



Staffing and Retention in Public Safety Answering Points (PSAPs): A Supplemental Study

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Research Report



**Center for
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Staffing and Retention in Public Safety Answering Points (PSAPs): A Supplemental Study

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EXECUTIVE SUMMARY

TOO OFTEN IT TAKES CATASTROPHIC EVENTS to shed light on the urgent contributions public safety communications work makes to our nation's well-being. During more routine moments, public safety professionals labor well out of the public eye and, often, with limited resources and insufficient support. Seeking to assess the conditions under which PSAPs are employed, the Association of Public-Safety Communications Officials (APCO) International established Project RETAINS® (Responsive Efforts to Assure Integral Needs in Staffing), which resulted in a 2005 report and the Project RETAINS toolkit. The second Project RETAINS study, commissioned in 2009, sought to extend APCO International's knowledge of PSAP staffing issues not addressed in the first study and to gauge the degree to which Project RETAINS had proved useful. The present study builds on both the 2005 and 2009 reports to observe how these conditions have developed over the past nine years, to reassess the perceived utility and utilization of Project RETAINS, and to add a new section detailing the use and knowledge of new technologies at PSAPs.

The findings in this report are based on primary data collected through two survey instruments: one for PSAP directors/managers, and one for PSAP employees. The PSAP director is based on a sample of 455 directors representing PSAPs from all across the country, while the employee survey draws on a sample of 646 employees working at PSAPs.

Despite the broad differences between PSAPs of different size, location, and type, a number of patterns emerged in this study that hold relevance for the nation's PSAPs. Selected findings are summarized below:

- Well over half of all PSAPs (65.4%) report an increase in the number of dispatched calls in the previous three years. Despite these reported increases, PSAP directors from PSAPs of all sizes overwhelmingly report that answer times have remained the same.
- Supportive supervision, co-worker support, and perceived recognition from the public emerged as key factors predicting employee commitment to their PSAPs. Proactive supervisors and inter-employee cooperation create a supportive environment that energizes workers and helps lead to the successful operations of PSAPs.
- Co-worker support is also an important factor in reducing psychological distress at PSAPs. Given the nature of public safety communications work, these employees are particularly likely to be exposed to emotional and traumatic events. While most PSAPs provide critical incident stress management (CISM), employee assistance programs (EAP), or both, the interpersonal support from co-workers appears to have a unique effect on employees' ability to effectively cope with difficult workplace situations.

- Staffing pressures were found in PSAPs of varying sizes, though in different ways. Large PSAPs struggle the most with staffing levels, with over 38 percent of large PSAPs reporting that staffing levels have decreased in the past three years. Over 77 percent of large PSAPs also report being consistently below authorized staffing levels during the previous year compared to 38 percent of medium and 19 percent of small PSAPs. Small PSAPs are the most likely to have met authorized staffing levels for the entirety of the past year (40%), but they are also the least likely to specialize, meaning that employees must perform multiple tasks as part of their work instead of focusing on just one job. Contrarily, as PSAP size increases, employee specialization tends to increase, as does access to important coping resources.
- There was evidence that small PSAPs are increasingly specializing their labor forces. Specialization at small PSAPs increased nearly 14 times since the 2009 report, suggesting that small PSAPs are working to institutionalize efficiency measures and workplace practices common at larger PSAPs, and which, in the long-run, might help alleviate some of the workload difficulties present at these PSAPs.
- We expect that PSAPs will have difficulty in recruiting millennials for two primary reasons: (1.) millennials desire work that encourages a work/life balance and sets clear boundaries between work and lifestyle; (2.) millennials deeply mistrust social institutions, especially government, and they are likely to associate PSAPs with government. See the conclusion of Section VIIIX for a detailed discussion of how we believe this will affect PSAPs.
- This study found an average retention rate of 71 percent. This retention rate is ten percentage points lower than the rate calculated in 2009 (81%), and shows important variations in PSAP experiences. It indicates that turnover has grown as a problem over the past decade.
- Medium PSAPs seem to excel in a number of metrics: they are the most likely to report that answer times have decreased over the past three years; the most likely to report increases in staffing levels; and boast the highest average retention rates.
- We found that Text to 9-1-1 calls are very rare occurrences. In over 91 percent of PSAPs with this service, they constitute less than two percent of total call volume.¹
- Additionally, opportunities for promotion and flexible work arrangements are found to be valued assets among employees, and as in the 2009 report, pay positively and significantly correlates with retention rates.
- Employees are proud of their jobs and their PSAPs, and express overwhelming interest in maintaining their employment long-term at their PSAPs.

¹ Following earlier studies, the 2017 survey offered respondents the choices: 0-2%, 2-5% and greater than 5%. Based on these findings, future surveys should offer greater granularity at the low end of the scale (e.g., 0-0.5%, 0.6%-1%, 1%-2%, more than 2%).

- While a majority of PSAP employees feel that the public appreciates their work, a strong majority disagree that the media appreciates their work. These findings underline the importance of adequate support and recognition. Management would do well to scrutinize not only its own internal human resource practices (for example, through supervisor training or through employee recognition programs), but should also explore ways of connecting employees with the public whom they serve.
- Significantly, only 15.2 percent of PSAP directors report having ever used RETAINS, meaning that nearly 85 percent of PSAPs have never utilized this resource. Large PSAPs are the most likely to have used RETAINS, although this accounts for less than 38 percent of PSAPs in this group. Just under 15 percent of medium PSAPs and just over 13 percent of small PSAPs report ever having used RETAINS.
- Those PSAP directors who have used RETAINS have positive feelings towards the toolkit, with an overwhelming majority reporting that it helps them manage staffing levels, justify staffing needs to government authorities, and that they are very likely to recommend it to other directors.
- While this study cannot say definitively why usage of RETAINS is low, it probably has to do with a lack of awareness of the resource, a perception that it is unnecessary, or a combination of both. Based on these findings, APCO might consider actions that will better diffuse knowledge of RETAINS, such as advertising or free trainings and demos of the platform.
- New to this report, we examined technological trends at PSAPs. Most PSAPs do not intend to upgrade their CPE, although this does vary by PSAP size: over 60 percent of large PSAPs intend to do so, compared to 42.3 percent of medium and 36 percent of small PSAPs. A sizeable proportion of PSAPs are using a CAD system that is greater than five years old (31%), less than half are using a CAD system that is two years or younger (37.6%), and the majority of PSAPs have no plans to upgrade their CAD systems.
- Familiarity with technology varies widely by type and PSAP size. Directors at large PSAPs are the most familiar with new technologies. Directors at medium PSAPs are also familiar with these technologies, but in lower proportions than directors at large PSAPs. Generally, directors at small PSAPs are the least familiar with new technologies.
- Although 75.4 percent of employees look forward to learning about new technologies in the field of public safety communications, only 28.5 percent feel that their PSAPs are providing adequate training for these new technologies. This shows that employees are enthusiastic about new technologies, are willing to take the time to learn them, but do not feel that their PSAPs provide adequate resources for doing so. PSAPs should take advantage of their employees' enthusiasm for new technologies and take steps to implement effective training programs.

SECTION I: INTRODUCTION AND BACKGROUND

In 2017, George Mason University's Center for Social Science Research (CSSR) conducted a systematic study based on surveys of PSAP directors and employees throughout the United States. The study was commissioned by the APCO International, the leading professional association in this occupation. The project was focused on PSAP operations, including employee retention, and the effectiveness of an earlier effort—Project RETAINS—that APCO International had developed previously, in order to address the chronic problems of understaffing and turnover that exist within this field. The 2017 CSSR study built on previous research on staffing and retention issues in PSAPs. The earlier research was conducted in 2005 by the University of Denver Research Institute (DRI), and in 2009 by the CSSR.

Using the 2005 and 2009 research as its point of departure, the latest CSSR study began collecting data from PSAP directors in April of 2017 and continued through July of 2017. This follow-up study takes up many of the issues addressed in the previous studies, including:

- Current staffing challenges facing PSAPs.
- Retention rates and analysis of the conditions that affect Public Safety Telecommunicator (PST) retention.
- Analysis of organizational commitment and psychological distress reported among PSTs. The degree to which Project RETAINS is known and used by PSAPs.
- Definition of an optimal workload for PSTs.
- Guidelines for staffing PST positions based on gauging how many units or radio channels a PST can effectively handle.

The current study also considers two more recent trends in PSAP operations: use and awareness of new technologies, as well as virtual and physical consolidation of PSAPs.

The following section briefly outlines the research strategy the 2017 CSSR study employed, with more detailed information presented in Appendix A. The report then presents key findings affecting retention and turnover. Here, reported rates of retention and turnover are looked at, but also PSAP directors' perceptions of these rates. The analysis then uses survey data to address the determinants of two aspects of employees' work experiences— organizational commitment and psychological distress—that have been found to impact both job performance and retention. Following this we specifically consider PSAPs' use of Project RETAINS. We next consider how the PST position might best be defined and employees' perceptions of workloads, along with staffing criteria as reported by PSAP directors. Finally, we turn to new technologies and PSAP consolidation.

Survey Design

Process: As was done in the 2009 effort, two survey instruments were created: (1.) a PSAP director survey and (2.) an employee survey. The 2009 surveys served as the starting points for both instruments. The survey questionnaires were developed by CSSR in collaboration with APCO International based upon: 1.) a review of the surveys utilized in the first two Project RETAINS studies; 2.) follow up questions prompted by these studies; 3.) new issues and research questions; and 4.) the need to evaluate PSAPs' experiences with Project RETAINS toolkit and worksheets over the past nine years. The survey was designed such that it could be completed as a web-based survey, a mail survey, or a phone survey. This multi-mode approach was designed to maximize participation and response rates, and to minimize overall project cost. Copies of the surveys are included in Appendix C.

The topic areas for the director/manager survey include:

- Characteristics of the PSAP (e.g., type of 9-1-1 service, size of area and population served, number of agencies served, functions provided, and call volume)
- Trends (e.g., change in call volume, answer times and staffing levels over three years)
- Staffing data (e.g., number of authorized positions)
- Criteria used for staffing decisions
- Retention data (e.g., number of positions filled, in training, left during training, left after training)
- Staffing characteristics (e.g., use of overtime, use of part-time workers, percentage female workers, percentage of workers by race)
- Experience with Project RETAINS
- Descriptions of PST positions (e.g., number of units, number of radio channels managed, number of voice transactions)
- Training provided to new and continuing employees
- Pay and benefits
- Characteristics of the survey respondent

The topic areas for the employee survey include:

- Job type (e.g., cross-trained or not)
- Description of dispatch position
- Scheduling
- Commitment to the PSAP
- Perceptions of PSAP's staffing levels
- Overtime
- Work-related stress
- Job complexity

- Relationship with co-workers/supervisors
- Recognition
- Pay and benefits

Survey Process

An initial postcard mailing was sent to 5,104 PSAPs across the country. These addresses were provided by APCO to CSSR in mailing label format. Prior to this mailing, APCO used other mailings, social media, and press contacts to create awareness of the survey, its goals, and importance. The postcards briefly explained the survey and provided the link, <http://cssr.gmu.edu>, where respondents could complete *a web-based version of the survey*. The postcard instructions asked that the PSAP director complete the survey. If the initial respondent was not the PSAP director, they were redirected to the employee survey at the end of which they were prompted to provide contact information for the PSAP director. If the survey was completed by the director, at the end of the survey, he or she was prompted to provide email addresses for PSAP employees so that a link to the employee survey could be sent to them.

Each postcard was printed with a unique identification number that respondents provided at the beginning of the survey. The postcard also provided the CSSR telephone number and email address that respondents could use to request a paper copy of the survey.

Prior to mailing the postcards, 324 PSAPs were randomly selected for intensive follow-up. Fourteen of these PSAPs were removed from the sample as they had consolidated with other PSAPs between the time the list was created and the survey went into the field. This was not a pure random sample, but a sample stratified by community size and U.S. Census regions, as was done in 2009. Two weeks after the initial postcard mailing, those PSAPs in the targeted sample who had not yet responded were called and emailed by CSSR survey lab interviewers and encouraged to participate in the online survey—they were given their registration number again and provided with the survey link. On this call, the PSAP director was also offered the opportunity to complete the survey over the phone. PSAP directors who completed the online survey were emailed to thank them for their participation and to encourage them to make the link available to their employees.

Later, in a further attempt to recruit respondents, those members of the targeted sample who still had not responded (193 PSAPs) were mailed a hard copy of the PSAP director survey. The mailing included a return envelope and each survey was marked with the PSAP's identification number.

After another two-week period, those who still have not responded were again contacted by telephone and an effort was made to complete the interview on the telephone using the CSSR Computer Assisted Telephone Interviewing (CATI) facility. This contact was also used to encourage directors to promote the survey among their employees.

The target for this multi-mode approach was to obtain completed surveys from 223 of the 310 targeted PSAPs to realize a 72 percent response rate as was the case in 2009. In 2017, the survey actually yielded 212 surveys producing a statistically valid sample with a margin of error of $\pm 6.6\%$ with a 68 percent response rate, closely matching the results obtained in 2009 ($\pm 6.7\%$).

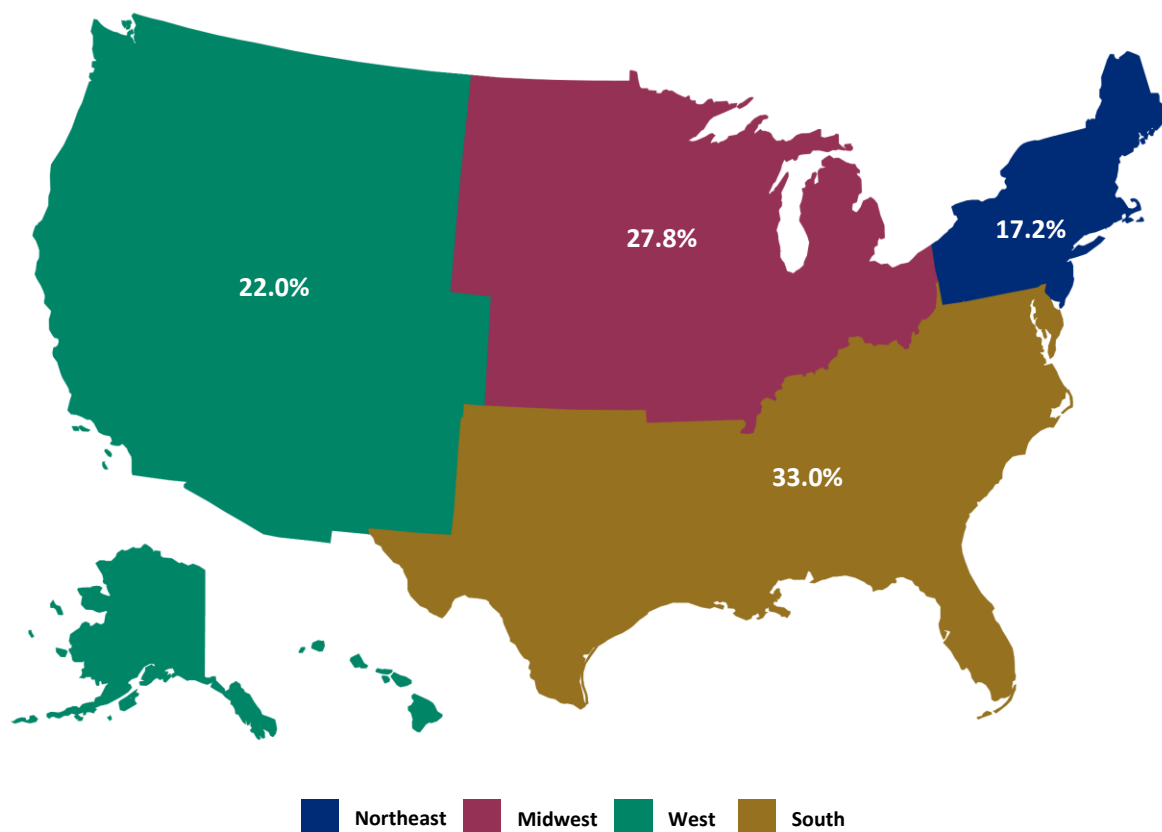
Due to the initial postcard mailing and outreach efforts by APCO to promote the survey, we added an additional 243 PSAPs to the sample. The total final sample included 455 PSAPs thereby reducing the margin of error to $\pm 4.4\%$. As is detailed in Appendix A, these surveys from outside the target sample were compared to the target sample. Some differences were found, particularly with regard to PSAP size. Combined with the target sample, however, these additional PSAPs produced a full sample of 455 PSAPs that was similar in size and location to the weighted 2009 sample. As a result, with the current study a post hoc weighting process to ensure the representativeness of the sample is not needed.

Because PSAPs in the target sample were randomly selected and the response rate was very high, the findings represent the larger population of PSAPs, within accepted margins of error.

SECTION II: PSAP CHARACTERISTICS AND TRENDS

Our sample of PSAPs represent the entire country. By region, 17.2 percent of the 455 sampled PSAPs are from the Northeast, 33.0 percent are from the South, 27.8 percent are from the Midwest, and 22.0 percent are from the West, as Figure 1 shows.

FIGURE 1: DISTRIBUTION OF PSAPS BY REGION (N=454)



We classify PSAPs into three groups according to standards established by the Commission on Accreditation for Law Enforcement Agencies, Inc. (CALEA). Small PSAPs are defined as consisting of one to 15 employees, medium PSAPs as 16 to 75 employees, and large PSAPs as 76 or more employees. In our final sample of 455 PSAPs, just over half (50.8%) are small PSAPs, 42.6 percent are medium PSAPs, and 6.6 percent are large PSAPs.

Consistent with findings from the 2009 report, we find that PSAPs of different sizes vary significantly from one another on a variety of characteristics. These differences are summarized in Table 1 and discussed in detail below.

TABLE 1: AVERAGE CHARACTERISTICS BY PSAP SIZE				
	SMALL PSAPS	MEDIUM PSAPS	LARGE PSAPS	WELCH F
NUMBER OF AUTHORIZED POSITIONS	10**	27**	100**	204.8
NUMBER OF AGENCIES SERVED	15	19	23	3.0
NUMBER OF CONSOLES	3**	9**	32**	148.8
NUMBER OF SERVICES PROVIDED†	15	13**	11**	5.8
TOTAL INCOMING CALL VOLUME	32,318**	82,781**	465,631**	104.7
TOTAL 9-1-1 CALL VOLUME†	10,477	38,211**	297,620**	13.6
TOTAL CALLS RESULTING IN AN INCIDENT BEING CREATED†	7,858	30,785**	121,196**	6.6
AVERAGE ANSWER TIME OF 9-1-1 CALLS (IN SECONDS)	10.2	11.6	7.3	1.9
ABANDONED CALL RATE (PER 100)	12.4	8.5	9.3	1.8
POPULATION SIZE	44,557**	167,566**	1,051,293**	34.1

** $p < .01$; † For this measure, **large PSAPs** differ significantly from **small** and **medium PSAPs**, but **small** and **medium** PSAPs do not differ.

The number of authorized positions for PSAPs of all sizes ranges from a reported low of one to a high of 190.² Large PSAPs average the highest number of authorized positions at 100, followed by medium PSAPs at 28, and small PSAPs at 10. These averages differ meaningfully from those found in the 2009 study, which reported an average of 141 positions for large PSAPs, 36 for medium PSAPs, and 8 for small PSAPs.

² The current directory for the smallest PSAP, which is located in a rural Midwestern county, only lists one employee, the county sheriff.

PSAP size has no statistically significant effect on the number of agencies served, although it does approach significance. Large PSAPs average 23 agencies, medium PSAPs average 19, and small PSAPs average 15. Total agencies served ranges from a low of four to a high of 127, and the average served for all PSAPs is 17.5, or about 18. Our findings differ from the 2009 report in two ways: first, small PSAPs are averaging more agencies now than in the previous study (15 versus 11); and second, medium and large PSAPs are averaging *fewer* agencies now than in the previous study (19 versus 22 for medium PSAPs, 23 versus 32 for large PSAPs).

The number of consoles per PSAP ranges from a low of one to a high of 50. For all PSAPs, the average is seven. PSAP size has a significant effect on the number of consoles, with small PSAPs averaging three, medium PSAPs averaging nine, and large PSAPs averaging 32. The number of consoles strongly correlates with the size of the population served. These findings are consistent with the 2009 study for small PSAPs, although the averages for medium and large PSAPs are lower than those found in the previous report. The number of consoles primarily dedicated to radio dispatch range from zero to 40, and averages two in small PSAPs, five in medium PSAPs, and 14 in large PSAPs.

The average annual incoming call volume for all PSAPs is 82,278 calls. Average annual call volume is significantly higher in large PSAPs (465,631) compared to medium (82,781) and small PSAPs (32,318).

Total average annual incoming and outgoing call activity is 104,969 calls. The average incoming and outgoing call activity is 42,421 for small PSAPs, 117,060 for medium PSAPs, and 709,097 for large PSAPs.

The average annual 9-1-1 emergency call volume is 43,698. Large PSAPs differ significantly from small and medium PSAPs, averaging 297,620 calls compared to 10,477 and 38,211 calls, respectively. Medium PSAPs do not significantly differ from small PSAPs in this measure. The average annual wireless 9-1-1 emergency call volume is 25,550 calls. Consistent with the 2009 study, the average volume of wireless emergency calls is significantly higher in large PSAPs (114,129) compared to medium (29,327) and small PSAPs (9,638).

The average number of calls that resulting in an incident being created is 25,890. The average number of calls that result in incidents being created is significantly higher in large PSAPs (121,196) compared to medium (30,785) and small PSAPs (7,858), although medium and small PSAPs do not significantly differ from one another.

There are no statistically significant differences between PSAPs of different sizes and the average answer time. In total, average answer time is 10.5 seconds. 95.0 percent of PSAPs report answering calls within 30 seconds or less, 82.0 percent in 15 seconds or less, and 68.7 percent within 10 seconds or less. Average answer time does not correlate with call volume or the

number of consoles in a PSAP. 87.0 percent of PSAP directors report that average answer time has remained the same over the past three years, 6.4 percent report that it has decreased, and the remaining 6.6 percent report that it has increased.

There are no statistically significant differences between PSAPs of different sizes and the abandoned call rate. The overall abandoned call rate percentage in CY 2016 was 10.5 percent. 95.0 percent of PSAPs reported an abandoned call rate of 30 percent or lower, 82.0 percent 15 percent or lower, and 34.0 percent or lower. The abandoned call rate percentage does not correlate with call volume or the number of consoles in PSAPs.

Expectedly, there are significant differences between PSAPs of different sizes and the size of the population and regional areas that they serve. Small PSAPs serve average populations of 44,557 compared an average of 167,566 for medium PSAPs and an average of 1,051,293 for large PSAPs (see Table 1). A similar linear pattern is observed for regional service area, which increases with PSAP size, as reported in Table 2.

