



How Cities Are Leveraging Technology to Meet Residents' Needs during a Pandemic

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Cities across the US moved quickly in response to COVID-19 to transition their employees to remote work, move services online, provide virtual opportunities for resident engagement, and use conferencing technology, social media, and web platforms to deliver critical information to their residents. But the pandemic also laid bare the reality that access to the technology requisite to take advantage of these shifts is not shared equitably among residents. To better understand how US cities used technology-based services and platforms to address equity gaps and meet the needs of residents and employees during the pandemic, the Urban Institute surveyed city technology and innovation personnel across the country. This brief presents the findings of that survey and presents examples for all cities striving to innovate equitably.

Why Is Equity a Concern Now?

As municipalities issued shelter-in-place orders to slow the spread of COVID-19, numerous dimensions of daily life for residents moved online. Many employers shifted to teleworking, schools moved classes online, and cities relied on websites and livestreams to disseminate critical information about COVID-19. Yet many residents lack the internet access, connected devices, and digital literacy to fully participate in online work, education, and civic life. In 221 large and medium-sized US cities, at least 30 percent of all households still lacked a wireline broadband connection (e.g., cable, fiber optic, or DSL) in 2018.¹ In 92 cities, at least one in five households had no broadband internet of any type, including cellular data plans. This digital divide is highest among low-income households² and disproportionately affects people of color³—even when accounting for differences in income, education, and employment.

The COVID-19 pandemic has further raised the stakes of the digital divide. According to a city official in Los Angeles, “one of the tragedies around COVID is that digital inequities and the digital divide [could lead] to higher rates of death.” Residents without internet may not receive critical COVID-19 information from the city or may be unable to telework,⁴ and they will either continue reporting to work in person, increasing their risk of contracting COVID-19, or lose their job. The nearly one in five teens who sometimes or often could not finish their homework before COVID-19 because they didn’t have internet or computer access at home now may be wholly unable to attend online school.⁵

The digital divide is just one example of how the COVID-19 pandemic is exacerbating existing inequities. Representatives from city technology offices worry about those outcomes. A survey respondent noted that “small businesses without an online presence are most often in low-income communities, and these same businesses are the ones struggling the most to adapt.” As cities rapidly scale up efforts to expand internet access and meet the needs of their residents online, equity needs to be at the center of decisionmaking.

In this brief, we focus on how cities are leveraging technology to advance procedural and distributional equity for residents—defined as a condition in which all residents can be represented in the process to develop programs and policies, and those programs and policies result in fair distributions of benefits and burdens across all segments of a community, prioritizing those with highest need.⁶

Methodology

Data Collection

To develop the survey questionnaire, the research team scanned the literature and talked with Urban data science and technology experts to assemble a list of examples from cities and develop the content of the survey. As part of this research, the team conducted six phone consultations in April 2020 with people working in city technology offices to gather insights about proposed survey topics and questions and refine the survey instrument. The research team consulted with representatives from Aurora (Illinois), Los Angeles, New Orleans, Philadelphia, and San Jose, in addition to the National Association of State Chief Information Officers.

The survey was fielded to a convenience sample of 52 city chief technology officers, chief information officers, chief innovation officers, and digital inclusion leads. The list was generated by a combination of contacts from Mastercard’s [City Possible](#) network and Urban researchers’ networks. The survey was also posted to Harvard’s [City Innovators Forum](#), which includes another set of city technology officers and innovation leaders.

We fielded the survey online from May 7, 2020, to May 20, 2020. Several rounds of reminders were sent to nonrespondents while the survey was fielded. We included in the analysis all surveys where respondents answered more than one substantive question. Based on this criterion, 14 of 52 chief technology officers, chief information officers, chief innovation officers, and digital inclusion leads

participated in the survey, yielding an overall response rate of 27 percent. We had three responses from one city and two from another, so the responses reflect a total of 11 cities.

Both the use of a small convenience sample and an overall low survey response rate prevent these findings from being extrapolated to all cities. The data are further limited because not all respondents answered each question. Although the survey findings cannot and should not be generalized to the entire population of technology and innovation personnel in US cities, the analysis presented here can provide useful insights on the types of challenges cities face and the ways technology staff are addressing these concerns. Such findings can motivate further discussion and indicate opportunities for further research.

