
CINCINNATI POLICE DEPARTMENT: PRICE HILL SHOTSPOTTER SURVEY EVALUATION REPORT

INTRODUCTION

This report outlines the results of surveys assessing citizens' views of the Cincinnati Police Department (CPD) and its response to shootings in Cincinnati's Price Hill neighborhood before and after the implementation of ShotSpotter, an acoustic gunshot detection system.

An acoustic gunshot detection system uses sensors to detect gun fire. For ShotSpotter, the sensors listen for gunshot noises. When gunshot like noises are detected, the soundwaves are analyzed and reviewed by technicians at ShotSpotter's headquarters who determine if the sound was a gunshot or something else, such as fireworks. If the noise is determined to be a gunshot, then police are dispatched to the scene. The precise shooting scene is located by triangulating gunshot sounds across sensors. The time from gunshot to dispatch is roughly 60 seconds.¹

ShotSpotter allows police to quickly respond to gunfire incidents, even if residents do not call 911, with the goal of making an arrest at the scene. Research suggests roughly 88% of gunshots recorded by ShotSpotter are not reported to the police by residents.²

It follows that implementing ShotSpotter may improve residents' perceptions of CPD and its response to shootings because police are now responding to all gunfire incidents. This report assesses if that was the case when ShotSpotter was implemented in Cincinnati's Price Hill neighborhood in July 2019.

SURVEY ADMINISTRATION

To assess the impact of ShotSpotter on community members' perceptions of CPD and its response to gun violence a survey was administered to Price Hill residents before and roughly 6 months after ShotSpotter was implemented in Price Hill.

Pre-Surveys (Wave 1)

Wave 1 of the surveys was collected prior to ShotSpotter being implemented in Price Hill. Surveys were collected in three ways:

1. Door-to-door from a random selection of census blocks
2. From attendees at three regularly scheduled community meetings
3. From invitations listed on CPD District Three's social media pages

To conduct the door-to-door surveys, the research team identified all U.S. census blocks with at least 10 housing units and completely within the West Price Hill, East Price Hill, and Lower Price Hill neighborhood boundaries (n = 183). Next, random sampling with replacement was used to select 12% of census blocks within each neighborhood, which resulted in the following breakdown:

¹ See: <https://www.shotspotter.com/>

² See: <https://www.brookings.edu/research/the-geography-incidence-and-underreporting-of-gun-violence-new-evidence-using-shotspotter-data/>

Neighborhood	Total Census Blocks	Sampled Census Blocks
West Price Hill	108	12
East Price Hill	64	7
Lower Price Hill	11	1
Total	183	20

Next, the 174 street segments making up the 20 randomly sampled census blocks were identified, and became the streets where surveys were collected. A group of college student and community volunteers were recruited and trained to administer the surveys. The volunteers met on Saturday, April 6, 2019 and followed a simple process:

- A volunteer group visited each of the 20 census blocks
- Volunteers walked along each side of the street making up the census block's perimeter
- Volunteers knocked on the doors of all detached residences³
- If a resident answered, the survey was administered
- If nobody answered, a post card with a link to an online survey was left in the door



Images show volunteers collecting door-to-door surveys.

Additionally, a member of the research team attended the meetings of three community organizations active in the Price Hill ShotSpotter area:

- 1) West Price Hill Community Council Meeting on April 9, 2019
- 2) East Price Hill Improvement Association on April 15, 2019
- 3) Price Hill Civic Association on May 6, 2019

Finally, CPD's District Three advertised an online link to the survey on its social media pages (e.g. Facebook).

³ Multi-unit apartment buildings were not surveyed by the volunteers due to the difficulty of entering buildings and the time associated with knocking on multiple doors in large apartment buildings. This is a common approach in door-to-door surveys.

During wave 1, 232 surveys⁴ were collected:

- 137 from door-to-door canvassing in the randomly selected census blocks
- 56 from community meetings
- 39 surveys from respondents recruited via social media

Post-Implementation Surveys (Wave 2)

Wave 2 surveys were collected using two methods:

- A mail-based survey for all Wave 1 respondents who provided a valid mailing address
- From attendees at three regularly scheduled community meetings

First, on November 2, 2019, approximately 6 months after the Wave 1 surveys were administered, graduate student researchers first placed an envelope containing a paper survey and business return envelope in the mailbox of all 224 Wave 1 respondents who provided a valid address. Eight respondents from Wave 1 did not provide an address and did not receive a Wave 2 survey. Instructions for how to complete the survey online were also provided. On December 11, 2019, 164 surveys were mailed to any Wave 1 respondents who had not yet responded to the Wave 2 survey in an attempt to increase the number of responses. Of the 164 surveys, 18 were undeliverable because the residences were now vacant.

Second, a member of the research team collected surveys from attendees at the following community meetings:

1. West Price Hill Community Council Meeting on January 6, 2020
2. Price Hill Civic Association on January 6, 2020
3. East Price Hill Improvement Association on January 20, 2020

During Wave 2, 121 surveys⁵ were collected:

- 73 mail-based surveys from original Wave 1 respondents
- 48 surveys from community meetings

Survey Respondent Demographics

Table 1 shows the demographic characteristics of each survey wave. Recall, seventy respondents took both Wave 1 and Wave 2 surveys. Additionally, U.S. Census American Community Survey (ACS), 2018 5-year estimates data were aggregated to the ShotSpotter coverage area based on all census tracts that intersected with the area to contextualize the sample demographics within the wider area.

⁴ There were 2 incomplete surveys that were returned during Wave 1. Incomplete surveys are those that did not answer any Questions 1 – 7 or did not provide a usable address.

⁵ During Wave 2, mail-based surveys were given to only those who completed a Wave 1 survey and provided an address, but community meeting attendees completed the Wave 2 survey regardless of their participation in Wave 1. Based on address information provided in both waves, it was possible to confirm at least 70 respondents completed both Wave 1 and Wave 2 surveys.

