calls 911, a call taker answers or, if the line is busy, the caller will hear a recording asking them to hold. If the caller hangs up, an APD call taker calls them back. Once the call taker answers, they get information from the caller. The call taker then transfers the caller to the appropriate public safety agency.

Exhibit 4: APD's call taking and dispatch process is the same regardless of the volume of calls they receive



SOURCE: Updated diagram of dispatch process from OCA's 2020 911 Operations audit.

Calls are processed in the order in which they are received regardless of call volume. APD call takers also call back each person who dialed 911 but hung up before speaking with a call taker. APD schedules additional call taking staff for days or events when they predict call volumes will be higher. APD can use voluntary or mandatory overtime for unscheduled periods of high demand.

At the time of this special request, APD had 104 call takers and 75 dispatchers budgeted. However, APD has numerous call center vacancies. APD's past standards called for a minimum of 14 employees on duty for call taking. These standards were lowered to a minimum of six employees on duty to reduce overtime and staff burnout.

A tool known as the Erlang calculator estimates the number of call takers a call center needs to attain a certain level of service. The estimate is based on call volume, call duration, desired level of service, and other factors. APD uses this calculator to determine staffing in two-hour blocks. The Erlang calculator suggests a range of 6 to 12 staff per hour depending on the average number of calls for an hour and day of the week. APD adds additional staff including teletype operators and non-emergency call takers to the base number suggested by the Erlang calculator, and so they have sufficient staffing to provide adequate breaks. This results in a range of 12 to 19 staff required per two-hour shift. Shifts are now staffed with between 22 and 25 call takers depending on the time of day.

Question 3

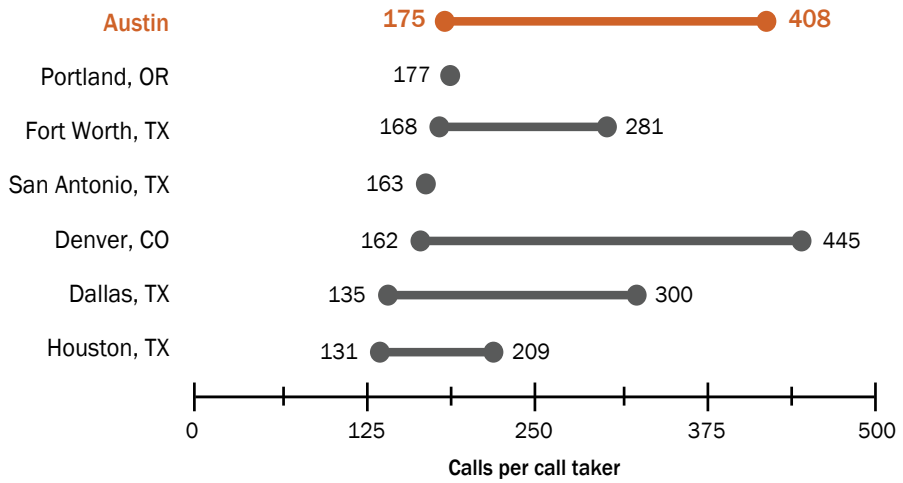
What actions do other cities and emergency communication centers use to scale operations and adjust capacity to meet high demand?

We compared Austin's 911 operations to those in Houston, Dallas, San Antonio, Fort Worth, Denver, and Portland. Like Austin, most of the other cities we contacted did not have a defined threshold for high demand. Dallas was the exception: Dallas defines high demand as 200 or more calls in a 15-minute period.

Each city had a different number of authorized staff, staff per shift, and average call volume. We compared the average number of calls per day to the lowest and highest number of call takers assigned to a shift to account for these differences.[3] Austin's call center has some of the greatest variability in the number of calls per call taker. When 6 call takers are assigned to a shift, Austin has the second highest number of calls per call taker, 408 calls per call taker, second only to Denver's 445 calls per call taker. When Austin's call center has 14 call takers on a shift, Austin still has the second-highest number of calls per call taker, but is closer to the majority of comparable cities we looked at.

[3] Calls fluctuate hour-by-hour and day-to-day, which means an average number of calls may be skewed by both low and high call volume days. Similarly, when we looked at specific days with high call volumes, those high call volumes were concentrated within only a part of the day.

Exhibit 5: Calls per call taker depends on the number of call takers assigned to a shift. Austin has the second widest range in average calls per call taker and the second highest calls per call taker*



SOURCE: OCA analysis of comparable cities' staff to call volume ratio. *Portland and San Antonio provided us with single numbers for staffing.

Each of the cities we looked at had at least one strategy to address high demand call volumes. All use overtime or reassign staff to take calls when demand is high. Almost half of the cities (43%) instruct call takers to shorten their standard line of questioning. Additionally, Portland transfers some less severe EMS calls to an external agency.