TABLE 2: REGIONAL SERVICE AREA (SQUARE MILES)			
SQ. MILES**	SMALL PSAPS	MEDIUM PSAPS	LARGE PSAPS
0 – 50	35.5% (77)	30.3% (56)	6.9% (2)
51 – 400	18.4% (40)	22.2% (41)	44.8% (13)
Greater than 400	46.1% (100)	47.5% (88)	48.3% (14)
TOTAL:	100% (217)	100% (185)	100% (29)
** $p < .01$			

The number of square miles in the service areas ranges from fewer than 10 to over 800. Small PSAPs are more likely than medium PSAPs and much more likely than large PSAPs to serve regions under 50 square miles in size, whereas large PSAPs are more likely than both small and medium PSAPs to serve regions between 51 and 400 square miles and regions greater than 400 square miles in size. The majority of PSAPs (52.6%) serve a county or parish, 35.2 percent serve a city, town, or borough, and about 7.9 percent serve a region or state. The remaining 4.2 percent serve a special jurisdiction, such as an airport, island, or campus.

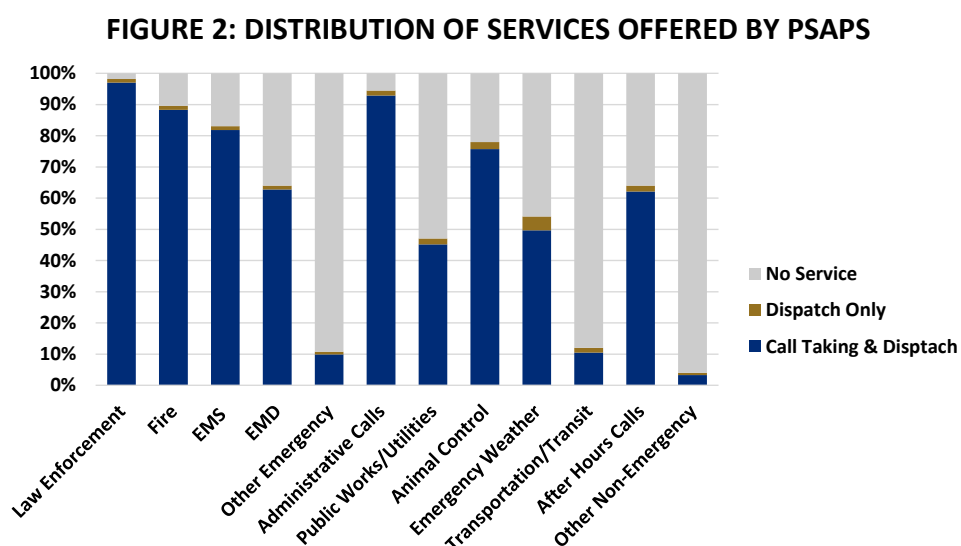
Many PSAPs respond to a wide array of ancillary tasks in addition to emergencies, while some specialize in one or a few functions. We asked PSAP directors about the types of emergency and non-emergency functions that their PSAP services. On average, the number of functions served by all PSAPs is 13. This includes the nine most common functions summarized below in Table 3, as well as a variety of additional functions that fall broadly under the “other” category.

Law enforcement is the most universally provided service, with 97.1 percent of PSAPs providing both calltaking and dispatch, 1.1 percent providing dispatch only, and 1.8 percent indicating they

do not provide this service. 88.3 percent of PSAPs provide calltaking and dispatching for fire services, 81.8 percent provide calltaking and dispatch for EMS medical, and 9.9 percent provide calltaking and dispatch for some other emergency function, such as a military entity, airport security, and colleges and universities.

TABLE 3: PSAP SERVICES BY DISCIPLINE			
EMERGENCY FUNCTIONS	CALLTAKING AND DISPATCH	DISPATCH ONLY	NO SERVICE
LAW ENFORCEMENT	97.1% (427)	1.1% (5)	1.8% (8)
FIRE	88.3% (364)	1.2% (5)	10.5% (43)
EMS MEDICAL	81.8% (320)	1.3% (5)	16.9% (66)
EMD MEDICAL	62.8% (255)	1.2% (5)	36% (146)
OTHER (EMERGENCY)	9.9% (45)	0.9% (4)	89.2% (406)
NON-EMERGENCY FUNCTIONS	CALLTAKING AND DISPATCH	DISPATCH ONLY	NO SERVICE
ADMINISTRATIVE CALLS	92.9% (340)	1.6% (6)	5.5% (20)
PUBLIC UTILITIES	45.2% (165)	1.9% (7)	52.9% (193)
ANIMAL CONTROL	75.7% (293)	2.3% (9)	22% (85)
TRANSPORTATION	10.5% (41)	1.5% (6)	88% (345)
AFTER HOURS CALLS	62.1% (226)	1.9% (7)	36% (131)
OTHER (NON-EMERGENCY)	3.3% (15)	0.7% (3)	96% (434)

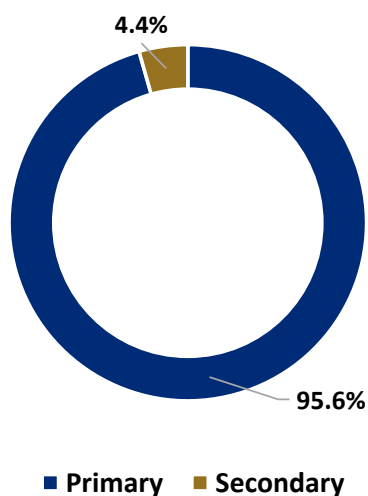
In terms of non-emergency functions, most PSAPs (92.9%) provide calltaking and dispatch for administrative calls, animal control (75.7%), and after hours calls (62.1%). Just under half provide calltaking and dispatch for public utilities (45.2%). A visual breakdown of these services is provided below in Figure 2.



PST job complexity generally increases as the number of functions and agencies a PSAP serves increase. Different departments may have unique procedures or protocols that require special handling. This is particularly important now, as several states are consolidating PSAPs, which may lead to increases in the number of protocols as PSAPs merge.

In the survey, we asked PSAP directors to indicate whether their PSAP is a primary PSAP or a secondary PSAP. A primary PSAP is the first PSAP to answer a 9-1-1 call; it may also be the point from which calls are dispatched. A secondary PSAP receives transferred 9-1-1 calls for dispatch

FIGURE 3: TYPE OF PSAP (N=454)



or further processing, after screening for a required service by a primary PSAP. As shown in Figure 3, an overwhelming majority of PSAPs are primary PSAPs (95.6%), while a small proportion serve as a secondary PSAP (4.4%).

PSAP directors were asked to summarize three-year trends in four interest areas: the number of dispatched calls, average call answer time, staffing levels, and employee retention. For each indicator, directors were asked to evaluate whether they experienced increases, decreases, or no change. The findings are summarized in Table 4 broken down by PSAP size.

Medium PSAPs are significantly more likely to report increases in staffing (31.6%) than both small (24.3%) and large (14.3%) PSAPs. Large PSAPs are significantly more likely to report decreases in staffing levels (38.1%) compared to small (14.4%) and medium (15%) PSAPs. There were no significant differences between PSAPs of different sizes and perceived changes to retention rates. Overall, directors perceive retention as remaining unchanged over the past three years.

Strong majorities of directors at PSAPs of all sizes report increases in the number of dispatched calls in the past three years. These differences are not statistically significant, meaning that the perception among directors that the magnitude of dispatched calls has increased is consistent across PSAPs of all sizes.

Directors at medium PSAPs are the most likely to report increases, with 66.4 percent reporting this is the case. Small PSAPs follow close behind, at 65.5 percent. Finally, 59.1 percent of directors at large PSAPs indicate increases, however, a large proportion (40.9%) report decreases in dispatched calls.

Only 5.1 percent of small PSAPs and 3.1 percent of medium PSAPs report decreases in the number of dispatched calls. This indicates that a set of unique processes are occurring at large PSAPs uncaptured by this survey.

TABLE 4: THREE-YEAR TRENDS ACROSS FOUR INTEREST AREAS				
SMALL PSAPS				
	DISPATCHED CALLS	AVG. ANSWER TIME**	STAFFING LEVELS*	RETENTION
INCREASED	65.5% (129)	2.7% (6)	24.3% (49)	14.9% (30)
DECREASED	5.1% (10)	4.9% (11)	14.4% (29)	21.3% (43)
NO CHANGE	29.4% (58)	92.4% (207)	61.4% (124)	63.9% (129)
MEDIUM PSAPS				
	DISPATCHED CALLS	AVG. ANSWER TIME**	STAFFING LEVELS*	RETENTION
INCREASED	66.4% (85)	11.7% (22)	31.6% (42)	19.4% (24)
DECREASED	3.1% (4)	8.0% (15)	15.0% (20)	23.4% (29)
NO CHANGE	30.5% (39)	80.3% (151)	53.4% (71)	57.3% (71)
LARGE PSAPS				
	DISPATCHED CALLS	AVG. ANSWER TIME**	STAFFING LEVELS*	RETENTION
INCREASED	59.1% (13)	3.4% (1)	14.3% (3)	20.0% (4)
DECREASED	40.9% (9)	8% (15)	38.1% (8)	30.0% (6)
NO CHANGE	0.0%	82.4% (24)	47.6% (10)	50.0% (10)

** $p < .01$; * $p < .05$

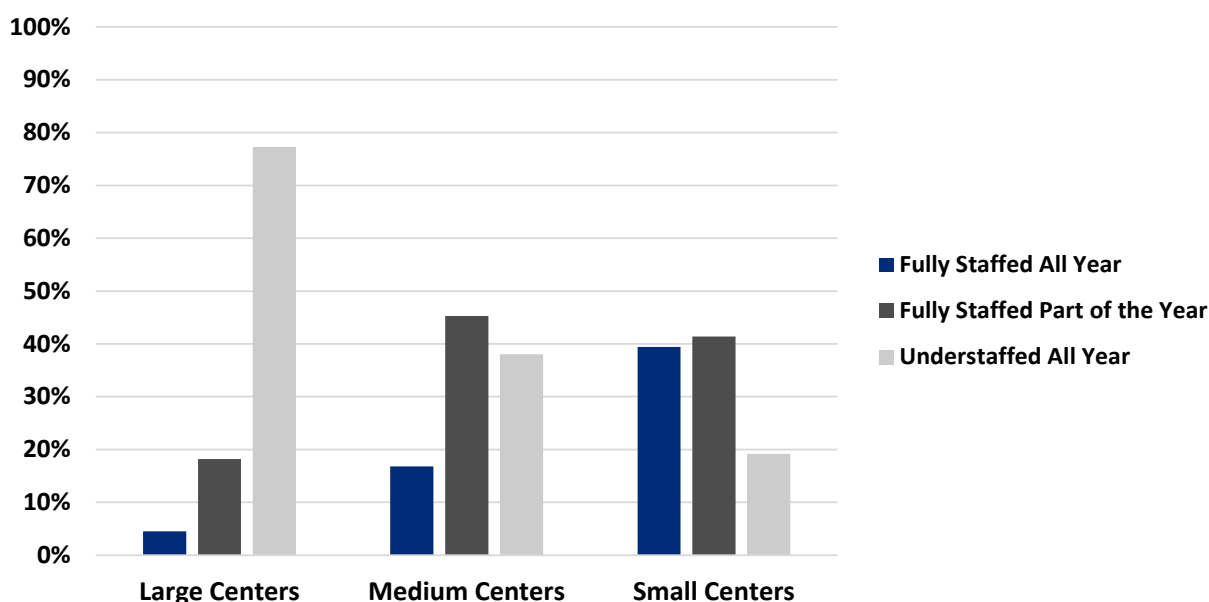
Staffing

Asked to evaluate their staffing levels for the previous year, fewer than 30.0 percent of directors report that their PSAP was staffed to authorized levels for all 12 months. The largest proportion (41.4%) report that staffing was low for at least part of the year, and 29.8 percent report that staffing was below authorized levels for the entire year. Just 28.7 percent of PSAPs were able to maintain staffing levels for the entire year.

There are significant differences between PSAPs of different sizes and their experiences with meeting authorized staffing levels, as shown in Figure 4. Meeting authorized staffing levels appears to be a substantial challenge for large PSAPs, with 77.3 percent reporting that they were consistently below authorized levels for the entire year compared to 38.0 percent of medium PSAPs and just 19.2 percent of small PSAPs. 41.4 percent of small PSAPs indicate that they met authorized staffing levels all year, compared to 16.8 percent of medium PSAPs and just 4.5 percent of large PSAPs.

In addition to PSAP directors, we measured employee perceptions of staffing levels by asking employees the following question: “Considering the number of employees at your PSAP right now, how sufficient is that number to meet the PSAP’s performance goals?” Employees in small PSAPs are the most likely to report that their PSAP employs enough staff (27.5%) than employees in medium (12.1%) or large PSAPs (5.0%). Conversely, employees in large PSAPs are the most likely to report that their PSAP is very understaffed (61%) than both small (22.8%) and medium (34.5%) PSAPs.

FIGURE 4: STAFFING LEVELS BY PSAP SIZE (N=362)



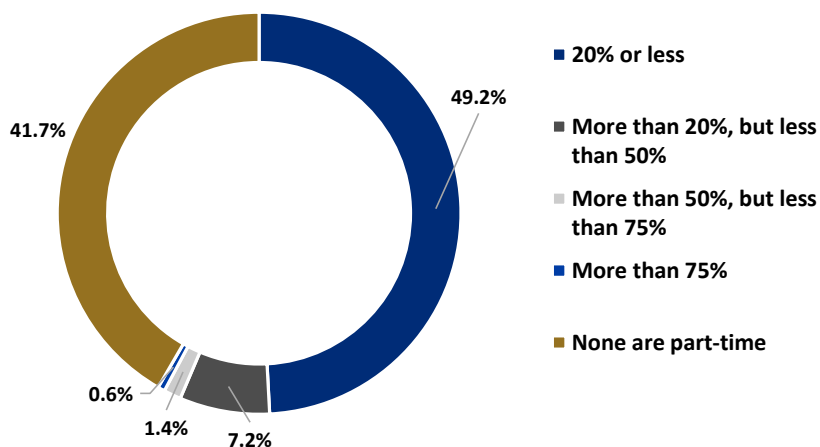
In certain respects, employee perceptions about staffing levels are in agreement with those of PSAP directors, although in others, they are not. In PSAPs where directors report being staffed to authorized levels for all of the past year, only 36.0 percent of the employees agree; where directors report that staffing levels were met for only part of the year, just 20.0 percent of the employees agree. However, where directors report that their PSAPs were consistently below authorized levels all year, only four percent of the employees said there was enough staff, indicating agreement with the assessments of directors.

PSAPs use several criteria to set staffing levels of calltakers and dispatchers, many of which differ in importance depending upon the size of the PSAP. Large PSAPs most often rely upon multiple metrics of demand and service: 85.0 percent utilize peak hour call volume, 80.0 percent utilize total call volume, 65.0 percent utilize average calls per hour, 81.0 percent utilize desired service level, and 61.9 percent utilize average answer times. Medium size PSAPs tend to utilize total call volume (71.0%), followed by peak-hour call volume (69.0%), desired service level (67.5%), and budget (60.0%). For small PSAPs, the most cited factor in determining staffing levels is budget

(67.0%), followed by total call volume (53.4%), desired service level (48.7%), and peak hour call volume (47.7%).

All in all, PSAP directors feel there are too few qualified candidates in the community to fill all of

FIGURE 5: PROPORTION OF PART-TIME WORKERS (N=360)



the job opportunities available in their PSAPs. 77.2 percent of directors either strongly agree (33.1%) or somewhat agree (44.0%), while 15.3 percent somewhat disagree and only 7.5 percent strongly disagree. The size of the PSAP has no effect on directors' perceptions of a lack of qualified candidates.

46.8 percent of PSAPs use part-time PSTs, an 11 point decrease from the 2009 study, which found that 58

percent use part-time PSTs to cover vacation, holiday, and overtime demands.³ In that study, interviewed directors noted it was often difficult to find qualified and dependable part-timers. Hence, part of this decrease in the use of part-timers might have to do with PSAPs looking for ways to avoid these staffing difficulties. As Figure 5 illustrates, in 49.2 percent of PSAPs, part-timers constitute 20.0 percent or less of all total employees, and in 41.7 percent of PSAPs, there are no part-timers at all. In just 1.95 percent of all PSAPs do part-timers constitute a majority of all employees—an extremely rare occurrence.

Minimum staffing requirements in PSAPs are most likely to vary by time of day (46.7%) followed by day of the week (28.0%) and season or time of year (26.3%). Large PSAPs are significantly more likely to have staffing needs that change according to the time of day (68.2%) compared to medium (60.0%) and small (35.3%) PSAPs. They are also the most likely to see variation in minimum staffing levels fluctuate by day of the week (46.0%) compared to medium (34.1%) and small (22.0%) PSAPs. There are no statistically significant differences between PSAPs of different sizes and seasonal minimum staffing requirements. These findings are consistent with those in the 2009 report.

³ This is consistent with the increase in mandatory overtime reported below.

Training

Successful training of PSTs is critically important for PSAPs due to the high-stress, fast-paced, and high-stakes work involved in managing and dispatching calls, especially for emergencies, but also for non-emergency situations. In total, directors from PSAPs of all sizes report an average training period of 16.5 weeks for their employees. PSAP size significantly affects this average.

Employees at large PSAPs receive the longest period of on the job training, averaging 20.2 weeks. Medium PSAPs average just slightly less at 19.8 weeks, and small PSAPs average 14.2 weeks of on the job training.

73.3 percent of PSAPs provide classroom or academy training for their new hires. Large PSAPs are much more likely to do so, with 94.7 percent reporting that this is the case. 81.0 percent of medium PSAPs offer classroom or academy training, although this number falls to just 66.7 percent when applied to small PSAPs.

Of those PSAPs offering classroom or academy training to their employees, they report that these programs last for an average of 5.8 weeks. Large PSAPs report the longest classroom training periods, averaging 11.2 weeks. This is a substantial period of time, differing significantly from the averages of 6.3 weeks at medium PSAPs and 4.7 weeks at small PSAPs.

While initial training protocols for new hires are crucial in order to get employees acclimated to the PSAP environment, ongoing training is important to ensure that employees remain up to date with organizational best practices and expectations, and that they are aware of any resources that PSAPs provide for their employees. Across PSAPs of all sizes, the average hours of continuing education or training provided to current or tenured employees is 22.6. PSAP size has no effect on this average: employees at PSAPs of any size receive about the same amount of continuing education or training.

Overtime

Overtime can be a very important component of employee satisfaction and retention. Every single large PSAP in our sample—100.0 percent—report that overtime is a frequent necessity compared to 89.0 percent of medium and 73.0 percent of small PSAPs. The necessity for overtime hours varies significantly by PSAP size. However, unlike the 2009 study, we do not find significantly different reasons for utilizing overtime across PSAPs of different sizes, although large PSAPs are the most likely to do so to meet minimum staffing levels (75.0%) compared to medium (55.0%) and small (43.0%) PSAPs. Overtime coverage for short notice illnesses is relatively stable across all PSAP sizes (25.0% of small, 22.0% of medium, 20.0% of large), as is coverage for Family and Medical Leave Act (FMLA) vacancies (2.5% of small, 2.4% of medium, 5.0% of large) and staff training (1.0% of small, 1.6% of medium, 0.0% of large). Small PSAPs are the most likely to report

that employee vacations are an important cause of overtime (28.0%), with only 20.0 percent of medium PSAPs reporting this to be the case and no large PSAPs indicating that this is the case.

Overtime is voluntary in just 25.4 percent of PSAPs and mandatory in 13.0 percent of PSAPs. About 62.0 percent of directors indicate that overtime is both mandatory and voluntary depending on PSAP conditions. There were no statistically significant differences between PSAPs of different sizes and whether or not employees work overtime at least once a month. 86.9 percent of employees at large PSAPs, 81.1 percent of employees at medium PSAPs, and 79.9 percent of employees at small PSAPs report working overtime at least once a month. However, the amount of actual overtime hours does vary by PSAP size. Employees in small PSAPs report working an average of 13.8 hours of overtime a month compared to 15.4 hours in medium PSAPs and 22.9 hours in large PSAPs. The overall average for all employees is 16.1 hours of overtime per month. Hence, those employees who do work overtime hours tend to work more if they are positioned at medium and large PSAPs.

15.6 percent of employees report that overtime is always voluntary, 75.1 percent report that it is sometimes voluntary, and 9.3 percent said that it is never voluntary. These figures show a slight decline in voluntary overtime from the 2009 findings and increases in mandatory overtime. In a sharp reversal from the 2009 study, employees in large PSAPs were significantly less likely to have the option of receiving compensatory time for overtime hours, with 62.6 percent of employees reporting that this is never the case. This compares to 41.5 percent of employees in small PSAPs and just 30.3 percent of employees in medium PSAPs. Employees at medium PSAPs are the most likely to report always receiving compensatory pay for overtime (42.4%) or sometimes receiving comp pay (27.2%). For small PSAPs these figures are 36.7 percent and 21.8 percent, respectively. Just 22.2 percent of large PSAPs report always receiving compensatory pay and only 15.2 percent report sometimes receiving compensatory pay.

In the 2009 study, when open ended interviews were conducted, the interview researchers reported that respondents expressed mixed feelings about overtime. One respondent from the 2009 study summarizes what appears to be a common sentiment about the effects of overtime:

I think that a little overtime is good because it's extra money. I think too much overtime burns people out. And I think it has an inverse effect because then when you're burnt out, you get sick and then you call in sick and then cause more overtime.

Closely related to overtime issues is the status of being on-call. On-call employees are required to come in to work, usually within one hour, whenever there is a staffing gap, such as when someone is sick and no volunteers are available. On-call work is less manageable for staff and creates more scheduling problems, especially for workers with young children, according to the 2009 interviews.

SECTION III: EMPLOYEE AND JOB CHARACTERISTICS

Employee Characteristics

The U.S. Department of Labor's Bureau of Labor Statistics (BLS) *Occupational Outlook Handbook* (2017b) uses the term "Police, Fire, and Ambulance Dispatchers"⁴ to describe the duties of PSTs:

Dispatchers answer calls from people who need help from police, firefighters, emergency services, or a combination of the three. They take emergency, non-emergency, and alarm system calls.

Dispatchers must stay calm while collecting vital information from callers to determine the severity of a situation and the location of those who need help. They then communicate this information to the appropriate first-responder agencies.

Dispatchers keep detailed records of the calls that they answer. They use computers to log important facts, such as the nature of the incident and the caller's name and location. Most computer systems detect the location of cell phones and landline phones automatically.

Some dispatchers also use crime databases, maps, and weather reports to best prepare first responders for the situations they will encounter. Other dispatchers monitor alarm systems, alerting law enforcement or fire personnel when a crime or fire occurs. In some situations, dispatchers must work with people in other jurisdictions to share information and transfer calls.

Dispatchers often must instruct callers on what to do before responders arrive. Many dispatchers are trained to offer medical help over the phone. For example, they might help the caller to provide first aid at the scene until emergency medical services arrive.

