Best Practices

CHAPTER 2

This chapter describes goals and actions related to effective and efficient public safety dispatching and describes related best practices. Goals are broad statements describing the desired outcomes for public safety answering points (PSAPs). Actions are general steps that PSAPs can take to help meet the goals. The goals and actions create a framework for identifying best practices for public safety dispatching.

In this chapter we ask:

- **What are the main goals that apply to 9-1-1 public safety dispatching in Minnesota?**
- **What actions should public safety answering points take to help reach the goals?**
- **What practices now in use reflect those actions?**

Local governments have great leeway over PSAP operations; however, state rules require, among other things, that PSAPs maintain a minimum grade of service, operate 24 hours per day, and have at least one published telephone number for nonemergency services.[1] Professional standards established by the public safety communications industry provide guidance for PSAP operations and procedures, even though the standards are not legally binding. We used these professional standards, statutes, rules, and our observations of Minnesota PSAPs to determine appropriate goals and actions for public safety dispatching in Minnesota.

9-1-1 dispatching involves 24-hour per day access to public safety communi-cations and requires speed and accuracy.

GOALS

We identified two primary goals for effective and efficient 9-1-1 dispatching. We believe these goals apply to all PSAPs regardless of size or location. The goals are:

1. **To provide 24-hour per day availability for receiving 9-1-1 and other public safety calls and either (a) dispatching law enforcement, fire protection, and emergency medical and ambulance services as needed or (b) transferring calls to the appropriate public agencies.** [2]

This goal emphasizes the need for emergency communications to be available to callers at all times, day or night, throughout the year. Statutes also prescribe the scope of the services available through a 9-1-1 system in Minnesota—police, fire fighting, and emergency medical and ambulance services, where these services are available—and allow other emergency and civil defense services to be incorporated at the discretion of PSAP administrators.

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1 *Minn. Rules*, ch. 1215.0800, subp. 1 and 4; ch. 1215.0900, subp. 3.

2 This goal is based on the statutory definitions of PSAPs and their services. See *Minn. Stat.* §§403.02, subd. 5 and 403.03.

2. **To provide an effective and efficient system that processes incoming calls and, as necessary, dispatches response units in an accurate and speedy manner.** [3]

This second goal focuses on two essential features of dispatching: doing the job well and doing it quickly. In public safety dispatching, the immediacy of many incidents cannot be overemphasized. Speedy communications can mean the difference between capturing a suspect and letting him get away, preventing a major fire and letting one escalate, or even life and death. Further, accuracy in communication is of utmost importance. Emergencies do not tolerate transposed numbers that result in help going to the wrong address. Achievement of both speed and accuracy is the mark of successful public safety dispatching.

ACTIONS AND BEST PRACTICES TO REACH THE GOALS

We identified seven actions that we believe will help PSAPs reach these goals. These are not the only actions that affect the performance of PSAPs. Other factors may also play a role and these seven are not intended to be exhaustive. Nor will each of the actions apply universally to all PSAPs. Nonetheless, these actions for efficient and effective dispatching are based on ideas and standards from the public safety communications industry.

The seven actions are:

1. **Develop and use standard operating procedures.**

2. **Support a trained and qualified work force.**

3. **Maintain adequate communications and network equipment.**

4. **Consider opportunities for coordinating the use of dispatching equipment and for cooperative dispatching.**

5. **Keep records and measure performance.**

6. **Promote information exchanges among public safety response agencies.**

7. **Educate the public on the 9-1-1 system and services.**

We describe below each of these seven actions. For each action we offer examples of how some Minnesota public safety answering points have put these actions into practice with demonstrated results. By including these examples we are not suggesting they are the only PSAPs that use these best practices; to the contrary, we learned of many PSAPs where these practices are in use. Time constraints, however, precluded us from getting detailed information from them all.

1. Develop and Use Standard Operating Procedures

Standard operating procedures are written guidelines that normalize the functions of PSAPs and standardize how business is conducted. Establishing and following written guidelines provides consistency in operations, allowing PSAPs to provide more prompt and reliable service.[4] This means that multiple dispatchers can provide consistent, well thought out responses to various situations, even when facing traumatic incidents. According to our survey of Minnesota PSAPs:[5]

3 Francis X. Holt and Ernest E. Ricci, "Enhanced 911: Planning and Implementation," *International City/County Management Association Management Information Service Report,* 23, no. 10 (October, 1991): preface.

4 Association of Public-Safety Communications Officials, *Public Safety Communications Standard Operating Procedure Manual* (New Smyrna Beach, Florida: APCO, August 1990), 7; and Eric Parry, *Managing the 9-1-1 Center* (Coshocton, Ohio: National Emergency Number Association, 1996), 96.

5 We surveyed 112 PSAPs and 10 State Patrol communications centers and received responses from 108, for a response rate of 89 percent.

- **Nearly 78 percent of PSAPs in Minnesota had written standard operating procedures for some dispatching functions in 1996.**

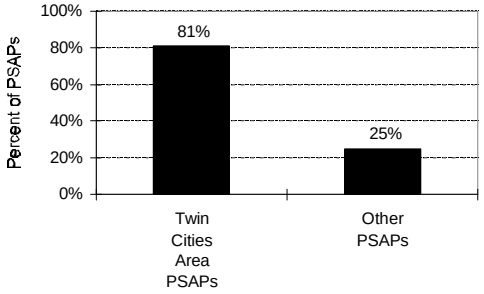
All functions of dispatching should be standardized: receiving and processing calls, obtaining information from callers, identifying and dispatching appropriate and available resources, communicating with response units, coordinating with other public safety agencies, resolving complaints and grievances, staffing the PSAP, operating equipment, and managing unanticipated malfunctions in the communications system.[6] Resources are available to assist PSAPs in developing standard operating procedures.[7]

Disaster Recovery Plans

As part of its standard procedures, a PSAP should have written disaster recovery plans that specify what steps it will take to maintain public access to emergency communication should the primary 9-1-1 or other telephone and radio systems become inoperative or in the event of some other disaster.[8] Disaster recovery plans help prepare the PSAP and its employees for unanticipated system malfunctions and disasters, standardize the procedures to be followed in those events, and guarantee continuous citizen access to public safety services. As shown in Figure 2.1:

- **A larger share of PSAPs in the Twin Cities area than other PSAPs had written disaster recovery plans or agreements in place in 1996.**

Figure 2.1: PSAPs with Written Disaster Recovery Plans or Back-Up Agreements, 1996



SOURCE: Legislative Auditor's Office Survey of Public Safety Answering Points, 1997.

Most other PSAPs had disaster recovery plans or back-up agreements but they were not written.

Disaster recovery plans should (1) specify what equipment will be used in disaster situations, (2) describe how dispatchers will coordinate with other response agencies, (3) identify an alternate PSAP to be used if phone calls cannot get through, and (4) outline the necessary steps required to resume operations. Contingency plans for specific disaster situations, such as a 9-1-1 system failure, should consider worst case scenarios and detail how the PSAP will deal with them.[9]

6 APCO, *Standard Operating Procedure Manual,* 23-108; American Society for Testing and Materials, "Standard Guide for Emergency Medical Services System" and "Standard Practice for Emergency Medical Dispatch," *1997 Annual Book of ASTM Standards,* Vol. 13.01 (West Conshohocken, PA: ASTM, 1997), 500 and 616; and Commission on Fire Accreditation, *Fire and Emergency Services Self Assessment Manual* (Fairfax, Virginia: CFA, 1997), 32.

7 For example, APCO and NENA both publish books that help PSAPs develop standard operating procedures. APCO publishes two documents: *How to Develop and Maintain a Public Safety Standard Operating Procedures Manual* and *Public Safety Telecommunications Standard Operating Procedures Manual;* NENA publishes *Managing the 9-1-1 Center*, with a section on standard procedures.

8 National Emergency Number Association, *NENA Network Quality Assurance* (Coshocton, Ohio: NENA, June 1995), 3, 9, 15; ASTM, "Standard Guide for Emergency Medical Services System Telecommunications" and "Standard Practice for Emergency Medical Dispatch," *1997 Annual Book of ASTM Standards,* 500-501 and 614; and National Association of State Emergency Medical Services Directors, *Planning Emergency Medical Communication, Volume I State-Level Planning Guide* (Washington D.C.: National Highway Traffic Safety Administration, June 1995), 42-44.

9 Parry, *Managing the 9-1-1 Center,* 141.

Backup and emergency procedures need to be tested.[10] Only through testing can PSAPs learn whether their plans and procedures help them effectively manage disaster situations. By regularly testing backup plans and equipment, such as with training drills, PSAPs can resolve problems that could otherwise render them inoperative.[11] They can also learn how their plans and procedures correspond with those of other response agencies and revise them as necessary to ensure interagency communication and coordination during a disaster. Additionally, testing prepares PSAP employees in responding to these circumstances. We found that:

- **About 28 percent of PSAPs had backup procedures and conducted ongoing tests of those procedures in 1996.**

Quality Assurance

A quality assurance program is necessary for all PSAPs. Ensuring the correct functioning of PSAPs is especially important in public safety dispatching because citizens' health, safety, and well being may depend on it. With a quality assurance program a PSAP takes a systematic, structured look at the actions and processes that produce quality outcomes so that it can achieve those results consistently.[12] An ongoing quality assurance review ensures that PSAP employees comply with the center's standard operating procedures and help meet its standards of service. Quality assurance is important to continually improve dispatch operations, identify and encourage the use of practices that lead to high quality responses to callers, avoid actions and practices that do not contribute to high quality, and assure the public of competent, trustworthy service.[13]

Quality assurance programs typically contain three main components: (1) setting the standards or practices that both define a high quality of service and instruct dispatchers on correct procedures, (2) monitoring the performance of PSAP employees for compliance with the standards, and (3) making changes or encouraging actions that improve operations with the intent of consistently meeting the standards. It is up to the PSAP to provide the education, retraining, or self-learning programs needed to bring dispatchers' practices in line with desired practices.[14] Quality assurance programs require PSAPs to take proactive steps in setting clear standards for dispatchers' work and ensuring the standards are followed by monitoring dispatcher responses to calls. These measures take PSAPs beyond simply responding to complaints to, instead, actively and continuously pursuing improvements in their delivery of service. Quality assurance initiatives let PSAPs catch potential problems before they become systemic.

Standardized quality assurance programs alert PSAPs to possible problems.

10 Ibid., 141; National Association of State EMS Directors, *Planning Emergency Medical Communications, Volume I*, 44; National Association of State EMS Directors, *Planning Emergency Medical Communication, Volume II Local/Regional Planning Guide* (Washington D.C.: National Highway Traffic Safety Administration, June 1995), 15; NENA, *NENA Network Quality Assurance*, 15; and ASTM, "Standard Guide for Emergency Medical Services System Telecommunications" and "Standard Guide for Planning and Developing 9-1-1 Enhanced Telephone Systems," *1997 Annual Book of ASTM Standards*, 501 and 728.

11 Parry, *Managing the 9-1-1 Center*, 141.

12 Francis Holt, *Emergency Communications Management* (Saddle Brook, New Jersey: PennWell Publication, 1991), 136; and National Highway Traffic Safety Administration, *Emergency Medical Dispatch: National Standard Curriculum, EMD Program Implementation and Administration* (Washington DC: NHTSA, 1995), 1-10 and 1-11.

13 ASTM, "Standard Practice for Emergency Medical Dispatch Management," *1997 Annual Book of ASTM Standards*, 898.

14 Ibid., 902.

Emergency Medical Dispatch

In addition to a quality assurance program, PSAPs that provide instructions to callers with medical emergencies should adhere to an "emergency medical dispatch priority reference system" approved by a medical director.[15] The reference system should include systematic caller interrogation questions, systematic prearrival instructions, protocols for assigning the appropriate response units to incidents, and appropriate training in emergency medical dispatching. Such a system provides a common set of expectations for training, performance, and planned response.[16] Emergency medical protocol prompts, on either flip cards or a computer, are necessary to assist with prearrival instructions. The prompts direct dispatchers through step-by-step instructions for such things as childbirth and poison control. According to our survey:

- **Approximately 10 percent of PSAPs offered, or transferred to another agency that offered, all the necessary components of a successful emergency medical dispatch program: a dispatch priority reference system with systematic prearrival instructions, appropriate training, and quality assurance mechanisms.**

A larger share of PSAPs offered some part of the four components described above. For example, approximately 51 percent of PSAPs offered prearrival instructions for medical incidents or transferred calls to another agency that offered prearrival instructions. Some PSAPs may have decided against offering emergency medical dispatching because the risks involved with providing the wrong instructions over the telephone, or having instructions misinterpreted, could subject the PSAP to liability for misfeasance.