Table 1. Sample Make-Up by Survey Wave

		Wave 1	Wave 2	ShotSpotter Area
Gender	Male	89 (38.4%)	54 (44.6%)	50.7%
	Female	141 (60.8%)	66 (54.5%)	49.3%
	Missing	2 (0.9%)	1 (0.8%)	--
Race	White	175 (75.4%)	109 (90.1%)	61.5%
	Black	47 (20.3%)	11 (9.1%)	35.2%
	Hispanic	2 (0.9%)	0 (0.0%)	7.1% ^a
	Asian	2 (0.9%)	0 (0.0%)	0.7%
	Other	2 (0.9%)	0 (0.0%)	2.6%
	Missing	4 (1.7%)	1 (0.8%)	--
Age	< 19	17 (7.3%)	0 (0.0%)	31.3%
	20 - 34	42 (18.1%)	11 (9.1%)	25.8%
	35 - 44	37 (15.9%)	8 (6.6%)	11.3%
	45 - 54	46 (19.8%)	20 (16.5%)	12.1%
	55+	90 (38.8%)	76 (62.8%)	19.6%
	Missing	0 (0.0%)	6 (5.0%)	--
Education	< High School Diploma	13 (5.6%)	4 (3.3%)	21.1%
	High School Diploma	58 (25.0%)	17 (14.0%)	32.6%
	Some College	56 (24.1%)	33 (27.3%)	27.5%
	College Degree	73 (31.5%)	40 (33.1%)	13.1%
	Graduate Degree	29 (12.5%)	26 (21.5%)	5.8%
	Missing	3 (1.3%)	1 (0.8%)	--
Employment	Full-Time	131 (56.5%)	56 (46.3%)	
	Part-Time	23 (9.9%)	13 (10.7%)	65.4% ^b
	Temporary	6 (2.6%)	0 (0.0%)	
	Retired	0 (0.0%)	21 (17.4%)	
	Unemployed	69 (29.7%)	26 (21.5%)	8.8%
	Missing	3 (1.3%)	5 (4.1%)	--
Valid N		232	121	--

^a The ACS captures Hispanic ethnicity in a separate question than race, but is shown here as if it was captured together for ease of reading. For example, it can include people identifying as Hispanic white or Hispanic black.

^b In the ACS, employment is not broken up by type; therefore, this represents the percent employed in the workforce. This does not include retired individuals or those “unemployable”.

- In both Wave1 and Wave 2, respondents were equally likely to be male and female, tended to identify as white, and were predominantly age of 55 or older. In both waves, males are slightly under-sampled and females are over-sampled compared to the ShotSpotter coverage area.
- Wave 1 respondents were slightly more racially diverse with at least some representation from the Black, Hispanic, and Asian communities. Wave 1 better approximates the racial makeup of the ShotSpotter coverage area, whereas Wave 2 over-samples white respondents and under-samples Black respondents compared to the ShotSpotter coverage area.
- Wave 1 had more representation from young respondents compared to Wave 2. Both waves over-sampled older respondents compared to the ShotSpotter coverage area.

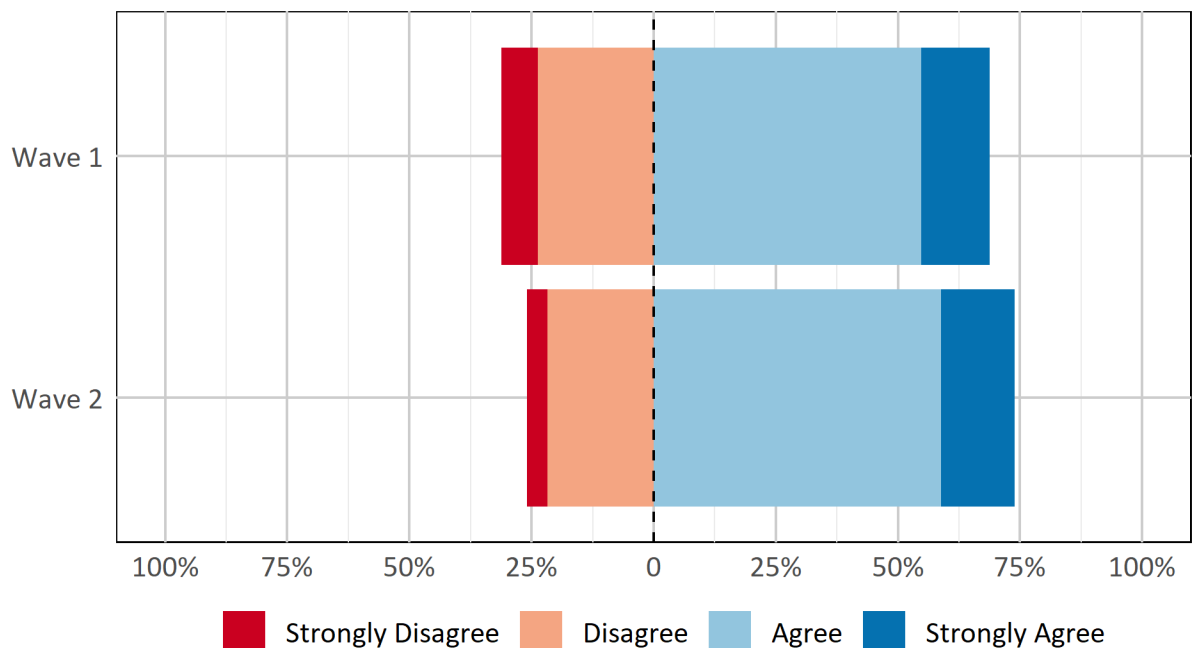
- Wave 1 and Wave 2 had similar educational backgrounds, but more educated respondents were over-sampled compared to the ShotSpotter coverage area.
- Nearly half of the respondents were employed full time and roughly 20%-30% were unemployed in both waves.

PRE-POST SHOTSPOTTER IMPLEMENTATION CHANGES IN RESIDENTS' VIEWS

Section 1. General Perceptions of the Cincinnati Police Department Performance

Section 1 of the survey asked respondents 6 questions about their views of safety, trust in CPD, general performance, and performance in relation to shootings in the Price Hill neighborhood. Respondents were asked to rate each question on a four-item scale: (1) strongly disagree, (2) disagree, (3) agree, and (4) strongly agree. Respondents also had the option to choose Refused / Don't Know. Overall, respondents' perceptions improved on all 6 of the questions asked after ShotSpotter was implemented in Price Hill. These improvements are discussed question by question below.

Question 1: I feel safe in my neighborhood.