According to the 2017 BLS handbook, in 2014 there were an estimated 102,000 workers nationwide in the job category "Police, Fire, and Ambulance Dispatchers," as compared to 93,670 such workers in 2007 (BLS 2007b). This represents growth in employment in the occupation of approximately 9.0 percent. However, employment is expected to decline by three percent to an estimated 99,000 workers in 2024. State and local budget constraints, along with PSAP

⁴ As part of its ongoing effort to increase recognition and respect for PSTs, APCO has made suggestions to the federal Office of Management and Budget (OMB), which coordinates federal statistical categories, to modify the Standard Occupational Classification (SOC) system and use the term "Public Safety Telecommunicators" instead. On November 28, 2017, OMB published its decision in the Federal Register changing the SOC occupational title. However, the OMB rejected APCO's further suggestion that Public Safety Telecommunicators be included in the broader classification of Protective Service Occupations, instead leaving them in the broad group of "Office and Administrative Support Occupations."

<https://www.apcointl.org/government-relations/topics/soc-revision/>

Staffing and Retention in Public Safety Answering Points (PSAPs): A Supplemental Study, July 2018

George Mason University Center for Social Science Research

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consolidation and greater efficiency due to new technologies, account for the projected decline in employment. Most of the workforce in 2014 was employed by local governments (approximately 81.0%), with the majority employed by law enforcement agencies and fire departments. The remainder work for health care services, state governments, hospitals, private employers, and colleges and universities.

Civilian/sworn status: In the 2017 CSSR survey, 76.0 percent of PSAP directors and managers are civilians, 20.8 percent have a sworn status as law enforcement personnel, and the remaining 3.2 percent have some other status. Unlike the 2009 report, we found significant differences in sworn status across PSAPs of different sizes. Small PSAPs were the most likely to have directors sworn as law enforcement personnel (26.0% compared to 16.0% for medium and none of those in our large PSAP sample), and large PSAPs were the most likely to have civilian PSAP directors (100.0% versus 82.0% for medium and 70.0% for small).

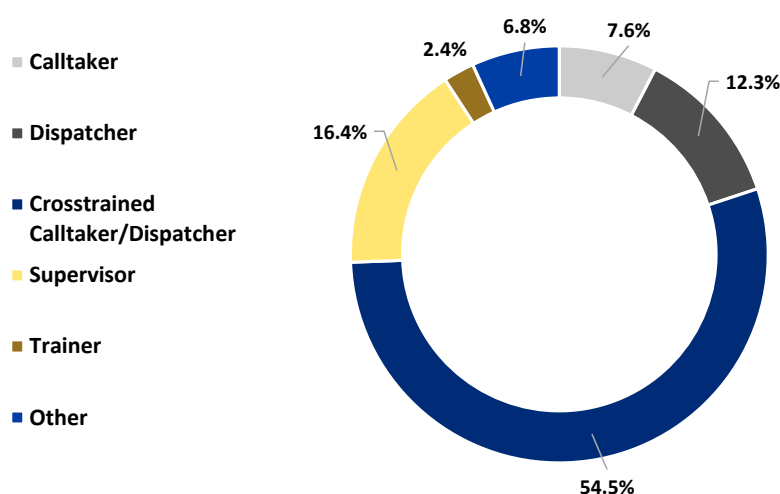
Most of the employees reported that they are civilians (89.5%), a small percentage indicated that they are sworn personnel in law enforcement (7.4%), and 3.1 percent indicated some other status. Employees at medium PSAPs were significantly more likely to have a sworn status in law enforcement (10.3%) compared to employees at small (about 7.0%) and large (0.0%) PSAPs; employees at small PSAPs were most likely to have some other status (5.3% compared to 2.4% for medium and 1.0% for large); and employees at large PSAPs were most likely to be civilian

(99.0% compared to 87.3% at medium and about 88.0% at small).

As was the case in the 2009 report, nearly all employees of civilian managers/directors (96.0%) are civilians. By contrast, only 57.0 percent of the employees of sworn managers or directors

are civilians, 38 percent are sworn employees or law enforcement personnel, and the remaining 5 percent have some other status.

FIGURE 6: PRIMARY ROLE OF EMPLOYEES (N=617)



Primary role: As shown above in Figure 6, when asked about their primary role at their PSAPs, the majority of respondents said that they are cross-trained as calltakers and dispatchers (54.5%). 16.4 percent work as supervisors, about 12.3 percent work as dispatchers only, 7.6

percent work as calltakers only, 2.4 percent work as trainers, and the remainder as something else (6.8%).

Years of service: PSAP directors and managers reported an average tenure of about 15 years at their PSAPs, a one year increase from the 2009 report. They have been employed for an average of seven years in their current position, a one year decrease from the previous report. In other words, they are staying longer with their organizations, but they are experiencing more mobility within their PSAPs.

Employees reported an average of nine years of employment at their PSAPs, an increase of one year from the 2009 study. Employees report having worked an average of 11.5 years in the overall field of public safety communications (i.e., not necessarily at the same PSAP). Within our sample of PSAPs, employees in large PSAPs average longer tenure (10.9 years) than employees in both small (9.14) and medium (8.5 years) PSAPs. However, all of the statistically significant difference is accounted for by the difference between large and medium PSAPs: neither medium and small PSAPs, nor large and small PSAPs, significantly differ from one another in terms of employee tenure.

Employment status: Most surveyed employees (96.0%) work full-time. There are no significant differences in employment status by gender or PSAP size.

Schedule: Employees were asked to choose a category that best reflects their work schedule. Consistent with the 2009 study, the most common types of scheduling are permanent assignments (36.2%) and rotation by bids (27.9%). Less common schedules include automatic rotation (20%), semi-permanent assignment (10.6%), or something else (5.3%).

However, in a series of follow-up questions, employee responses seem to diverge from what they report to be the most common types of scheduling. Only 19.3 percent of employees report that their shifts are assigned by a supervisor, a sharp decrease from the 31 percent reporting this to be the case in the 2009 study. Just under 19.0 percent of employees say that shifts are made by automatic rotation on a regular basis, and not even one percent report that shifts are assigned by randomly drawing from a pool.

Finally, and critically, only 4.5 percent of employees report that their shifts are customized to meet their needs, a sharp decline from the 11.0 percent of employees reporting this to be the case in the 2009 study. This suggests that over the past several years, employees have seen shift flexibility decline substantially.

While 32.2 percent of PSAPs report that they do not use bids, about two-thirds do. Among employees in PSAPs that do use bids, over half are determined by seniority or rotating seniority (59.3%). The remainder is determined by some other means (8.5% of PSAPs).

Scheduling procedures do vary according to the size of the PSAP. Unlike the 2009 study, which found that smaller PSAPs offer employees greater shift customization, we find that employees in PSAPs of all sizes are not likely to have shifts customized to their needs (1.6% in small, 2.1% in medium, 0.0% in large). Small and medium PSAPs are the most likely to have shifts assigned by regular automatic rotation (17.8% and 16.8%, respectively) compared to large PSAPs (2.0%). Like the 2009 study, employees in large PSAPs (60.0%) and medium PSAPs (36.8%) were significantly more likely than employees in small PSAPs (25.0%) to say that assignments are made by employee bid. Employees in medium PSAPs are the most likely to be assigned shifts by a supervisor (19.2%) compared to small (14.1%) and large PSAPs (7.0%). Seniority is an important factor in all PSAPs, although it is more determinative in small PSAPs (36.6%) than in medium (20.6%) and large PSAPs (23.0%). Large PSAPs are the most likely to report using some other metric (8.0%) compared to just over four percent for both small and medium PSAPs.

Unionization: Slightly fewer employees report that they belong to a labor union or collective bargaining unit in this study (37.4%) compared to the 2009 report (42.0%), and PSAP size does not affect this distribution. Interestingly, the sworn or unsworn status of employees is significantly related to employee unionization. Civilians are the most likely to belong to a union (40.3%) while sworn personnel are the least likely (4.7%).

Education: Respondent education levels were similar to those reported in the 2009 study, although slight increases to educational credentials are observed. The largest proportion of employees have some college but no degree (34%), although almost 19.0 percent had bachelor degrees, a 3 point increase from the 16.0 percent reported in 2009. The proportion of high school graduates decreased from 19.0 percent in 2009 to 16.6 percent in this report, and the proportion of associate degree holders improved from 13.0 percent to 16.4 percent. 3.4 percent of employees report holding a graduate degree, 1.1 percentage points more than those holding a GED (2.3%), and almost as many employees report having taken graduate courses without receiving a degree (2.1%) as have a GED.

Gender: As in the 2009 study, PSAP directors and managers are most likely to be male (54.4%) while the majority of employees are female (70.3%). The researchers from the 2009 study reported that their findings were quite consistent with the 2005 iteration, which found that 56.0 percent of directors were male and 72.0 percent of employees were female. These findings, replicated three times over the past 12 years, show that while the primary employee workforce is largely feminized, manager and director positions remain dominated by men.

PSAP directors' perceptions about the proportion of female employees in their PSAPs are mostly consistent with these findings, with 73.3 percent of directors reporting that more than 50.0 percent of their workforce is female. Specifically, 27.3 percent report that this proportion is greater than 50.0 percent, but less than 75.0 percent, while 46.0 percent report that this figure is more than 75 percent.

Age: Consistent with the 2009 report, PSAP directors and managers tend to be older than their employees. Over half of PSAP directors report being 46 or older, with 32.2 percent saying they are between 46 and 55 years old. 23.8 percent report they are 56 or older. An additional 28.8 percent of directors say they are between 36 and 45, and just 9.1 percent said they are under 35. Among employees, only 7.3 percent are 55 or older. 26.8 percent are between 45 and 54, 29.3 percent are between 35 and 44, and 30.2 percent are between 25 and 34. Only 6.4 percent of employees are under 25.

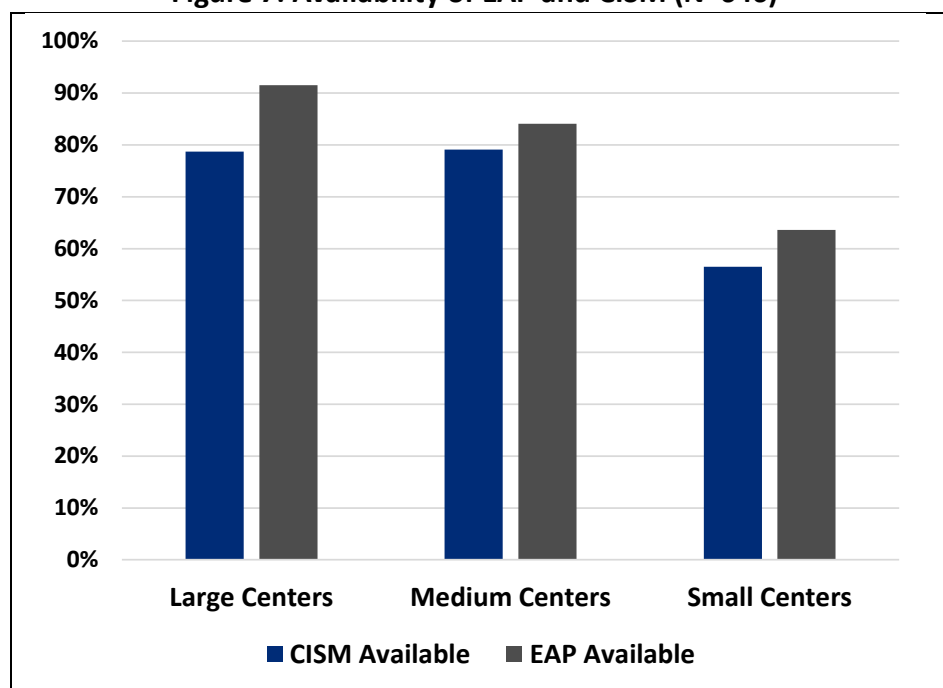
Employee Assistance, Benefits, and Pay

The majority of employees surveyed report that their PSAPs provide an EAP (78.7%). Similarly, a majority of employees report that their PSAPs provide CISM (71.8%). While both EAPs and CISM are oriented towards helping employees cope with traumatic events that might occur on the job, these programs are distinct in their scope and the resources they mobilize.

The U.S. Office of Personnel Management (OPM) defines an EAP as a “voluntary, work-based program that offers free and confidential assessments, short-term counseling, referrals, and follow-up services to employees who have personal and/or work related problems” (OPM n.d.). Everly et al. (2000) define CISM as “a range of crisis intervention services that usually include [pre-crisis] training, individual crisis counseling, group debriefing, and [post-incident] referral for primary and secondary victims” (p. 23).

As summarized in Figure 7, close to 85.0 percent of employees at small PSAPs, 97.1 percent at medium PSAPs, and

Figure 7: Availability of EAP and CISM (N=646)



medium PSAPs, and fully 100.0 percent at large PSAPs report that their PSAPs provide EAP. For CISM, close to 56.0 percent of employees at small PSAPs, 79.0 percent at medium PSAPs, and close to 79.0 percent at large PSAPs report that this service is provided to them. These differences are statistically significant, meaning that although majorities

of PSAPs of all sizes offer both EAP and CISM, large PSAPs are definitively the most likely to offer both services. The availability of EAP

and CISM programs are important. In PSAPs that do offer both services, over 66.0 percent of employees indicate that they or one of their co-workers have used these services. This is a sizeable majority, suggesting that employee coping resources are considered to be important elements contributing to effective handling of workplace responsibilities. These findings are consistent with the 2009 report.

Nearly all employees report that their PSAP provides them with health insurance that covers them and their dependents, and that this insurance is mostly paid for by their employer (92.2%). Additionally, 93.3 percent of employees report that they receive either employer contributions to their pension plans, retirement savings plans, or both. Unlike the 2009 report, however, we observe significant differences in whether or not employers provided these benefits by PSAPs size. Small PSAPs are the most likely to provide retirement savings accounts (70.6%) compared to medium (69.9%) and large PSAPs (57.1%), and large PSAPs are more likely to provide pension plan contributions (76.3%) than small (60.6%) and medium PSAPs (72.1%). Small PSAPs are also the most likely to offer neither retirement savings plans (13.9%) or pension plans (29.1%). For medium PSAPs, these numbers are 9.2 percent and 16.8 percent, respectively, and for large PSAPs 5.5 percent and 11.3 percent.

Part-time employees are significantly less likely to receive these benefits. 60.0 percent of part-timers indicate that they do not receive health care coverage compared to just 7.0 percent of full-timers, and only a quarter of part-timers receive pension contributions compared to almost 70.0 percent of full-timers.

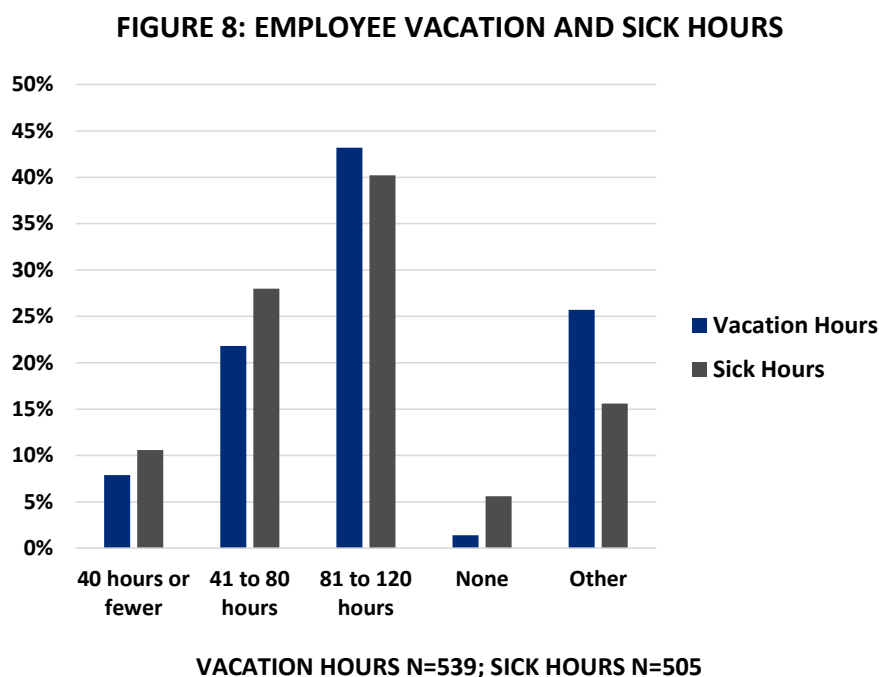
However, in terms of non-pension savings plans (e.g., 401ks), the differences between full-time and part-time employees become less defined. Fifty percent of part-time employees and over two-thirds (67.9%) of full-time employees report that their PSAPs contribute to a non-pension retirement savings account. While larger proportions of full-time employees report receiving this type of retirement savings benefit, only 20 percent of part-timers report that they do not have access to these benefits. It is also important to note that these differences are not statistically significant, meaning that there is no evidence to suggest that access to non-pension retirement savings accounts differs between full-time and part-time status. This suggests that market-based oriented savings accounts are offered widely to employees while pensions are reserved for full-time employees (although, for reasons discussed below, pensions will likely be replaced by market based savings accounts in the long-run).

An important departure from the 2009 report is that unionization has a significant and positive effect on employee access to benefits. Nearly all unionized employees (95.1%) report that they

receive health care benefits mostly paid for by their employers. While non-unionized workers also report high levels of health care access (90.4%), these differences are statistically significant.

An important finding is that unionized workers are significantly more likely to receive pension contributions from their employers (almost 77.0% compared to about 65.0% of non-unionized workers). Contrarily, non-unionized workers are the most likely to receive retirement savings contributions from their employers (about 75.0% compared to about 57.0% of unionized workers).

Employees report that they received from zero to over 120 hours of vacation time per year, with the largest proportion receiving between 81 and 120 hours (45.8%) and close to a quarter (21.9%) receiving over 120 hours. Less than two percent receive no vacation hours, only 8.2 percent receive 40 hours or less, and almost a quarter (22.6%) receive between 41 and 80 hours (see Figure 8).



Like the previous study, there are significant differences between PSAPs of different sizes and the amount of vacation hours one receives. While four percent of employees at small PSAPs report receiving no vacation hours, this is true in less than one percent of medium PSAPs and none of the large PSAPs. Large PSAPs are the most likely to provide 81 to 120 hours (48.3%) and more than 120 hours (23.6%), although small PSAPs are the most likely to offer 41 to 80 hours (26.3%).

Asked how many sick hours they receive per year, employees responses ranged from zero hours to over 120 hours. Most employees (78.6%) report receiving between 41 and 120 hours, and less than 4 percent report receiving more than 120 hours. Close to 5.0 percent receive no sick hours, and just over 9.0 percent receive 40 hours or less (see Figure 8). Consistent with the 2009 study, PSAP size has no effect on the distribution of sick hours.

Overall, half of all employees earn between \$30,000 and \$49,999 annually. Over a quarter of surveyed employees report that their incomes are between \$50,000 and \$69,999, and nine percent report that their incomes are equal to \$70,000 or more. Data from the U.S. BLS on police, fire, and ambulance dispatchers show that for the year 2016, their median incomes were \$38,870 and their median wages are \$18.69, slightly above the medians of \$32,660 and \$15.70 reported in the 2009 study (BLS 2017b). From the BLS (2017b) data, it is also extrapolated that the highest median pay for these workers comes from state governments at \$44,240. Local governments follow close behind, with a median of \$38,840. Hospitals and private organizations have the lowest median pay at \$35,370. Employees in the highest decile earn a median of over \$61,000, while those in the lowest decile earn a median of just over \$25,000.

Consistent with the previous report, employee pay was affected by PSAP size. Employees at small PSAPs are the most likely to report incomes of less than \$30,000 (22.8%) compared to medium (12.0%) and large (2.2%) PSAPs. Conversely, large PSAPs were the most likely to report incomes of \$50,000 to \$69,999 (49.5%) compared to small (18.5%) and medium (24.6%) PSAPs. Interestingly, medium PSAPs are the most likely to have employees earning \$70,000 or more (11.2%) compared to small (6.0%) and large (8.6%) PSAPs. Some of this difference is likely due to the fact that large employers tend to pay more than smaller ones (Hope and Mackin 2007). Additionally, some of the difference is probably related to the higher cost of living in cities where most large PSAPs are located.

Employee Experiences and Outlook

Beyond the analysis of the social and organizational context in which our respondents are employed, it is important to consider the attitudes and experiences that are commonly found among employees themselves. The employee survey questionnaire introduced a number of items that enable us to gauge the work outlooks of PSAP employees. The general picture that emerges is one in which employees are proud of their work, identify with their positions, and express a commitment to their PSAPs. Yet evidence of stress and strain is not far beneath the surface.

Most employees are proud to work at their PSAPs, with 54.0 percent strongly agreeing and 39.0 percent agreeing that this is true. Almost 80.0 percent of employees see themselves working for their PSAPs for at least five more years (58.3% say very likely, 21.0% say somewhat likely).

Two survey items tapping attitudes towards supervisors are revealing, especially inasmuch as supervisory treatment emerged as an important predictor of employee attitudes. About 33.0 percent of employees strongly agree that their supervisors are supportive, and about 49.0 percent agree. Employees are likely to agree that their supervisors really appreciate the challenges they face in their work situation, with 29.0 percent strongly agreeing and 47.3 percent agreeing.

Employees were less likely to agree that their supervisors often take time to acknowledge when they have done something well, with just 21.0 percent strongly agreeing and 41.0 percent agreeing. Almost 28.0 percent disagree with this statement, and over 10.0 percent strongly disagree. Employees are also less likely to agree that their PSAPs have a recognition program for outstanding employee performance, with 16.5 percent strongly agreeing, 40.2 percent agreeing, 28.2 percent disagreeing, and 15.1 percent strongly disagreeing.

Unlike the 2009 study, there are no significant differences between PSAP size and employee perceptions on whether or not their supervisors acknowledge when they have done something well. However, in keeping with the 2009 report, larger PSAPs are significantly more likely to report that their PSAP has a recognition program for outstanding employee performance. Employees at medium PSAPs are the most likely to strongly agree (19.4%) followed by employees at large (16.7%) and small (11.5%) PSAPs. Employees at large PSAPs are the most likely to agree (60.4%) followed by employees at medium (40.3%) and small PSAPs (29.7%). On the other hand, employees at small PSAPs are the most likely to strongly disagree (23.6%) followed by employees at medium (13.1%) and large (5.2%) PSAPs.

Overall, employees have favorable opinions about their coworkers. Over 94.0 percent either strongly agree or agree that they have good working relationships with their coworkers. In a change from the 2009 report, employees in small PSAPs are significantly less likely to strongly agree that they have good working relationships with coworkers (34.8%) compared to medium (45.8%) and large (37.1%) PSAPs. However, almost 57.0 percent of employees at small PSAPs agree, just behind the almost 59.0 percent of employees at large PSAPs, and greater than the 50 percent of employees at medium PSAPs.

86.0 percent of employees either strongly agree or agree that there are people at work they can count on for help when they need to cope with issues on the job. Moreover, almost 90.0 percent of employees strongly agree or agree that their co-workers help them perform their job the best they can. Consistent with the 2009 study, employees at medium PSAPs are significantly more likely to strongly agree (32.4%) compared to employees at small (27.2%) and large (28.6%) PSAPs, although employees at large PSAPs are the most likely to agree (64.3%) compared to employees at small (58.2%) and medium (58.9%) PSAPs.

Most employees (about 83.0%) either strongly agree or agree that their coworkers conduct themselves in a professional manner at work. Employees in small PSAPs are slightly more likely to strongly agree (22.8%) compared to employees at medium (22.6%) and large (10.2%) PSAPs, although over three-quarters of employees at large PSAPs agree followed by over 61 percent of employees at medium PSAPs and over 57.0 percent of employees at small PSAPs.