Examples of Standard Operating Procedures

Developing disaster recovery plans and operating procedures for PSAPs' daily functions can be expected to benefit PSAPs by bringing consistency to operations, improving reliability in the service, and planning in advance what steps must be taken in the event of natural disasters and equipment breakdowns. Costs for procedure manuals and disaster plans include the time and expense involved with developing and writing them, as well as the time necessary to instruct dispatchers and others on the content of the manuals and disaster plans. Quality assurance programs offer the benefit of reviewing PSAP practices to ensure they provide a high level of quality service. When used continually to review operations and suggest improvements, quality assurance programs can also help reduce the PSAP's exposure to tort liability. But quality assurance programs require time to develop and implement. They are ongoing efforts, not one-time initiatives, used progressively in each area of the PSAP's operations.

Emergency medical dispatching requires standard operating procedures and is often an essential means of providing immediate emergency care, especially in regions with great distances between victims and ambulances. The potential for liability can be reduced with rigorous attention to appropriate dispatcher training, a medically approved priority response system, prescribed prearrival instructions, and quality assurance mechanisms. Each of these elements of a proper emergency medical dispatching program has costs, some of which are: initial training of dispatchers in emergency medical dispatching, recertification of the dispatchers, paying others to substitute while training occurs, and working with a medical director trained in emergency medical care to oversee the development and implementation of the dispatch program. Some PSAPs believe that the direct risk to the PSAP, as well as the costs, may be lessened when a qualified entity other than the PSAP processes medical calls.

15 ASTM, "Standard Practice for Emergency Medical Dispatch," *1997 Annual Book of ASTM Standards,* 613; and NHTSA, *Emergency Medical Dispatch,* 1-19 through 1-24.

16 ASTM, "Standard Practice for Emergency Medical Dispatch," *1997 Annual Book of ASTM Standards,* 612-613.

General Standard Operating Procedures

Ramsey County

Ramsey County's PSAP, serving 160,000 residents, uses standard operating procedures to standardize the activities performed by dispatchers. With multiple dispatchers working multiple shifts, the PSAP director wanted uniform procedures to which all dispatchers would adhere. In 1988, the PSAP compiled a formal, written procedure manual to distribute to each dispatcher. The procedure manual documents PSAP policies for personnel, communication with police and fire, emergency medical services, animal control, city maintenance, dispatch equipment, and emergency operations.

PSAP administrators have found that a formal, written procedure manual clearly relays office expectations to dispatchers. The PSAP holds the lead dispatcher or supervisor of each shift accountable for adherence to the procedures. Supervisors review random audio tapes, checking for dispatchers' compliance with procedures.

PSAP officials also find that it is easier to respond to complaints when adhering to standard operating procedures. Often when individuals complain about the way their calls were handled, a review of the tape can reveal whether the dispatcher was following the written policies. The PSAP director also believes that the procedure manual prevents many complaints from ever surfacing, as the standardized practices limit deviation in dispatcher responses.

Standard procedures allow multiple dispatchers to respond consistently.

While the actual compilation of a formal procedure manual is not difficult, it can be time consuming. In Ramsey County, one PSAP employee conducted most of the research and documented the information for the manual. PSAP officials estimate that the office spent roughly one year putting together the manual, working as time permitted among the normal daily functions of the office. Aside from the time dedicated for the project, other costs included those for copying the procedures and binding the document.

With the procedure manual written in a computerized word processing program, revisions are relatively simple. The PSAP revises the procedure manual as needed, namely when a change in operations occurs or something new arises.

To facilitate the successful implementation of standard operating procedures, Ramsey County PSAP officials recommend talking with staff and other users of the manual to get their input on the policies. They encourage PSAPs to obtain copies of standard operating procedures from other communications centers. With many sound standard operating procedures already in place around the state, a PSAP can adapt existing documents to meet its individual needs. Finally, administrators caution that PSAPs should use standard operating procedures as guidelines, not hard and fast rules. Special circumstances will always arise that require actions different from those in the manual.

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Ramsey County Sheriff's Communications
612/481-1318

or

Shari Hughes
Assistant Director of Communications
Ramsey County Sheriff's Communications
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Anoka County

The Anoka County PSAP, serving a population of 279,000 and dispatching for 11 law enforcement agencies and 15 fire departments, established PSAP procedures manuals jointly with other emergency personnel in the county. The process resulted in procedures manuals for radio communications and fire communications; each of these two manuals provides a common set of expectations by the many emergency response agencies in the county.

Instead of confining the development of the procedures to only PSAP personnel, the PSAP involved several representatives from law enforcement and fire agencies. In this way, not only does the PSAP receive the added professionalization and standardization of procedures used by numerous dispatchers, but it also benefits from the awareness of PSAP procedures on the part of fire fighters, police, and deputies. Because they helped produce the standard procedures, the county's multiple law enforcement agencies and fire departments know what to expect of the PSAP dispatchers. This contributes to a coordinated emergency response between the communications center and other emergency personnel.

Involving law and fire personnel in developing the procedures did take additional time to resolve differences of opinion and reach consensus between agencies. PSAP officials estimate that each of the radio communications and fire communications manuals required approximately 30 hours of meetings and an additional 20 hours to compose the manual and train dispatchers.

The involvement of law and fire agencies may be especially valuable in service areas with numerous emergency response agencies.

For more information contact:

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Anoka County Central Communications
612/323-5822

or

Linda Hanson
PSAP Coordinator
Anoka County Central Communications
612/323-5826

Emergency Medical Dispatching

City of Burnsville

The city of Burnsville, with 57,000 residents in Dakota County, offers 24-hour ambulance and emergency medical services (EMS) through its fire department. Burnsville dispatchers receive all EMS calls, directly dispatch fire department units for those calls, and provide prearrival instructions to callers.

The Burnsville PSAP requires all dispatchers to be trained as first responders, with 40 hours of initial training and annual refresher training. Currently, two dispatchers are also certified as emergency medical dispatchers (EMD)—although PSAP officials have their own goal of eventually seeing all dispatchers trained as EMDs. The city's EMS program is approved and supervised by a doctor from a local hospital. Dispatchers use a set of medical protocol prompts on flip cards as guides for providing prearrival instructions.

With standard procedures for EMD documented, dispatchers provide callers consistent, reliable prearrival instructions. Paramedics have expressed their approval of EMD functions performed by dispatchers, citing dispatchers' ability to retrieve information from callers that is useful to the paramedics. Feedback on calls is used to improve the duties dispatchers perform prior to the paramedics' arrival, such as gathering patient history information or contacting a chaplain.

The principal costs of EMD services are staff training and time. Initial training for first responders is $100 per dispatcher and EMD certification costs $300 per dispatcher, plus the cost of time for those involved with training and their substitutes on duty. The nature of EMD calls often means dispatchers stay on the phone longer—requiring sufficient staffing to handle other calls.

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Mahnomen County

Dispatchers in the Mahnomen County PSAP, serving about 5,200 residents, are trained as emergency medical dispatchers. Emergency medical training allows dispatchers to provide medical help over the telephone before the arrival of emergency medical technicians or ambulances.

In 1997, the PSAP employed a trainer to come to Mahnomen County and instruct dispatchers in emergency medical dispatching. Among other things, training covered how to question and instruct callers with medical emergencies, the correct procedures for providing prearrival instructions, an understanding of the legal aspects of emergency medical dispatching, and setting medical dispatch priorities.

When medical calls come in to the PSAP, dispatchers rely on desk reference manuals for emergency medical dispatching, which have been approved by a doctor trained in emergency medicine. The reference manuals guide dispatchers through protocols appropriate to the particular medical emergency. Dispatchers are cautioned to use only the instructions provided by the reference manuals and not fall back on impromptu directions that may end up being inappropriate to the situation. They offer medical instructions only when the callers agree they want them and are capable of using them.

To help ensure that the emergency medical dispatching procedures are followed correctly, the PSAP dispatchers have frequent feedback with the ambulance providers and Mahnomen County deputies who are trained as emergency medical technicians. After major incidents they review the steps they took and look for ways that could improve service for future incidents. In addition, the PSAP's dispatcher/coordinator is responsible for reviewing the procedures that dispatchers followed to check for ongoing quality and correct problems when they occur.

Mahnomen County paid $250 per dispatcher for the training in emergency medical dispatch. Ongoing costs will include those for training to recertify emergency medical dispatchers after three years. Dispatchers are also interested in additional training that will keep them updated with changing procedures, such as those for cardiopulmonary resuscitation. One of the dilemmas the PSAP faces is the scarcity of training available in its part of the state, which other rural counties also encounter.

Although the costs for appropriate emergency medical dispatching are ongoing, the PSAP believes that the public's expectation for prearrival instructions has grown and that the need for emergency medical dispatching justifies its expense. Particularly in counties like Mahnomen, where the distances between medically trained emergency personnel and victims can be long, the need is great for qualified dispatchers to provide medical instructions prior to the ambulance's arrival.

For more information contact:

Richard Rooney
Sheriff

or

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Dispatcher/Coordinator
Mahnomen County
218/935-2257

Emergency Medical Dispatching Provided by Other Agencies

Scott County

Scott County's PSAP, serving a population of 71,500, provides prearrival medical instructions for its 9-1-1 callers through a private ambulance service. PSAP officials believe providing prearrival instructions through a private company allows them to increase the level of service to residents without having to incur the expense of special training for staff or increase the communications center's potential for liability.

One of the three ambulance services that serve Scott County provides prearrival instructions. Scott County dispatchers receive all incoming 9-1-1 calls, and transfer medical calls necessitating prearrival instructions after determining the nature of the call. Three-way conferencing allows the dispatcher to stay on the line with the caller and the ambulance service as long as necessary. The ambulance service uses trained medical dispatchers to dispatch the ambulance and provide prearrival instructions, as needed.

Using a private ambulance service allows Scott County to offer prearrival instructions to its residents through another provider while allowing its dispatchers to concentrate on other 9-1-1 calls and communicate with field units. Those providing emergency medical dispatching are professionals that specialize in responding to medical situations. Additionally, training on prearrival instructions is no longer necessary for Scott County dispatchers, freeing up amounts previously paid for EMD training and associated overtime costs. PSAP officials also believe transferring prearrival instructions out of the communications center has lowered its liability risks.

While the ambulance service is currently providing countywide prearrival instructions free of charge as a courtesy to Scott County, PSAP officials believe eventually the county may be required to pay for the service.

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Scott County Sheriff's Department
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Summary Related to Standard Operating Procedures

Common to these examples illustrating general operating procedures and emergency medical dispatching is the standardization of practices. Standardizing operating procedures enables all dispatchers at a given PSAP to perform their duties in a systematic way, according to that PSAP's criteria. It is each PSAP's responsibility to develop operating standards, revise them as needed, inform dispatchers about them, and ensure they are followed.

2. Support a Trained and Qualified Work Force

Skilled dispatchers are the critical link between people with emergencies and a timely and appropriate public safety response. To effectively perform dispatching functions, PSAPs must support a trained and qualified work force. Using appropriate selection and hiring criteria helps PSAPs find qualified employees. Providing initial and ongoing training, evaluating personnel regularly, and offering stress management measures helps ensure that dispatchers have the skills, knowledge, and abilities needed for the job.[17] Adhering to appropriate staffing levels allows PSAPs to maintain the sufficient number of personnel needed for answering and processing calls in a timely manner.[18]

Selection and Hiring

Prior to hiring dispatchers, PSAPs should take several steps to help ensure they have the right people for the job. These include: realistic job descriptions, tests of applicants' aptitudes and skills, and background checks. PSAPs should develop realistic job descriptions that provide an accurate picture of the job.[19] This means outlining

17 Parry, *Managing the 9-1-1 Center*, 26, 68, 71; ASTM, "Standard Guide for Planning and Developing 9-1-1 Enhanced Telephone Systems," and "Standard Practice for Emergency Medical Dispatch Management,"*1997 Annual Book of ASTM Standards, 727, and 897-898; Association of Public-Safety Communications Officials, National Public Safety Telecommunicator Training Standard* (APCO, 1996), 1; National Association of State EMS Directors,*Planning Emergency Medical Communications, Volume I,* 7, 44-45; and National Fire Protection Association,*NFPA 1061, Standard for Professional Qualifications for Public Safety Telecommunicator* (Quincy, Maryland: NFPA, 1996), 5.

18 Holt, *Emergency Communications Management,* 41-42; Parry, *Managing the 9-1-1 center,* 58; ASTM, "Standard Guide for Planning and Developing 9-1-1 Enhanced Telephone Systems,"*1997 Annual Book of ASTM Standards,* 728; and NFPA, *NFPA 1221, Standard for the Installation, Maintenance, and Use of Public Fire Service Communication Systems* (Quincy, Maryland: NFPA, 1994), 8.