Exhibit 6: Cities' strategies for addressing high call volumes

Strategy	Austin	Houston	San Antonio	Dallas	Fort Worth	Denver	Portland
Implement voluntary or mandatory overtime or reassign additional staff for high demand events	✓	✓	✓	✓	✓	✓	✓
Use abridged call taking script	✗	✗	✗	✓	✗	✓	✓
Transfer non-emergency calls to third party outside of agency	✗	✗	✗	✗	✗	✗	✓

Source: OCA analysis of comparable cities' strategies for high call volumes.

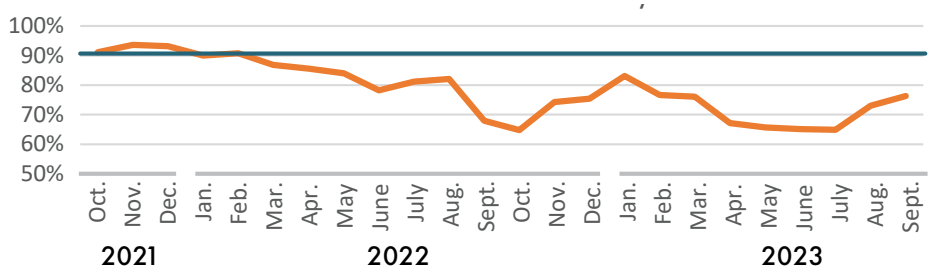
We also found cities are starting to use artificial intelligence (AI) to address high demand call volumes. Austin uses AI for non-emergency calls as part of its iReport system. Portland recently began to use AI in 2023 to assist with non-emergency calls. Denver is in the process of contracting AI technology for use during high demand call events and hopes to have AI technology implemented by 2025. Denver is looking at using AI to geotag an area with a known incident and create a voice message for any 911 callers within the vicinity to let them know police are aware of the issue. This could reduce the number of calls about the same incident handled by call takers.

Question 4

How do bulk arrival or high demand events impact wait times for callers?

People generally wait longer for their calls to be answered as call volumes increase. However, an increase in call volume did not always result in an increase in wait times. Lower call volumes did not ensure faster answering times. The percentage of calls answered in 15 seconds or less dropped from a high of over 93% in November 2021 to an average of about 77% in 2022 and 2023.

Exhibit 7: APD has been below their goal of 90% of calls answered in 15 seconds or less since February 2022



SOURCE: OCA analysis of ECaTS data between Oct. 1, 2021 and Sept. 30, 2023.

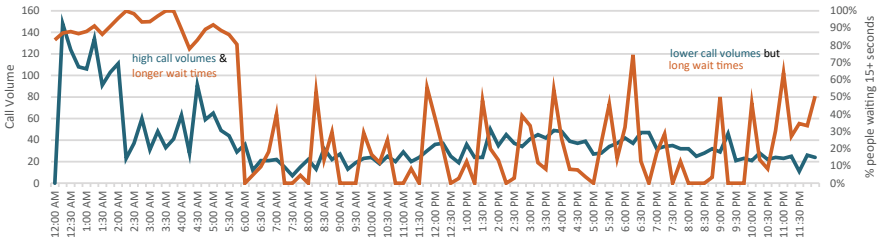
Longer wait times mean callers wait longer to reach a call taker, which adds time to the initial part of the dispatch process. Callers on hold may hang up completely or hang up and redial 911 to try to get ahead in the queue. As call volumes increased, so did the percentage of calls where people hung up before their call was answered.

Our office looked at the four days from Oct. 2021 through Sept. 2023 with the highest volume of calls. Call volumes were not uniformly high throughout the day. Call volume and answering times were not completely correlated. Wait times periodically spiked on all four days, sometimes without a corresponding increase in call volume.

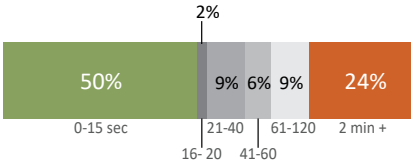
Exhibit 8: A sample of high-volume days show wait times do not always correspond to call volume

January 1, 2023

Calls were concentrated between 12 AM and 6 AM but **wait times** spiked throughout the day.



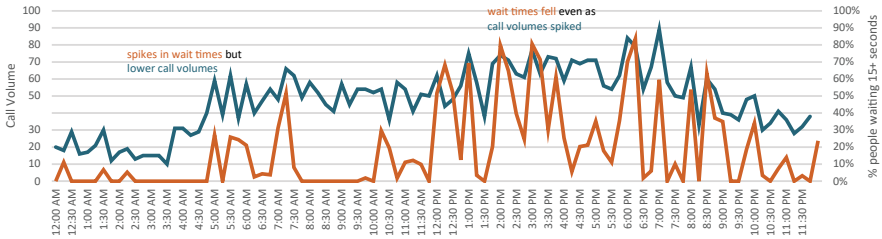
Half of calls were answered within **15 seconds**, but almost a quarter of callers waited **2 minutes or longer**.