Employees are somewhat divided about opportunities for promotion. Only 13.3 percent strongly agree that such opportunities exist. While 39.1 percent agree, almost half (48.0%) either disagree

or strongly disagree. Similarly, most employees either disagree or strongly disagree (64.2%) that their possibility for advancement or promotion within the next couple of years is good at their PSAP.

Employee feelings towards their likelihood of promotion differs by civilian versus sworn status. Employees with sworn status are the most likely to strongly agree that they have opportunities for promotion at their PSAP (25.6%), although employees with civilian status are the most likely to agree (40.0%). Employees with an “other” status are the most likely to disagree that they have opportunities for promotion (50.0%), and employees with civilian status are the most likely to strongly disagree (almost 20.0%).

Being in a union and having educational credentials does not have an effect on employee perceptions towards promotional opportunities, a key departure from the 2009 study. However, PSAP size does affect this outcome. Employees in large PSAPs are significantly more likely to strongly agree (26.6%) or agree (51.1%) that there is opportunity for promotion in their PSAP compared to employees in small (3.2% strongly agree and 30.6% agree) and medium (15.2% strongly agree and 40.4% agree) PSAPs. Similarly, employees in large PSAPs are the most likely to strongly agree or agree that the possibility of advancement or promotion within the next couple of years is good compared to those working in small and medium PSAPs.

Asked how strongly they agree with the statement that their work is appreciated by the public, respondents express similar opinions as found in 2009 report. 10.7 percent strongly agree, 46.4 percent agree, 30.4 percent disagree, and 12.5 percent strongly disagree. Employees were also asked how strongly they agree that their work is appreciated by the media, and here the responses are more cynical. Over half (57.0%) disagree or strongly disagree, and less than 6 percent strongly agree. While almost 38.0 percent agree, in general, PSAP employees do not believe that their work is appreciated by the media.

There is significant variation in how often employees feel they must handle emotionally difficult situations. Employees in medium PSAPs are the most likely to report dealing with emotionally difficult situations once or more per shift (50.7%) compared to employees at small (31.4%) and large (47.4%) PSAPs. Similarly, there are significant differences between employees at PSAPs of different sizes and the frequency that they handle traumatic situations that are going to end badly no matter what. Employees at large PSAPs are the most likely to report handling such situations once or more per shift (14.1%) or once or more per week (38.4%) compared to employees at small (4.3% and 27.7%, respectively) and medium (12.8% and 35.3%, respectively) PSAPs. Employees at small PSAPs are the most likely to deal with such incidents less than once per month or never (28.7%) compared to employees at medium (15.2%) and large (18.2%) PSAPs.

There is quite a bit of variation in whether employees agree with the statement that the shift selection process allows them to meet family obligations: 11.0 percent strongly agree and 46.0 percent agree. However, a sizeable minority either disagree (28.0%) or strongly disagree (15.0%). Unlike the 2009 study, PSAP size has no effect on employee perceptions of whether or not their shift selection process allows them to meet family obligations, although we confirm the previous report's finding that employee gender does not influence the outcome.

In a change from the 2009 study, employees in large PSAPs are the least likely to strongly agree that their PSAP's leave policy allows for personal time as needed (14.9%) compared to employees at small (32.8%) and medium (26.0%) PSAPs. Employees at large PSAPs are also the most likely to strongly disagree (20.2%) compared to just 2.7 percent of employees at small PSAPs and 6.8 percent of employees at medium PSAPs.

Most employees agree that their job requires them to do things just the way they are told, with 88.2 percent strongly agreeing or agreeing that this is the case. There is less agreement with the statement that "The amount of work I do is carefully measured by the people above me," with about 18.0 percent strongly agreeing, about 44.0 percent agreeing, 30.3 percent disagreeing, and 8.4 percent strongly disagreeing. There were no significant differences in responses by PSAP size.

SECTION IV: DEFINING THE PUBLIC SAFETY TELECOMMUNICATOR POSITION

This section looks in detail at staffing and workload data for PST, who function as calltakers and dispatchers at PSAPs. A PST functions as a calltaker when processing incoming calls through by analyzing, prioritizing, and disseminating of information to aid in the safety of the public and responders. A PST functions as a dispatcher when providing dispatch services by analyzing, prioritizing, and processing calls by Computer Aided Dispatch (CAD) or radio contact with responders to ensure safe, efficient, and effective responses to calls for emergency medical, fire, and law enforcement services, in accordance with local, state, tribal, or national standards. In some instances, a PST performs both functions, and in other cases, a PST specializes in one or the other.

In response to requests from PSAPs to provide guidelines for defining and staffing their PST positions, this section seeks to help establish appropriate criteria based upon current practices in PSAPs regarding the staffing and workload of the calltaker and dispatch functions.

Complicating the task of defining the PST position and establishing standard criteria for staffing is the wide variety of ways that these positions are structured across PSAPs, which makes the exact work requirements for these employees highly contingent on a complex set of local factors. Some of the variations in the position are based upon:

- **Workload.** A PST may be responsible for police, fire, or EMS units, or a combination of these. Dispatch for a variety of other services may also be provided (see Table 5). PSTs may be specialized, solely dedicated to dispatching, or they may also have duties such as receiving emergency calls or providing medical instruction to those on the scene of the emergency. In other cases, PSTs may be responsible for a channel, frequency, or for servicing requests for data, tow trucks, other support agencies, or interfacing with data networks not available to police units.
- **Employee—Director Synergy.** As these workload concerns demonstrate, PSTs are under pressure to maintain excellent performance in the face of stressful situations and many overlapping responsibilities. On the other hand, PSAP directors are expected to optimize their PSAPs so that they can maintain performance and effectively respond to the calls their PSAPs receive. Both PSTs and directors, then, experience substantial pressure to perform. Any slippage in workload expectations on either side can lead to difficulties in the successful operation of PSAPs and the establishing of uniform standards.

- **Staffing Criteria.** PSAPs of different sizes use a variety of criteria for determining the staffing levels of their PST positions, which feeds directly back into workload matters and employee-director synergy around performance and workplace expectations. The needs of PSAPs, and consequently the structuring of the PST positions, will vary, adding one more wrinkle to establishing uniform standards.

Workload

As was noted in Section II, PSAPs offer a range of public services. These include essential emergency services, such as law enforcement, EMS, and fire, as well as a host of supplementary non-emergency services (e.g., animal control, public utilities assistance, and weather notifications). Some PSAPs provide both calltaking and dispatch for their services, while others only provide dispatch. For purposes of illustration, we repeat the summary of these findings below in Table 5.

TABLE 5: PSAPS PROVIDING DISPATCH BY DISCIPLINE			
	Call Taking and Dispatch	Dispatch Only	No Service
Law Enforcement	97.0% (427)	1.1% (5)	1.8% (8)
Fire	88.3% (364)	1.2% (5)	10.4% (43)
EMS Medical	81.2% (320)	1.3% (5)	16.8% (66)
EMD Medical	62.8% (255)	1.2% (5)	36% (146)
Other (Emergency)	9.9% (45)	0.9% (4)	89.2% (406)
Administrative Calls	92.9% (340)	1.6% (6)	5.5% (20)
Public Utilities	45.2% (165)	1.9% (7)	52.9% (193)
Animal Control	75.7% (293)	2.3% (9)	22.0% (85)
Transportation	10.5% (41)	1.5% (6)	88.0% (345)
After Hours Calls	62.1% (226)	1.9% (7)	36.0% (131)
Other (Non-Emergency)	3.3% (15)	0.7% (3)	96.0% (434)

To reemphasize the data, virtually all PSAPs provide both calltaking and dispatch services for law enforcement (97%), fire (88.3%) and EMS (81.2%). Most PSAPs also provide administrative calltaking and dispatch (92.9%), and many also provide calltaking and dispatch for animal control (75.7%) and after hours calls (62.1%). Most PSAPs do not provide additional emergency services beyond standard law, fire, and EMS (just under 10% report that they do), and only a small number of PSAPs (3.3%) provide additional non-emergency services beyond those listed in Table 5.

In the 2009 report, it was found that large PSAPs were significantly more likely to specialize than were both small and medium PSAPs. It was also found that PSTs in large PSAPs were significantly more likely to attend to only one discipline (e.g., law enforcement, fire, etc.). Our findings are mostly consistent with those of the previous report, although our observations of specialization yields important findings.

To determine total PSAP specialization, we summed the total number of specialized calltakers with the total number of specialized dispatchers in a PSAP. Taken together, both figures represent total specialization, accounting for the quantity of employees in a PSAP who perform the function of only calltaking and only dispatching. We then divided this number by the quantity of total employees in a PSAP and multiplied the result by 100. Table 6 reports the average rates of specialization by PSAP size.

As Table 6 shows, there are significant differences between PSAPs of different sizes and their degree of specialization. On average, small PSAPs have a rate of specialization of 13.87 percent, medium PSAPs specialize at a rate of 10.61 percent, and large PSAPs average a rate of 42.96 percent. However, medium and small PSAPs are not significantly different from each other in terms of their rates of specialization, suggesting that their levels of calltaker and dispatcher specialization are comparable. In fact, all the statistical significance is caused by large PSAPs and their high levels of specialization relative to both small and medium PSAPs.

TABLE 6: AVERAGE RATES OF SPECIALIZATION BY PSAP SIZE			
	SMALL PSAPS	MEDIUM PSAPS	LARGE PSAPS
Average Rate	13.87% (224)	10.61% (188)	42.96% (29)
Std. Deviation	28.60	17.60	39.30
Welch F	9.940		
p-value	.000		

One difference that presents itself here is that small PSAPs have seemingly increased their rates of specialization since the last report. Whereas, in 2009, the researchers only found that one percent of small PSAPs specialized, our results show that this number has increased by a factor of nearly 14. The most probable explanation for this important change is that small PSAPs are trying to address the organizational difficulties and occupational anxieties that come along with low levels of specialization and require employees to wear many hats and continuously switch roles (cf. Davis and Cobb 2010 on organization size and workplace outcomes).

In 2017, 40.1 percent of PSAPs report that their dispatch positions cover only one discipline at a time, such as law enforcement or fire, meaning that close to 60.0 percent of PSAPs—a sizeable majority—have their dispatch positions handle multiple disciplines at a time. Here, too, there are significant differences between PSAPs of different sizes, as Table 7 shows.

TABLE 7: DISPATCH POSITION HANDLING OF DISCIPLINES BY PSAP SIZE			
	SMALL PSAPS	MEDIUM PSAPS	LARGE PSAPS
ONE DISCIPLINE	24.0% (50)	55.5% (76)	91.7% (22)
MULTIPLE DISCIPLINES	76.0% (158)	44.5% (61)	8.3% (2)
χ^2	62.386		
p-value	.000		

Nearly all large PSAPs (91.7%) report that their dispatch positions only focus on one discipline at a time. A majority of medium PSAPs report this to be the case (55.5%), although less than a quarter of small PSAPs indicate this to be true. Indeed, in small PSAPs, fully 76.0 percent of dispatch positions are working with multiple disciplines at one time compared to 44.5 percent of medium PSAPs and just 8.3 percent of large PSAPs. These findings echo those of the 2009 report, where 71.0 percent of large PSAPs, 47.0 percent of medium PSAPs, and 17.0 percent of small PSAPs had their dispatch positions handle only one discipline at a time.

It is clear from these data that there is a strong positive relationship between increasing PSAP size and increasing rates of specialization. Given the data on the quantity of disciplines covered by PSAPs and the divergent rates of specialization within PSAPs of different sizes, it is important to examine the quantity of units that PSTs handle at a given time to determine the average workload for the dispatch position. Table 8 presents findings on the average number of units managed by PSTs at a single time as reported by PSAP directors.

As the results show, there are statistically significant differences between the average workloads of the dispatch position across PSAPs of different sizes. PSTs at large PSAPs handle a higher proportion of both law enforcement units and fire units at once, averaging 26 and 14, respectively. PSTs in medium PSAPs average 16 law enforcement units and 11 fire units at once, and PSTs in small PSAPs average just 8 law enforcement units and 5 fire units at once.

TABLE 8: AVERAGE UNITS HANDLED BY DISPATCHERS AT ONE TIME BY PSAP SIZE AS REPORTED BY PSAP DIRECTORS				
	SMALL	MEDIUM	LARGE	WELCH F
Law Enforcement Units (N=339)	8**	16**	26**	40.672
Fire Units (N=318)	5**	11**	14**	12.985
Primary Radio Channels (N=327)	4	3	4	41.153
Secondary Radio Channels (N=318)	3	3	4	.237
Total Units at a Time	12**	20**	27**	12.985
**<i>p</i><.01				

PSAP size is not significantly related to the number of primary or secondary radio channels managed. In terms of estimating total units managed at a time, irrespective of discipline, directors at large PSAPs report that PSTs handle 27 units, compared to an estimated 20 at medium PSAPs and 12 at small PSAPs.

Our statistical tests show that for fire units, PSTs in large PSAPs and medium PSAPs do not significantly differ from one another in terms of the average quantity of units they handle at one time, although PSTs at small PSAPs are noticeably different. For total units handled at a time, this same relationship is repeated: PSTs at small PSAPs are significantly different from those at medium and large PSAPs, but employees at medium and large PSAPs are not different from each other.

One measure in the survey that attempts to get at these productivity challenges asks directors to evaluate the number of radio transactions a PST can effectively handle during critical events before they struggle to satisfactorily manage their channels. The results are presented in Table 9.

TABLE 9: DURING CRITICAL EVENTS, AT WHAT LEVEL OF TRANSACTIONS DO DISPATCHERS STRUGGLE TO EFFECTIVELY HANDLE RADIO CHANNELS?			
	SMALL PSAPS	MEDIUM PSAPS	LARGE PSAPS
Mean	16 (117)	24 (54)	21 (8)
Welch <i>F</i>	3.898		
<i>p-value</i>	.022		

Directors in small PSAPs report that PSTs begin struggling to effectively handle their radio channels at around 16 overlapping transactions. For medium PSAPs, directors report 24 transactions, and for large PSAPs, this number is 21. These differences are statistically significant, indicating that PSAP size does have an effect on the productivity of PSTs. Interestingly, directors from large PSAPs report a figure slightly below that of medium PSAPs. However, all of the statistical significance is accounted for by differences between small and medium PSAPs.

Part of this might simply be due to sample size and representativeness, for large PSAPs make up a small proportion of cases in the sample data set. In this case, it is possible that PSTs in large PSAPs might actually be able to manage more transactions during critical events than PSTs at smaller PSAPs. On the other hand, if this average is true, then large PSAPs might present particular difficulties to workers, perhaps in terms of types of emergency incidents or organizational stressors that make PSTs less able to handle large numbers of radio transactions in relation to medium PSAPs. However, more research is needed to generalize on this point. For small PSAPs, this lower number is likely due to the fact that the division of labor is much less specialized, meaning employees occupy multiple roles at once. Thus, each additional transaction presents particular difficulties for PSTs who must move fluidly between organizational tasks.

Nevertheless, given these data, we can conclude that the PST workload, as differentiated across PSAP size, has significant implications for employee productivity and, potentially, their wellbeing, job satisfaction, and organizational commitment.

Employee—Director Synergy

Given our findings on how directors understand the workload of the dispatcher position, it remains critical to examine whether or not PSTs themselves understand their work on similar terms. Tables 10 and 11 present data on average workload by discipline as reported by PSTs themselves.

These findings show that there are significant differences between average workloads for dispatch positions in PSAPs of different sizes for law enforcement units and for fire and/or EMS units. Dispatcher positions in small PSAPs average nine law enforcement units at one time compared to an average of 17 at medium PSAPs and 27 at large PSAPs. In terms of fire and/or EMS units managed at one time, dispatch positions in small PSAPs average nine, medium PSAPs average 13, and large PSAPs average 11. However, for fire and/or EMS units, all of the variance is accounted for by differences between dispatch positions in small and medium PSAPs. That is, the dispatch positions in large PSAPs do not significantly differ from either small or medium PSAPs in terms of total fire and/or EMS units handled at one time.

TABLE 10: DISPATCHER WORKLOAD AS REPORTED BY DISPATCHERS THEMSELVES				
	SMALL PSAPS	MEDIUM PSAPS	LARGE PSAPS	WELCH F
Average Law Enforcement Units Handled at One Time	9**	17**	27**	84.077
Average Fire and/or EMS Units Handled at One Time	9**	13**	11**	7.900

** $p < .01$

These employee data only slightly diverge from those of PSAP directors reported above. While directors at small PSAPs only underestimate the average law enforcement units handled by PSTs at one time by a figure of one, for fire units, they underestimate by a figure of four, reporting an average of five compared to the PSTs' reports of nine.

For medium PSAPs, directors estimated that PSTs handled 16 law enforcement units and 11 fire units at once. For PSTs, these numbers are 17 and 13 respectively, very close to the directors' estimates. Large PSAPs experience similar consistency, with directors estimating that PSTs handle 26 law enforcement units at once and 14 fire units at once. PSTs at large PSAPs report figures of 27 and 11, respectively, relatively close to the directors' estimates.

As Table 11 shows, dispatchers at large PSAPs are the most likely to report that they handle no additional secondary radio channels, while dispatchers at small PSAPs are the most likely to report that they handle six or more additional secondary radio channels.

TABLE 11: ADDITIONAL SECONDARY RADIO CHANNELS MANAGED BY DISPATCHERS AS REPORTED BY DISPATCHERS			
	SMALL PSAPS	MEDIUM PSAPS	LARGE PSAPS
0	2.1% (4)	11.0% (32)	18.4% (16)
1	13.9% (27)	19.6% (57)	23.0% (20)
2 to 6	57.2% (111)	59.8% (174)	58.4% (49)
6 or more	26.8% (53)	9.6% (28)	2.3% (2)
χ^2	57.894		
p-value	.000		

The figures are almost identical for PSAPs of every size when measuring PSTs who handle between two and six additional secondary radio channels, ranging from 57.2 percent to 59.8 percent.

There is considerable spread among PSTs who must handle a single additional secondary radio channel, with PSTs at large PSAPs composing the largest proportion of this category at 23.0 percent compared to 19.6 percent for medium PSAPs and just 13.9 percent for small PSAPs.

Importantly, handling two to six additional radio channels seems to be the norm at PSAPs of all sizes, with this being the case at 57.2 percent of small PSAPs, 59.8 percent of medium PSAPs, and 58.4 percent of large PSAPs.

Table 12 presents results concerning PSTs' perceptions of the maximum effective workload for the dispatch position. Here, it is shown that statistically significant differences do exist between PSTs' reported effective average workloads controlling for PSAP size. PSTs at small PSAPs report being able to manage 10 total units at one time effectively and 3 primary radio channels at one time effectively. The findings in Table 12 suggest that PSTs at small PSAPs are working just below their maximum effective thresholds when comparing these findings to their actual reported workloads (see Table 10 above).

TABLE 12: DISPATCHER PERCEPTIONS ON THEIR MAXIMUM EFFECTIVE WORKLOAD				
	SMALL PSAPS	MEDIUM PSAPS	LARGE PSAPS	WELCH F
Average Total Units Effectively Managed at One Time	10**	16**	22**	69.56
Average Total Primary Radio Channels Effectively Managed at One Time	3**	2**	2**	5.238

****p<.01**

PSTs at medium PSAPs are slightly overworked, reporting that their maximum effective threshold is 16, but taking on an average of 17 units at a time. The same is true for large PSAPs, where the discrepancy between the maximum effective threshold and the highest average actually managed stands is a gap of five: 27 actual compared to an estimate of 22 effective.

Staffing Criteria

Effectively managing the staffing levels of dispatch positions has significant consequences for the organizational productivity and effective ability to handle emergency and non-emergency situations at PSAPs. Consequently, maintaining a set of best practices for predicting staffing needs is essential for the efficient operation of PSAPs.

As our findings in Table 13 below indicate, there are important differences between PSAPs of different sizes and the weight they attribute to specific criteria in determining their staffing levels. Expectedly, a high proportion of PSAPs of all sizes indicate that budget is an important factor, and there is no statistically significant variation. Call volume and its associated variables (*i.e.*, calls per hour and peak hour call volume) are much more likely to be used as staffing criteria in large and medium PSAPs than in small PSAPs, and these differences are statistically significant.

TABLE 13: STAFFING CRITERIA BY PSAP SIZE			
CRITERIA:	SMALL PSAPS	MEDIUM PSAPS	LARGE PSAPS
BUDGET	67.0% (130)	60.0% (75)	50.0% (10)
TOTAL CALL VOLUME	53.4% (107)**	71.2% (93)**	80.0% (16)**
AVERAGE CALLS PER HOUR	35.8% (67)**	60.8% (76)**	65.0% (13)**
PEAK HOUR CALL VOLUME	47.7% (92)**	69.0% (87)**	85.0% (17)**
AVERAGE ANSWER TIME	30.1% (56)**	46.0% (57)**	61.9% (13)**
AVAILABLE RADIO FREQUENCIES	19.9% (36)	22.8% (28)	10.0% (2)
NUMBER OF PSAP CONSOLES	45.8% (88)*	35.5% (43)*	20.0% (4)*
PROJECT RETAINS STAFFING WORKSHEET/TOOLKIT	10.4% (19)**	18.0% (22)**	42.1% (8)**
DESIRED SERVICE LEVEL	48.7% (92)**	67.5% (85)**	81.0% (17)**
SOME OTHER METRIC	6.3% (5)	14.8% (8)	20.0% (2)

** $p < .01$, * $p < .05$

Intuitively, call volume will increase with PSAP size, which tends to increase with higher density population areas. It makes sense, then, that the larger the PSAP, and the larger the population served, the greater the call volume and, therefore, the greater demand for PSAPs to effectively mediate calls. Doing so requires adequate staffing levels.

Average answer time is a marginal consideration when determining staffing levels at small and medium PSAPs (30.1% and 46%, respectively, use it). For large PSAPs, however, this figure is nearly 62.0 percent, substantially higher than, and significantly different from, small and medium

PSAPs. Small PSAPs seem to place a greater emphasis on the number of consoles they have in determining their staffing criteria, with 45.8 percent deploying this metric as an indicator. Only 35.5 percent of medium PSAPs and just 20.0 percent of large PSAPs use this as a determinant, and these differences are statistically significant. The quantity of available radio frequencies does not seem to be a significant factor in determining staffing levels for PSAPs of any size, nor do other metrics unaccounted for in the survey.

A critically important finding here is the statistically significant differences in usage of Project RETAINS across PSAPs of different sizes as a staffing criteria. Just 10.4% of small PSAPs and only 18% of medium PSAPs use the RETAINS worksheets or toolkit in predicting staffing levels, compared to 42.1% of large PSAPs.⁵ Even here, though, only a minority of large PSAPs make use of RETAINS in this way.

It is not clear why this is, although it could be that PSAP directors are simply unaware of RETAINS, particularly at small and medium sized PSAPs, indicating that APCO should take steps to further educate PSAPs and municipalities about this initiative. Other possibilities include the perception among PSAP directors that their PSAP simply does not need RETAINS, in which case APCO might consider new strategies of persuasion that could convincingly highlight the benefits of using the RETAINS toolkit. Finally, PSAP directors also might be intimidated by the prospect of learning and implementing a new platform like RETAINS, in which case APCO might consider opportunities for training directors, or develop robust online tutorials that are extremely easy to use, comprehensive, and time efficient.