19 Parry, *Managing the 9-1-1 Center*, 23.

specific job performance requirements that: convey accurate information about the job; are specific about the tasks involved; cover the scope of all the position's duties, the typical work climate, and supervision policies; are perceived as credible by the applicants; and offer important information about the position and organization offering it.[20] By defining what employees should be able to do to successfully perform their duties, realistic job previews help job applicants judge how well the job fits their expectations and whether they should continue pursuing it. Realistic job descriptions ensure that individuals understand the scope and nature of the required duties and reduce job disillusionment once an individual is hired.

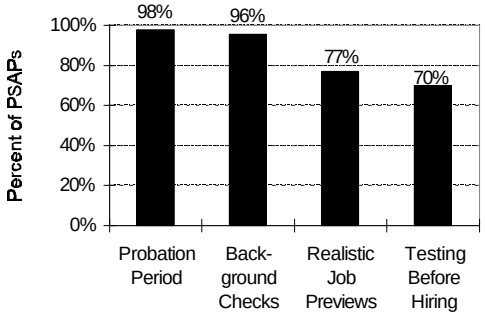
Testing applicants before hiring them helps PSAPs determine whether applicants have the requisite skills. Aptitude tests provide a standardized measure of applicants' aptitude for various verbal and performance-related abilities, such as keyboard skills. "Multi-tasking" tests measure the ability of applicants to do more than one thing at a time—an important skill for dispatchers.[21] Tests are available that measure job applicants' aptitudes and skills specifically for public safety dispatching.PSAPs should also conduct background checks and psychological tests to screen out applicants who may not be able to carry out their responsibilities because they cannot endure the stressful working conditions or are emotionally unstable.[22] Monitoring dispatchers during a probationary period allows the PSAP to determine how well suited newly hired employees are for dispatching.[23] According to our survey, 54 percent of PSAPs used to some degree these four selection and hiring practices: realistic job previews, candidate tests, background checks, and probation periods.

Figure 2.2 shows the frequency of these hiring practices used by Minnesota PSAPs in 1996. Based on the results of our survey, we found that:

- **PSAPs that used realistic job descriptions and tested applicants before hiring typically had higher dispatcher retention rates than others.**

We found that a larger share of PSAPs reporting use of realistic job previews and testing job applicants had high employee retention rates compared to those PSAPs that did not follow these hiring practices. Retaining employees over time can help a PSAP avoid the expense and time involved with recruiting and hiring new employees. This link between realistic job previews, tests of applicants, and high retention rates does not mean that job previews and testing caused higher job retention; rather, it simply shows a connection among these factors. The relationship between conducting background checks, using probation periods, and high dispatcher retention rates was apparent but not as strong. Nearly all PSAPs (at least 96 percent) reported that they conduct background checks and use probation periods.

Figure 2.2: Hiring Practices Used by PSAPs, 1996



SOURCE: Legislative Auditor's Office Survey of Public Safety Answering Points, 1997.

20 NFPA, *NFPA 1061,* 15; and James A. Breaugh and Robert S. Billings, "The Realistic Job Preview: Five Key Elements and Their Importance for Research and Practice," *Journal of Business and Psychology,* Summer 1988, 293-294.

21 Parry, *Managing the 9-1-1 Center,* 37; ASTM, "Standard Guide for Emergency Medical Dispatch," *1997 Annual Book of ASTM Standards,* 899; and NFPA, *Professional Qualifications for Public Safety Telecommunicator,* 5.

22 NFPA, *Professional Qualifications for Public Safety Telecommunicator,* 5; and Parry, *Managing the 9-1-1 Center,* 36.

23 ASTM, "Standard Practice for Emergency Medical Dispatch," *1997 Annual Book of ASTM Standards,* 616; and NFPA, *Professional Qualifications for Public Safety Telecommunicator,* 14.

Initial Training for Newly Hired Dispatchers

Once hired, initial and ongoing job-related training prepares dispatchers for the rigors of their work and enhances their skills and knowledge. Training that is targeted to employees' individual needs can also help them meet desired job performance requirements.[24] PSAPs can develop their own individualized training programs, and they can also use general training offered by professional organizations, such as the Association of Public Safety Communication Officials International, Inc. (APCO) or the National Emergency Number Association (NENA).[25] In Minnesota, the Minneapolis Community and Technical College offers two levels of dispatcher training: a technical diploma and an associate of arts degree in public safety communication/9-1-1.

Formal training for newly hired employees establishes a firm knowledge base to begin dispatching. At a minimum, topics should cover the roles and responsibilities of the PSAP and telecommunicators; legal aspects of law enforcement, fire, and EMS agencies; interpersonal communications; technology and equipment use, including telecommunications devices for the deaf (TDD); telephone techniques and call processing; call classification by type of call and priority; radio communication protocols, rules, and responder safety; and stress management.[26] According to our survey:

- **Nearly 69 percent of PSAPs in Minnesota reported offering at least some amount of training in each of the recommended subject areas.**

However, as mentioned in Chapter 1, only 19 percent of PSAPs fulfilled all training guidelines recommended by the Association of Public-Safety Communications Officials (APCO).

As part of formal training, PSAPs should devise an orientation program to familiarize new employees with the organization's standards, practices, policies, and procedures.[27] For example, PSAP orientation may explain the organization of the PSAP and provide an overview of office procedures and protocols to which dispatchers must adhere. New employees should receive on-the-job training to help establish the link between classroom knowledge and job performance.[28]

Ongoing Training

PSAPs should offer training opportunities both for newly hired and experienced employees. PSAPs should encourage continuing education and training among all dispatchers to ensure they maintain effective skills and demonstrate them proficiently.[29] Continuing education helps dispatchers keep current with changes in laws, policies, procedures, and technologies. According to our survey:

- **In 1996, over 57 percent of PSAPs in Minnesota required annual training targeted to dispatchers' individual training needs.**

Personnel Evaluations

PSAPs should use personnel evaluations to determine how well employees are meeting established standards and complying with agency protocols. Evaluations are especially important in dispatching because monitoring employee performance and taking corrective action when

24 NFPA, *Professional Qualifications for Public Safety Telecommunicator,* 5.

25 Parry, *Managing the 9-1-1 Center,* 77.

26 APCO, *National Public Safety Telecommunicator Training Standard,* 4.

27 Parry, *Managing the 9-1-1 Center,* 85-86; and ASTM, "Standard Practice for Emergency Medical Dispatch Management," *1997 Annual Book of ASTM Standards,* 898-899.

28 NFPA, *Standard for Professional Qualifications for Public Safety Telecommunicator,* 12; and Parry, *Managing the 9-1-1 Center,* 86-87.

29 Parry, *Managing the 9-1-1 Center,* 80-81; ASTM, "Standard Practice for Emergency Medical Dispatch Management," *1997 Annual Book of ASTM Standards,* 898; APCO, *National Public-Safety Telecommunicator Training Standard,* 8; and NFPA, *Standard for Professional Qualifications for Public Safety Telecommunicator,* 14.

needed can prevent mistakes in life-threatening situations. While PSAPs should not use personnel evaluations in place of ongoing supervision, regular personnel evaluations allow PSAPs to determine whether employees are performing effectively.[30] They also provide employees with feedback on their job performance by documenting areas of successful performance and identifying needed improvements. PSAPs can use evaluations to identify the individual work goals and training needs of its employees.[31] Our survey showed that in 1996:

- **Approximately 74 percent of PSAPs conducted personnel evaluations at least once a year.**

Written publications and software are available to guide PSAPs through the process of developing their personnel evaluations.[32]

Stress Management

PSAPs should help employees manage the stress of their job. Dispatchers are often faced with time-pressured, critical, life-and-death incidents. Although trained to remain calm during emergencies, dispatchers who internalize their stress day after day can become subject to physical and emotional problems. PSAPs should use a variety of approaches to help dispatchers manage stress, such as incorporating stress recognition and management in their training.[33]

Some PSAPs use debriefing teams after particularly stressful emergencies to help dispatchers deal with the event. In Minnesota, for example, Critical Incident Stress Management Teams, consisting of emergency service personnel that volunteer as peer counselors trained in stress management, provide critical incident stress debriefing at no cost to emergency service personnel across the state. Aside from debriefing, PSAPs can offer exercise and general health programs, peer support groups, opportunities for professional counseling, or teach relaxation techniques. Although roughly equivalent shares of PSAPs in the Twin Cities area and elsewhere in Minnesota offered critical incident stress debriefing to dispatchers in 1996, those in the Twin Cities area generally had a wider variety of stress management tools than others, as shown in Table 2.1.

Staffing Levels

Finally, PSAPs should have an appropriate number of dispatchers to ensure prompt processing of calls. Many factors are involved in determining the appropriate number, including the number of telephone lines in the PSAP service area, the average number of calls received and size of the population served by the PSAP, and the extent of additional duties assigned to dispatchers. Ultimately, PSAPs must determine the minimum

Table 2.1: Stress Management Tools Used by PSAPs, 1996

	Twin Cities Area PSAPs (*N*=26)	Other PSAPs (*N*=69)
Professional Counseling	76.0%	55.7%
Critical Incident Stress Debriefing	64.0	67.1
Stress Management Training	52.0	34.3
Exercise and General Health Programs	52.0	25.7
Peer Support Groups	24.0	8.6

SOURCE: Legislative Auditor's Office Survey of Public Safety Answering Points, 1997.

30 Susi B. Steele, *Emergency Dispatching, A Medical Communicator's Guide* (Englewood Cliffs, New Jersey: Regents/Prentice Hall, 1993), 200.

31 Parry, *Managing the 9-1-1 Center*, 30, 68; ASTM, "Standard Guide for Emergency Medical Dispatch Management," *1997 Annual Book of ASTM Standards*, 899-900; and NFPA, *Professional Qualifications for Public Safety Telecommunicator*, 5.

32 For example, APCO and NENA both publish books that help PSAPs develop personnel evaluations. APCO publishes *Human Resource Management in Public Safety Communications* and has available employee evaluation software for annual evaluations; NENA publishes *Human Resource Management in 9-1-1*, which contains a section on performance management.

33 Parry, *Managing the 9-1-1 Center*, 63-67; and Holt, *Emergency Communications Management*, 161-164.

number of dispatching positions required to run the communications center during routine operations and employ a sufficient number of persons to fill those positions 24 hours a day and 7 days a week.[34]

In short, staffing levels must be in line with a PSAP's workload.[35] Workload measurement studies, typically conducted by professional analysts, systematically measure all tasks performed by dispatchers over a designated period of time, such as one week. Analysts determine the service time for each task performed and then build a mathematical model of the PSAP. From this model, PSAPs can ascertain the number of operators per shift, the number of telephone lines, and the number of radio channels necessary for timely call answering and processing.[36] Although accurate, workload measurement studies can be time consuming and expensive. As an alternative, some professional organizations provide general staffing estimates based on factors such as numbers of telephone lines and trunks.[37]

In Minnesota, PSAPs that recorded all incoming calls had a median 3,658 calls per full-time equivalent (FTE) dispatcher in 1996. PSAPs that recorded only calls for which an initial complaint report was filed had a median of 1,923 calls per dispatcher. (Table 2.2 shows the range of calls received by PSAPs.)

PSAPs in service areas serving the largest populations typically had the largest number of calls per FTE dispatcher. For instance, in PSAPs that recorded all types of calls, all of the PSAPs serving populations above 54,000 had relatively high numbers of calls per dispatcher (greater than the statewide median of 3,658 per FTE dispatcher); only 10 percent of those PSAPs serving small populations (below 21,000) had calls per dispatcher above the median. (See Figure 2.3.) PSAPs serving smaller populations tended to have fewer calls per dispatcher and use dispatchers to perform other duties in addition to their main roles of call taking, dispatching, and communicating with field units.

Table 2.2: 9-1-1 and Other Calls per Full-Time Equivalent Dispatcher, 1996

	PSAPs Recording All Calls (*N*=30)	PSAPs Recording Calls that Generate Initial Complaint Reports* (*N*=43)	PSAPs Recording Calls Resulting In Units Dispatched (*N*=5)	PSAPs Using Other Counts of Calls (*N*=4)
Minimum	112.9	50.1	1,080.0	455.0
Median	3,658.3	1,922.8	3,185.7	1,896.8
Maximum	28,829.3	14,179.2	6,063.0	9,273.0

*Incidents that are cause for initial complaint reports (ICRs) in some PSAPs may not generate ICRs in others.

SOURCE: Legislative Auditor's Office Survey of Public Safety Answering Points, 1997.