Data Analysis

The survey questions cover six thematic areas: new or expanded online services, broadband use, community engagement strategies, procurement and security policy changes, cybersecurity needs, and longevity of digital services after COVID-19. The appendix lists the research questions and how they map to the survey questions. Frequencies and descriptive statistics were produced for each survey question.

Using insights from both consultations and survey data, the project team identified challenges, levers, and strategies for city technology leaders to consider in response to the pandemic.

Findings

The survey was designed to answer the following research questions:

- What government services have been moved online or expanded as a result of the COVID-19 pandemic?
- How are cities using technology to engage their residents virtually?
- How are chief technology officers and their staff leveraging new authorities in this time to increase services for their residents?
- How are the people working in city technology offices considering the needs of their city's most vulnerable residents during this time?

1. Internet Access Has Been Expanded, but the Digital Divide Is More Consequential Than Ever

While city representatives reported that the digital divide, specifically residents' access to broadband, was a priority before COVID-19, they noted that the pandemic either made the magnitude of the issue clearer, or expedited solutions, or both. As one technology official from Aurora, reflected, "internet isn't a luxury any more, it's a necessity." City personnel and their partners have accelerated efforts to improve access along multiple dimensions of digital inclusion:

- Nine of 12 respondents indicated that services such as **low-cost or free internet** for residents had expanded since COVID-19.
- Eleven of 12 respondents said that their city was able to provide **expanded access to connected devices** (smartphones, computers, tablets) in response to COVID-19.
- Nine of 10 respondents said that **digital literacy training** had been expanded for their residents since COVID-19.

For many cities, these expanded digital inclusion efforts represent an acceleration of programs and objectives that predated COVID-19. Only 1 respondent indicated that the programs were new since COVID-19, while 8 of 14 respondents indicated that their department had catalyzed existing efforts or plans to expand broadband faster in response to COVID-19.

We partnered with our local internet service providers to provide free home internet to new customers, we assisted our local school district/colleges in negotiating and acquiring mobile hotspots to help students get online. – Survey respondent

While respondents were largely aligned in expanding digital inclusion efforts in response to COVID-19, they indicated significant diversity in the approaches their cities are taking to increase internet access for residents. When asked about the various approaches shown in table 1 below that cities are taking to directly (or in partnership with private or nonprofit actors) expand broadband access, responses were fairly evenly split. Notably, for the options that involve expanding the availability of internet to new geographies or households (expanding broadband access by geography, increasing mobile hotspots, increasing public Wi-Fi hotspots), most respondents indicated no change since COVID-19. This result, combined with the finding above that 9 of 12 survey respondents reported that services such as low-cost or free internet had expanded in response to COVID-19, may suggest that residents who already had access have increased lower-cost options, but that people living in “unconnected” areas still haven’t been served.

The most common new approach since COVID-19 is producing aggregated information resources on available Wi-Fi across the city (7 of 12 respondents). Los Angeles launched getconnectedlosangeles.lacity.org, a website that consolidates information on low-cost or free internet services and options to buy computers and tablets for as low as \$100. Residents can enter their address and identify the low-cost internet and device services available in their neighborhood.

The survey data point to the varied approaches cities are taking to expand broadband access as quickly as possible. Several cities included in this research, including Philadelphia, New Orleans, San Jose, and Los Angeles, partnered with school districts to rapidly disseminate thousands of hotspots and

connected devices to students in the early weeks of the pandemic. Respondents mentioned the [1Million Project Foundation](#), which aims to give 1 million students devices and free high-speed Wi-Fi, as a key partner in this effort. City representatives also reported aggregating information on public Wi-Fi networks that can be used safely from parked cars, and Philadelphia opened an emergency grant funding window through its [Digital Literacy Alliance](#).

TABLE 1
Changes to Broadband Services since the COVID-19 Pandemic

Change	New	Unchanged	Don't know	Not applicable	Total responses
Expanded broadband access by geography (e.g., new neighborhoods)	3	7	2	0	12
Improved the upload and download speed of broadband connections	5	4	2	0	11
Lowered the price of internet	6	5	1	0	12
Increased quantity of mobile hotspots available to residents	4	8	1	0	13
Increased quantity of free public Wi-Fi hotspots	5	8	1	0	14
Aggregated information resources on available Wi-Fi across the city	7	4	1	0	12

Source: Urban Institute CTO survey, 2020.