⁵ Here, the proportion of large and medium PSAPs reporting that they use RETAINS in predicting staffing levels is larger than the proportion of large and medium PSAPs who report having used RETAINS at all. The reason for this is because the sample sizes differ. Here, the sample size is only 122 for medium and 19 for large, compared to a sample of 188 medium and 29 large for the question that asked PSAPs if they have used Project RETAINS above in section VII. Due to the smaller sample size here, the proportions are different, although the quantities of medium and PSAPs that report using RETAINS for staffing criteria are less than the quantities of medium and large PSAPs that have ever used Project RETAINS. This confirms that usage of RETAINS remains low and marginal.

SECTION V: RETENTION AND TURNOVER RATES

In this report, we define turnover as the total number of separations in an organization divided by the average number of employees. In general, turnover is calculated on a monthly basis. For the purposes of this study, we are dealing with turnover over the course of a year, specifically CY 2016. Yearly turnover is equal to the sum of all the monthly turnover rates within a 12-month period.

The BLS provides a detailed record of turnover statistics across different industrial and regional contexts. Data for 2016 show a national yearly turnover rate of 41.8 percent, an increase of over 2 percentage points from 2007. Turnover in government work is comparatively low, at 18.3 percent, and turnover in the leisure and hospitality industries is extremely high, at 74.3 percent (BLS 2017a).

While turnover varies sharply across industries, occupations, and geographical locations, it is crucial to understand that the consequences of turnover also vary in important ways. In branches of the economy where skill requirements are relatively low or where the human and societal consequences of poor performance are relatively limited (as in food service work, for example), the costs of high turnover may also be low. In other branches of the economy, a constant hemorrhaging of skilled or motivated personnel may have a different and more serious impact.

Public Safety Telecommunicator Retention Rates

The initial 2005 Project RETAINS study calculated the turnover rate for each agency as the total number of employees who left employment in the previous year, divided by the total number of current employees. The retention rate was then calculated as the inverse of the turnover rate, multiplied by 100, as shown in Table 14.

TABLE 14: 2005 STUDY'S ESTIMATION OF TURNOVER AND RETENTION RATES

Turnover Rate = # of staff who left last year / # of current employees

Retention Rate = (1 – Turnover Rate) x 100

With this methodology, the 2005 study found an average retention rate of 83.0 percent, with rates ranging from 23.0 to 100.0 percent. In other words, this equals an average turnover rate of 17 percent. This rate, it was noted, was not unlike turnover rates found in another study of PSAPs averaging 16.0 percent (Yearwood 2004:9-10), and similar to those for other professions, such as nurses and teachers (15.0%).

In 2009, the same method was used to calculate the retention rate. Hence, the retention rate calculated for each PSAP was based on the number of staff who left in the previous year divided

by the total number of current employees. In order to calculate the total number of staff who left last year, the researchers summed the numbers provided by PSAP directors for the following two variables:

- 1) How many of the new hires from 2007 “washed out” during the training/probationary period?
- 2) How many PSTs who had completed training and probation left the PSAP in 2007?

In the current study, we adopt a slightly different approach to measuring retention. This approach, recommended by the Society for Human Resource Management (SHRM), is more careful to distinguish attrition from turnover. According to the SHRM (2015), an appropriate measure must account for retirees, employees who died, and employees who left due to relocation. The reason we must account for these variables is because we assume that these positions, made vacant by these factors, are going to be filled with new labor. In other words, simply because an employee died, retired, or relocated does not mean that the position is now closed. If this were the case, then this would be an example of attrition, not turnover. Since we assume the position will remain and will be re-staffed, these employees must be considered in any computation of retention and/or turnover.

Conceptually, the calculation of the turnover rate and the retention rate remains the same. The only difference is the range of variables considered in the computation of the number of staff that left the PSAPs in 2016. In keeping with the 2005 and 2009 report, we use basically the same formulae reported above in Table 14.

To compute turnover rate, we first determined the total quantity of turnovers. This calculation is broader than that used in the 2005 and 2009 studies, as we include additional measures of turnover. Our broader, more comprehensive measure includes:

- Quantity of new hires who left before completing training;
- Quantity of new hires who left after completing training;
- Quantity of all employees who left due to burnout/problems of fit;
- Quantity of all employees who left due to retirement/death/relocation.

The findings from our calculations are presented below in Table 15. We find an average retention rate of 70.7 percent for all PSAPs (i.e., a turnover rate of 29.3%).

TABLE 15: DESCRIPTIVE STATISTICS FOR RETENTION RATE					
MEAN	MEDIAN	MIN	MAX	STD. DEV.	N
70.69	76.20	-150.00	100.00	32.46	451

The range for retention is quite wide, from a low of -150.0⁶ percent to a high of 100.0 percent. There is considerable variation, indicated by the standard deviation, which is close to 33.0 percentage points. However, the median is not so far from the mean, calculated at about 76.2 percent, suggesting that the average is a fair representation of expected retention rates in PSAPs, despite the degree of variation.

Given these figures, it appears that retention has grown as a problem since the previous study. The 2009 report found an average retention rate of 81.0 percent, and a median of 91.0 percent. Their reported range was also a bit less, from a low of -100.0 percent to a high of 100.0 percent.⁷ Our larger range, which bottoms out at -150.0 percent, indicates that certain PSAPs have an extremely difficult time retaining staff, most probably explained by the fact that these PSAPs routinely hire far more employees than stay on board. One possibility is that, in anticipation of losing most of their hires, some PSAPs may hire PSTs *en masse*, and then lose many of them during the training period or soon after. Part of this increase is also likely due to the broader definition of turnover adopted in the current study.⁸ This also raises the possibility that the narrower definition used in the earlier studies may have overestimated retention rates.

The 2009 report did not find a relationship between PSAP size and retention rate. Our analysis suggests that there may be a relationship, with the highest retention rates being found in the medium sized PSAPs (76.8% on average). Large PSAPs have the lowest average retention rate

⁶ A negative turnover rate is possible if over the course of a year a PSAP loses more employees than its total size; in other words, one or more positions is vacant multiple times in a year. For example, the retention rate of -150.0% occurred in a PSAP with two positions, where in the previous year, one hire did not complete the training, two left after completing training but on probation, one left after probation due to retirement, and one left due to burnout yielding a turnover of five, a turnover rate of 2.5 and a retention rate of -150%.

⁷ A negative retention rate occurs when the number of employees who left exceeds the number of current employees. The smaller a PSAP is, the more likely it is to have negative retention rates or lower retention rates due to the simple rules of proportionality. For example, in one of our sample PSAPs, there were two current PST positions and five individuals who occupied, but then left, these positions during the year in question.

⁸ When calculating retention using the exact method as the 2009 and 2005 studies, we find an average retention rate of 82.6 percent and a median of 87.1 percent, an improvement over the findings in Table 15. Hence, some of the decrease in retention we observe is due to our measure. However, it is likely that the old measure has underestimated retention rates due to the reasons explained above. Moreover, while the average of 82.6 is slightly above the rate of 81 percent found in 2009, the median for this measure is 87.1 percent, almost five percentage points lower than the median of 91 percent reported in 2009. This lower median suggests that, even if we adopt the original measure, retention rates have declined. The median is a good indicator because, unlike the mean, it is not affected by extremely large values (in this case very high, but rare, retention rates), helping to clarify actual trends in retention. Finally, using this more restricted measure does not affect the results of the analyses presented in this section.

(58.7%), and the average for small PSAPs falls in the middle (67.3%). Table 7 summarizes these figures

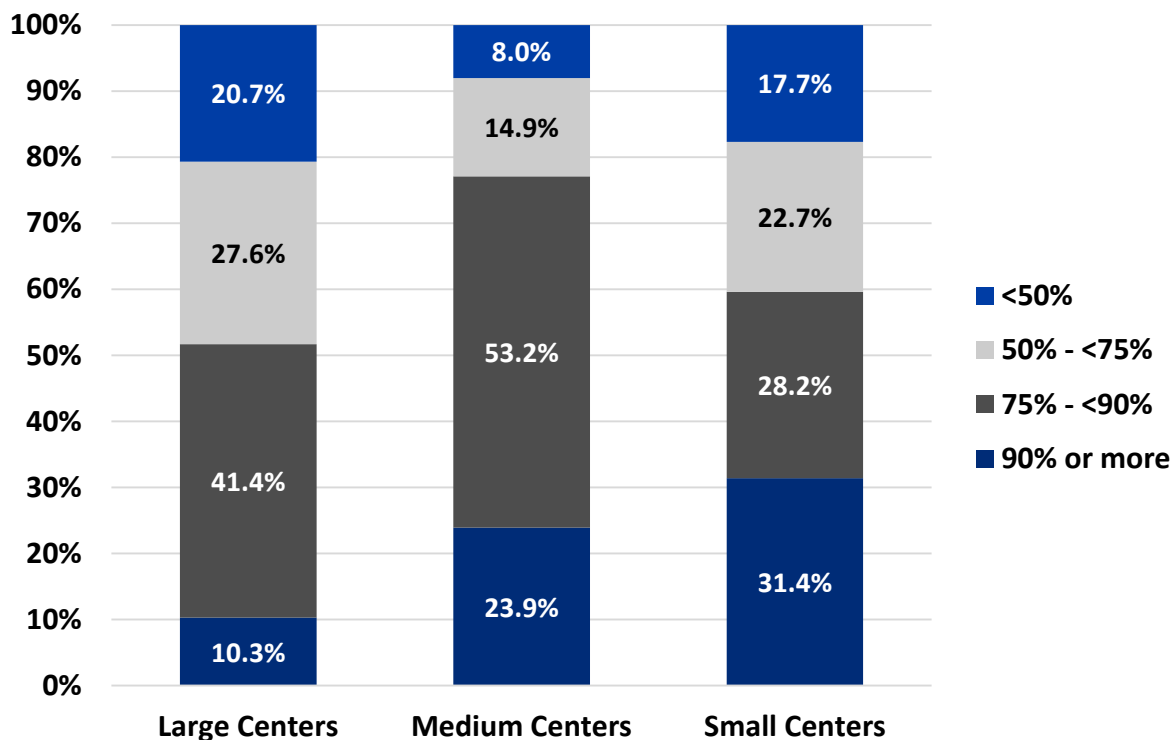
TABLE 16: EFFECT OF PSAP SIZE ON RETENTION RATE			
	SMALL PSAPS	MEDIUM PSAPS	LARGE PSAPS
Mean	67.32	76.77	58.75
Std. Dev.	40.00	18.81	39.46
N	220	188	29
Welch F	72.07		
p-value	.001		

As Table 7 shows, our findings indicate that these differences are statistically significant. However, all of this difference is explained by retention rates in medium PSAPs. The retention rates of small and large PSAPs are not significantly different from one another, although both differ significantly from medium PSAPs. In other words, all the statistically significant difference we observe is accounted for by the relatively high retention rates found in medium PSAPs.

Importantly, our findings contrast to the 2009 study in terms of the magnitude of variation in retention rates. While the previous report found little variation in retention rates among large PSAPs, here we see that such variation is substantial. This is also true for small PSAPs. Both small and large PSAPs experience lower than average retention. Interestingly, both large and small PSAPs have almost identical standard deviations (39.46 and 40.00, respectively). Medium PSAPs, contrarily, show substantially less variation ($s=18.81$).

These relations are captured by the graph in Figure 9. The bars represent small, medium, and large PSAPs. Each bar shows the percentage of agencies that fall into various categories of retention rates as indicated by the colors. Comparing across PSAP sizes, the graph shows that small and medium sized agencies are more likely to have retention rates of 90.0 percent or greater compared to large PSAPs. Medium PSAPs are the least likely to have very low retention rates, with just 8.0 percent of these PSAPs having rates below 50.0 percent.

FIGURE 9: RETENTION RATES BY PSAP SIZE



The retention rates of small PSAPs are relatively evenly distributed, although retention rates of 50.0 percent or more are quite common for these PSAPs: just under 18.0 percent of small PSAPs have rates below 50.0 percent. Medium PSAPs stand out among the three as boasting the strongest retention rates. Over 77.0 percent of these PSAPs see rates of 75.0 percent or greater. Just over 51.0 percent of large PSAPs experience retention rates of 75.0 percent or greater, although only a very small proportion have retention rates greater than 90.0 percent

These findings are interesting given our results on average retention rates. As the chart in Figure 9 shows, very low retention rates—rates below 50.0 percent—are only a minor occurrence for PSAPs of all sizes. Yet, our data also show that retention rates are lower than the previous study, possibly indicating an overall downward trend for employee retention in PSAPs. These low rates seem to be concentrated in small and large PSAPs. For medium PSAPs, very low retention does not appear to be a major problem. For small and large PSAPs, however, very low retention is common, with about 18.0 percent and 21.0 percent of these PSAPs, respectively, falling into the category of 50.0 percent or less employee retention. They also mirror each other in the distribution of PSAPs falling into the 50 percent to less than 75 percent category. Within this category, close to a quarter of small and just over a quarter of large PSAPs are accounted for.

While these findings confirm one observation from the 2009 report—that low retention rates can be a problem for small PSAPs—it shows that, contrary to the 2009 study, low retention no longer appears to be problematic for medium PSAPs. Instead, large PSAPs seem to be struggling more so than their medium counterparts in this regard. It is possible that, on the one hand, small and large PSAPs are vulnerable to low retention occasionally, and that these data reflect that. On the other hand, it is also possible that certain structural factors—such as organizational culture, management, hiring and staffing policies—are having a negative effect on retention, or that these organizations are simply pressed for resources, with this expression taking shape in the observed retention rates.⁹

Statistical information emerging from the director survey data seems to confirm these trends. Small PSAPs are much more likely than both medium and large PSAPs to report negative retention rates (six PSAPs compared to only one medium PSAP and one large PSAP). Of course, due to their small size, turnover of any quantity will cause significant fluctuations when represented as a percentage due to the rules of proportionality. For the large PSAP data, there is an important qualification. These PSAPs represent only a very small sample of our data set (n=29). While the single large PSAP reporting negative retention appears to be an outlier, more data is needed to generalize this claim. Nevertheless, we can say with confidence that low retention is a difficulty presenting itself to small PSAPs, and for a few of them (those with negative rates), it appears to be a critical vulnerability. This may have to do with a lack of specialization at these smaller PSAPs (see Section VIII for further detail), which can be very small indeed, requiring workers to perform many tasks at one time.

PSAP directors' Perceptions of Retention Rates

Our results indicate that although retention rates have decreased between 2009 and 2017, directors do not perceive this to be the case when asked to evaluate how their PSAP's retention rates have fared over the past three years. Just 22.5 percent of directors report that retention has decreased, while a sizeable majority, 60.7 percent, report that it has remained the same. Only 16.8 percent of directors indicate that retention has increased.

By size, the 2009 study found that small and medium PSAPs were more likely to report that staff retention had decreased over the past three years (56.0 percent of small PSAPs and 57.0 percent of medium PSAPs, compared to 41.0 percent of large PSAPs). Large PSAPs were most likely to report that staff retention had increased during the past three years.

⁹ Though the retention rates are statistically indistinguishable between the small and large PSAPs, this does not mean that the same processes or organizational features account for the fact that both have lower retention rates than the medium PSAPs.

Our findings diverge from those of the previous report, as below described in Table 17. There are no statistically significant differences between directors' perceptions about retention in PSAPs of different sizes. This suggests that perceptions about employee retention are relatively consistent in the minds of directors across PSAPs of all sizes.

TABLE 17: DIRECTORS' PERCEPTIONS ABOUT RETENTION RATES BY PSAP SIZE			
	SMALL PSAPS	MEDIUM PSAPS	LARGE PSAPS
RETENTION INCREASED	14.9% (30)	19.4% (24)	20.0% (4)
RETENTION DECREASED	21.3% (43)	23.4% (29)	30.0% (6)
NO CHANGE	63.9% (129)	57.3% (71)	50.0% (10)
N	202	124	20
X²	2.688		
p-value	.611		

Authorized Staffing Levels

In 2009, when asked to evaluate employment for the previous year, directors of small PSAPs were significantly more likely to indicate that their PSAPs met authorized staffing levels all year, while large PSAPs were more likely to be staffed consistently below authorized levels. As Table 18 shows, meeting staffing levels remains a difficulty, and the difficulty of doing so varies across PSAPs of different sizes.

Small PSAPs are much more likely to report meeting authorized staffing levels all year (39.4%) than are both medium PSAPs (16.8%) and large PSAPs (4.5%). These differences narrow slightly when comparing partial understaffing, with 41.4 percent of small PSAPs and 45.3 percent of medium PSAPs meeting authorized staffing levels for at least part of the year. However, only 18.2 percent of large PSAPs report being able to meet authorized levels for part of the year, and they are significantly more likely to report being consistently understaffed, with 77.3 percent of large PSAPs indicating that this is the case. Only 38 percent of medium PSAPs and just 19.2 percent of small PSAPs report being understaffed all year long, suggesting that meeting authorized staffing levels is a particular concern for large PSAPs.

TABLE 18: AUTHORIZED STAFFING LEVELS BY PSAP SIZE			
	SMALL PSAPS	MEDIUM PSAPS	LARGE PSAPS
STAFFED TO AUTHORIZED LEVELS ALL YEAR	39.4% (80)	16.8% (23)	4.5% (1)
LOW AT TIMES, BUT MET AUTHORIZED LEVELS AT LEAST PART OF THE YEAR	41.4% (84)	45.3% (62)	18.2% (4)
CONSISTENTLY BELOW AUTHORIZED LEVELS ALL YEAR	19.2% (39)	38.0% (52)	77.3% (17)
N	203	137	22
χ^2	49.992		
<i>p-value</i>	.000		

In aggregate, only 28.0 percent of PSAPs report meeting authorized staffing levels all year, while 41.4 percent report being below authorized levels at least part of the year, and 29.8 percent report being consistently below authorized levels all year. The aforementioned differences in PSAP sizes notwithstanding, the ability to meet adequate staffing levels is an acute issue in the field of public safety communications.

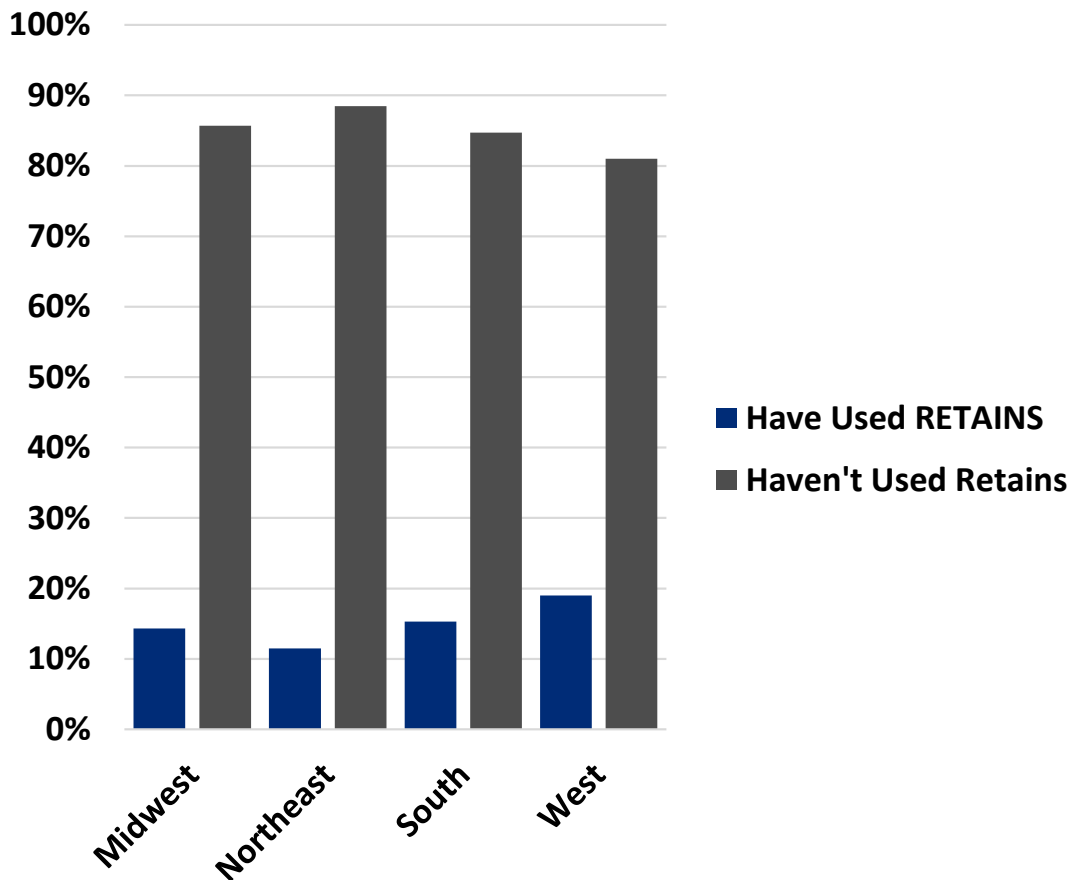
SECTION VI: PROJECT RETAINS

The Project RETAINS Toolkit emerged out of the results of the 2005 study. Given the challenges PSAPs face in determining adequate staffing levels and filling them with requisite labor, the toolkit seeks to provide PSAP directors with the resources needed to address these issues, including a staffing estimator, a retention rate calculator, and an employee satisfaction survey (APCO 2017).

Unfortunately, our data does not reflect wide usage of the RETAINS toolkit. In total, only 15.2 percent of all PSAPs report having ever used Project RETAINS. Large PSAPs are significantly more likely to have used RETAINS, with 37.9 percent reporting they have done so compared to 14.9 percent of medium and 13.4 percent of small PSAPs. Even so, the proportion of large PSAPs that have made use of RETAINS represent only a minority of these PSAPs.

Geographically, there are no significant differences between the likelihood of having used Project RETAINS and spatial location, as Figure 10 shows. Indeed, there is near complete symmetry between usage of RETAINS across all four major U.S. regions.

FIGURE 10: USE OF PROJECT RETAINS BY REGION



There does appear to be a relationship between the size of the population served and a PSAP's likelihood of having used RETAINS. As Table 19 shows, as population increases, so does the likelihood of having used RETAINS. For PSAPs that serve populations of 250,000 or more, 28.8 percent report having used RETAINS. This compares to just 10.8 percent of PSAPs serving 100,000 or fewer people, and 25.0 percent for those serving populations in between 100,001 and 250,000. These relationships are statistically significant at the .01 level.

TABLE 19: POPULATION SERVED AND LIKELIHOOD OF HAVING USED RETAINS			
	HAVE USED RETAINS	HAVEN'T USED RETAINS	N
100,000 or less	10.8% (32)	89.2% (265)	297
100,001-250,000	25.0% (22)	75.0% (66)	88
Greater than 250,000	28.8% (15)	71.2% (37)	52
χ^2	17.900		
<i>p-value</i>	.000		

Another significant finding is that those PSAPs that are most likely to have used RETAINS are also those PSAPs that are most likely to consistently fail to meet authorized staffing levels, as detailed in Table 20. This suggests that PSAPs in which staffing remains a real problem have been proactive in trying to resolve this issue at least in part by utilizing the Project RETAINS toolkit. In other words, PSAPs that are experiencing retention issues are turning to Project RETAINS to help them address these issues.