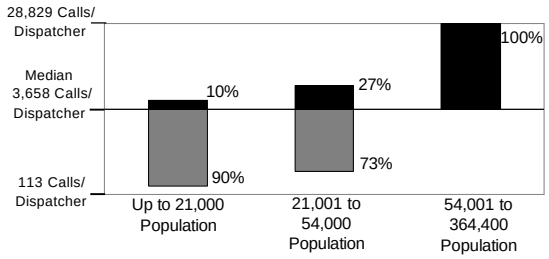
34 Holt, *Emergency Communications Management*, 42-48.

35 Parry, *Managing the 9-1-1 Center*, 58.

36 *Ibid.*, 59-60.

37 The American Society for Testing and Materials has a standard for planning and developing 9-1-1 systems using a calculation based on standard operating assumptions that provides estimates for lines and trunks. The formula can also be applied to staffing by incorporating other call processing requirements (such as seven-digit calls) of the PSAP. See ASTM, "Standard Guide for Planning and Developing 9-1-1 Enhanced Telephone Systems," *1997 Annual Book of ASTM Standards*, 728. Additionally, the National Fire Protection Association has a standard for public fire service communication systems that suggests for jurisdictions receiving 600 or more alarms per year, the number of operators must be sufficient for (1) 95 percent of alarms to be answered within 30 seconds and (2) the dispatch of appropriate fire services to be made within 60 seconds after the completed receipt of an emergency alarm. See NFPA, *Standard for the Installation, Maintenance, and Use of Public Fire Service Communications Systems*, 8-9.

Figure 2.3: Calls Per Dispatcher Above and Below Median by Population of PSAP, 1996



NOTE: Data are only for PSAPs that record all incoming calls; number of dispatchers represents full-time equivalents.

SOURCE: Legislative Auditor's Office Survey of Public Safety Answering Points, 1997.

Examples Related to a Trained and Qualified Work Force

The benefits of using appropriate selection and hiring practices, ongoing training, personnel performance appraisals, and stress management techniques include: better matches between job applicants and dispatcher positions, dispatchers with improved skills, adherence to established standards and protocols, increased job satisfaction, better management of stress-related problems, and opportunities to lower employee turnover. Costs include those for testing applicants, training and certifying new and experienced dispatchers, covering dispatching shifts during training periods, and providing the time away from the job to manage stress-related problems. Other costs are the time needed to evaluate employees as well as to plan and implement sound hiring practices and stress-management methods.

Selection and Hiring Practices

Anoka County

The Anoka County PSAP, serving a population of 279,000, uses screening, oral and practical exams, and personnel profiles when selecting and hiring new dispatchers. PSAP officials believe these practices promote lower turnover among new dispatchers, saving the PSAP dollars and time.

When a new dispatching position opens, officials require candidates to submit a written application and perform a typing test. Those that pass the typing test, indicating that they can perform keyboard functions, are eligible for subsequent oral and practical exams.

A panel of three or four current PSAP supervisors conducts a structured oral exam for each second-round applicant, asking a set of questions designed to determine whether the applicant's traits match those of a successful dispatcher. After the oral exam, the applicants take a practical exam. This role-playing exam features a dispatcher in one room simulating a 9-1-1 caller. The applicant, in another room, plays the role of complaint taker and takes three calls over approximately 20 minutes while being recorded. PSAP officials listen to the recorded tapes afterward and score each applicant. Role playing gives PSAP officials the opportunity to see the applicant's ability to (1) gather and organize information and (2) solve problems.

Candidates with the highest total scores then undergo a series of written tests. The tests, which take approximately one and one-half hours to complete, include (1) a brief profile of the applicant's personality, (2) a test designed to determine the applicant's mental ability and intelligence, and (3) a test designed to determine the applicant's ability to work with distraction.

Based on the personality profile, PSAP officials conduct a final round of interviews, during which applicants tour the facility. They conduct reference checks for each candidate. New dispatchers are on county probation for six months and PSAP probation for an additional six months, giving the PSAP one full year to determine their ability to perform.

The hiring and selection process is time consuming. Actual time spent varies depending upon the number of applicants, but PSAP officials estimate that they spend roughly 100 hours during each hiring and selection process, which typically occurs twice a year. Such an extensive process may not be efficient for PSAPs with a limited number of applicants; the Anoka County PSAP typically receives between 15 and 25 qualified applications for each dispatching position posted. On the other

hand, PSAPs that spend a significant amount of time training new employees would likely benefit from eliminating unqualified candidates through ability testing and personality profiles. Dispatchers who quit or are terminated after weeks of training represent a financial loss to PSAPs.

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Clay County/Moorhead

The public safety answering point in Clay County, managed by the Moorhead Police Department and serving 53,000 residents, used a simulated dispatch console to test applicants for communication officer positions in 1997. The test is one tool that, when combined with other written tests, oral interviews, psychological evaluations, and background checks, helps the PSAP identify candidates with the skills and knowledge needed to match the job requirements.

For the most recent hiring of dispatchers, the PSAP tested job candidates for their ability to think under pressure, respond to a stressful situation, and perform multiple tasks at the same time. Although the PSAP had in the past made it a practice to test job applicants for typing and communication abilities, it had not tested applicants for these other skills that are particular to dispatching.

For the test, the PSAP contracted with a test administrator who conducted an exam taken with a simulated dispatch console. The test takes 30 minutes per applicant and consists of several prerecorded scenarios to which the candidates are asked to respond. For instance, in one case the applicants hear a combination of 35-letters and numbers spoken with increasing speed and are asked to write them in the correct order. In another case, the applicants listen to a story of an incident, take notes, and are later asked to answer 10 questions about the incident. The applicants are told to expect a call; they are to ascertain from the caller the name, phone number, address, type of emergency, and nature of the services needed. The prerecorded call duplicates a hysterical mother with a choking child. During the scenarios, the tape recording requires candidates to take several steps, such as filling out a specific form, stamping it with the correct date and time, and using a map index.

The test administrator observes and tape records the applicants' responses and then scores them; final scores are presented to the PSAP manager at the end of the testing day. According to the test administrator, the higher scoring candidates are more likely to be able to function in stressful settings and perform multiple tasks simultaneously. Evaluations conducted of applicants who took the

Simulated console to test multi-tasking skills of job applicants

test in other jurisdictions and were subsequently hired show a correlation between high test scores and strong performance appraisals by PSAP managers a year after hiring.[38]

Although the Moorhead/Clay County public safety answering point has used this test only once, officials are cautiously optimistic that the test helps screen out applicants who could not stand the rigors of the job. In the past, up to half of the newly hired employees would quit midway through the PSAP's training program. After introducing this test into the PSAP's typical hiring practices, all of the new communications officers completed training. Officials will be able to make a fuller assessment of the simulation's usefulness after the new communications officers have been on the job for a longer period. Using a test administrator from outside the department helps ensure impartial testing.

To minimize costs, the Moorhead/Clay County PSAP shared the services of the test administrator with the nearby Fargo Police Department; Fargo had used the test in the past with successful results. They split a $500 charge plus travel expenses of the test administrator to test numerous job applicants. (Test costs may vary based on factors such as the number of persons tested.) Because of the time involved with Moorhead/Clay County's intensive 16-week training program for communication officers, PSAP officials are pleased that the test appears to have been useful in helping them identify appropriate job candidates. This particular console simulation test is designed for public safety dispatching applicants in jurisdictions of any size and has been used at state, county, and city levels of government.

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Steele County

The Steele County PSAP, serving a population of 32,000, follows a structured hiring process for its dispatchers, who also function as jailers. PSAP officials believe the efforts have contributed to a relatively low turnover rate among dispatchers.

When the PSAP is hiring dispatchers or deputies and has a large pool of applicants, it requires candidates to undergo tests to measure personality traits and aptitudes as well as basic math, typing, and communication skills. Tests are scored in-house and testing costs are assessed at $6.50 per test plus a $215 base fee. After scoring the applicants, the PSAP typically invites the top 10 before an interview panel. The panel consists of three members, one of whom is a lead dispatcher from outside the county. All members of the panel have served as dispatchers and are therefore acquainted with the attributes of an effective dispatcher. This panel recommends its top three candidates to a group composed of the sheriff, chief deputy, and the police chief, which conducts background checks and makes the final hiring decisions. The hiring process typically lasts four to eight weeks.

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Initial Training

Clay County/Moorhead

The public safety answering point operated in Clay County, serving 53,000 residents, developed an extensive, 16-week training program for newly hired dispatchers. The program provides a standard curriculum for training as well as a standardized evaluation of trainees' performance. In the Clay County PSAP, dispatchers are communication officers employed by the county, but the Moorhead Police Department manages the communications center.

38 The test administrator conducted the evaluations; we did not independently verify the results.

Over a 16-week period, trainees go through a four-phase training. With experienced dispatchers as trainers, the trainees follow a training manual that covers most aspects of the dispatching job. Material in each phase builds on what was covered previously. The first phase is an introduction to the job and provides an orientation to the law enforcement center, the telephone consoles' features, and county personnel policies. In this phase the trainees also spend time riding along during certain shifts of city police, county deputies, and fire departments to become acquainted with operations in the field and get to know the people with whom they will be interacting.

During the second phase, communications officer trainees learn about radio consoles and headsets, radio language and transmission procedures, setting radio traffic priorities, paging, and radio channels. They also receive training on sirens and the alarm systems for burglaries, holdups, fires, and other situations.

Building on that information, the third phase teaches trainees about the content and use of the different computers and databases in the center. Communications officers learn how to retrieve information from the state and national repositories of criminal data and how to provide criminal histories to the patrol officers and deputies. They operate the various computer printers and the tape machine that records calls. Finally, dispatchers learn the center's call types, the geography of the service area and surrounding counties, and other agencies they will need to know about when on the job.

In addition to the written training manual, the communications center uses a standardized program of evaluating trainees. All of the experienced communications officers have attended sessions on how to be effective trainers. One of these experienced dispatchers works with the trainee to cover each day's material. As trainees demonstrate proficiency in the subject, the experienced dispatchers sign a sheet indicating that the trainee has accomplished the material. Every other week, the trainer will summarize the trainee's progress. Over the four training phases, a trainee will train with four or five different dispatchers, each of whom writes his or her own evaluation of the trainee's work.

In the last week of training, the trainer leaves the trainee alone in the dispatch center. This is the first time the trainee is operating solo to field calls and communicate with officers on the street. The trainer carries a portable radio to keep in contact with the trainee during this time.

Following training, the new communications officers remain on probation for the rest of a one-year period. Because the training itself lasts four months, PSAP managers have found that a six-month probation is too short; they need a full year to adequately assess the dispatcher's ability to perform under a wide variety of circumstances.

Comprehensive and systematic training offers several benefits. Everyone who passes the training has mastered approximately the same set of skills and knowledge. The thoroughness of the training prepares the communications officers for many different problems and eventualities. With officers and fire fighters in the field depending heavily on the role filled by the dispatcher to do their own jobs, the training system also increases their confidence in the dispatchers' capabilities. This contributes to an effective and smooth emergency response in which each member's work enhances the others.

Systematic training provides the dispatching corps with the same skills and resources.

Signing off on the tasks accomplished by the trainee each day ensures that no aspect of training is inadvertently missed or brushed over lightly. Because several experienced dispatchers work with the trainees, the new communications officers gain from a variety of perspectives. In addition, PSAP managers receive multiple evaluations of the trainees' progress, providing a well-rounded critique and reducing the likelihood that personality conflicts involving one person would interfere with an objective review.

Developing the training program and written manual took months of initial preparation. Beyond that, PSAP officials have spent additional time updating the manual. They have had to alter the sequence of some parts of the training so that information learned early on builds a foundation for what comes later. They recommend periodic reviews of training programs to make these kinds of adjustments. Although the size of another jurisdiction and the number of emergency response agencies in it could alter the length of similar training programs elsewhere, PSAP officials in the Moorhead Police Department believe most jurisdictions could receive the same benefits from standardized, comprehensive training.

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Ramsey County

Ramsey County's PSAP, serving 160,000 residents, uses a training manual and training task analysis sheet to ensure that new employees have the knowledge and ability to perform effectively as dispatchers. Officials have found that these and other training tools produce more competent employees, improve confidence among the police officers and firefighters served, and result in fewer complaints from citizens.

Once Ramsey County hires new dispatchers, it places them in a one-week general orientation. During this orientation, new employees receive tours of each of the five police departments the PSAP serves, the sheriff's office, and different agencies within the county with whom they may have contact—such as the adult detention center, juvenile detention center, or mental health clinics. They also review geographic maps that detail the PSAP's service areas, an overview of the department's line of authority, and an introduction to the computer-aided dispatching (CAD) system.