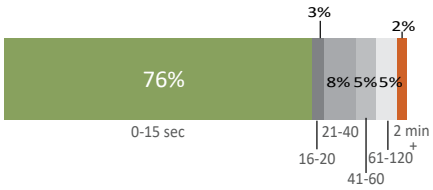
Calls were concentrated in the early hours of the morning. Answering times were slower during this peak but improved as call volumes dropped later in the morning. However, wait times spiked throughout the rest of the day even as call volumes remained lower. Overall, most calls were answered promptly. Half of calls were answered within 15 seconds. However, almost a quarter of callers waited two minutes or longer.

February 1, 2023

Longer **wait times** mostly matched increases in **call volumes**.



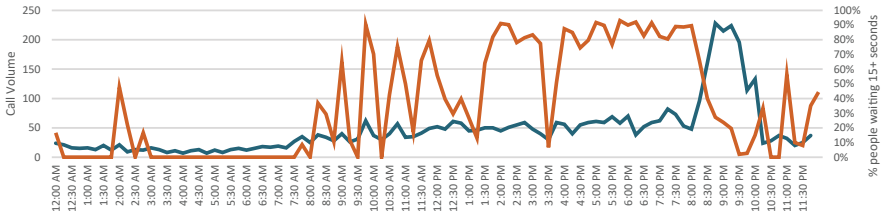
Over 3/4 of calls were answered within **15 seconds**.



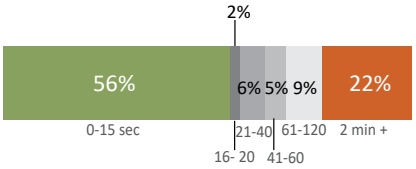
Slower answer times generally corresponded with increases in call volumes. Sometimes, however, answer times were faster even as call volumes remained higher.

April 20, 2023

Calls were concentrated between 8 and 10 PM but **wait times** spiked throughout the day and increased before the peak call volume.



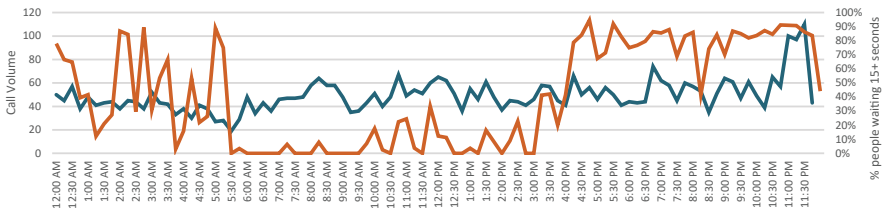
Over half of calls were answered within **15 seconds**, but almost a quarter of callers waited **2 minutes or longer**.



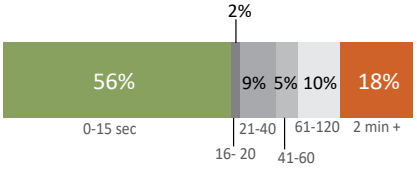
Some slowdowns in answering times were not associated with corresponding increases in call volumes: While call volumes gradually increased throughout the day until a large increase in the evening, answering times fluctuated considerably. Answering times improved even as call volumes peaked.

June 17, 2023

Calls peaked between 11-11:30 PM but **wait times** were longer between midnight and 5:30 AM and 4 PM and midnight.



Over half of calls were answered within **15 seconds**, but almost a quarter of callers waited **2 minutes or longer**.



Answering times spiked several times in the early morning and dropped in the afternoon before the peak in call volumes, even as call volumes stayed relatively flat.

SOURCE: OCA analysis of ECaTS data between Oct. 1, 2021 and Sept. 30, 2023.

Why We Did This Report

This report responds to a request from Council Members Alison Alter and Vanessa Fuentes regarding handling of 911 calls during high demand.

Scope

This special request included Emergency Call Tracking System (ECaTS) data from October 1, 2021, through September 30, 2023.

Methodology

To complete this special request, we performed the following steps:

- interviewed APD staff
- reviewed the APD policies and procedures for call taking and dispatch
- reviewed national standards from the National Emergency Number Association (NENA)
- analyzed data 911 call data from APD's Emergency Call Tracking System (ECaTS)
- selected a judgmental sample of the four highest call volume days within the scope date range and analyzed call volumes and wait times. This sample cannot be projected to the entire population of days within our scope
- researched and interviewed comparable cities about their 911 call center data and processes

Project Type

Special request projects conducted by the Office of the City Auditor are considered non-audit projects under Government Auditing Standards and are conducted in accordance with the ethics and general standards (Chapters 1-3).

The Office of the City Auditor was created by the Austin City Charter as an independent office reporting to City Council to help establish accountability and improve City services. Special requests are designed to answer specific questions to assist Council in decision-making. We do not draw conclusions or make recommendations in these reports.

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