TABLE 20: USE OF PROJECT RETAINS AND MEETING AUTHORIZED STAFFING LEVELS			
	HAVE USED RETAINS	HAVEN'T USED RETAINS	N
FULLY STAFFED ALL YEAR	13% (9)	33.1% (95)	104
FULLY STAFFED PART OF YEAR	34.8% (24)	42.5% (122)	146
UNDERSTAFFED ALL YEAR	52.2% (36)	24.4% (70)	106
χ^2	22.891		
<i>p-value</i>	.000		

In terms of when PSAPs first used RETAINS, the largest proportion of PSAPs report doing so in 2016, with 9 PSAPs, or 16.4 percent of all PSAPs that have used RETAINS, indicating that this is the case. There is a noticeable uptick in the use of RETAINS beginning in 2010, when 12.7 percent of PSAPs first used the toolkit. These statistics are summarized in Table 21 below.

For the years 2011 through 2015, the proportions remained steady, peaking at 9.1 percent for three of the five years. 5.5 percent of surveyed PSAPs chose 2017, indicating their intent to implement RETAINS the year they were surveyed.

Dividing the data more symmetrically, PSAPs that adopted RETAINS between 2005 and 2010 averaged a retention rate of about 76 percent. For those that adopted RETAINS in 2011 or later, the retention rate is 74 percent. A t-test revealed that these differences are not statistically significant. Given these data, we can conclude that longer use of RETAINS does not have an effect on retention.

TABLE 21: YEAR WHEN PROJECT RETAINS WAS FIRST USED

Year	Percent	N
2005	7.2	4
2006	5.5	3
2007	3.6	2
2008	7.3	4
2009	5.5	3
2010	12.7	7
2011	9.1	5
2012	3.6	2
2013	5.5	3
2014	9.1	5
2015	9.1	5
2016	16.4	9
2017	5.5	3
Total:	100.0%	55

In their evaluations of Project RETAINS, 42.6 percent of directors said that RETAINS has been very useful for calculating staffing needs, followed by 48.5 percent indicating it has been somewhat useful. Only 5.9 percent and 2.9 percent indicated it was either not very useful or not useful at all, respectively.

This suggests that PSAP directors generally have favorable attitudes towards RETAINS and its ability to predict staffing needs.

Building on this, 88.2 percent of directors who have used Project RETAINS indicate that they are either very likely or somewhat likely to recommend the resource to other PSAP directors, with only 8.8 percent saying they are somewhat unlikely to do so, and just 2.9 percent saying it is very unlikely.

In terms of whether or not Project RETAINS has been helpful in justifying staffing needs to governing authorities, the findings are mostly positive. 22.7 percent of PSAP directors indicate it has been very successful, and 42.4 percent indicate it has been somewhat successful, showing that 65.2 percent of directors feel that RETAINS is useful in this capacity. Findings for this variable do not vary significantly by PSAP size.

Section Summary

RETAINS is not widely used by PSAPs. Of those that have used RETAINS, the largest proportions began doing so recently, with 2010 and 2016 sticking out as important years. Directors who have used RETAINS evaluate it positively, and they are likely to recommend it to others.

Given these data, one crucial qualifier must be applied. In our data set, fully 68.0 percent of the PSAPs sampled serve populations of 100,000 or less, and over 88.0 percent of our sample serves populations of 250,000 or less. This means that just under 12.0 percent of PSAPs in our sample service populations greater than 250,000.

This has important implications for how we interpret our data. As we have seen, as the size of the population served increases, so does the likelihood of having used RETAINS. As we have also seen, large PSAPs are the most likely to have used RETAINS. Our data shows that as the population served increases, so too does the size of the PSAP servicing it. This is an expected and intuitive relationship.

However, it is also likely that this is skewing our results. It is conceivable that, given the linear trends between population served and use of RETAINS and PSAP size and use of RETAINS, a sizeable proportion of large PSAPs might make use of RETAINS tools and resources. The small sample of large PSAPs in our data could be concealing this fact, as could the fact that under 12.0 percent of our total sample services populations greater than 250,000. We do not have the necessary data to generalize this claim.

Another possibility is that large PSAPs are declining in relative significance even as PSAPs consolidate, leading to the proliferation of medium sized PSAPs. In this case, consolidation might be aiming to avoid the potential overwork that comes from a lack of specialization in small PSAPs while also avoiding the bureaucratic difficulties that might come with PSAPs of larger sizes. Our findings certainly show some support for this claim, given the large sample and strong retention rates of medium PSAPs in our dataset. It is known that consolidation is an ongoing phenomenon, but whether or not this is, in fact, creating more medium PSAPs and fewer small and large PSAPs cannot be inferred from our data.

SECTION VII: PREDICTING ORGANIZATIONAL COMMITMENT

For the purposes of this study, we followed the approach taken in the 2009 report, which drew on previous studies that developed useful measures to capture the concept of employee commitment to the organization (Blair-Loy and Wharton 2004; Clay-Warner, Hegtveldt, and Roman, 2005; Lincoln and Kalleberg 1990). Key items from this work are shown in Table 22.

TABLE 22: ORGANIZATIONAL COMMITMENT SCALE COMPONENTS

I am proud to work at this PSAP.

I would turn down another job for more pay in order to stay with the PSAP.

Do you see yourself working here for at least five more years?

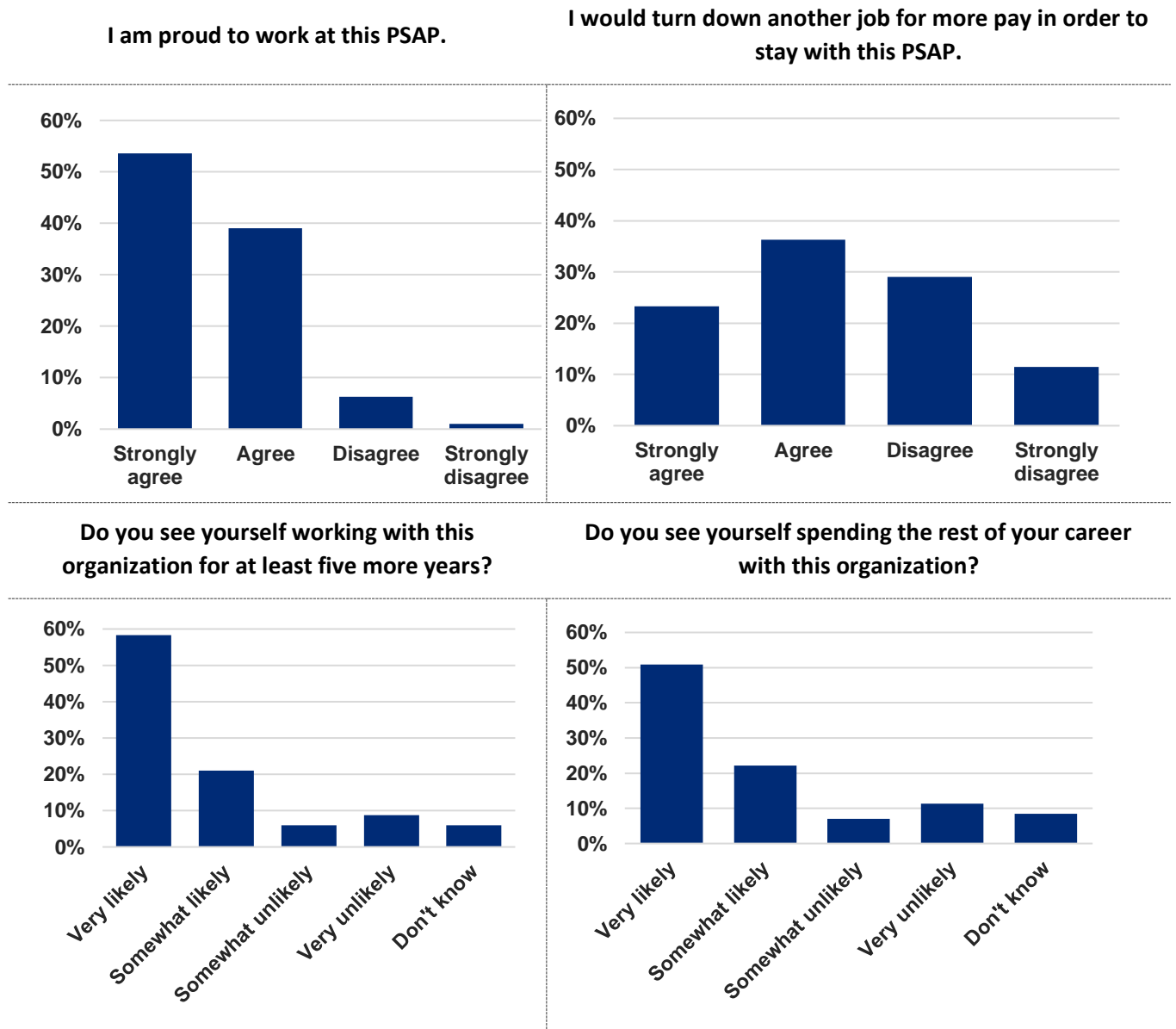
Do you see yourself spending the rest of your career with this organization?

Employees were asked to indicate their responses to each of these items. The possible responses to each question ranged from one (strongly disagree or very unlikely) to four (strongly agree or very likely). To construct a unitary measure of organizational commitment, we summed employee responses to these four questions. This sum functions as an index, with scores ranging from four (the lowest level of commitment) to 16 (the highest score).

The results obtained on these individual items are captured by the graphs in Figure 11. With three of the four items the results are quite similar to those obtained in 2009. The lone exception is found with the statement: “I would turn down another job for more pay in order to stay with this PSAP.” In 2009 about 12.0 percent of the respondents strongly agreed with this statement, but in 2017 23.0 percent of our respondents “strongly agree” with this statement, while the proportions who said they “agree” with the statement are roughly the same. In other words, in terms of this item, the 2017 data reflects a stronger degree of organizational commitment than was found in 2009.

From Figure 11, we see that most employees are in fact proud to work in the PSAPs that employ them (54.0% strongly agree and 39.0% agree). A large majority see themselves staying on the job at least five more years (58.0% see this as very likely). The longer-term commitment was also strong: 51.0 percent said it was very likely that they would spend the rest of their career with the organization, and 22.0 percent said that was somewhat likely. However, about 40.0 percent of respondents would not turn down another job for more pay just to stay with their current PSAP. In 2009, this number was nearly 50.0 percent, perhaps indicating that pay rates have become somewhat less important.

FIGURE 11: INDIVIDUAL ITEMS MEASURING EMPLOYEE COMMITMENT



As was done in the 2009 study, to construct a single measure of organizational commitment, we summed employee responses to these four questions. This sum functions as an index, with scores ranging from four (the lowest level of commitment) to 16 (the highest score). With this combined measure of commitment, the results from our study are very similar to those found in 2009. In 2009 the average score was 12.5 and in 2017 the average was 12.3 – in both cases well above the mid-point of the index.

As was the case in 2009, we found that the mean commitment score does not significantly vary with PSAP size. Replicating the analysis from 2009, we also grouped employee commitment into four categories: very strong 15-16; strong 13-14; moderate 9-12; and weak 1-8. Here, too, there was not a statistically significant relationship between PSAP size and employee commitment. However, there is an interesting pattern that is very similar to what was found in 2009 (see Figure 12).

There were significantly more strongly committed employees in small PSAPs and fewest in medium size PSAPs. 35.8 percent of employees in small PSAPs were in the very strong group, compared to 29.9 percent of employees in medium and 28.0 percent in large PSAPs. The 2009 study found that smaller PSAPs also had the largest percentage of

employees with weak commitment: 23.0 percent, compared to 15.0 percent in medium PSAPs and 19.0 percent in large PSAPs. However, in 2017, it is the large PSAPs that had the greatest proportion of employees reporting a weak commitment (21.0%), followed by the small PSAPs (16.0%) and medium PSAPs (14.0%)

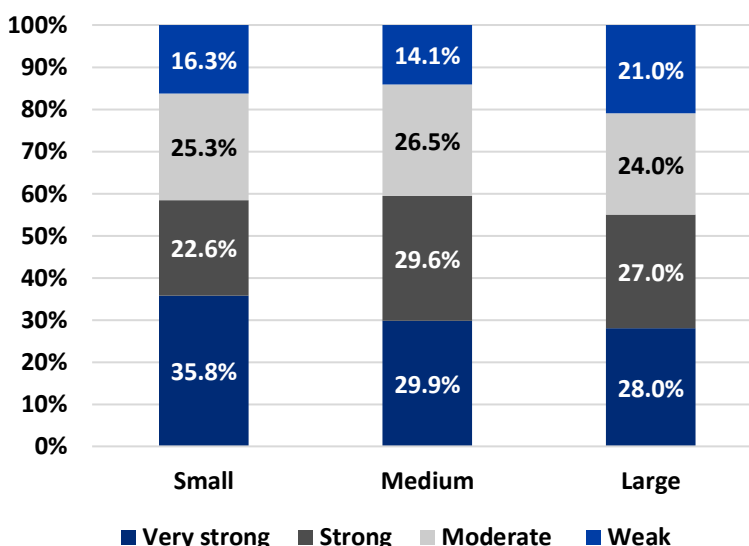
What is salient from this data is that small PSAPs continue to have smaller proportion of employees who are in the middle, reporting either moderate or strong commitment to their organization compared to medium or large PSAPs. The reason for this more extreme variation in commitment from employees at small PSAPs bears further study.

Questions to consider include:

- Are there certain work practices or social dynamics that exist in small PSAPs that are conducive to more extreme levels of satisfaction or dissatisfaction by employees?
- Which aspects of PSAP work processes most powerfully impinge on employees' levels of organizational commitment?
-

The answers to these questions are important for decision makers at all PSAPs.

FIGURE 12: EMPLOYEE COMMITMENT BY PSAP SIZE



As previously noted, the 2017 survey questionnaires were modeled on the 2009 questionnaires, which were designed to incorporate several sets of job and organizational influences that might conceivably impinge on organizational commitment, and that are commonly employed in studies in organizational behavior. First, they include aspects of job design – that is, the characteristics of the tasks that workers must routinely perform. Here they include measures of the substantive complexity of workers’ jobs, the closeness of supervision that employees encounter on their jobs, and their level of exposure to emotional strain. Second, they include measures of the social support and appreciation they experience while performing these tasks. In this vein, items are included that tap into the degree to which they encounter supportive supervision, supportive relations with their co-workers, and perceived recognition from both their employers and from the public at large. The questionnaires also include items assessing the resources PSAPs provide, including the opportunity for promotion and the ability to vary their work schedules (through flexible work arrangements). Finally, the survey questionnaire also included items relating to organizational (PSAP) characteristics, such as organization size, the salary level at the PSAP, and a recognized union.

Following the methodology of the 2009 report, we performed a statistical procedure known as factor analysis to test how these various items are related to one another (see Appendix A for a more detailed description). The aim of the analysis was to combine highly correlated measures into a single factor to simplify the model. As was the case in the earlier study, we found that nine distinct factors emerged from the statistical analysis:

- Supportive supervision
- Co-worker support
- Opportunity for promotion
- Job complexity
- Perceived recognition
- Exposure to emotional strain
- Coping resources
- Flexible work arrangements
- Closeness of supervision

These factors are described in greater detail below. Our analyses depart from the 2009 study in one minor, but methodologically important detail. Each individual’s score on a factor was divided by the number of items to which they responded. This transformation brings the measure back to the original scale for each item, ranging from 1 to 4, and also adjusts the factor score for any item nonresponse. An individual who did not respond to any of the items in a factor was treated as missing and not included in the analysis. Methodologically, this is a cleaner approach, but, as we shall see below, the 2017 analysis comes to many of the same conclusions in the 2009 report.

Supportive Supervision

Studies of human relations in the corporate world have long underscored the importance of supervisory patterns that provide recognition and support to front-line employees. Moreover, supportive supervision is likely to be of particular importance to public safety professionals given the stressful and sometimes traumatic nature of their work.

With these points in mind, the survey questionnaire included four items that were designed to capture employee perceptions of their support from immediate supervisors. The four questions in Table 23 were combined into one index measuring how supportive employees perceive their supervisors to be.

Each of the four questions that make up the supportive supervision index was scored as follows: 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. Summing across the questions and dividing by the number of items answered, possible scores on the index range from one to four. The most supportive supervision is represented by a score of four, and the weakest by a score of one. Observed scores ranged from one to four with an average of 2.9.

TABLE 23: SUPPORTIVE SUPERVISION SCALE COMPONENTS

The supervisors I work with are supportive of me.

My supervisor really appreciates the challenges I face in my work situation.

Supervisors often take time to acknowledge when I have done something well.

My center has a recognition program for outstanding employee performance.

Co-worker Support

Quite apart from levels of support from supervisors, social scientists have also emphasized the importance of peer-based social support. Beginning in the late 1970s, for example, the Institute for Social Research at the University of Michigan demonstrated that levels of peer support often served to protect employees against the adverse impact of harsh, onerous, or stressful working conditions. Subsequent studies have shown that social networks have similar effects. Thus, the four survey items shown in Table 24 were combined into one index measuring the quality of relationships and mutual support among co-workers.

Each of the four questions that make up the co-worker support scale was scored as follows: 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. Summing across the questions and dividing by the number of items answered, possible scores on the index range from one to four, with a score of four representing the most co-worker support. Observed scores ranged from one to four with an average of 3.2.

TABLE 24: CO-WORKER SUPPORT SCALE COMPONENTS

My co-workers conduct themselves in a professional manner.

My co-workers help me perform my job the best I can.

I have good working relationships with my co-workers.

When I need help coping with the difficulties of my job, there are people at work I can count on to help.

Promotion

The structure of opportunity within an organization—that is, its provision of job ladders or policies involving promotion from within—has often been found to have a significant bearing on attitudes and behaviors toward work, including retention, motivation, and even physical well-being and longevity (Cambois 2004; Kanter 1977). Two survey items regarding employees' perceptions about promotions in their work situation (shown in Table 125) were combined into one scale.

TABLE 25: PROMOTION SCALE COMPONENTS

On my job, there is an opportunity for promotion to a higher paying or more responsible position.

Your possibility of advancement or promotion within the next couple of years is good.

The two questions that make up the promotion index were scored as follows: 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. Summing across the questions and dividing by the number of items answered, possible scores on the scale range from one to four. A score closer to four indicates greater optimism regarding likelihood of promotion. Observed scores ranged from one to four with an average of 2.3.

Job Complexity

Research on job complexity has often shown that this aspect of workers' jobs has long term effects on cognitive styles, self-esteem, intellectual flexibility, and other variables (Kalleberg 2011). Some research has also suggested that workers who perform jobs that underutilize their skills are likely to show low levels of organizational commitment as well (Angle and Perry 1983).

To determine the importance of job complexity, we examined the three survey items used in 2009 (see Table 26). Based on the analysis of item reliability (see below) one of the previously used items ("My job requires that I multi-task") was eliminated for the 2017 study since it was poorly correlated with the other two items, but these were still highly correlated with one another.

TABLE 26: JOB COMPLEXITY SCALE COMPONENTS
My job requires split-second decision-making.
My job requires that I use a number of different skills
My job requires that I multi-task.

The remaining two questions that make up the job complexity index were scored as follows: 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. Summing across the questions and dividing by the number of items answered, possible scores on the scale range from one to four. A score closer to four indicates greater perceived job complexity. Observed scores ranged from one to four with an average of 2.6 indicating that most employees agree on the two measures of job complexity.

Perceived Recognition

The Human Relations tradition within management theory has long stressed the need for organizations to provide employees with symbolic gratifications, including a sense of appreciation, recognition, and belonging. The two items found to best represent perceived recognition are shown in Table 27.

The two questions that make up the perceived recognition index were scored as follows: 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. Summing across the questions and dividing by the number of items answered, possible scores on the scale range from one to four. A score closer to four indicates greater perceived appreciation by the public and the media. Observed scores ranged from one to four with an average of 2.4.

TABLE 27: PERCEIVED RECOGNITION SCALE COMPONENTS

My work is appreciated by the public.

My work is appreciated by the media.

Exposure to Emotional Strain

Studies of job stress and worker strain have expanded in recent decades. The literature usually approaches this dimension of work as an aspect of job or task design. Given the nature of PSAP work (which often compels workers to handle urgent or even traumatic incidents as a “normal” feature of their working lives), we were keen to include this dimension of workers’ jobs. Our factor analysis results suggest that exposure to emotional strain does emerge as a separate factor, distinct from other features of job design such as the closeness of supervision or the complexity of the job. We used two items to tap into this element of the job, as described in Table 28.

TABLE 28: EXPOSURE TO EMOTIONAL STRAIN SCALE COMPONENTS

You likely deal with a wide range of situations every day, from the routine to critical emergencies. On an average day, about how often do you handle situations that are very intense or emotionally difficult?

How often would you say it is true that on your job you have to handle traumatic situations that are going to end badly no matter what?

The first question was scored as follows: 1 = less than once per month or never, 2 = once or more per month, but not every week, 3 = once or more per week, but not every shift, 4 = about once per shift and 5 = several times per shift. The second question was scored as follows: 1 = less than once per month or never, 2 = once or more per month, but not every week, 3 = once or more per week, but not every shift and 4 = once or more per shift. Summing across the questions and dividing by the number of items answered, possible scores on the index range from one to four and one-half. A score closer to four indicates handling difficult situations more frequently. Observed scores ranged from one to four with an average of 2.9.

Coping Resources

Akin to our measures of social support from supervisors and co-workers, the questionnaires included items designed to capture the availability of formal policies or programs that might help workers cope with job-induced stresses and strains. Two survey items measuring coping resources made available at the PSAPs in which employees work were combined into one index (see Table 29).

TABLE 29: COPING RESOURCES SCALE COMPONENTS

Does your agency provide critical incident stress management?

Does your agency provide Employee Assistance Programs?

The two questions that make up the stress management resources index were scored as follows: 0 = no and 1 = yes. Summing across the two questions and dividing by the number of items answered, possible scores on the index range from zero to two with a mean score of 1.6, indicating that the average respondent strongly agreed with these items.

Flexible Work Arrangements

Studies of the work/family relationship have frequently found the ability to vary one's working days and hours is often a vital component of a desirable job, especially for employees with kinship obligations (not just, children but also to aging or ill parents and other relatives). Our survey included two items designed to tap into employee access to flexible working arrangements (see Table 30).

TABLE 30: FLEXIBLE WORK ARRANGEMENTS SCALE COMPONENTS

The shift selection process allows me to meet my family obligations.

My center's leave policy allows for personal time as needed, i.e., family emergency, illness, etc.

The two questions that make up the scheduling and leave index were scored as follows: 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. Summing across the two questions and dividing by the number of items answered, possible scores on the index range from one to four. A score closer to four indicates perception of more flexible leave and scheduling policies. Observed scores ranged from one to four with an average of 2.8.