New employees then continue an intensive six- to eight-week training program.. They are paired with a dispatcher designated as coach and, with the aid of an extensive training manual, spend time observing and practicing dispatching. Initially, new employees observe the coach processing calls for service. They wear a special headset that enables them to hear both the caller and the dispatcher, allowing them to get a sense of responses to different types of calls and callers. As new employees increase their knowledge, the coaches allow them to start taking calls. Coaches then debrief new employees after their calls, discussing the calls in detail and how the new employee responded to the calls.

Coaches use a training task analysis sheet to mark off each training topic explained. For each activity listed on the checklist, such as use of equipment, manual dispatch, and tours, coaches verify when the activity was explained and practiced, how well it was performed, and additional remarks pertinent to the activity.

In addition to the checklist, coaches are required to submit weekly summaries of the trainees' progress. This narrative summary allows PSAP administrators and coaches to more closely follow the overall progress of new employees, rectify minor problems before they escalate, and plan the following weeks' activities to best meet the needs of the new employee.

Part of the eight-week training involves two to three days dedicated to CAD, one week dedicated to fire responses, one week dedicated to data systems, one week dedicated to the main police radio channel, and ongoing training on call processing. It also includes day-long ride alongs with the sheriff's department and at least one police department as well as tours of the Bureau of Criminal Apprehension and the State Highway Patrol offices.

The Ramsey County PSAP adheres to a six-month probation period, during which administrators get a feel for how new employees fit the job. Because of the time and money invested in initial training, the PSAP makes every attempt through training to address special needs of new employees.

PSAP officials have found multiple benefits from their new-employee training. New employees report feeling more confident of their skills when they begin their jobs and better supported while on

Experienced dispatcher conducts training

the job. Officials have also found improved confidence among those with whom they work—police officers and firefighters—because new employees are better prepared for handling emergency calls. Better trained employees have cut down on response time through more efficient call processing.

Each new employee spends 40 hours a week in training for 6 to 8 weeks, as do the coaches training the employees. Additionally, the training coordinator spends another 4 to 6 hours a week monitoring the progress of each new employee. Costs also include developing the training manuals, which Ramsey County officials estimate took one dispatcher 200 hours, and printing them.

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Steele County

In Steele County's PSAP, which serves a population of 32,000, newly hired dispatchers go through a minimum six-week training, the format of which was developed by other Steele County dispatchers over several months of time. Trainees are assigned to a dispatcher during a shift and over the training period will work with multiple dispatchers to become acquainted with each work shift. The dispatcher who serves as trainer follows a check list of the many functions the trainee is expected to learn. As the trainee learns these skills to the trainer's satisfaction, the trainer checks them off the list.

Training also includes riding along with police, deputies, and fire fighters, which allows the trainee to observe the work of the emergency response units from the vantage point of the responder. Similarly, the deputies and officers are required to sit for part of a shift in the communications center to better understand how the dispatchers operate and the multiple tasks they perform. This improves both the dispatchers' and the response units' appreciation for each other's work.

After the training, which can go beyond six weeks if needed to meet the individual needs of the trainee, new employees remain on probation for six months. At that point, the sheriff and jail administrator conduct a review of the trainees' work. The review may include listening to tapes of how the trainees answered calls and processed requests for service. Based on the evaluations, the sheriff determines whether to hire the employees permanently. The training processes are time consuming, but they have contributed to a high employee retention rate at the Steele County PSAP.

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Personnel Evaluations

Renville County

The Renville County sheriff oversees the hiring and evaluations of the dispatcher/jailers who process 9-1-1 and other calls in the county's PSAP. Renville County's PSAP serves 17,600 residents and also handles 9-1-1 calls from some parts of adjoining counties.

The sheriff conducts annual performance evaluations of four full-time and four part-time dispatcher/jailers. This is one formal step the sheriff takes in monitoring the overall performance of the PSAP, in addition to informal interactions with the dispatchers on an ongoing, regular basis.

Once a year all dispatchers fill out a performance appraisal form. They have the opportunity to describe their individual job-related goals and rate their own performance of the past year. The sheriff then rates the dispatchers on several measures including their quality of work, knowledge of the job, and ability to work with the public. Together the sheriff and employee go over the appraisal's contents.

Renville County's appraisal of dispatchers is used for adjusting salaries, deciding position advancements, and reviewing disciplinary actions taken during a year, if applicable. It is also used to identify areas of training customized to each dispatcher's own set of strengths and needs. The sheriff recommends additional training in areas where it may supplement a dispatcher's skills and improve his job. Because employees are involved in setting work-related goals for themselves, the goals are personalized and more meaningful as employees work toward improving their performance.

The performance appraisals are one piece of the process used to monitor the overall performance of the dispatchers. The relatively small size of the county allows the sheriff to personally oversee and interact with the dispatcher/jailers on a regular basis, conduct the performance appraisals, and take corrective steps when necessary. In larger jurisdictions with more employees, the sheriff could not reasonably have that level of involvement with all staff. PSAPs of all sizes, however, can get value from ongoing monitoring and regular performance appraisals.

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Stress Management

Rice County/Faribault Police Department

The PSAP operated by the Faribault Police Department on behalf of most of Rice County, serving 37,000 residents, uses different approaches to help manage job stress for dispatchers. It tries to prepare communications officer job applicants for the stressful nature of the dispatcher's work. It also encourages dispatchers and officers to meet following troubling incidents or to attend stress debriefings following particularly traumatic events. The debriefings are available for any emergency response personnel involved in emergency incidents that are especially stressful or emotional and that affect a person's ability to function on the job or at home.

The PSAP recognizes that dispatchers' jobs can be very stressful because of the pressures brought on by dealing with human tragedies and the uncertainties of the next call. In its hiring process, the PSAP tries to make job applicants aware of the levels of stress that go hand-in-hand with the job. Applicants take a test to identify their personality type and likelihood for handling stress. During the oral interview, the interview panel members describe a stressful situation and ask the applicants how they would respond. In the job posting and oral descriptions of the dispatchers' position, PSAP officials discuss the nature of the work shifts and the need for dispatchers to work nights and holidays, which can contribute to job stress and burnout.

Beyond trying to prepare job candidates for the rigors of the work, the PSAP encourages dispatchers to take steps that manage stress. One of

these steps is critical incident stress debriefings. Available through Southeastern Minnesota Emergency Medical Services to Rice County and 10 other southeastern Minnesota counties, stress debriefings are intended for dispatchers and others involved in responding to critical incidents, such as the death of a child, or the injury of a person related to, or a friend of, the dispatcher.[39] The sessions are conducted by specially trained individuals to help dispatchers and other emergency services personnel identify and acknowledge their signs of distress, provide reassurance and support, and prepare them to cope with similar incidents that could occur in the future.

The PSAP takes steps to prepare dispatchers for the stressful nature of their jobs.

Short of critical incident stress debriefings, which involve outside personnel, the PSAP encourages dispatchers and officers to meet together following other incidents that may be less traumatic yet still stressful. In this way, dispatchers receive some closure on incidents in which they played a part but were not apprised of the outcome.

Outside of the time spent in a critical incident stress debriefing, there is no cost to the PSAP or dispatchers for using the service. From the Rice County PSAP's perspective, avoiding or ignoring the factors that contribute to stress can take its toll on the morale of communications officers and job turnover. Regardless of a PSAP's size, the PSAP can benefit by preparing dispatchers to expect and manage the stress of the job, as well as encouraging them to avail themselves of professional help when needed. In jurisdictions with a high volume of calls, stress factors may be more frequent than elsewhere. While dispatchers working for smaller PSAPs may not experience critical incidents with as much frequency, they nonetheless are subject to the same symptoms of ongoing pressure-filled work conditions.

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Summary Related to a Trained and Qualified Work Force

These examples highlight the value of taking the necessary steps to identify appropriate candidates for dispatcher positions, training dispatchers to do the job right, and helping them maintain good job performance. Together these practices help PSAPs ensure that they have dispatchers with the skills, knowledge, and abilities to provide quality service.

3. Maintain Adequate Communications and Network Equipment

Communications equipment is fundamental to the daily operations of PSAPs. Maintaining adequate PSAP communications and network equipment, and replacing it when needed, are paramount to timely and consistent service delivery. PSAPs need equipment both for communications and to collect appropriate information, such as pending severe weather developments, that could affect public safety.[40]

Beyond the physical equipment, PSAPs have to provide the up-front planning and support functions that are necessary for the communications center to operate. This means planning for adequate trunking capabilities; interacting with the telephone companies that provide trunks, routers, and other technical components of 9-1-1 service; staying current with state-of-the-art technology developments; building and maintaining a master street address guide; and ensuring the database of residents' names, telephone numbers, and locations is constantly updated. Although these activities

39 Critical incident stress debriefing is also available to dispatchers and other emergency services personnel around the state through one of eight emergency medical services regions.

40 APCO, *Standard Operating Procedure Manual*, 60 and 76.

may fall outside the realm of typical law enforcement work, PSAPs need these important support functions to operate.

Equipment Features

Telephones are essential to the dispatching function, and many features are available to help dispatchers process emergency calls efficiently. NENA recommends certain features for PSAPs with enhanced 9-1-1. For instance, three-way conferencing permits dispatchers to transfer a call to the appropriate agency while remaining in contact with the caller before and during the transfer. This is helpful when the dispatcher needs to relay or verify information to the agency receiving the transferred call. A speed dial library and last number redial expedite calls to other agencies, especially important considering the urgency of emergency calls.[41]

NENA's standards also recommend automatic call distribution or call queuing to allow calls to be uniformly distributed among available dispatchers in the order they were received. In practice, however, some agencies have experienced problems with callers hanging up when put on hold via automatic call distribution. PSAPs using automatic call distribution must ensure their workload and staffing levels will produce desired results. Those without automatic call distribution should have some mechanism to indicate which call has been on hold the longest.[42] According to our survey, 28 percent of PSAPs reported using call queuing or automatic call distribution in 1996.

NENA's recommendations for an enhanced 9-1-1 system include selective, default, and alternate routing. Selective routing routes a 9-1-1 call to the appropriate PSAP based on the location of the caller. Default and alternate routing ensure that calls get answered under all conditions. Default routing routes a 9-1-1 call to a designated PSAP when the call cannot be selectively routed. Alternate routing automatically reroutes a 9-1-1 call to a designated alternate location if a PSAP's phone lines are busy or out of service.[43] As Table 2.3 shows:

- **A larger share of PSAPs in the Twin Cities area than PSAPs located elsewhere reported having selective and alternate routing in 1996.**

Selective routing is associated with enhanced 9-1-1. Because a larger number of PSAPs in the Twin Cities area than elsewhere have enhanced 9-1-1, it is understandable that selective routing is found predominantly in this area.

Table 2.3: Selective and Alternate Routing at PSAPs, 1996

	Twin Cities Area PSAPs	Other PSAPs
Selective Routing	88.0% (*N*=25)	33.8% (*N*=68)
Alternate Routing	95.7 (*N*=23)	29.9 (*N*=67)

SOURCE: Legislative Auditor's Office Survey of Public Safety Answering Points, 1997.

Preventing Service Disruptions

All PSAPs, whether providing basic or enhanced 9-1-1 service, need equipment designed to prevent disruptions in service and further guarantee callers 24-hour access to public safety agencies. PSAPs need an uninterruptable power supply that furnishes electrical power to equipment in the event of a loss of commercial power at the PSAP, providing no disruption to calls in progress or incoming calls.[44] An uninterruptable power supply is designed to maintain operation of critical equipment components long enough for commercial power or auxiliary generators to come on line and become

41 National Emergency Number Association, *NENA Generic Standards for E9-1-1 PSAP Equipment* (Coshocton, Ohio: NENA, June 1996), 40-41.

42 *Ibid*, 40.

43 ASTM, "Standard Guide for Planning and Developing 9-1-1 Enhanced Telephone Systems," *1997 Annual Book of ASTM Standards*, 720-722; and NENA, *Standards for PSAP Equipment*, 3.

44 NENA, *Standards for PSAP Equipment*, 70; and Parry, *Managing the 9-1-1 Center*, 137.

stable. PSAPs should also have access to adequate independent standby power sources, such as batteries or generators, to avoid sole dependence on commercial power should it become temporarily unavailable.[45] We found that:

- **Over 80 percent of PSAPs reported having an uninterruptable power supply in 1996.**

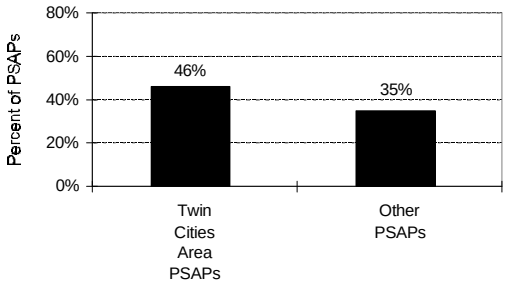
This high percentage may be due to differences in types of uninterruptable power supplies at PSAPs. For instance, some PSAPs may have uninterruptable power supplies solely for their telephone system while others may have a system sufficient to run all console equipment throughout the communications center. Our survey did not require respondents to specify what type of uninterruptable power supply they had in place in 1996.