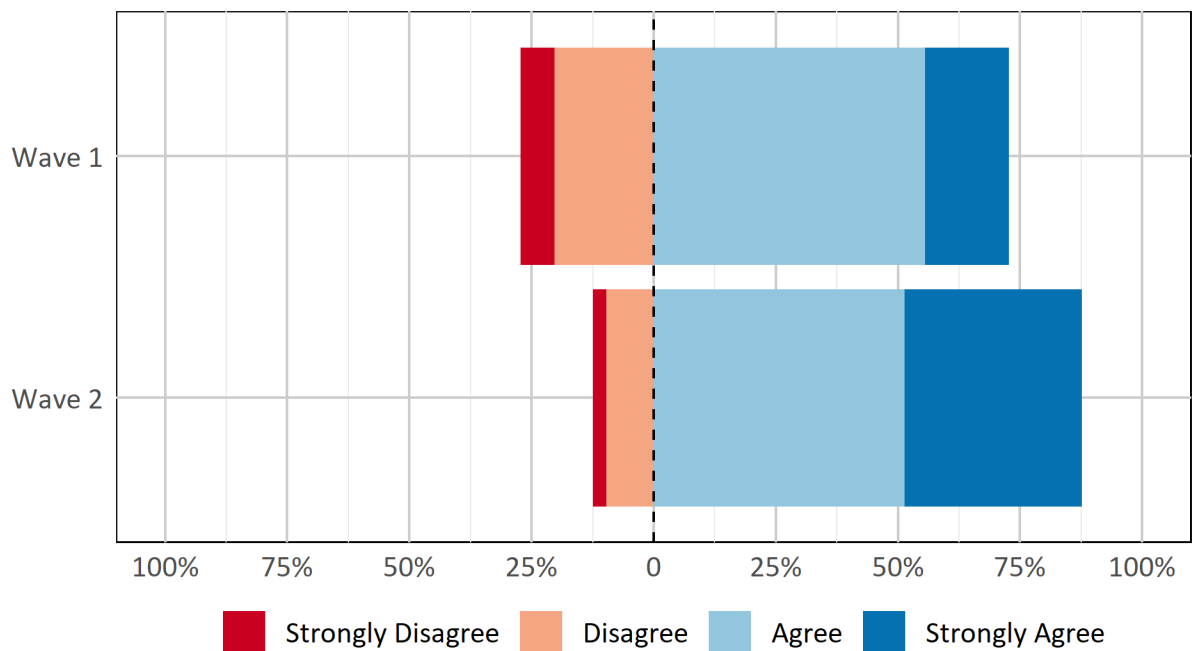
Overall, respondents reported feeling safe in their neighborhoods, and feelings of safety improved in Wave 2 compared to Wave 1. This is shown in the graph above depicting agreement and disagreement with the statement, "I feel safe in my neighborhood" among respondents by wave.

Specifically:

- In Wave 2, 73.9% of respondents reported they agree or strongly agree with the statement compared to 68.9% in Wave 1.

- Likewise, the percentage of respondents reporting they strongly disagree and disagree with the statement dropped from 31.1% in Wave 1 to 26.1% in Wave 2.
- These results are based on 228 respondents in Wave 1 and 119 respondents in Wave 2 who answered Question 1.

Question 2. I trust the Cincinnati Police Department to make decisions that are good for the people in this neighborhood.

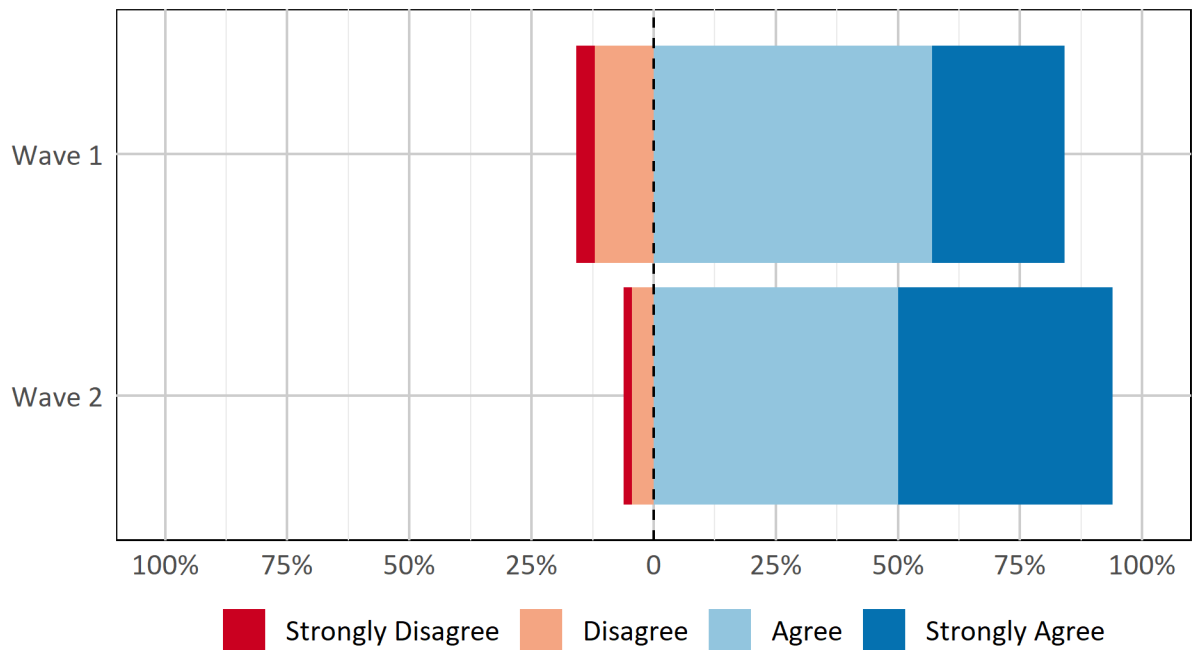


Overall, respondents also generally agreed with the statement, “I trust the Cincinnati Police Department to make decisions that are good for the people in this neighborhood”.

Specifically:

- In both waves, the bars just about reached 75% agreement.
- In Wave 2, however, those who “strongly agreed” increased from 17.2% in Wave 1 to 36.3% in Wave 2 after the implementation of ShotSpotter.
- Overall, there were also fewer respondents who strongly disagreed or disagreed with the statement in Wave 2 (12.4%) compared to Wave 1 (27.3%).
- In both Waves, there were 5 respondents in Wave 1 and 8 in Wave 2 who refused to answer or did not know how to rate their trust in CPD decision-making; leaving 227 respondents in Wave 1 and 113 respondents in Wave 2 for analysis.

Question 3. Most Cincinnati Police Department officers do their job well.