City representatives acknowledged the key role of local and national internet service providers (ISPs) in closing the gap. New Orleans' local cable company offered free installation of home services, and many national ISPs have offered discounted services. In some cases, cities were able to leverage relationships with ISPs to go even further, like Los Angeles working with Verizon, AT&T, T-Mobile, and Comcast to provide free Wi-Fi for educators, health care workers, and K-12 students.

2. Cities Are Using New Tools to Reach Residents, and They Are Reaching More Residents Than Ever Before

In light of the coronavirus pandemic, cities are thinking about new ways to connect with their residents. With in-person meetings banned or extremely limited because of social distancing requirements, cities have been shifting to digital platforms. Live-streaming meetings on conference platforms like Zoom or GotoWebinar, social media engagement on pages like Facebook and Twitter, and increased programming on community access television are just some of the mediums cities are using.

Our survey showed that cities are using new tools to reach their residents. All 14 respondents who completed our survey stated that they agreed or strongly agreed that they were using different tools to reach out to residents. Cities are also expanding services to reach residents. Nine of 10 respondents indicated that services such as streaming city council or other government meetings, as well as digital

literacy training for residents, had expanded since COVID-19. In addition, 10 of 14 respondents agreed or strongly agreed that a higher volume of residents was using the services provided by cities.

According to respondents, the most popular tool with residents has been videoconferencing; 12 of 14 participants mentioned that their residents were using videoconferencing (Zoom, GoToWebinar, etc.) considerably more since COVID-19. In Aurora, the first virtual city council meeting in March 2020 had roughly 2,000 virtual attendees and another 9,000 viewers that logged in for part of the meeting. The total number of participants was over 220 times higher than what the city typically observed at in-person meetings (usually around 50 participants). Los Angeles holds a nightly press conference where Mayor Eric Garcetti updates residents on the coronavirus pandemic. These press conferences are carried by local television providers and then posted on YouTube for others to see later.

City staff are also employing social media sentiment analysis software, which scans social media platform content, to geolocate resident feelings and help design a methodological approach for fighting misinformation. Twelve of the 14 survey respondents stated that their residents had somewhat or considerably more social media engagement since COVID-19. The software that cities are using for combating misinformation is also being used to deploy services where they are most needed. Aurora used software to locate where remote learning was a concern in specific underserved communities. In response, it is looking into developing and subsidizing a STEM summer camp or e-learning platform targeted to those communities.

Although these tools are expanding access to city services and leadership, many concerns remain. Members from low-income and other marginalized communities could be left out of engagement because of the digital divide and other obstacles such as irregular work hours and language barriers. City personnel are also unsure of how to determine if their increased online engagement is reaching a diverse representation; they had some preliminary concerns about opt-in “complaint-based” systems overrepresenting higher-income populations. Cities need better data on who is being reached to understand how to effectively reach these groups.

3. Cities Are Aggregating Information in Real Time and Moving Services Online

Throughout the pandemic, cities’ abilities to manage their online platforms has directly affected their ability to deliver critical information to their residents. Of all possible online services, 11 of 14 survey respondents (79 percent) indicated that COVID-19 informational pages were one of the two highest in-demand technology-based city services (table 2).

Though aggregated information on the health impacts of the pandemic was reported to be in highest demand, survey respondents also indicated that information about safety net programs was highly sought after. This sentiment was echoed in our phone consultations, where representatives noted the high demand for information about unemployment insurance.

TABLE 2

Technology Services in Highest Demand since the COVID-19 Pandemic

Most sought-after technology-based city services among city residents (respondents selected top two, by call or website request volume)

Technology-based city services	Frequency	Share of respondents
COVID-19 informational web pages	11	79%
Small business loans information (web-based services)	4	29%
Unemployment benefits or services (hotline or web-based services)	3	21%
Food assistance (hotline or web-based services)	3	21%
311 reporting (hotline or web-based entries)	2	14%
Building permits or inspections (web-based or virtual)	2	14%
Transportation information (web or app-based)	1	7%
Job listings (web-based)	1	7%
Eviction help (hotline or web-based entries)	0	0%
Vital documents	0	0%
Other	0	0%

Source: Urban Institute CTO survey, 2020.

Finally, in addition to providing information via online platforms, city staff reported moving certain services online for the first time. Nine of 13 survey respondents indicated that services such as web-based applications had expanded since COVID-19. One example of this is the onset of virtual inspections for building permitting: two survey respondents indicated that web-based and virtual building permits or inspections were one of their two most-used technology-based city services.