Computer-Aided Dispatch

Some PSAPs have found that automation through computer-aided dispatch (CAD) increases their efficiency by providing more timely and accurate communications.[46] CAD is a computer program that provides to the PSAP dispatcher information about the status of emergency response units in real time, allowing the dispatcher to select the best response to a request for emergency help. A CAD system can capture details of the request for assistance and dispatch actions taken, and compile that information into a record that is available for retrieval in tracking incidents. Some PSAPs have found that designating one individual to be responsible for maintaining the CAD database improves control over system accuracy and data integrity.

Figure 2.4 shows that while CAD was not widely used around the state, more PSAPs in the Twin Cities region than elsewhere had CAD in 1996. Those with CAD usually served larger populations than other PSAPs; more than half with CAD served populations of at least 37,600, which was larger

Figure 2.4: Availability of Computer-Aided Dispatch, 1996



SOURCE: Legislative Auditor's Office Survey of Public Safety Answer Points, 1997.

than about two-thirds of the populations within the service areas of all PSAPs. PSAPs that used CAD in 1996 typically had call volumes that were higher than the median. Those PSAPs also tended to employ a larger number of full-time equivalent dispatchers, especially evident in Twin Cities area PSAPs. Overall, PSAPs with CAD in 1996 were more likely than others to also rank highly on many of our measures of effectiveness and efficiency (listed in Appendix B). For instance, when we compared costs per capita, we saw that more PSAPs with CAD than those without had costs per capita in 1996 that were below the statewide median.

Because different CAD systems have different features, PSAPs have to select ones that meet their individual needs. CAD systems can interface with other computer systems, such as internal records systems; crime information systems; law enforcement centers, fire stations, or ambulance stations; and mobile data terminals in patrol, fire, and other response vehicles. Computer system interface allows PSAPs to obtain and share information more quickly and reliably than through manual data entry during telephone or radio conversations.

45 Parry, *Managing the 9-1-1 Center*, 139-140; National Association of State EMS Directors, *Planning Emergency Medical Communications, Volume I,* 43; and National Association of State EMS Directors, *Planning Emergency Medical Communications, Volume II,* 15.

46 Sue Pivetta, *The 9-1-1 Puzzle: Putting All the Pieces Together* (Coshocton, Ohio: National Emergency Number Association, 1995), 89, 177.

Ergonomic Designs

PSAP equipment and furniture should be ergonomically designed to reduce the risk of repetitive motion injuries and problems related to improper lighting and the constant use of computer screens.[47] Equipment that can help reduce work-related injuries and associated tort actions include items such as individually-controlled lighting at answering positions, height-adjustable consoles, and self-adjustable seating.

Height-adjustable console accommodates different dispatchers

Equal Access to Emergency Communication

PSAPs must have equipment to ensure that individuals with speech and hearing impairments have equal access to emergency communication.[48] The Americans with Disabilities Act requires that telephone emergency services, including 9-1-1 services, provide direct access to individuals using telecommunications devices for the deaf (TDD).[49] PSAPs should have a TDD detection device and procedures in place that dispatchers follow to determine whether a silent call is a TDD call.[50] In addition to having the appropriate TDD equipment, equal access to hearing impaired people requires appropriate dispatcher training on identifying and processing TDD calls, proper maintenance of TDD equipment, and backup plans to continue service in the event of malfunctions or power failure.[51] According to our survey:

- **Nearly 66 percent of PSAPs reported that they provided the same level of service for TDD callers as other callers.**

Approximately 87 percent of PSAPs reported that half or more of their answering positions had access to telecommunications devices for the deaf.

Likewise, PSAPs with non-English speaking populations should ensure that those individuals have access to emergency communication.[52] PSAPs can employ dispatchers that are multi-lingual and able to communicate with non-English speaking callers. Language translation services that connect the dispatcher and caller with a translator are also available through private vendors.

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47 *Ibid.*, 94.

48 NENA, *Standards for PSAP Equipment*, 30, 42; ASTM, "Standard Guide for Planning and Developing 9-1-1 Enhanced Telephone Systems," *1997 Annual Book of ASTM Standards*, 723; and Pivetta, *The 9-1-1 Puzzle*, 80.

49 *28 CFR*, 35.162.

50 NENA, *Standards for PSAP Equipment*, 43.

51 U.S. Department of Justice, *Questions Regarding Telephone Emergency Services*, WWW document, URL http://www.usdoj.gov/crt/ada/pubs/911.txt, (October 14, 1997.)

52 ASTM, "Standard Guide for Planning and Developing 9-1-1 Enhanced Telephone Systems," *1997 Annual Book of ASTM Standards*, 723.

In Minnesota, the Department of Administration contracts for an on-line language interpretation service and makes it available at no charge to all 9-1-1 communications centers for emergency calls anywhere in the state. The language service allows PSAPs to dial a main number for access to interpreters for hundreds of languages. Three-way calling permits the dispatcher to stay connected to interpreters as they communicate with non-English speaking callers. The language line is also available for nonemergency calls; however, local governments pay a per-minute usage fee for that service. Our survey shows that:

- **Over 83 percent of PSAPs reported that they had access to interpreter services in 1996 for communicating with non-English speaking callers.**

Reliable and Secure Communications

Because dispatchers often serve as a relay point—requesting the appropriate information from callers and relaying it to the correct emergency response agency or providing information to officers at the scene of an incident—radio communication is crucial. Consequently, PSAPs need reliable means of communicating with law officers, fire fighters, and other responders through radio, wireless phones, pagers, and other means. They also need equipment that allows confidential communications between dispatchers and officers for times when security may be at risk.

For adequate radio communications, the number of radio channels must be sufficient for the radio traffic and radio coverage must be both reliable and secure.[53] Public safety agencies need a minimum number of radio channels to permit immediate communication without waiting for frequencies to become available; the actual number varies by jurisdiction and depends on usage levels. Trunked radio systems make efficient use of limited frequency capacity by assigning base and mobile radios to multiple channels which are opened only as needed when the radio microphone is activated. They permit numerous groups of public safety radio users to communicate in "talk groups" across agencies. In a trunked system, computers automatically assign available channels to users and reassign them as they become open, making efficient use of a limited number of channels.

Reliable radio coverage is essential not only for relaying information needed to help callers, but also for assuring the safety of field personnel. Police arriving at the scene of a break-in, for instance, need to know whether the intruder is on the premises and is armed. Radio coverage between the PSAP and either mobile or hand-held radio units should be reliable throughout the service area and should have at least 90 percent reliability when accounting for the inefficiency of antennas operating inside certain buildings.[54] Public safety agencies often need radio relay stations, or repeaters, designed to automatically rebroadcast what is received, to increase the effective radio range in a service area.[55] As Table 2.4 shows:

- **PSAPs in the Twin Cities area reported reliable radio coverage over larger percentages of their service areas than PSAPs elsewhere.**

This is likely due in part to the larger geographic area served by some PSAPs in rural Minnesota. It

Table 2.4: Percent of Service Area with Reliable Radio Coverage, 1996

	Twin Cities Area PSAPs (*N*=26)	Other PSAPs (*N*=72)
100 Percent	19.2%	22.2%
At Least 90 Percent	76.9	45.8
At Least 80 Percent	3.8	15.3
At Least 70 Percent	0.0	8.3
Less Than 70 Percent	0.0	8.3

SOURCE: Legislative Auditor's Office Survey of Public Safety Answering Points, 1997.

53 ASTM, "Standard Guide for Emergency Medical Services System Telecommunications," *1997 Annual Book of ASTM Standards*, 496.

54 National Association of State EMS Directors, *Planning Emergency Medical Communications, Volume II*, 16.

55 National Association of State EMS Directors, *Planning Emergency Medical Communications, Volume I*, 88.

may also have to do with differences in availability of equipment, such as repeaters that extend the range of radio communications by receiving transmissions from mobile or hand-held radios and rebroadcasting them from higher power transmitters or locations with wider coverage.

Secure communication between dispatchers and law enforcement is also critical at times when confidential information becomes key to a successful operation. At these times, PSAPs and response agencies can maintain secure communications by using mobile data computers, trunked radio systems, mobile or cellular phones, electronic scramblers, or other encryption schemes for both hardwire and cellular telephones. In addition to security, mobile data computers can expedite the retrieval of important information by allowing officers to query this information directly in their squad cars instead of by radio through a dispatcher; this in turns allows dispatchers to concentrate their efforts on incoming calls and other communications with response agencies.

Equipment and Database Maintenance and Replacement

Routine maintenance and testing of equipment helps ensure that equipment is functioning as intended and prevents problems from escalating in magnitude.[56] PSAPs should keep written logs on equipment problem reporting, repair, and maintenance.[57] PSAPs should also regularly inspect and test radio system equipment under varying conditions to ensure adequate performance.[58]

PSAPs should have access to a local telephone service provider for technical support 24 hours a day and 7 days a week for immediate telephone problem identification and equipment repair.[59] Remote maintenance capabilities further safeguard the system by allowing the maintenance provider to access PSAP equipment from a remote location. This assists in trouble isolation, resolution, and fault clearing. Remote maintenance features should accumulate statistics on system performance, provide automatic remote alarm reporting, enable remote or local programming of any function, constantly monitor all system functions, take corrective action when possible, and allow system access for alarm reset.[60]

PSAPs should have an equipment replacement plan for obsolete or worn out equipment.[61] Systematically financing large capital purchases over a period of years prevents undue financial stress on the local government budget in any single year. Planned equipment replacement programs also facilitate the purchase of equipment in a timely manner. Table 2.5 shows the availability of routine

Table 2.5: Availability of Equipment Maintenance and Replacement Plans, 1996

	Twin Cities Area PSAPs	Other PSAPs
Routine Maintenance	46.2% (*N*=26)	18.3% (*N*=71)
Remote Maintenance	66.7 (*N*=24)	34.8 (*N*=66)
Equipment Replacement Plans	53.8 (*N*=26)	67.6 (*N*=71)

SOURCE: Legislative Auditor's Office Survey of Public Safety Answering Points, 1997.

56 NENA, *Standards for PSAP Equipment,* 54; ASTM, "Standard Practice for Emergency Medical Dispatch,"*1997 Annual Book of ASTM Standards,* 616; CFA, *Fire and Emergency Services,* 33; and National Association of State EMS Directors,*Planning Emergency Medical Communication, Volume I,* 45.

57 National Association of State EMS Directors,*Planning Emergency Medical Communication, Volume I,* 45; and National Association of State EMS Directors,*Planning Emergency Medical Communication, Volume II,* 16.

58 National Association of State EMS Directors,*Planning Emergency Medical Communication, Volume I,* 45; and National Association of State EMS Directors,*Planning Emergency Medical Communication, Volume II,* 16.

59 NENA, *Standards for PSAP Equipment,* 55; and National Emergency Number Association,*NENA Recommended Standards for Local Service Provider Interconnection Information Sharing* (Coshocton, Ohio: NENA, February 1997), 8.

60 NENA, *Standards for PSAP Equipment,* 37.

61 Holt, *Emergency Communications Management,* 182-183.

maintenance, remote maintenance, and equipment replacement plans at Minnesota PSAPs.

PSAPs typically design and maintain databases of their service area's residents, telephone numbers, locations, and emergency response agencies responsible for each location. These databases are often independent of, but may be tied to, databases of telephone subscribers maintained by telephone companies. Accurate database information is vital to the successful operations of the public safety answering point because the data tell dispatchers where an incident is occurring and help determine which agency should respond. PSAPs must establish maintenance procedures to routinely update their databases (as residents move or subdivisions are added, for instance) and report any data errors that dispatchers may encounter.[62] The time necessary to maintain databases will vary depending upon the type of database a PSAP uses; PSAPs using local location identification, for instance, will have to spend substantial time maintaining their database to keep their enhanced 9-1-1 service operating accurately.

Establishing and maintaining databases in rural parts of the state, where large areas may have only post office boxes and no addresses, presents its own difficulties. From the emergency response perspective, however, creating addresses for rural areas is crucial; enhanced 9-1-1 especially relies on street addressing to work properly.[63]

Examples Related to Communications and Network Equipment

Maintaining access to reliable equipment and databases that provide essential and accurate information can enhance public safety agency preparedness, quicken response times, ensure continuous communications with all segments of the population, improve worker safety, and result in more effective and efficient management of PSAP resources. The costs associated with these benefits include the time and expense involved in planning, purchasing, implementing, and maintaining equipment and network systems, such as repeaters on towers to increase the range of radio communications or weather surveillance systems to provide advance warning of dangerous weather. Additional costs arise from the advance planning required to maintain and replace equipment and update databases and from training to guarantee the proper use of the overall network and communications system.