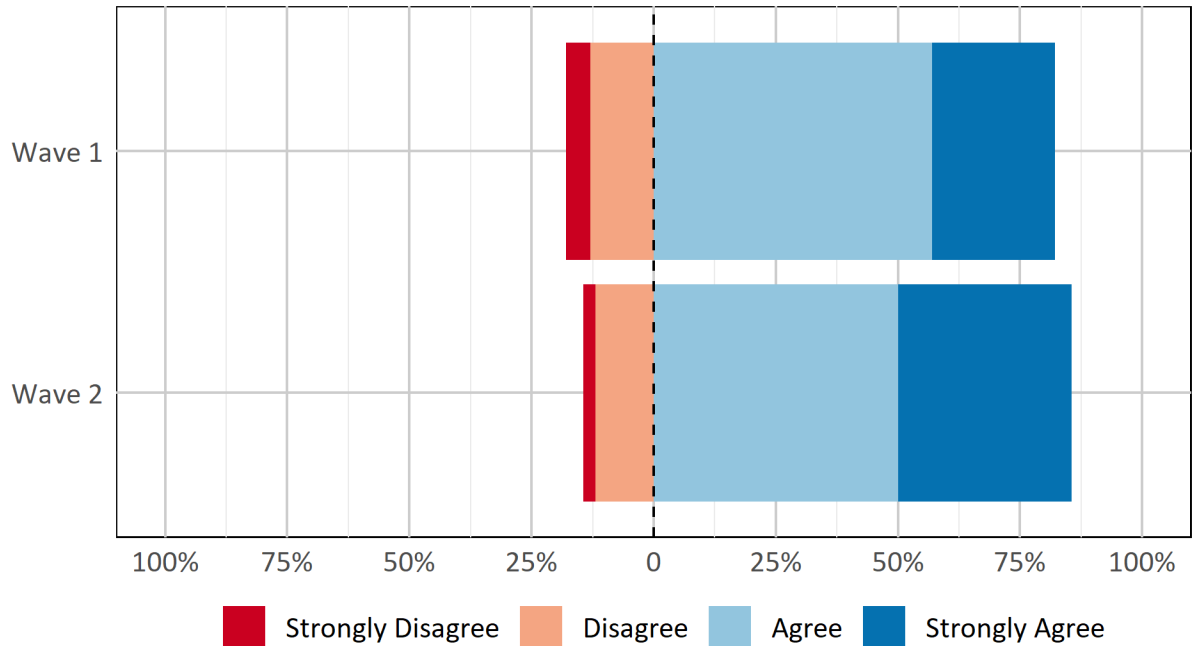


Question 3 asked respondents about their level of agreement with the statement, “Most Cincinnati Police Department officers do their job well”. Again, respondents overwhelmingly agreed with the statement.

Specifically:

- In Wave 1 about 84.1% of respondents reported “agree” or “strongly agree” with the statement, but that percentage increased to about 93.6% in Wave 2.
- In Wave 2, there were also more respondents who “strongly agreed” with the statement (43.9% in Wave 2 compared to 27.1% in Wave 1).
- Alternatively, respondents who felt negatively shrunk from 15.9% in Wave 1 to 6.1% in Wave 2.
- In Wave 1, there were 18 respondents who did not rate Question 3, leaving 214 valid responses. In Wave 2, there were 7 missing responses, leaving 114 valid respondents in Wave 2.

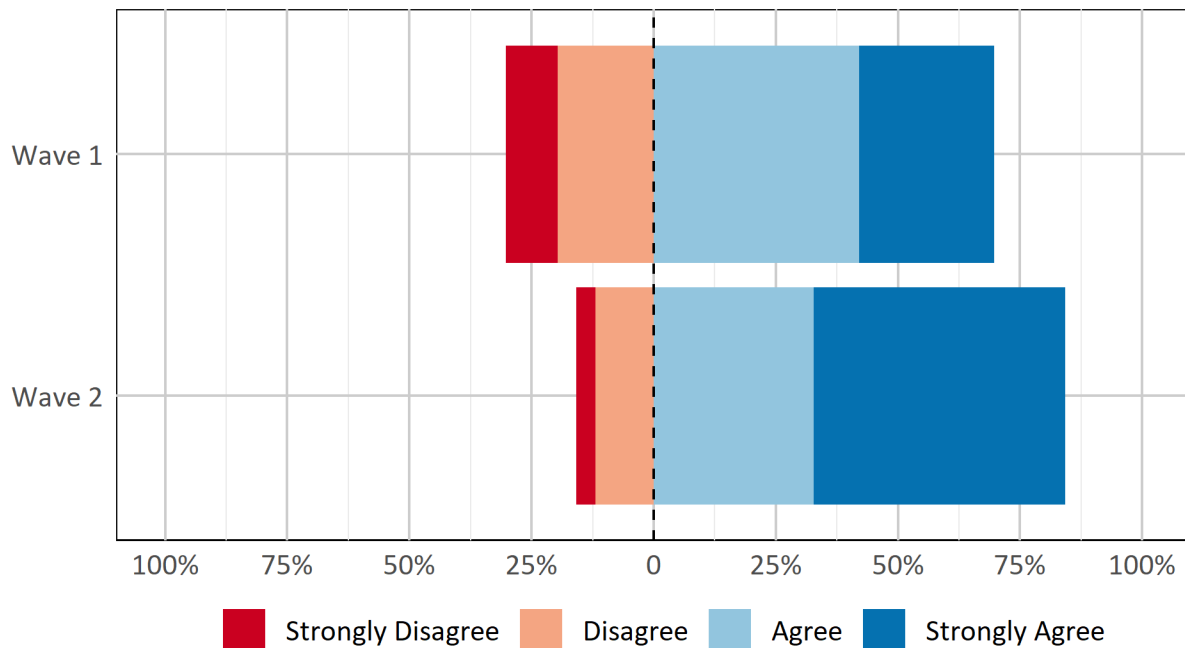
Question 4. Overall, I have confidence that the Cincinnati Police Department can do its job well.



Question 4 asked about respondents’ overall confidence in CPD to do its job well. Like past questions, respondents generally agreed with the statement, “Overall, I have confidence that the Cincinnati Police Department can do its job well.”

- There was little change in the overall percentage of respondents who agreed about having overall confidence in CPD to do its job well with 82.1% strongly agreeing/ agreeing in Wave 1 and 85.6% strongly agreeing/ agreeing in Wave 2 for an increase of about 3.5%.
- However, there were more respondents who “strongly agreed” in Wave 2 (35.6%) after ShotSpotter was implemented than in Wave 1 (25.1%).
- There were 9 respondents in Wave 1 and 3 respondents in Wave 2 who refused to answer or did not know the rating, which left 223 respondents in Wave 1 and 118 respondents in Wave 2 for the above analysis.