Closeness of Supervision

Two survey items regarding employees' perceptions of closeness of supervision of their work were combined into one index (see Table 31).

The two questions that make up this index were scored as follows: 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. Summing across the two questions and dividing by the number of items answered, possible scores on the index range from one to four. A score closer to four indicates perception of more regulation. Observed scores ranged from one to four with an average of 2.9.

TABLE 31: CLOSENESS OF SUPERVISION SCALE COMPONENTS

My job requires that I do things just the way I am told.

The amount of work I do is carefully measured by the people above me.

Statistical Findings

We tested a statistical model to predict employee commitment (utilizing the employee commitment index discussed at the start of this section). The model tested the ability of a variety of factors describing employee and job characteristics to predict employee commitment. Table 32 below summarizes four different models of how to explain employee commitment. Model [4] is the “best” model as it explains the most variation in employee commitment. However, walking through each of the models is instructive as it illustrates the importance of the most critical factors: supervisor support, co-worker support, promotion opportunities, employee recognition and job flexibility. In this regard these 2017 findings are very similar to those from 2009 and explain nearly an identical amount of variance in employee commitment (32% in 2017 and 34% in 2009).

The simplest model, Model [1], includes important employee demographic characteristics like gender, race, education, and age, and only explains two percent of the variation in commitment. In fact, age is the only statistically significant variable. Respondents of prime working age (25 through 44) are less committed, most likely because they have a range of other employment options.

In Model [2], several features of employee experience are taken into account, but the model still only explains about five percent of the variation in employee commitment. In this model, employees who report overtime hours at least once a month are significantly more committed, while those who say their PSAP is consistently understaffed are significantly less committed to their employment. In this model, the negative effect of being of prime working age is slightly weaker, but still significant.

In model [3] additional variables measuring employee experience are added. While PSAP size is not significantly related to employee commitment, unionized employees are significantly less committed to their employment. On the other hand, the presence of a quiet room at the PSAP increases commitment. This model also includes the number of years a respondent was

employed at the PSAP, and longer tenure is associated with higher levels of commitment. Additionally, age is no longer significant.¹⁰ Finally, hourly pay for new hires is not related to employee commitment. Model [3] explains about eight percent of the variation in commitment.

With Model [4], however, the proportion of variation explained increases to 32 percent. This model includes the job characteristics described above and shows that supportive supervision, co-worker support, opportunities for promotion, perceived recognition, and flexible work arrangements are all significant factors associated with higher levels of employee commitment. Close supervision, on the other hand, is significantly and negatively related to employee commitment. It is also noteworthy that when these job characteristics are controlled for in Model [4], those who work at large PSAPs are significantly less committed to their employment.

It is particularly important that large PSAPs attend to these other factors if they are to promote employee commitment.

¹⁰ This suggests that the age effect found in Models [1] and [2] is actually a proxy for job tenure.

TABLE 32: REGRESSION ANALYSIS PREDICTING EMPLOYEE COMMITMENT (N=558)				
PREDICTOR	[1] Employee Demographics	[2] Employee Experience	[3] Employee/ PSAP Experience	[4] Job Characteristics
Constant	13.073**	12.925**	11.923**	3.592+
EMPLOYEE DEMOGRAPHICS				
Sex (1 = male)	-.445	-.460	-.356	-.342
Race (1 = white)	-.224	-.197	-.176	-.253
Education (1= HS degree or less)	.006	.001	-.038	.054
Age group (1 = 25-44)	-.741**	-.656*	-.327	.000
EMPLOYEE EXPERIENCE				
Overtime at least 1 time/month	--	.654+	.665+	.379
Enough staff	--	.144	.274	.102
Very understaffed	--	-1.039**	-1.028**	-.340
Staffing gotten worse	--	-.286	-.366	-.157
EMPLOYEE/PSAP EXPERIENCE				
Unionized call center	--	--	-.578+	.185
Employees bid for shifts	--	--	.173	.021
PSAP has quiet room	--	--	.999**	.609*
Small PSAP	--	--	.152	.440
Large PSAP	--	--	-.567	-.618+
Base pay rate	--	--	.011	.012
Years at center	--	--	.051**	.062**
JOB CHARACTERISTICS				
Supportive supervision	--	--	--	.944**
Co-worker support	--	--	--	.718**
Promotion	--	--	--	.686**
Job complexity	--	--	--	-.092
Perceived recognition	--	--	--	.478**
Exposure to emotional strain	--	--	--	-.151
Coping resources	--	--	--	-.031
Flexible work arrangements	--	--	--	.669**
Closeness of supervision	--	--	--	-.377+
R ²	.018	.053	.085	.320

† $p < .10$, * $p < .05$, ** $p < .01$ (two-tailed tests). Note: Intercept term for regression equations omitted from table.

Discussion

These findings are very similar to those described in the 2009 study, which was described as consistent with results obtained by other researchers in reference to the predictors of employee commitment to the organization. Balfour and Wechsler (1996), in a study focusing on the antecedents of organizational commitment among public employees, conclude that “public employees are not predisposed to commitment on the basis of personal characteristics. Instead, commitment is influenced by experiences at work, the impact of organizational arrangements, and characteristics of the job itself” (p. 270-271). As the 2009 report emphasized, this implies that institutional arrangements at PSAPs are designed in ways that may have a positive impact on employee retention. If anything, many of the relationships noted in 2009 are even stronger in the 2017 study.

In 2017, as was the case in 2009, supportive supervision stands out as one of the most important factors influencing employee commitment. Supportive supervision was measured based upon the employees’ perception of their supervisors as supportive, aware of the challenges employees face, and forthcoming with positive feedback, as well as whether the employee believed the PSAP had recognition programs. This factor did not vary with PSAP size.

In 2009 the positive impact of co-worker support on employee commitment was marginally significant. However, with the 2017 survey, the positive impact of co-worker support was clearly significant, and the magnitude of the effect was nearly as great as that of supervisor support. Here, there is a relationship between co-worker support and PSAP size with employees at small PSAPs reporting lower levels of co-worker support than those at medium and large PSAPs. This relationship is not surprising simply due to the limited pool of co-workers at a small PSAP. Nevertheless, the results do suggest that directors at small PSAPs need to go out of their way to create opportunities for creating good working relationships among their limited staff of employees.

While the 2009 study did not find a significant relationship between opportunities for promotion and employee commitment, this factor was highly significant among respondents to the 2017 survey. There was a predictable relationship with PSAP size. The opportunities for advancement are more limited in a small organization, and according to survey respondents working in small PSAPs, they were less likely to see opportunities for advancement or promotion in their organizations. This not dissimilar to realities at small firms in the private sector, where advancement opportunities are often quite limited (Davis 2011).

In 2017, as was the case in 2009, perceived recognition, the extent to which respondents feel their work was appreciated by the public and the media, was also positively and significantly associated with employee commitment. The size and significance of the effect of perceived recognition was even larger in 2017 than in 2009, suggesting that this factor has an even greater impact on employee commitment today.

Employee perceptions of flexible work arrangements, measured here as scheduling that allow employees to meet family obligations and leave that meets the employee's need for personal time, appears to be one of the strongest predictors of employee commitment in the 2017. This is consistent with results from the 2009 report. Neither in 2009 nor in 2017 was there a significant relationship between the perception of flexible work relations and gender. However, we did find in 2017 that there was a significant relationship between the perception of flexibility and PSAP size. Employees at small PSAPs perceived the greatest flexibility and those at large PSAPs perceived the least.

Finally, while the 2009 study concluded there was no relationship between closeness of supervision and employee commitment, we do observe a marginally significant association between these two factors. The relationship we observe does not vary by PSAP size; it is constant across PSAPs of all sizes.

However, this is one factor that bears further consideration in the future as the generational makeup of the labor force inevitably will change over time.

It is estimated that millennials will make up half of the U.S. workforce by the year 2020 (Fry 2015), but while some believe that millennials are less amenable to close supervision (e.g., Lindquist 2008), others argue that “findings suggest that millennials want and even need close supervision at a level greater than any other generations and, in many cases, greater than what their different generational leaders and managers feel necessary or want to provide” (Barbuto and Gottfredson 2016:61; cf. Sherman 2006).

These ambiguities around supportive supervision notwithstanding, research has consistently shown that millennials want jobs that support a healthy work/life balance and flexibility in the workplace, while also promising job security (Linden 2015). They also want meaningful jobs that contribute to social value, not simply the production of profit, and they are highly conscientious of company mission statements and corporate responsibility (Ng, Schweitzer, and Lyons 2010).

At the same time, millennials are very much aware of the realities of the labor market, as they live on the front lines of “precarious work”—jobs that stray from the standard employment relationship of full-time work with one employer, at the employer's place of business, for a living wage, and with benefits such as health care coverage, retirement or pension plans, and paid time off (Silva 2014).

Precarious work is no small problem. Depending on the definition adopted, as much as 40.0 percent of jobs in the United States can be characterized as precarious (U.S. Government Accountability Office [GAO] 2015). Lawrence Katz and Alan Krueger (2016) take a more conservative approach and estimate the proportion of precarious jobs to account for about 16.0

percent of the labor market. Critically, however, they show that from 2005 to 2015, 94.0 percent of all net new job growth was in precarious employment arrangements (Katz and Kruger 2016:7).

These labor market trends are crucial when considering generational changes to the domestic workforce and their implications for PSAPs. Millennials expect their jobs to be meaningful, creative, and socially purposeful, while at the same time providing them with job security, good pay, and a work/life balance that sets clear boundaries between work and private life, and restricts work from bleeding into lifestyle matters when off the clock.

Meeting millennials' standards will be extremely difficult for PSAPs. As has been observed, the basic characteristics of PSAPs and the jobs performed within them make work/life balance matters an issue. Most employees work regular overtime, and at many PSAPs, such overtime is involuntary. Moreover, it is not immediately clear from this data how well PSAPs have been able to respond to the changing precarious nature of the labor market in recent years, although we can make some inferences. The large use of part-time employees is often considered as contributing to precarity (Kalleberg 2009). While part-timers are often used in PSAPs to cover for understaffing, employee vacations, or other organizational needs, in the broader labor market, they are also used to limit employer responsibilities to their employees regarding benefits like health care coverage and pension plans, thereby decreasing organizational costs.

Another major hurdle PSAPs will have to reckon with is millennials' mistrust of institutions. Coming of age during some of the most tumultuous historical moments—9/11, the wars in Iraq and Afghanistan, the Great Recession, and the explosion of school shootings since the turn of the century, to name but a few—millennials harbor a deep skepticism towards market institutions, the government, and public safety officials (Brooks 2018). Feeling like their generation has been failed by society's main institutions and the decisions of the generations that came before them, millennial trust in government has bottomed out at an all-time low of 20.0 percent (Pew 2017).

In an environment of austerity, where state budgets are being cut and all public services are expected to innovate and become more efficient, these labor market realities are likely to put significant pressure on PSAPs to sustain full-time jobs with decent pay and good benefits and to maintain staffing levels at rates that will not require significant overtime. It will be especially difficult to attract millennials given these conditions. Finally, even if millennials consider the work of PSAPs to be socially valuable, it is very likely that they will associate PSAPs with the institutions of government and public safety that they so distrust, therefore diminishing public safety communications work from their perspective. All in all, PSAPs will face significant difficulties recruiting workers from this generation. The industry may wish to look at particular methods used in the military, for example, to recruit and retain younger workers for high-stress public service jobs.

SECTION VIII: PREDICTING PSYCHOLOGICAL DISTRESS

As was the case in 2009, in this 2017 study a further outcome measure of great interest, beyond retention or commitment, relates to employee well-being –specifically, levels of psychological distress. Organizational and industrial psychologists have a long history studying the link between occupational conditions and such distress. The literature here has obvious importance in an occupational field where employees are routinely exposed to emergency situations and traumatic conditions.

Essentially referring to evidence of cognitive and/or emotional strain reported by respondents, the concept of psychological distress is typically measured by items that inquire into the frequency with which employees experience feelings of anxiety, hostility, depression, and poor self-esteem. In this vein, the concept does not refer to symptoms of mental illness, but rather to signs of mental strain.

The 2009 study reviewed evidence of the link between occupational conditions and psychological distress noting that it varies across different types of work settings, and identified two major themes in the literature. First, most research finds a connection between the work setting and distress, though it may come from a variety of causes such as highly intense job demands, work that provides employees with little or no control over the performance of their tasks, or overly harsh patterns of supervision. Second, some literature provides strong indication that the work/distress relationship can be moderated or reduced if compensating conditions (such as the availability of coping resources or social support) are available. We follow the same approach here as noted in the 2009 study.

The emotional distress of employees is important to consider for both the effect on the wellbeing of the employee and to workplace consequences. Untreated psychological distress for employees may include serious health and mental health problems. On the other hand, some of the findings related to the effects of positive emotion on workplace performance, which include increased task activity and persistence and enhanced cognitive functioning. Other effects include enhanced interpersonal attractiveness, a halo effect by which people with positive emotions are evaluated more positively by others, and increased social influence on others. Further, employees who are in good moods may be more likely to help others. Finally, employees with more positive emotions received more favorable supervisor evaluations and greater pay after 18 months and received greater supervisor and co-worker support.¹¹ Following the 2009 study, to

¹¹ These authors are careful to point out that their findings on the positive workplace outcomes of positive emotions do not preclude some beneficial outcomes of negative emotion, which may include ability to make critical evaluations, enhanced deliberate decision-making, or reduced workplace interruptions by co-workers (Staw et al, 1994).

measure psychological distress, we rely on measures constructed and standardized by the World Health Organization. Our measure is a condensed index composed of the seven survey items shown in Table 33.

TABLE 33: PSYCHOLOGICAL DISTRESS STRAIN SCALE COMPONENTS						
HOW OFTEN HAVE YOU EXPERIENCED THE FOLLOWING PROBLEMS OVER THE LAST 30 DAYS?	NONE OF THE TIME	HARDLY EVER	SOME OF THE TIME	MOST OF THE TIME	ALL OF THE TIME	TOTAL:
Felt so sad that nothing could cheer you up?	42.0%	28.0%	26.0%	3.0%	1.0%	100% (N=563)
Felt hopeless?	48.0%	27.0%	20.0%	4.0%	1.0%	100% (N=560)
Felt worthless?	52.0%	25.0%	18.0%	4.0%	1.0%	100% (N=559)
Felt like everything was an effort?	32.0%	28.0%	35.0%	4.0%	1.0%	100% (N=563)
HOW OFTEN HAVE YOU EXPERIENCED THE FOLLOWING PROBLEMS OVER THE LAST 30 DAYS WHILE YOU WERE WORKING?	NONE OF THE TIME	HARDLY EVER	SOME OF THE TIME	MOST OF THE TIME	ALL OF THE TIME	TOTAL:
Feeling your heart pounding or racing?	31.0%	28.0%	35.0%	4.0%	1.0%	100% (N=562)
Feeling nervous or fidgety and tense?	24.0%	27.0%	40.0%	8.0%	2.0%	100% (N=559)
Becoming very tired in a short time?	19.0%	22.0%	41.0%	14.0%	3.0%	100% (N=557)

Each of the seven questions that make up the psychological distress index was scored as follows: 1 = none of the time, 2 = hardly ever, 3 = some of the time, 4 = most of the time, and 5 = all of the time. Summing across the questions, possible scores on the index range from seven to 35. Scores closer to 35 indicate higher psychological distress.

The increase in the mean stress level is not due to a few outliers but rather across the index. For example, in 2009 approximately 27 percent of the respondents scored a seven or eight on the psychological distress index, meaning they answered “none of the time” to all seven items or to six items and “hardly ever” to a single item. In 2017, however, only 12.0 percent of the sample scored a seven or eight on this index, as Figure 13 below shows.

Statistical Findings

As in the analysis of employee commitment in 2009, in the current study, the following scale variables were included in models of psychological distress: perceived recognition, supportive supervision, co-worker support, opportunities for promotion, job complexity, perceived recognition, flexible work arrangements, exposure to emotional strain, coping resources, and closeness of supervision. We also included several individual and organizational items in the analysis.

Four models were estimated for psychological distress with additional variables included in the analysis as represented in Table 34. Model [1] is the simplest model of employee demographics, including gender, race, age and education. As was the case with organizational commitment, this model explains very little variation in psychological distress. White

respondents and those of primary working age experience significantly higher levels of psychological distress than non-whites and those who are either below the age of 25 or over the age of 44. However, these variables only explain about two percent of the variation.

In Model [2], a handful of variables capturing employee experience are added into the analysis, but only those who said their PSAPs were very understaffed (compared to those who said their PSAPs had enough staff) had higher levels of psychological distress. Model [2] doubles the amount of variation explained in Model [1], but still only captures four percent of the variation. Race is no longer significant in Model [2], but those of prime working age continue to have significantly higher psychological distress scores.

Model [3] includes additional variables related to an employee's experience at a particular PSAP. These include whether the PSAP is unionized, whether employees bid for shifts, and whether the PSAP has a quiet room. Additionally, it includes PSAP size, the base pay rate for new hires, and how long each employee has worked at the PSAP. As was the case in 2009, none of these variables were significant predictors of psychological distress.

Finally, Model [4] includes the job characteristics introduced in the previous section. As was the case in 2009, perceived recognition by the public and in the media, as well as flexible work arrangements, were significantly associated with lower levels of psychological distress and emotional strain.

FIGURE 13: PSYCHOLOGICAL DISTRESS SCALE

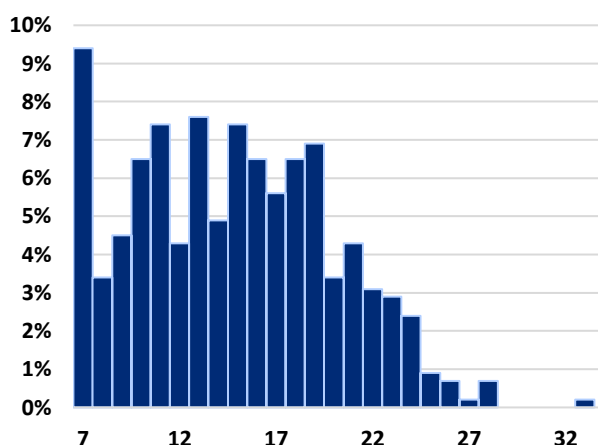


TABLE 34: REGRESSION ANALYSIS PREDICTING PSYCHOLOGICAL DISTRESS (N=555)				
PREDICTOR	[1] Employee Demographics	[2] Employee Experience	[3] Employee/PSAP Experience	[4] Job Characteristics
Constant	1.920**	1.746**	1.732**	2.883**
EMPLOYEE CHARACTERISTICS				
Sex (1 = male)	.062	.052	.043	.022
Race (1 = white)	.135+	.127	.119	.169*
Education (1= HS degree or less)	-.029	-.028	-.022	-.062
Age group (1 = 25-44)	.182**	.168**	.155**	.114+
EMPLOYEE EXPERIENCE				
Overtime at least 1 time/month	--	.109	.105	.082
Enough staff	--	.051	.021	.057
Very understaffed	--	.142+	.154+	.044
Staffing gotten worse	--	.109	.104	.066
EMPLOYEE/PSAP EXPERIENCE				
Unionized PSAP	--	--	.001	-.086
Employees bid for shifts	--	--	.042	.082
PSAP has quiet room	--	--	-.076	-.051
Small PSAP	--	--	.080	.137+
Large PSAP	--	--	.056	.054
Base pay rate	--	--	.002	.002
Years at center	--	--	-.002	-.004
JOB CHARACTERISTICS				
Supportive supervision	--	--	--	-.065
Co-worker support	--	--	--	-.140*
Promotion	--	--	--	-.052
Job complexity	--	--	--	-.178
Perceived recognition	--	--	--	-.120**
Exposure to emotional strain	--	--	--	.166**
Coping resources	--	--	--	.049
Flexible work arrangements	--	--	--	-.109**
Closeness of supervision	--	--	--	.062
R ²	.021	.043	.049	.172
+ <i>p</i> <.10 * <i>p</i> <.05 ** <i>p</i> <.01 (two-tailed tests)				

Interestingly, co-worker support was also related to lower levels of distress, although this was not the case in 2009. In this final model, which considers the effects of all the variables in each of the preceding models in addition to the job characteristics variables, workers in small PSAPs and workers between the ages of 25 and 44 are slightly more likely to have higher rates of distress. Model [4] accounts for 17.0 percent of the variation in reported rates of distress.

Discussion

Some of the same variables found to predict employee commitment in the 2009 report also emerge here as significant predictors of psychological distress. **Perceived recognition** for the work that PSTs do predicts their levels of psychological distress, and any gains organizations can make in improving this aspect of the job will likely pay off—not only in terms of worker commitment and effectiveness, but also in employees’ personal wellbeing.

In our 2017 analysis, co-worker support and flexible work arrangements are two additional job characteristics that both increase employee commitment to the organization and decrease psychological distress. These are also areas that PSAPs should seek to improve upon as it may carry this double benefit and lead to greater employee retention.

Exposure to emotional strain continues to play a key role in limiting psychological distress. Data to construct this scale come from self-reported evaluations of how frequently employees face emotionally difficult situations on the job. This, as a subjective measure, most likely reflects a combination of *how often* difficult situations actually arise in combination with how stressful these situations are *perceived* by the employee.

Interventions designed to reduce emotional distress may be targeted to the individual employee or to the organizational level. Interventions designed to help individuals deal with stress may include programs to increase resilience and promote health and wellbeing (e.g., fitness programs, diet and nutrition programs, relaxation, stress management, and psychological counseling). Organizational-based interventions (e.g., increasing worker control, reducing the workload or improving training) may also hold potential (Danna and Griffin 1999), although conclusive evidence of the effectiveness of such approaches for reducing worker emotional stress is lacking (Kang et al. 2010).

Clearly, the frequency with which intense and traumatic situations occur is not something within the control of the organization. Control of the frequency with which individual employees confront such situations can really only be done if the number of calls were reduced by increasing the number of employees—a solution that is not likely when budgets are tight. It is important to explore new formal coping resources, but also to pay greater attention to flexible work arrangements and continue to explore how informal coworker support can be encouraged or even institutionalized.

SECTION IX: TECHNOLOGY AND PSAPS

This section examines recent technological trends in PSAPs to understand how these organizations are responding to rapid developments in information and communications technologies (ICT) that have occurred in recent years. In this section, we focus especially on PSAPs' customer premise equipment (CPE), computer aided dispatch (CAD), and familiarity with technologies such as Text to 9-1-1, NG9-1-1, FirstNet, and ESINet.

Of all the PSAPs surveyed, only 40.2 percent intend to upgrade their CPE technology, leaving a sizeable majority of PSAPs with no intent to upgrade. As can be seen in Table 35, small PSAPs are much less likely to be planning to upgrade their CPE technology, with only 36.0 percent intending to do so. Medium PSAPs are slightly more likely, with 42.3 percent intending to upgrade. Large PSAPs, however, are much more likely to report that they intend to upgrade their CPE, with a 62.5 percent majority claiming this to be true.