Computer-Aided Dispatch

St. Louis County

St. Louis County's two PSAPs, serving a population of 199,000, use computer-aided dispatch (CAD) to aid dispatching and track calls for service. PSAP officials have found the system to be a valuable management tool, using it in setting the budget, scheduling shifts, and analyzing agencies' use of its services.

St. Louis County implemented its CAD in 1991, largely due to an increased call volume. PSAP officials thought a CAD system would be the most efficient way to track and manage its calls for service. St. Louis County purchased the hardware and software for 12 CAD terminals at a cost of approximately $500,000, paid in part by a McKnight Foundation Grant. The PSAPs use the county's management information systems department for the general maintenance of CAD and personal computers. The PSAP also pays $15,000 each year for a maintenance contract that covers on-line problems and upgrades.

PSAP officials believe the benefits of CAD are well worth the costs. The system produced gains in dispatching efficiency, with more accurate call information recorded and consistent tracking of agency responses. Efficiency is enhanced by the system's recommendations for response units based upon their geographic proximity to the incident. The tracking has proven especially beneficial in the

62 Pivetta, *The 9-1-1 Puzzle*, 43-48.

63 Ibid., 56-60.

investigation of problems and complaints, with detailed call information available for review and documentation.

PSAP officials also use the information for management decisions. For instance, the systematic collection of call traffic data helped the communications center justify and achieve additional staffing. CAD adds credibility to data collection, standardizing the process and improving the accuracy of information retrieved. Officials believe that incremental gains have been made in dispatch response time and that improvements will continue.

One additional consideration in implementing a CAD system is the training time necessary to ensure dispatchers use it correctly. St. Louis County incorporates into its six-month training for new dispatchers instruction on the use of CAD. The St. Louis CAD system allows operation in training mode, simulating calls under varying circumstances to which dispatchers in training must respond.

While the management information gained from CAD could benefit any PSAP, the costs may prohibit smaller communications centers from making such a purchase. Officials caution that following the initial acquisition, PSAPs need to be prepared to invest in the ongoing maintenance and upgrades necessary to keep up with ever-changing technology.

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Communications Director
St. Louis County Communications Department
218/726-2920

Countywide Addressing

Renville County

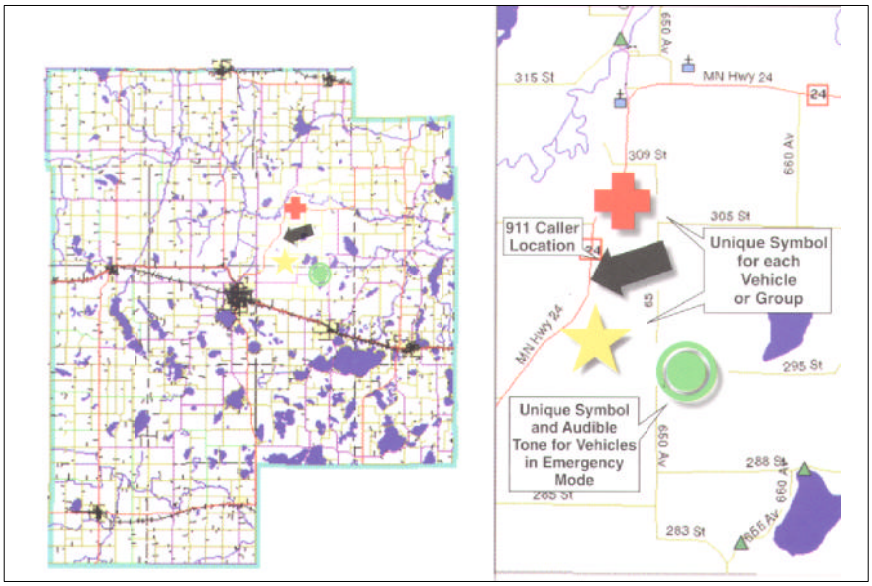
The Renville County PSAP, serving 17,600 residents, recently completed a project to assign addresses within all areas of the county. Before this project, about 25 percent of the county had only rural routes and did not have locatable addresses, which can hinder a public safety response. By June 1998, the county expects to have the maps, which correspond to the new address system, on-line and available for dispatchers' use.

The county hired a private firm to map the county and oversee the assignment of addresses. Through a combination of global positioning system coordinates and geographic information system maps, the firm has plotted all locations in the county with a high degree of accuracy. With these data, the firm creates county maps that can be viewed electronically at different scales—from a countywide perspective down to a single city block. It will be possible in the future for other county departments, such as public works, to use the geographic information system maps for their own needs.

When assigning street and avenue numbers, the county involved the postal service, emergency response agencies, and residents so that the interested parties would be aware of the changes. The county assigned five-digit street numbers throughout the county. It decided against naming streets after residents or in honor of families who had lived in a part of the county for a long time to avoid local disputes over whose name was most appropriate.

After the mapping system has been fully installed, dispatchers will be able to call up the map on computer terminals in the communications center; a red dot on the map will identify where the emergency call is occurring and the address will appear simultaneously. Dispatchers will have the option of printing a hard copy of the map and faxing it to the fire department or ambulance service responding to the call.

The sheriff expects that the addressing and mapping will enable quicker responses to emergencies. Dispatchers will not have to rely on the callers, who may be panicked or disoriented, to describe their locations. It was the PSAP's experience that residents who knew only their postal routes could not provide useful descriptive information to assist the emergency response agencies; some callers could not even recall the name of their townships for dispatchers. Until this time, the PSAP had only the capacity to provide automatic number identification for 9-1-1 calls; dispatchers used their computers to provide directions and distances on



An electronic map display for 9-1-1 calls

systems. By using a private firm for this work, the county did not have to purchase the sophisticated mapping equipment itself. Nor did it need among its own staff the specialized technological expertise for developing the maps. The firm is coordinating the mapping, assignment of addresses, and service area alignments that will eventually provide an integrated set of information to dispatchers.

For more information contact:

Jerry O. Agre
Sheriff
Renville County
320/523-1161

the roads to the location of the call. With the new system, dispatchers will have the exact address and a map displaying the location. Because the new addressing system uses 5-digit street and avenue addresses, it will be able to accommodate new housing subdivisions when they are developed.

The addressing and mapping project has been more than one and a half years in the making and is estimated to cost about $50,000. It is part of Renville County's upgrade to enhanced 9-1-1, which will include new terminals installed in the communications center, selective routing of 9-1-1 calls, and a contract with an outside vendor to maintain and update the database. The county will pay for the upgrade in part with its share of the enhanced 9-1-1 telephone user fee collected and distributed by the state. To complete the mapping, the county still has to resolve some differences over where fire department service areas precisely begin and end. Training will be necessary before the dispatchers can use the mapping and addressing system.

For other counties that do not yet have full addressing, Renville County PSAP officials recommend using professional services with the expertise and equipment to provide accurate assignments of locations via global positioning

Equipment Maintenance

St. Louis County

St. Louis County, with a population of 199,000, has an in-house radio maintenance division responsible for all two-way radio system design, installation, maintenance, and procurement for county agencies. The division also regularly tests the two PSAPs' uninterruptable power supply and backup procedures to ensure they are functional in the event of an emergency. PSAP officials have found having an in-house radio maintenance division expedites problem identification and rectification, and provides the service at a lower cost than outside vendors.

The size of St. Louis County warrants an in-house radio maintenance division; the county is 7,000 square miles and contains 19 radio towers and over 2,000 pieces of radio equipment. To cover the large area, St. Louis County operates one PSAP in Duluth and a second in Virginia. Each is connected to a radio shop, allowing technical problems to be handled on-site immediately. PSAP officials have found that their complex dispatching systems require immediate responses when problems arise. Additionally, dispatchers with technical questions can get them answered right next door.

Officials believe one of the greatest benefits is the maintenance of backup equipment. In the event of a large-scale equipment outage, technicians are available on the spot and can have backup equipment running immediately while they work on the problem. To help prevent equipment failures, the maintenance division conducts regular testing of PSAP backup equipment at the communications centers and radio sites. For each of its radio sites with generators, an automated test is performed weekly to ensure the equipment is functioning properly. Alarms are also in place at each site to indicate any malfunction. The county has also implemented a program that provides a monthly preventive maintenance check at all radio sites. This program requires a technician to thoroughly inspect all radio equipment, generally taking one full day at each radio site.

The county budget for the radio-maintenance division is $430,000 annually, which includes all associated expenses (equipment purchases, personnel, space and tower leasing, travel, training, etc.). Employing an in-house radio maintenance division may not be effective for an individual PSAP, but could prove so for the county as a whole, particularly in the larger counties. Counties without a substantial amount of radio equipment may be better off contracting for maintenance services.

For more information contact:

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Equipment Replacement Plan

Clay County/Moorhead Police Department

Officials managing the public safety answering point in Clay County, which serves a population of 53,000, use an equipment replacement plan for replacing worn-out or obsolete equipment. Because public safety dispatching is heavily dependent on proficient communications equipment, the replacement plan is especially valuable.

Clay County and the city of Moorhead, which operate a joint law enforcement facility, share equipment costs equally. Using internal service funds (that account for goods provided by one department to other departments), departments pay a "rental" fee for each piece of equipment they use. The rental fee consists of the equipment's cost amortized over the anticipated life cycle of the equipment. Every department that uses equipment is billed for its use. For instance, to use a cellular telephone the communications center budgets for a yearly rental fee that is based on the cost of the telephone prorated over its three-year expected life. When a new piece of equipment is needed that has not been purchased previously, the department requesting it budgets for the acquisition cost plus the amortized rental fee.

An equipment replacement plan prepares the PSAP to replace its equipment.

Rental revenues go into a revolving capital fund. Money in this fund is used to purchase new equipment when replacements are needed. The revolving capital fund also receives some additional revenue generated from police auctions and sales of surplus equipment.

From the PSAP's perspective, the equipment replacement plan has been very beneficial. When the communications center needed a complete upgrade, it was financed with money from the revolving capital fund. The primary advantage is that users set aside money incrementally for the express purpose of replacing equipment in poor condition. This helps avoid the difficulty of raising large sums of tax dollars in any single year to finance high capital-cost items.

Making the equipment replacement plan work requires advance planning. The plan depends on a complete inventory of equipment and accurate estimates of the expected life cycles of each piece by the city's communications director. It also requires reliable estimates of future replacement

costs and yearly adjustments in calculations to accommodate equipment and price changes.

The concept of setting aside money to replace malfunctioning or obsolete equipment is a simple yet potentially useful one for jurisdictions of all sizes. For communications centers, where improper or outmoded equipment can negatively affect public safety, the need for advance planning to replace equipment is fundamental to operations.

For more information contact:

Gary Landsem
Deputy Chief of Police
Moorhead Police Department, Clay County Law Enforcement Center
218/299-5132

Reliable and Secure Communications

Cottonwood County

The PSAP in Cottonwood County, serving about 12,800 residents, uses microwave radio for communication between dispatchers and deputies in the field. Microwave radio signals between the communications center transmitter and receivers located around the county provide reliable communication with both mobile and portable radio units.

Microwave radio systems use antennae that narrowly focus radio signals like a beam of light and transmit them over line-of-sight distances. Users typically mount antennas on towers or building rooftops and each microwave site can receive, amplify, and retransmit the radio signal to the next site, thereby covering long distances and overcoming difficult terrain.

Cottonwood County installed its microwave link in 1980 and erected two 180-foot freestanding towers in different corners of the county for complete radio coverage. Cottonwood County's terrain and the location of the sheriff's office have made the microwave link particularly useful. The county seat is Windom, which is located in the river bottoms of the Des Moines River on the southern edge of the county; the sheriff's office and communications center (and other county facilities) are located there. The advantage of the microwave towers is their location on higher ground. Together the county's microwave station and towers form a communication "chain" that reaches countywide. For instance, when a deputy is driving in the northern part of the county, the dispatcher transmits off the tower located in the northern city of Jeffers. Squad car radios have 100 watts of power to operate throughout the long distances in the county.

With the microwave radio system, Cottonwood County eliminated the transmission problems caused by moisture when the cables coming in for the telephone link were located under the river. Transmission wires have also been eliminated. The PSAP has not experienced frequency interference or the interference caused by overlapping channels. Although the potential exists for severe weather conditions to block microwave communications, the county has not had this problem in its 18-year experience with the microwave system.