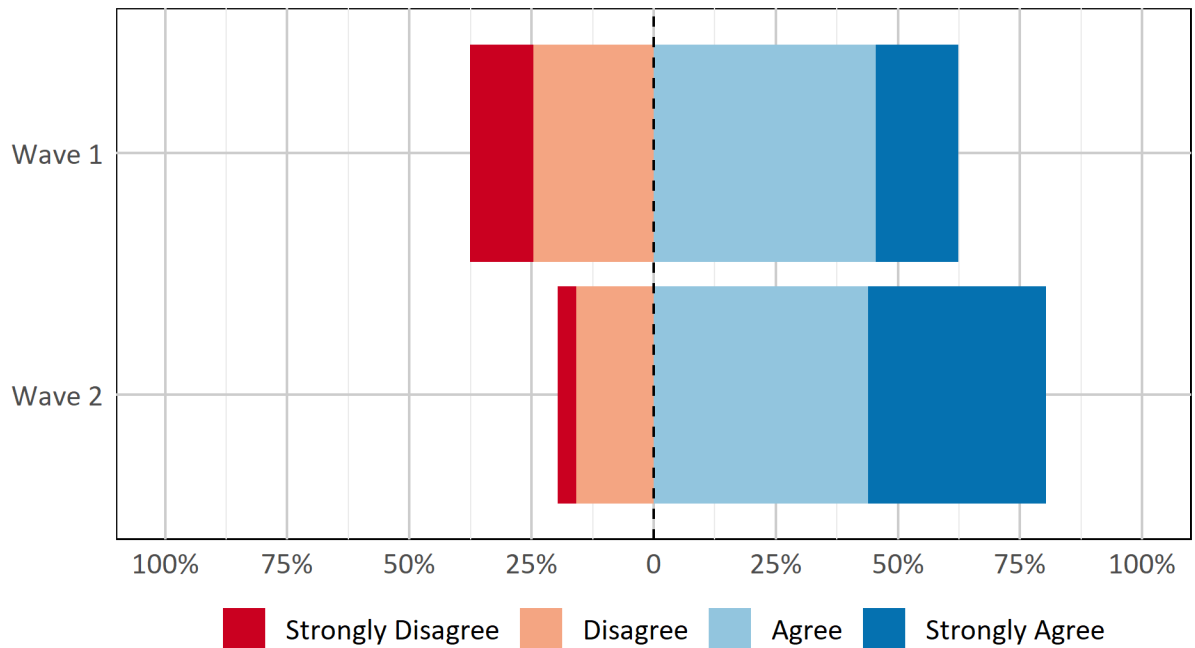
Question 5. The police in my neighborhood treat gunfire as a priority.



In Question 5, respondents were asked to rate whether they agreed police treated gunfire as a priority. The percentage of respondents strongly agreeing/agreeing increased after ShotSpotter was implemented.

- The percentage of respondents who did not agree that CPD treats gunfire as a priority decreased from 30.3% in Wave 1 to 15.8% in Wave 2 after ShotSpotter was implemented.
- Additionally, the percentage of respondents who “strongly agreed” with the idea that CPD treats gunfire as a priority in their neighborhood increased by roughly 23.8 percentage points from 27.7% in Wave 1 to 51.5% in Wave 2 after ShotSpotter was implemented.
- In sum, nearly 84% of respondents strongly agreed/agreed that “The police in my neighborhood treat gunfire as a priority” after ShotSpotter was implemented with approximately half of Wave 2 respondents “strongly agreeing” with the statement.
- In Wave 1, 44 respondents (19.0%) refused to answer or chose “Refused/Didn’t Know”, leaving 188 valid respondents. In Wave 2, 20 respondents (16.5%) refused to answer or chose “Refused/Didn’t Know”, leaving 101 valid respondents.

Question 6. Overall, I am satisfied with the job that the police in my neighborhood are doing to control shootings.



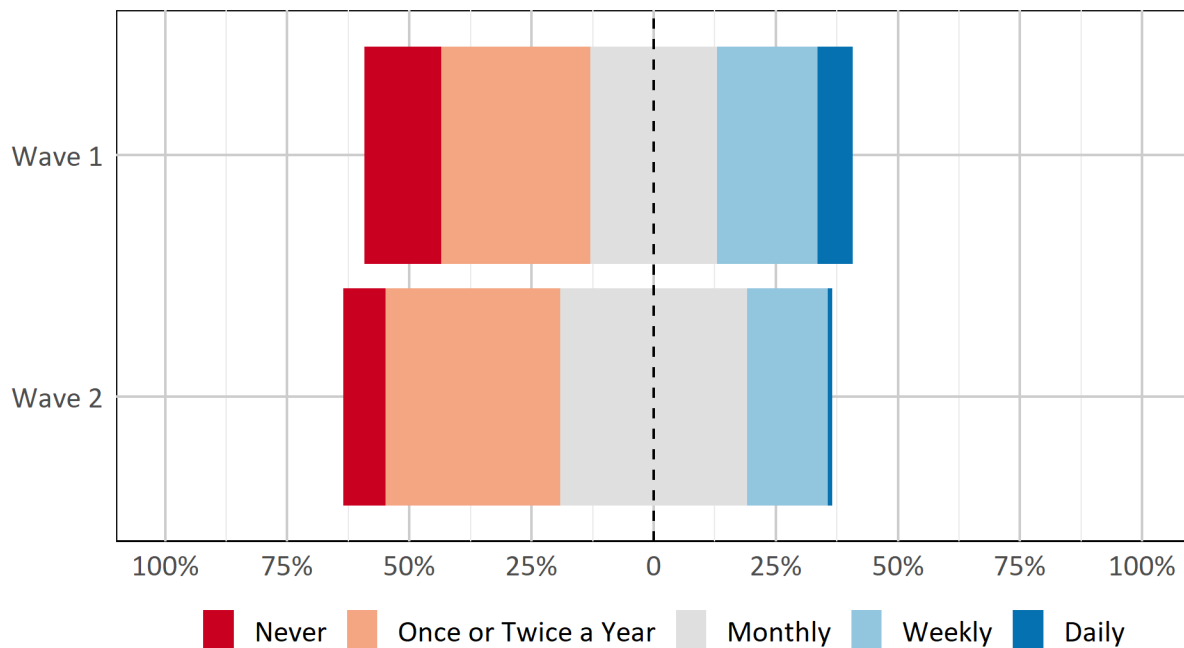
The last question asked respondents to rate how satisfied they were with CPD’s job to control shootings in their neighborhood. Again, respondents generally agreed that they were satisfied with CPD’s job to control shootings.

- Between Wave 1 and Wave 2, the percentage of respondents “agreeing/strongly agreeing” with the statement increased.
- The increase in “agree/strongly agree” responses between Waves 1 and 2 was observed in the “strongly agree” response with the percentage of respondents who “agreed” with the statement remaining steady at about 44% in each wave, but the percentage who strongly agreed increased from 16.9% of respondents in Wave 1 to 36.4% in Wave 2 after ShotSpotter was implemented.
- When comparing Wave 1 and Wave 2, the percentage of respondents answering “strongly disagree” or “disagree” both decreased. For example, in Wave 1, 13.0% of respondents selected strongly disagree with the statement; however, this decreased to only 3.7% of respondents in Wave 2.
- There were 25 respondents (10.8%) in Wave 1 and 14 respondents (11.6%) in Wave 2 who refused to answer or chose “Refused/Didn’t Know”. This left 207 and 107 respondents in each respective wave for analysis.

Section 2: Respondents' Perceptions for Shootings & CPD Response in Price Hill

In the next section, survey respondents were asked about the frequency of shootings and how CPD responds to shootings in Price Hill. Overall, respondents reported shootings were occurring less frequently and decreasing but that CPD was responding to shootings more frequently after ShotSpotter was implemented.