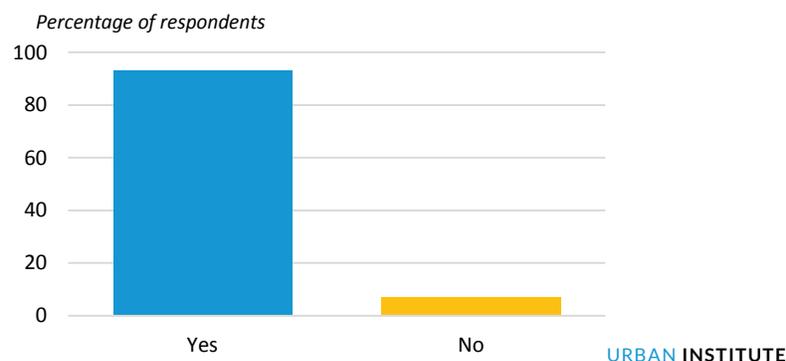
4. Cities Are Leveraging Relationships and Authorities to Deliver Services Faster

Most survey respondents (13 of 14) indicated that it has been necessary to obtain new legal, administrative, or procurement authority—from the city, state, or federal government—to respond effectively to the crisis (figure 1).

FIGURE 1

City Technology Staff Leveraging New Authorities during the COVID-19 Pandemic

Need to obtain new legal, administrative, or procurement authority to respond effectively to the crisis



Source: Urban Institute CTO survey, 2020.

Specifically, respondents highlighted that their ability to respond to the crisis was expanded through more flexible procurement authorities, which came from declarations of emergency by the state and local agency or by an emergency clause in municipal code. These expanded authorities allowed city staff to purchase equipment like Chromebooks and laptops for students, software like document e-verification tools, and in some cases even deliver cash to residents. One respondent shared their experience: “The city of Austin Equity Office partnered with the Family Independence Initiative to give direct assistance to families and allowed them to best decide how to spend the money. It was a major process to convince Legal this was allowable. We did obtain special procurement authority, whereby we could distribute the funds first, and obtain Council ratification after the fact.”

Some of the fastest and most tangible procurement successes were aimed at getting devices in students’ hands as they transitioned to remote learning. At the beginning of the pandemic, as many as 33 percent of Los Angeles Unified School District (LAUSD) students did not have a personal computer or internet at home. But in March, the LAUSD board approved an emergency declaration, which allowed officials to begin purchasing devices. As a result, as of early May, 96 percent of LAUSD elementary students had both a laptop and internet access.⁷

What Do Cities Still Need?

Though local governments have moved nimbly to move both their staffs and residents online, barriers to delivering access to all residents remain.

Localized Data

Access to accurate data is important for cities to understand how to make decisions that will benefit their residents. Administrative data sources like the American Community Survey from the US Census and the [Form 477](#) data from the Federal Communications Commission provide some information on employment, travel patterns, broadband availability, and digital inclusion down to the block level. Some cities are also able to field resident surveys that ask about digital inclusion. But because such surveys are expensive and take time to implement (so can be unhelpful in rapidly changing times), cities need more real-time localized data on the needs of their residents and their ability to access city services.

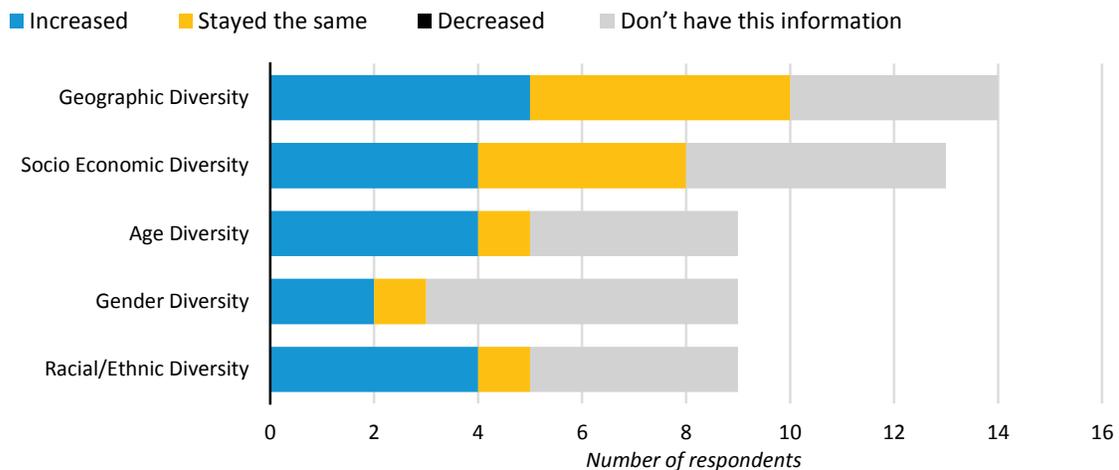
Most cities don't have the platforms set up but there's a need for more localized data.