TABLE 35: INTEND TO UPGRADE CPE TECHNOLOGY			
	SMALL PSAPS	MEDIUM PSAPS	LARGE PSAPS
Yes	36.0% (72)	42.3% (58)	62.5% (15)
No	64.0% (128)	57.7% (79)	37.5% (9)
X²	6.694		
p-value	.035		

Of those PSAPs that intend to upgrade their CPE technology, almost 71.0 percent plan on doing so within one year or less. Just 5.7 percent of PSAPs intend to upgrade in five or more years. There are no significant differences between the sizes of PSAPs and when they intend to upgrade their CPE, although the largest proportions for PSAPs of all sizes intend to upgrade within two years.

For all PSAPs, a large proportion (31.0%) are using a CAD system that is more than five years old. Less than half (37.6%) are using a CAD system that is two years or younger, although a sizeable proportion, 19.8 percent, are using a CAD system that is less than one-year-old. There are no statistically significant differences between PSAP size and the age of the CAD system, although 40.9 percent of large PSAPs are using a CAD system less than one-year-old compared to just a quarter of medium PSAPs and 23.7 percent of small PSAPs.

There also appears to be a bi-modal tendency for large PSAPs, with 45.5 percent report using a CAD system that is more than five years old. This leaves little room in the middle, indicating that large PSAPs appear more likely to have either very new CAD systems, or very old CAD systems.

In terms of upgrading their CAD systems, a majority of PSAPs (51.4%) have no intention of doing so. For the remainder, one quarter plan to do so within one year, and 11.0 percent intend to do so within two years. Only 12.4 percent of PSAPs intend to upgrade their CAD systems within three or more years. These findings do not vary significantly by PSAP size.

Familiarity with New Technologies

In the director survey, we asked respondents to indicate their familiarity with Text to 9-1-1, NG9-1-1, FirstNet, and ESINet (see Table 36). NG9-1-1 and Text to 9-1-1 are by far the most commonly known technologies with 88.5 percent and 88.1 percent of PSAPs being very familiar or somewhat familiar with these technologies, respectively. FirstNet is less commonly known, with only 29 percent of PSAPs reporting to be very familiar with the technology, although 41.1 percent are somewhat familiar. ESINet is the least commonly known technology. While a slight majority (56.9%) of PSAPs express familiarity with the program, only 23.8 percent are very familiar and only 33.1 percent are somewhat familiar.

TABLE 36: DIRECTORS' FAMILIARITY WITH NEW TECHNOLOGIES				
	Text to 9-1-1	NG9-1-1	FirstNet	ESINet
Very Familiar	52.2% (193)	50.5% (186)	29.0% (106)	23.8% (86)
Somewhat Familiar	35.9% (133)	38.0% (140)	41.1% (150)	33.1% (120)
Somewhat Unfamiliar	7.6% (28)	4.3% (16)	11.8% (43)	17.4% (63)
Very Unfamiliar	4.3% (16)	7.1% (26)	18.1% (66)	25.7% (93)

As shown in Table 37 below, familiarity with these technologies varies significantly by PSAP size. Large PSAPs express the highest level of familiarity with all four technologies. Directors at large PSAPs report being very familiar with FirstNet (66.7%), NG9-1-1 (83.3%), and Text to 9-1-1 (83.3%), and half are very familiar with ESINet.

Medium PSAPs are also familiar with these technologies, with 76.4 percent reporting they are very familiar or somewhat familiar with FirstNet, over half reporting to be very familiar with NG9-1-1, and 62.9 percent reporting to be very familiar with Text to 9-1-1. Just over a quarter, however, are very familiar with ESINet.

Small PSAPs are much less familiar with all the technologies. For all four technologies, only a minority of small PSAPs report being very familiar with each, ranging from a low of 19.1 percent for ESINet, and a high of 42.6 percent of NG9-1-1. They do express some degree of familiarity with each technology, but they are also much more likely to report being somewhat or very unfamiliar with each technology.

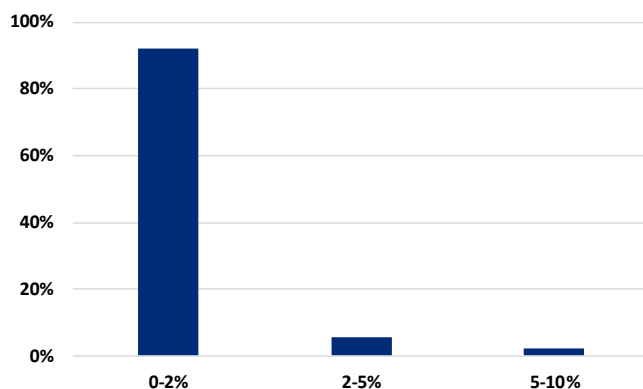
Overall, we can generally say that most PSAPs are at least aware of these technologies, although ESINet appears to be an exception. For reasons unaccounted for in this survey, ESINet remains less known in PSAPs of all sizes.

TABLE 37: TECHNOLOGICAL FAMILIARITY BY PSAP SIZE				
Large PSAPs				
	Text to 9-1-1	NG9-1-1	FirstNet	ESINet
Very Familiar	83.3%**	83.3%**	66.7%**	50.0%**
Somewhat Familiar	12.5%**	16.7%**	29.2%**	33.3%**
Somewhat Unfamiliar	4.3%**	0.0%**	4.2%**	12.5%**
Very Unfamiliar	0.0%**	0.0%**	0.0%**	4.2%**
Medium PSAPs				
	Text to 9-1-1	NG9-1-1	FirstNet	ESINet
Very Familiar	62.9%**	56.4%**	34.3%**	25.9%**
Somewhat Familiar	29.3%**	35.7%**	42.1%**	43.9%**
Somewhat Unfamiliar	4.3%**	2.9%**	11.4%**	12.2%**
Very Unfamiliar	3.6%**	5.0%**	12.1%**	18.0%**
Small PSAPs				
	Text to 9-1-1	NG9-1-1	FirstNet	ESINet
Very Familiar	41.3%**	42.6%**	20.9%**	19.1%**
Somewhat Familiar	43.2%**	42.2%**	41.8%**	25.6%**
Somewhat Unfamiliar	10.2%**	5.9%**	12.9%**	21.6%**
Very Unfamiliar	5.3%**	9.3%**	24.4%**	33.7%**
** $p < .01$				

Only 37.0 percent of PSAPs report being able to receive Text to 9-1-1 requests, although this varies significantly by PSAP size: large PSAPs are the most likely (54.2%), followed by medium PSAPs (47.9%), and finally small PSAPs (27.8%). While large PSAPs have been the quickest to implement Text to 9-1-1, of those PSAPs without it, over 75 percent have ongoing plans to implement Text to 9-1-1.

The following data was derived from the survey based on the question “what percent of your call volume is text to 9-1-1 calls?” However, because the breakdown for the answers was preset at 2%, 5%, 10%, and the statistical sample was relatively small, APCO cannot guarantee the accuracy of the information reflected in the answers related to this specific question. For those PSAPs that already support Text to 9-1-1, an overwhelming majority (92.1%) report that Text to 9-1-1 calls only constitute between zero and two percent of total call volume, as illustrated in Figure 14. In fact, in a study of one county, in 2017, only one-tenth of one percent of total 9-1-1 call volume

FIGURE 14: TEXT TO 9-1-1 CALL VOLUME



consisted of Text to 9-1-1 calls.¹² Only 5.5 percent of PSAPs report that Text to 9-1-1 constitutes between five and ten percent of total call volume, and just 2.4 percent report that it constitutes greater than ten percent of total call volume. As a service, Text to 9-1-1 is not widely used.

Overall, employees at PSAPs are excited about these new technologies. 74.0 percent of employees at PSAPs of all sizes believe that the new technologies will be beneficial for their PSAPs. When breaking the measure down by PSAP size, this finding is replicated for both small and medium PSAPs, although employees at large PSAPs express some ambiguity. While 61.6 percent of employees at large PSAPs believe these new technologies will benefit their PSAPs, equal amounts of employees are either unsure or feel that that the technologies will not benefit their PSAPs (19.2%, respectively). Nevertheless, even here, a sizeable majority express optimistic feelings towards technology.

Employees are very enthusiastic about learning new technologies. 75.4 percent of employees at PSAPs of all sizes look forward to learning new programs. This is true at PSAPs of all sizes, as no statistically significant differences are observed. However, while employees are energized about new technologies, they do not feel that their PSAPs have effectively implemented training programs to help them learn newly adopted programs. Only 28.5 percent of employees agree that their PSAP is adequately training them in new technologies, a sizeable minority (39.8%) disagree, and a large proportion (31.8%) express a neutral attitude.

There are significant differences across PSAPs of different sizes and how adequately trained in new technologies employees feel, as reported in Table 39. Employees at large are the most likely to report that their PSAP does not provide adequate training in new technologies (50.5%) followed by small PSAPs (42.0%) and medium PSAPs (34.9%). Just 18.8 percent of employees in large PSAPs believe that their PSAPs adequately train them in new technologies compared to 26.1 percent in small PSAPs and 33.5 percent in medium PSAPs. The proportion of employees holding neutral opinions is about the same across PSAPs of all sizes, gravitating to around 31.0 percent.

TABLE 38: PSAP PROVIDES ADEQUATE TRAINING IN NEW TECHNOLOGIES			
PSAP PROVIDES ADEQUATE TRAINING IN NEW TECHNOLOGIES:	SMALL PSAPS	MEDIUM PSAPS	LARGE PSAPS
AGREE	26.1% (49)	33.5% (95)	18.8% (19)
NEUTRAL	31.9% (60)	31.7% (90)	30.7% (31)
DISAGREE	42.0% (79)	34.9% (99)	50.5% (51)
χ^2	11.058		
<i>p-value</i>	.03		

¹² See the report “Text to 9-1-1 by the Numbers” by Jaime A. Seling, Oakland County, MI Sheriff’s Office.

Given that employees express a strong interest in new technologies, it is unfortunate that large numbers of them do not feel like their PSAPs are adequately training them in these new programs. PSAPs should capitalize on this enthusiasm and develop comprehensive training programs that ensure that their employees are being given opportunities to learn these technologies.

For those PSAPs that have training programs of this sort already in existence, given this data, it appears they are inadequate. PSAPs should reevaluate their training strategies with respect to new technologies in light of these findings. In doing so, it could be useful to create opportunities for employees to communicate to their supervisors, trainers, and directors about what, exactly, they perceive to be the weaknesses of current protocols so that PSAPs can respond organically to the perceived difficulties confronting their employees.

Consolidation: Virtual and Physical

One other technological trend affecting PSAPs is virtual consolidation. However, this only affects a small minority of PSAPs surveyed here. 16.1 percent of PSAPs report being virtually consolidated, and only 11.1 percent report having plans to virtually consolidate in the future. PSAP size does not affect whether or not a PSAP is virtually consolidated, nor does it predict whether or not a PSAP plans to virtually consolidate in the future.

In terms of physical consolidation, the trends are similar. Only 16.2 percent of PSAPs report having been physically consolidated with other PSAPs. PSAP size *does* seem to have an effect on the likelihood of being consolidated, however, as Table 39 shows.

Unsurprisingly, large PSAPs are slightly more likely than medium PSAPs to have been consolidated, and much more likely than small PSAPs (see Table 39).

TABLE 39: PHYSICAL CONSOLIDATION BY PSAP SIZE			
	Large PSAPs	Medium PSAPs	Small PSAPs
Consolidated	29.2%	25.2%	8.7%
Not Consolidated	70.8%	74.8%	91.3%
χ^2	19.981		
<i>p-value</i>	.000		

It is important to note that PSAP consolidation has increased in recent years, and many small PSAPs have disproportionately consolidated. Nevertheless, large majorities of each remain unconsolidated.

Only 12.1 percent of PSAPs report having plans for physical consolidation. Of those physically consolidating, most (72.6%) plan to do so within two years or less. Slightly more than a quarter (just over 27.0%) plan to physically consolidate within three or more years. There are no significant differences between the size of a PSAP and its intention to physically consolidate.

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APPENDIX A: RETAINS GLOSSARY AND ACRONYMS

Abandoned calls – See Call Abandonment.

Annual Call Volume (ACV) – The total number of calls processed by a PSAP in a year. It is often reported as incoming calls only but a more accurate measure includes all call activity: incoming, internal transfers, and outgoing calls. Duplicate calls for a single incident, such as multiple wireless calls for the same car accident, should also be considered for inclusion in total call volume since they require a response and consume calltaker time.

ANOVA – A statistical test of the difference in means (averages) between three or more groups.

Average Speed of Answer (average answer time) – A common quality measure in PSAPs; it is the time it takes a calltaker to pick up from first ring in the PSAP.

Bivariate – A type of statistical analysis that looks at the relationship between two variables.

Busy Time – The time when a calltaker is actually talking on the telephone or the dispatcher is actually talking on the radio. It is the time recorded by most software programs and does not include any additional time associated with a particular call or incident.

Call Abandonment – An incoming call that is abandoned when the caller hangs up before the call is answered. The number of abandons and the abandon rate are good quality indicators and generally related to speed of answer.

Call Completion Time – The non-telephone time spent processing a call. It includes all additional time related to a call; time spent entering data in to the CAD system, handling the call internally, transferring calls, dispatching a unit to the scene, address verification, etc.

Call Volume – A common term for the number of calls. Usually used with a time delineated qualifier such as annual call volume, or hourly call volume. Call volume is not about the length of calls or the nature of the calls. It is simply the number of calls and it is used to determine workload. PSAPs where each employee handles telephone and radio activity, may want to add the number of incidents dispatched to the number of telephone calls to obtain a more accurate indication of workload (number of CAD entries or incidents dispatched is considered a more realistic indicator than number of push-to-talk events).

Calltaker – A PST who processes incoming calls through the analyzing, prioritizing, and disseminating of information to aid in the safety of the public and responders. See Position below.

PSAP size – Small PSAPs (1 – 15 employees); Medium PSAPs (16 – 75 employees); Large PSAPs (76 or more employees). See CALEA definition below.

Chi Square (χ^2) – A test of the existence of a relationship between two categorical variables. When chi-square is statistically significant ($p < .05$) there is a relationship between the variables.

Client Agencies – Those agencies which are served by the PSAP. These include fire, police, EMS, public utilities, etc.

The Commission on Accreditation for Law Enforcement Agencies, Inc., (CALEA) – The purpose (e.g., determination of PSAP classification size) of CALEA’s Accreditation Programs is to improve the delivery of public safety service by: maintaining a body of standards developed by public safety practitioners that covers a wide range of up-to-date public safety initiatives; establishing and administering an accreditation process; and recognizing professional excellence.

Computer-Aided Dispatch (CAD) – Computer software that provides dispatch related services such as records management, mobile data, 9–1–1, links to National Crime Information Center (NCIC) and state databases, and interfaces to jail, property, personnel records, etc.

Confidence Interval – Because statistical estimates generated from sample data are not likely to be exactly equal to the value of the larger population we are interested in, a confidence interval is constructed to delimit the upper and lower range of values that likely contain the actual population value. This range is affected mostly by the size of the sample from which the estimate is generated.

Console – The physical space where a calltaker or dispatcher works, also called a work station or post.

Correlation Coefficient – A statistical measure of the strength of the relationship between two numerical variables. The closer to 1 (or -1), the stronger the relationship is, or the more power one variable would have in predicting the value of the other.

Coverage Position – A job category in which the number of employees is determined by the need to provide service regardless of the workload. The “coverage” may refer to a particular task, a specific work station, post, or console that must be staffed or “covered” for a given length of time, usually continuous service 24/7/365. This position type is most closely equated to minimum staffing. This position is discussed more in-depth in the first APCO Project RETAINS study. See the Effective Practices Guide for more details.

Critical Incident Stress Management (CISM) – An adaptive, short-term psychological helping-process that focuses solely on an immediate and identifiable problem. It can include pre-incident preparedness to acute crisis management, to post-crisis follow-up.

Cronbach’s alpha – A statistic that measures how well a set of variables or items, taken together, measure a single underlying concept. The closer the measure is to 1, the greater the reliability of the set of items.

Public Safety Dispatcher (Dispatcher) – A PST who provides dispatch services by analyzing, prioritizing, and processing calls while maintaining radio contact with responders to ensure safe, efficient, and effective responses to calls for emergency medical, fire, and law enforcement services, in accordance with local, state, tribal, or national standards. See also Position.

Employee Availability – A measure of the actual number of hours employees are available to handle a task. It is calculated by subtracting the total hours an employee is on leave or in training from the total work hours (i.e. the number of hours in a year for a “full time” employee).

Employee Commitment – See Organizational Commitment.

Full Time Equivalent (FTE) – The number of full time staff it takes to cover a position for one shift. If a PSAP schedules two half-time employees to cover one position, the two employees make up one full time equivalent, or one FTE. Each half-time employee would be .5 FTE.

Huber-White “sandwich” estimator — A specialized regression procedure that accounts for the dependence of errors across individuals in a dataset without assuming a pattern of error variance. This kind of technique reduces the bias presented by having multiple individuals who share certain characteristics within the sample.

Incident – An emergency event requiring a response from Police, Fire, EMS or combination thereof.

Incoming Call Volume – The total number of incoming wireless and wire-line calls received in a given time period.

Linear regression model — A model for looking at the independent effects of one or several independent variables on an outcome or dependent variable using a least squares function. The regression model allows us to predict a value of the dependent variable based upon the value(s) of the independent variable(s).

Minimum Staffing – The minimum number of staff required to work during a given time period. Normally driven by the number of positions that need to be staffed, call volume, and other factors.

Multivariate model — A way of analyzing data so that we compute the independent effects of several predictor or independent variables on one outcome or dependent variable.

Organizational Commitment – An outcome measure used in this report. It was created by combining responses to four survey questions on pride about one’s job, willingness to turn down an between paying job, intention to stay at the organization five more years, and intention to spend the rest of one’s career with the organization.

Over hire – Some PSAPs are authorized to hire additional employees, beyond their authorized levels, to accommodate predictable changes in employment levels due to turnover, FMLA, etc.

Pearson’s R — A measure of the strength of a relationship between two numerical variables.

Performance Targets – Quality indicators that serve as a proxy for PSAP performance. Common indicators are the percentage of calls that are answered within ten seconds, the percentage of calls answered within three rings, the call abandonment rate, the average speed of answer (ASA), blocked calls (busy signals), etc.

Position – A job in a PSAP that has specific requirements and duties.

Primary Public Safety Answer Point (PSAP) – A facility equipped and staffed to receive emergency and non-emergency calls requesting public safety services via telephone and other communication devices. 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.

Probationary – Staff that has been recently hired or is still in a “probationary” period that usually includes intensive training and/or mentoring. Also referred to as “new hires”.

Project RETAINS – A national study of staffing and retention issues in a random sample of PSAPs in 2004. A second study was conducted in 2005 to find out if staffing and retention issues were different in large PSAPs (using the CALEA definition above). The tools are research-based and designed specifically for public safety PSAP managers.

Psychological Distress – An outcome measure used in this report. It was created by combining the responses to survey questions on experiences of sadness, hopelessness, worthlessness, feeling like everything is an effort, heart pounding or racing, nervousness and tiredness.

Public Safety Answering Point (PSAP) – A facility equipped and staffed to receive emergency and non-emergency public safety calls for service via telephone and other communication devices. Emergency calls for service are answered, assessed, classified, and prioritized.

Public Safety Telecommunicator (PST) – The individual employed by a public safety agency as the first of the first responders whose primary responsibility is to receive, process, transmit, and/or dispatch emergency and non-emergency calls for service for law enforcement, fire, emergency medical, and other public safety services via telephone, radio, and other communication devices.

Recruit – A newly hired employee, typically still in training or within the probationary period. Recruiting is an area of great interest to managers who have difficulty finding employees who can handle the work and finding enough to handle the amount of work comfortably.

RETAINS (Responsive Efforts to Assure Integral Needs in Staffing) – See Project RETAINS.

Retention – The ability of an organization to keep its employees, as opposed to losing them as a result of voluntary or involuntary departure decisions. Retention is the opposite and complement of turnover.

Retention Rate – Percentage of employees that remained with an organization during a given period of time (usually annually). Calculated as $[1 - \text{Turnover Rate}] \times 100$ (100 – minus turnover)

Scheduling – The process of assigning employees to specific time slots. Staffing is the determination of the number of employees needed, while scheduling is the allocation and deployment of available employees.

Secondary Public Safety Answer Point (PSAP) – A facility to which 9-1-1 calls for service are transferred from a primary PSAP (see Primary PSAP).

Selection – The process of screening and selecting potential employees who are highly qualified and/or a good fit with the work.

Staffing – Staffing is a broad term that includes the process of determining the number of employees needed to handle a specific set of tasks and/or a given workload, finding, hiring and keeping the appropriate number of employees. It differs from scheduling in that staffing is about the number of employees needed to handle the work load, whereas scheduling is about the allocation and deployment of those employees.

Telecommunicator – See Public Safety Telecommunicator (PST).

Total Call Volume (TCV) – is used to estimate staffing needs for volume–influenced positions. Call volume is simply the number of calls; it is not about the length or nature of the calls. All calls should be counted, incoming, lateral or transfer calls, and outgoing calls contribute to the total number of calls handled. As long as a call requires time, it should be included in the total. Note that Total Call volume can be for any time period, and it can be for any position, as long as the data is available in that format.

Turnover Rate – The ratio of the number of workers who had to be replaced in a given time period to the average number of workers. Project RETAINS research calculated turnover as the percentage of all current positions that required replacement workers. This includes the total number of staff that leave employment in a given year, for any reason (i.e. both voluntary and involuntary separations), divided by the total number of employees that year.

Volume–influenced positions – Jobs within a PSAP that require different levels of staffing based on the workload; positions that require additional employees to accommodate daily, weekly or seasonal variations in call volume. Job categories or tasks where the number of employees on any given shift is determined by the activity level (“volume”) of incoming calls and/or incoming calls and dispatch. This position is discussed more in-depth in the first APCO Project RETAINS study. See the Effective Practices Guide for more details.

Welch *F* – A statistic used when normality assumptions for an ANOVA are violated as indicated by a Levene’s statistic. Due to the small proportion of large PSAPs in our sample, the distributions of certain variables are often skewed, but true differences between PSAPs of different sizes do exist. To correct for this skewness, we use a Welch *F* to ensure the veracity of the ANOVA results when significant relations are found but a Levene’s test indicates asymmetric distributions in variance.

Acronyms and Abbreviations

APCO	The Association of Public-Safety Communications Officials
BLS	Bureau of Labor and Statistics
CAD	Computer-Aided Dispatch
CALEA	Commission on Accreditation for Law Enforcement Agencies
CATI	Computer-Assisted Telephone Interviewing
CISM	critical Incident Stress Management
CPE	Customer Premise Equipment
CSSR	Center for Social Science Research at George Mason University
DRI	Denver Research Institute
EAP	Employee Assistance Programs
EMD	Emergency Medical Dispatch
EMS	Emergency Medical Services
FMLA	Family and Medical Leave
GED	General Education Diploma
GMU	George Mason University
ICT	Information and Communications Technologies
OPM	U.S. Office of Personnel Management
PSAP	Public Safety Answering Point
RETAINS	Responsive Efforts to Assure Integral Needs in Staffing
SHRM	Society for Human Resource Management
SPSS	Statistical Package for the Social Sciences