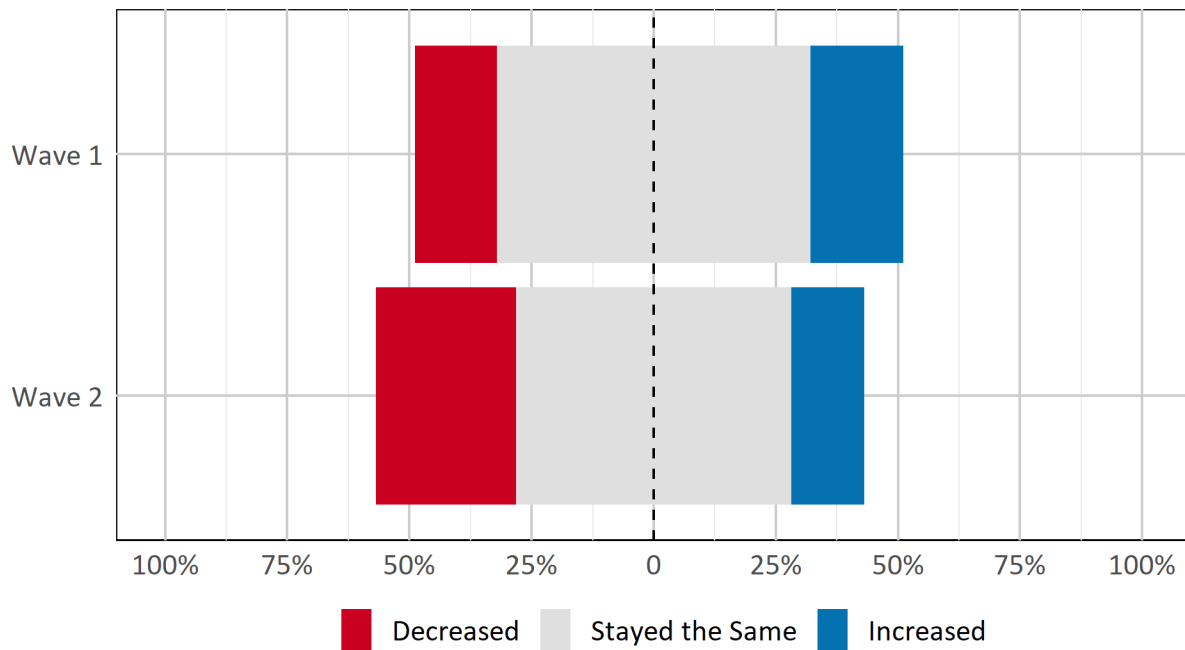
Question 7. I hear gunshots in my neighborhood.



Question 7 asked respondents about the frequency of hearing gunshots in Price Hill on a five-item scale: (1) Never; (2) Once or Twice a Year; (3) Monthly; (4) Weekly; (5) Daily. Overall, respondents' perceptions of audible gunshots have improved in Wave 2.

- The percentage of respondents who reported gunshots in the more frequent categories decreased between Wave 1 and Wave 2:
 - Hearing gunshots daily decreased from 7.2% (Wave 1) compared to 0.9% (Wave 2)
 - Hearing gunshots weekly decreased from 20.6% (Wave 1) compared to 16.5% (Wave 2)
- The percentage of respondents who reported hearing gunshots in the less frequent categories, however, increased between Wave 1 and Wave 2:
 - Hearing gunshots monthly increased from 26.0% (Wave 1) to 38.3% (Wave 2)
 - Hearing gunshots once or twice a year increased from 30.5% (Wave 1) to 35.7% (Wave 2)
- In both Wave 1 and Wave 2, about 4% of respondents (3.9% in Wave 1 and 5.0% in Wave 2) refused to answer or did not know how to rate gunshots in their neighborhood.

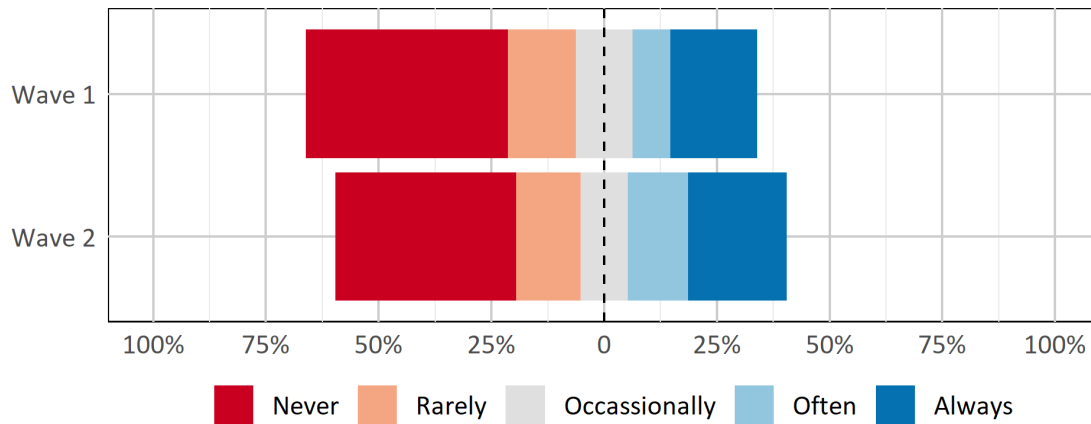
Question 8. In the past 6 months, shootings have...



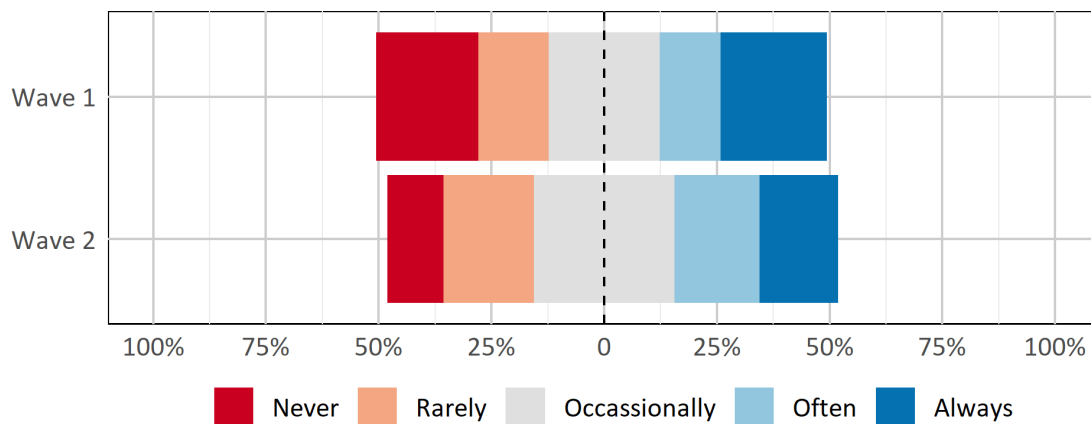
Question 8 asked respondents to answer whether they believed shootings have (1) Decreased, (2) Stayed about the same, or (3) Increased in the past 6 months.