—City chief information officer

Without the local data, it is difficult to make a decision based on evidence. This concern was consistent among the city personnel we surveyed. Though the majority of our respondents indicated

that the composition of the residents that they were engaging with had changed since COVID-19, most also reported that did not have enough information to know whether this was based on socioeconomic diversity or gender diversity (figure 2). Interestingly, 5 of the 9 respondents stated that that they did have information about racial/ethnic diversity, age diversity, and geographic diversity of residents engaging with city technology offices since COVID-19.

FIGURE 2
Demographics of Residents Engaging with City Technology Offices since COVID-19
Observed change in composition of engaged residents



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Source: Urban Institute CTO survey 2020.

The fact that cities had some information about diversity by race, gender, age, income, and geography but were unsure of how to interpret that data, speaks to the concern that the data are incomplete and/or the ability to interpret the data is inadequate. Cities could look to bring on more staff to help collect the needed data and interpret it to help with better decisionmaking. However, given that budgets are being slashed in many cities as a result of the coronavirus, few cities will likely be able to bring on new talent in the short term.

Increased Broadband Infrastructure for the Long Term

Though cities reported that low-cost or free internet had been increased for residents, and access to devices was increased, cities face challenges in getting residents online. As shown above, 7 of 12 respondents indicated that broadband access by geography remained unchanged since COVID-19, and 8 of 14 respondents indicated that the quantity of free public Wi-Fi hotspots had remained unchanged (figure 2). Survey respondents expressed concern that providing hotspots and discounted internet will be insufficient to close the digital divide, with the looming deadline of a new virtual school year starting in the fall. One technology official from Philadelphia noted that the programs offered by private ISPs

“are all about getting things at a reduced cost or deferring bills rather than providing free access, which is really what’s needed.”

Some cities are exploring how to expand their broadband networks as a long-term solution. “If you build the network, you give people opportunities for years, versus a hotspot which helps someone for a few months,” shared one official from San Jose. Aurora is leveraging its \$300 million, 20-year concession with Smart City Capital, Nokia, and Jacobs Engineering to provide high-speed, low-cost internet to those affected by the digital divide.⁸ San Jose is taking a different approach, accelerating its partnership with East Side Union High School District to build city-operated networks that are free for students and families in the district’s attendance areas.⁹ New Orleans is exploring a public Wi-Fi pilot in five neighborhoods impacted by the digital divide. These partnerships have paved the way for much progress since March 2020, but in reality, many regulations stand in the way of these models sustaining under normal circumstances.

Greater Legal Authority

Though local governments have been able to move swiftly to purchase and distribute devices and even expand low-cost and free internet access, the quality and comprehensiveness of any local broadband infrastructure still remains largely in the hands of states and private companies, because state preemption laws in 22 states ban or restrict municipalities from launching or expanding their own public broadband networks.¹⁰ One official from San Jose lamented how these regulations reduce cities’ options to expand internet access in response to COVID-19. “Look for the kids who are suffering the most,” they stated, “and I think it’s because we took a tool off of the table.”

This reality has implications for equity because even if cities understand where gaps in broadband access or quality are, they may lack the authority to address them. As one survey respondent noted, “We are unable to tackle the digital divide due to state preemption. Basic services like water or sewer, right now are in the hands of for-profit operators that are not incentivized to provide universal quality coverage, nor appropriate devices for productivity.”

In the era of COVID-19, many states have increased local preemption, creating a need for organizations like the Local Solutions Support Center to provide legal guidance to local governments over broadband governance. These organizations are also providing guidance on local efforts like making paid sick leave available to their workers and enacting moratoria on evictions.¹¹

When discussing digital equity, it is important to note that most of the availability of services are in the hands of the broadband providers, and regulation at the state level prevent us from taking substantial action. These issues are visible within the City's workforce creating obstacles as about 20–25 percent of city employees that need to work remotely have reported lack of connectivity as a core issue.—Survey respondent

Further, a lack of legal authority has left cities to negotiate directly with private providers, and though multiple cities highlighted the strength of these partnerships, they also noted the limitations of such a governance model. One survey respondent noted that “a lot of [our ability to provide laptops] was based on our ecosystem and our relationships, but you shouldn’t have to operate like that.” Similarly, when asked what their biggest concern was for the low-income and other underserved residents they serve, one survey respondent said, “The inability of tackling the digital divide due to state preemption.”

Conclusion

The COVID-19 pandemic has required cities to change how they engage their residents and collect data on new services; meanwhile, the effects of the stark digital divide have renewed a focus to provide broadband access. Cities have shown they can adapt to the new paradigm. Technology and innovation officers have been given more authority through the procurement and other legal processes to expand services and shift the ways they engage residents. They have been able to use new digital services to share information with residents.

But there is still a lack of local data that would help cities understand how these services are providing a benefit to underserved communities, which residents are still left out, and what needs remain. Cities are attempting to address these shortcomings, because in the short term, all residents, but especially students, employees, older people, and low-income people will continue to rely on the internet for necessary information. In the long term, any steps taken now toward equitable access to information—and any partnerships forged between ISPs, local municipalities, and residents— will contribute to a more robust civic society. Our survey has shed light on the challenges and opportunities, and it provides other cities across the country with key insights about adjusting in the time of a pandemic.

Appendix. Survey Questions

Research question	Survey question(s)
1. <i>What government services have been moved online or expanded as a result of COVID-19?</i>	
a. What technology-based city services have been in the highest demand among your city's residents (by call or website request volume) as you respond to COVID-19? Please select the top two?	Q1
b. Have you introduced or expanded any of these technology-based services in response to the COVID-19 crisis?	Q2
c. Which, if any, of the following changes have you made to city-provided broadband services or worked with private or non-profit providers to accomplish?	Q4
2. <i>How are chief technology officers and their staff utilizing technology to engage the community?</i>	
a. Which statements best describe your work on broadband access in response to COVID-19? (please select all that apply)	Q5
b. To the best of your knowledge, please assess the change in use (by your residents) for the following tools for engagement as a result of COVID-19.	Q7
c. To learn more about how the COVID-19 crisis changed how cities engage with their residents, for each category please select the statement that best describes your city's current stage of engagement with the community. If you are unsure of where you fall on this continuum, please select "not sure"	Q8
3. <i>How are chief technology officers and their staff leveraging new authorities at this time to increase services for their residents?</i>	
a. Has it been necessary to obtain new legal, administrative, or procurement authority—either from the city, state or federal government— in order to respond effectively to the crisis? (e.g. expediting procurement timelines, increased negotiating power with private companies) If it has been necessary to obtain new legal, administrative, or procurement authority—either from the city, state or federal government— in order to respond effectively to the crisis, please explain.	Q12-Q13
4. <i>How are individuals who work in city technology offices considering the needs of their city's most vulnerable residents during this time?</i>	
a. As you determine how to expand or introduce services, what issues of equity (for example, disparities across race, income, or age) are you considering and what tools or data, if any, are you leveraging to help you make decisions (for example mapping based on income levels or sentiment analysis, or FCC data on broadband availability)?	Q3
b. What partnerships with the private or public sector or other government agencies (e.g., school districts) have been the most impactful in increasing broadband access? (please list the top 2-3 partnerships or initiatives)	Q6
c. Has the composition of residents you are engaging changed since COVID-19? If yes, which of the following demographic changes (among those residents with whom you are engaging) most closely aligns with your observations?	Q9-Q10
d. Are there any other details that you would like to provide about how the demographics of residents you are engaging have changed since COVID-19?	Q11
e. What is your greatest concern for the low-income and other underserved residents you serve?	Q17
<i>Other questions</i>	
a. Cybersecurity: How would you rate your current level of confidence when it comes to protecting the city against a potential cyber-attack? What are the top three concerns you have regarding cybersecurity?	Q14-Q15

Research question	Survey question(s)
b. Into the future: Which, if any, of the changes your department has made since the beginning of COVID-19 do you hope continue beyond the crisis? Are there any upcoming challenges for which it would be helpful to know what other cities are doing? (e.g., budget decisions or how to leverage expanded services)	Q16

Notes

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