- The percentage of respondents who believed shootings increased in the past 6 months remained stable:
 - 19.0% of Wave 1 respondents compared to 14.9% of Wave 2 respondents
- However, the percentage of respondents who believed shootings decreased in the past 6 months improved after ShotSpotter implementation:
 - 16.8% in Wave 1 compared to 28.7% in Wave 2
- Also of note is that the percentage of respondents who reported shootings have “stayed the same in the past 6 months” changed from 64.1% during Wave 1 to 56.3% in Wave 2 after ShotSpotter implementation.
- For Wave 1, 184 valid responses were available for analysis. For Wave 2, 87 valid responses were available for analysis.

Question 9. When I hear gunshots in my neighborhood, I call 911 or the police non-emergency number.



Question 10. I see police respond when I hear shots fired.



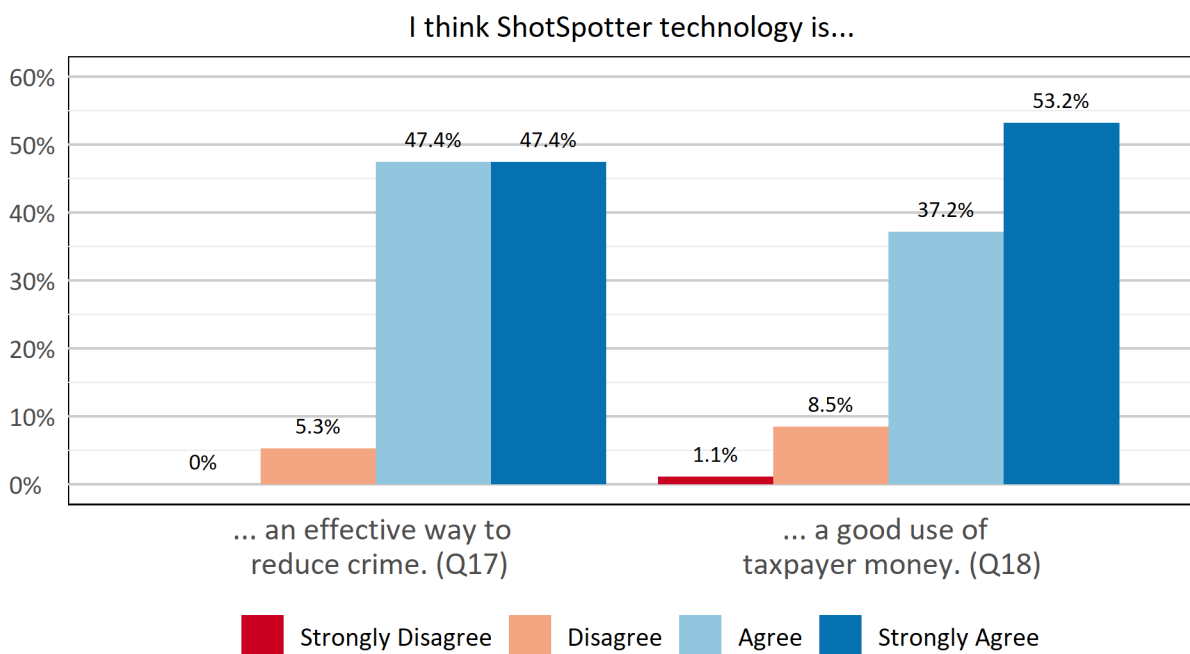
Question 9 asked whether respondents notify the police, while Question 10 asked whether they see police respond (regardless of whether they call or not) after they hear gunshots. Answers were on a 5 point scale: (1) Never, (2) Rarely, (3) Occasionally, (4) Often, and (5) Always. Respondents could also select (6) “Refuse/Don’t Know”.

- In Question 9, the percentage of respondents claiming they often or always call the police after hearing gunshots increased from Wave 1 (25.4%) to Wave 2 (30.6%), while those claiming they never, rarely, or occasionally call the police decreased (66.8% in Wave 1 vs. 56.2% in Wave 2).
- In Question 10, the percentage of respondents who reported seeing police respond to gunshots overall increased slightly between Wave 1 and Wave 2.
 - The change was mostly driven by a decrease of “Never” responses (Wave 1 22.6% vs. Wave 2 12.5%), and an increase in “Occasionally” responses (Wave 1 24.7% vs. Wave 2 31.2%) and “Often” responses (Wave 1 13.4% vs. Wave 2 18.8%).

Section 3: Residents Perceptions of ShotSpotter

Finally, Section 3 asked respondents directly about ShotSpotter. However, the nature of these questions means they were only relevant to the survey administered after ShotSpotter was implemented (Wave 2). Those who answered these questions were first required to have reported knowing what ShotSpotter technology is. This was captured on a filter question that asked whether the respondents were “... aware of the gunfire detection system called ShotSpotter?” There were 11 of the 121 respondents who answered “No” and were not included in the following analysis. This left 110 valid respondents in the Wave 2 ShotSpotter questions.

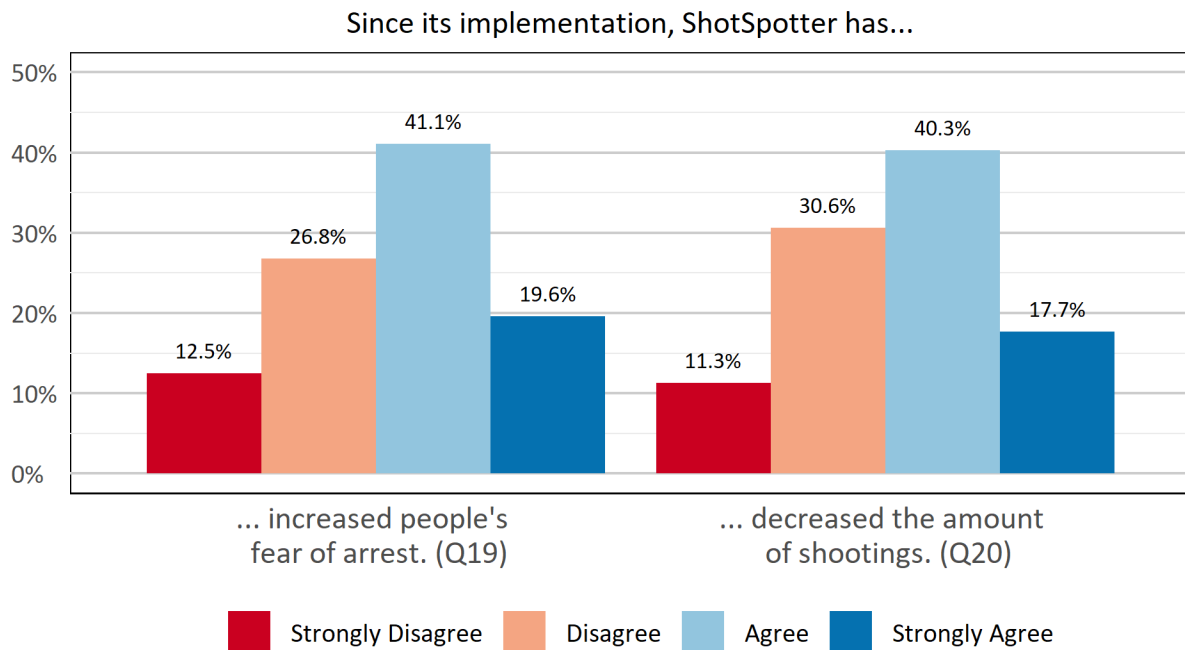
Question 17 and Question 18. Usefulness of ShotSpotter Technology



Question 17 and Question 18 asked respondents to judge the usefulness of ShotSpotter technology. Overall, the respondents felt positively about ShotSpotter’s usefulness.

- In Question 17, 94.7% of the Wave 2 respondents agreed or strongly agreed with the view that ShotSpotter is an effective way to reduce crime.
- In Question 18, nearly 90% of respondents believed ShotSpotter was a good use of taxpayer money, 53.2% strongly agreed with the statement. Of the remaining 10% of respondents, 1.1% strongly disagreed and 8.5% disagreed with the statement.
- The analysis for Question 17 and 18 were based on 95 respondents and 94 respondents, respectively.

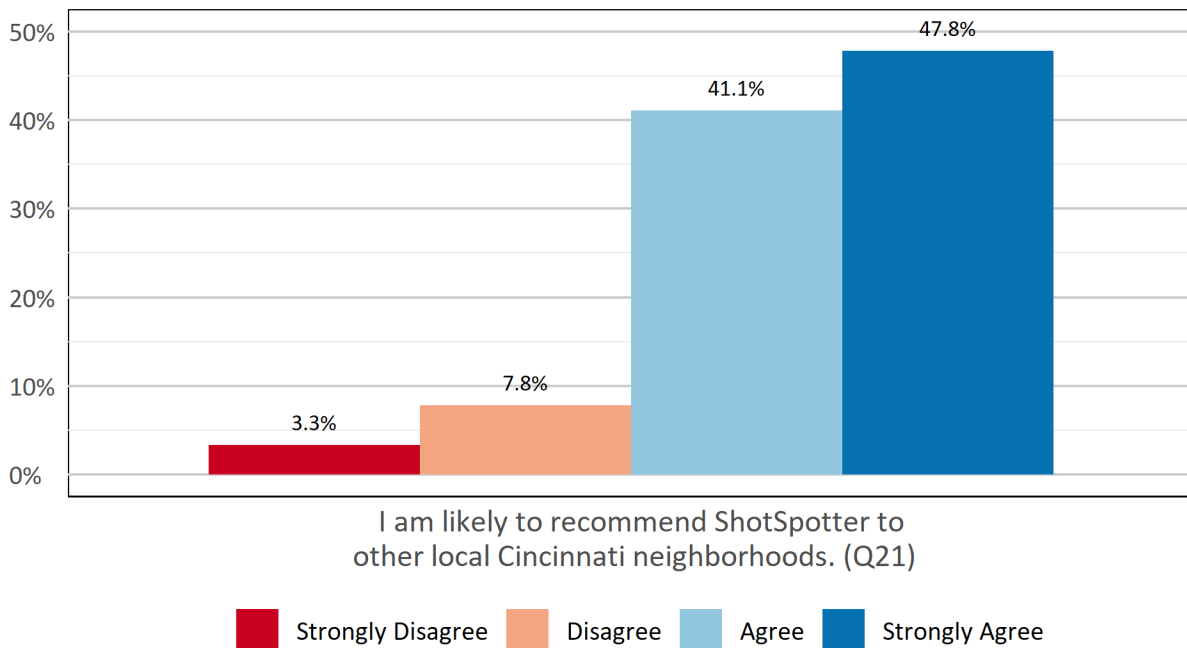
Question 19 and Question 20. Results of ShotSpotter Technology



Question 19 and Question 20 asked respondents about ShotSpotter’s impact on people’s fear of arrest and shootings. Overall, a slight majority of respondents “agreed / strongly agreed” ShotSpotter was effective at increasing fear of arrest and decreasing shootings.

- In Question 19, 60.7% of respondents “agreed / strongly agreed” ShotSpotter increased fear of arrest.
- In Question 20, 58.1% respondents “agreed / strongly agreed” ShotSpotter decreased the number of shootings.
- Only 56 respondents in Question 19 and 62 respondents in Question 20 provided valid answers, meaning about half of the valid respondents refused to answer or chose “Refused/Don’t Know” for the respective questions.

Question 21. Likelihood of Recommending ShotSpotter Technology



The last question asked respondents who knew about ShotSpotter whether they would recommend its' use to other Cincinnati neighborhoods. In sum, 88.9% of respondents either "agreed or strongly agreed" that they would recommend ShotSpotter to another neighborhood. Twenty respondents refused to answer or chose "Refused/Don't Know" on Question 21, leaving 90 respondents for analysis.

SUMMARY & CONCLUSION

In general, citizens voiced positive attitudes to each survey item, with their perceptions becoming more positive after ShotSpotter was implemented in Price Hill.

- A substantial majority (about 70%) of respondents feel safe in their neighborhood, with an increase in Wave 2 respondents agreeing with this perception.
- While most respondents trusted CPD to make proper decisions for their community, the proportion of respondents who strongly agreed increased in Wave 2.
- There was an increase in respondents' strong agreement with the statement that police officers do their job well. There were similar results with citizen confidence in the abilities of CPD.

When respondents were asked directly about their perceptions of the frequency of gunfire incidents and the visibility of CPD officers after shootings, their ratings also improved after ShotSpotter was implemented.

- As to CPD efforts with gunfire incidents, most respondents believed CPD treats gunfire as a priority and they are satisfied with the job of CPD to control shootings. Further, for each item

the percentage of respondents who strongly agreed increased and those who strongly disagreed decreased in Wave 2.

- Respondents reported a decrease in hearing gunfire in their neighborhood in Wave 2.
- There was also a slight increase in the proportion of respondents who now call police if there is a shooting.

The final survey items asked only Wave 2 respondents their views concerning the effectiveness of ShotSpotter and their support of the technology.

- A majority of respondents believe the technology has increased the fear of arrest (58.3%) and decreased the number of shootings (60.7%).
- Over 90% of the respondents were in agreement that ShotSpotter is effective and a good use of city resources.
- Finally, almost 90% (88.8%) of the respondents agreed that they would recommend ShotSpotter.

FOR MORE INFORMATION

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