Cottonwood County paid about $70,000 to purchase and install the microwave link and towers. For counties with terrain difficulties, and those that want to avoid tying up frequencies by using repeaters to rebroadcast transmissions, microwave radio is especially useful. From Cottonwood County's experience, counties considering a similar arrangement will find it beneficial to conduct their own independent analyses of their equipment needs instead of relying solely on the manufacturer's recommendations. This will allow counties to acquire the equipment that best meets their situation without purchasing capacity in excess of what is actually needed.

For more information contact:

Glen Ward
Sheriff
Cottonwood County
507/831-1375

Mahnomen County

To maintain security in communications between deputies and the Mahnomen County PSAP, the county installed an electronic security feature in its dispatch console and radios. Mahnomen County's PSAP serves a sparse population of about 5,200,

although there are seasonal fluctuations due to the influx of summer vacationers.

The security feature is an electronic chip placed in each mobile unit's radio and the dispatch console. The chip's programmed code scrambles the voice frequencies and prevents others tuned to the same channel from hearing the conversation between public safety personnel. Dispatchers activate the secure frequency with a button at the console. When dispatchers inform deputies to "go to secure," they can use this feature for private communication.

The primary benefit of the security feature is officer safety. Deputies often face situations where radio communications broadcast to outside listeners could jeopardize their work or even endanger them. In addition, secure communications may lower the risk of the PSAP's liability for releasing certain information over the air, such as disclosing the identity of a person who is a crime witness.

For each radio and the dispatch console, Mahnomen County paid $1,300 per unit to install the security feature. The PSAPs and deputies have used it for about four years without ever having security compromised. For PSAPs that cannot afford the expense of mobile data terminals for squad cars, the security feature presents a more efficient option.

For more information contact:

Richard Rooney
Sheriff

or

Rhonda Waltz
Dispatcher/Coordinator
Mahnomen County
218/935-2257

Renville County

When Renville County dispatcher/jailers need to have secure communications with deputies and others in the field, they use cellular telephones. The Renville County PSAP serves 17,600 residents and processes calls for 10 fire departments and first responder units and 6 ambulance providers, in addition to 13 law enforcement agencies.

Because of the expense, Renville County does not have scrambler devices for its radio system, which would allow messages between dispatchers and deputies to be encoded by the transmitter and decoded by the receiver. In lieu of purchasing scrambler devices, the county relies on cellular telephones when they do not want to broadcast information over radio waves. Although cellular telephones do not offer as high a level of security and the convenience that law enforcement would prefer, the telephones provide a measure of secure communications at moderate cost.

Each squad car now has portable cellular telephones that deputies can remove from the squads when necessary. Several of the squad cars have high wattage telephones that ensure communication over longer distances when the deputies are in far corners of the county. Most of the ambulance services in the county have also purchased cellular telephones, both for security in communications and to have direct telephone contact with the hospitals.

The cost of the cellular telephones for the county sheriff's office is under $20 a month per telephone. When compared to the thousands of dollars that would be needed to install scrambler devices, the cellular telephones provide a more cost-effective option. Because law enforcement will always face situations when it needs secure communications, even counties with limited resources can attain some level of security with a modest investment.

For more information contact:

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Renville County
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Weather Information

Cottonwood County

The PSAP in Cottonwood County, serving about 12,800 residents, has access to weather information fed by its own weather radar. Combined with a network of volunteer "weather spotters," the radar provides accurate and timely weather surveillance.

When the possibility of severe weather occurs, dispatchers contact the radar technician who is trained to read the "echo" on the radar screen. The radar signals are displayed on a terminal located below ground level and underneath the communications center. The color display provides a birds-eye view of the area surrounding the PSAP. With a keystroke, the technician can change the display to view only the county, the surrounding counties, and areas in eastern South Dakota. After interpreting the radar signals, the technician determines the location and intensity of the storm and gives the information to the dispatchers.

The PSAP relies on its own weather radar and trained volunteer weather spotters.

In addition to the radar, the county relies on 60 to 70 people who have volunteered to serve as weather spotters. The weather spotters relay information on the nature of the storms back to the radar technician; all weather spotters have received training in what to survey and what information to convey to headquarters.

When radar information suggests severe weather, the radar technician contacts a number of the weather spotters who have either been furnished portable radios or who come to the county's law enforcement center to pick up a radio. With each weather spotter traveling to a predetermined location and relaying data back, in combination with the radar data, the radar technician has sufficient information to decide when to sound the weather siren. He alerts the dispatchers who convey the weather information to the appropriate public safety personnel. Dispatchers also make it a practice to alert dispatchers in nearby counties.

The weather observation capabilities offered by the weather radar gives the PSAP advance warning about potentially dangerous weather conditions. The weather information is up-to-the-minute and specific to the local area, which is more useful than data from other radar facilities located far from the county. The PSAP does not have to wait for weather updates from other sources, which is a real advantage when severe weather is imminent or localized. It also gives public safety personnel time to be prepared. In addition, many of the weather spotters are also trained as first responders; if necessary, dispatchers can call upon them to respond to injuries or other problems.

The county purchased the weather radar for a one-time cost of about $30,000. Other costs include the initial time involved with planning and implementing the weather observation system and the time spent each year training the volunteer weather spotters. Weather spotter training is provided a few days each year by civil defense volunteers for Cottonwood County weather spotters as well as spotters in nearby counties. Other areas interested in their own weather radar need personnel on hand who are trained to read and

Weather radar screen

manipulate the radar display; in Cottonwood County a team of volunteers who assist the sheriff's office with civil defense provide this service. Because Cottonwood County purchased the weather radar equipment and shares its weather data outside the county, surrounding counties benefit without also making similar equipment purchases.

For more information contact:

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Renville County

The Renville County PSAP, serving 17,600 residents, receives weather information from a satellite communication system for timely weather surveillance specific to the county. Through the system, Renville County dispatcher/jailers have 24-hour, year-round access to weather radar, weather maps, and forecast maps in the communications center.

Renville County's Sheriff's Department contracts with a private firm that supplies the weather information via satellite to a separate, stand-alone terminal in the communications center. The data come through a satellite dish attached to the roof of the courthouse annex in which the communications center is located.

With this weather information system, dispatcher/jailers can call up a radar weather screen with the system's keyboard. They can track the formation and progress of storms as they develop. Dispatchers can view weather conditions to the west or can zoom in to current conditions within the county itself. The system is programmed to emit an audible tone when a weather warning has been issued. Because the weather data are current and constantly updated, dispatchers have information in advance of a storm that helps public safety personnel prepare for worsening conditions.

The Renville County Sheriff's Department pays a monthly subscription fee for the weather information service that amounts to under $1,000 a year. Because the vendor supplies the 30-inch satellite dish, satellite receiver, color monitor for the radar display, and all connecting cables, the county does not have to acquire this equipment on its own. Counties that do not have their own weather surveillance equipment could find similar weather information systems to be a cost-effective option.

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Summary Related to Communications and Network Equipment

Because of the highly technical environment of public safety telecommunications, PSAPs have had to make substantial investments in capital equipment. Each of the best practices exemplified here reflect PSAPs' efforts to ensure that they have the proper equipment and expertise. These investments and advance planning prepare PSAPs to provide emergency communications at all times, and equip them to continue operations even under adverse circumstances.

4. Consider Opportunities for Coordinating the Use of Dispatching Equipment and for Cooperative Dispatching

To add to effectiveness and efficiency, PSAPs should explore coordinating the use of their equipment with other jurisdictions as well as consider opportunities to jointly provide dispatching services where such efforts improve service and reduce costs.

Coordinating the Use of Equipment

By coordinating the purchase and use of equipment, such as computer-aided dispatch (CAD), with nearby jurisdictions, PSAPs may be able to enhance their service and lower overall costs.[64] For instance, coordinating the use of a single CAD system for every PSAP within a county containing multiple PSAPs (or among adjoining counties) can increase effectiveness by sharing information across jurisdictions. It can also prove more efficient because multiple jurisdictions share in the cost of the CAD and backbone equipment and because of the economies of scale garnered by large-scale purchasing.

Despite these advantages, technical and operational issues can preclude coordinated ventures from working. For instance, the distance between two public safety answering points may be too great to allow the efficient purchase and installation of certain equipment, such as shared records systems.

PSAPs involved with coordinating their equipment use have to acknowledge the costs of time and compromises associated with the process. Participating jurisdictions typically have to allocate additional time for discussions and negotiations with each other. This can stretch the time for planning equipment purchases beyond what would be needed if a single jurisdiction were involved. Plus, coordinated purchasing typically involves compromises among the participants; the final decision on equipment may not contain all features that every participant wanted because of the necessary give-and-take that is part of coordination among different jurisdictions.

In addition, the timing on equipment replacement is important if cost savings are to be achieved. Unless the participating jurisdictions already need to replace equipment or purchase it for the first time, the expense may not be cost-effective.

Another approach with similar potential benefits has one agency negotiate with a vendor for equipment, intending that other agencies may purchase from the same contract. The contract establishes the product, its available options, and their prices, as well as specifies that others may use the same contract. Additional agencies that purchase through the contract have the opportunity to choose from among equipment options that may better fit their needs. Using this approach, agencies may be able to sidestep extensive contract negotiations while still meeting their equipment needs. They may also benefit from enhanced sharing of information and data by using equipment compatible with adjacent jurisdictions.

Shared information systems can improve communication across jurisdictions.

Considering Opportunities for Joint Dispatching

Beyond coordinated equipment purchasing, PSAPs should consider arrangements, such as joint powers agreements, in areas where cooperative dispatching may yield better service and lower costs. In several places around Minnesota, such as Moorhead in Clay County and Breckenridge in Wilkin County, city police departments have joined with county sheriff offices to operate PSAPs. In other areas, such as Eagan and Rosemount, cities cooperate to provide 9-1-1 and after-hours dispatching services.

Cooperative arrangements may involve joint powers agreements that spell out specific lines of responsibility and determine what each unit of government will pay for the costs of personnel and equipment.[65] They may involve contractual arrangements where one entity agrees to provide the service on behalf of another for a fixed price. Minnesota also has examples of single PSAPs that cover hundreds of thousands of people or hundreds of square miles. For instance, since the 1970s, Anoka County has operated a single dispatch center that handles all 9-1-1 and other calls countywide for multiple police, fire, and emergency medical

64 Pivetta, *The 9-1-1 Puzzle*, 91.

65 *Minn. Stat.* §403.10, subd. 3.

services. This center covers a 280,000 population and 424 square-mile area.

In areas where joint dispatching is justified, one benefit is the savings inherent in maintaining or upgrading one center instead of two or more. There is a potential for lower operating costs because one center may have fewer supervisors and less overhead than multiple centers.[66] Another benefit is that joint dispatch centers can improve communications between agencies because they may share the same radio, CAD, and other communications equipment. When each jurisdiction has its own communications equipment that does not interface with that of a neighboring community, communication across jurisdictions is more difficult; joint dispatching lessens this problem. A third benefit may be improved technology because improvements are more feasible when several jurisdictions share the costs. Cost benefits, however, can only be attained when PSAPs planned to update or replace obsolete or worn out equipment anyway. In addition, a joint dispatch center operating under a joint powers agreement can engender greater cooperation among the different public safety agencies in a service area while still allowing the agencies to maintain their individual missions and identities.

Joint dispatching allows PSAPs to share costs for improved technologies and enhance intercommunications.

It cannot be assumed that cooperative dispatching will automatically produce benefits in every locale. Each area has to determine whether jointly provided dispatching will generate better service and lower costs. In addition, the difficulties in transforming an area from one with multiple PSAPs to one with centralized dispatching should not be underestimated. Cooperatively provided dispatching cannot be achieved easily or quickly.[67]

For instance, defining an appropriate size for a PSAP service area is difficult. A one-size-fits-all approach will not work because of varying local needs, numbers of public safety calls, and desired levels of service. Residents may have come to depend on a level of service that has been historically provided in an area but would not be possible if a PSAP served a larger service area. Measuring citizens' willingness to pay for a local public safety communications center, through focus groups or resident surveys, has helped some PSAPs determine whether to retain a small service area or join with a larger one. For example, public opinion via citizen surveys helped Cottage Grove decide in 1995 it would maintain its own PSAP instead of joining with Washington County.

Large service areas can at times be problematic, despite gains in economies of scale, if steps are not taken to assist dispatchers who lack familiarity with the area's features.[68] Dispatchers' working knowledge of an area's topography, buildings, roadways, and population centers can help them make decisions about appropriate responses to calls. Those who are not personally familiar with an area may sometimes not have all of the information needed to make informed decisions for callers with emergencies.

On the other hand, training and using CAD and electronic mapping systems diminishes the need for dispatchers to be intimately knowledgeable about an area's features. Training for dispatchers on local geography and land features and ride-alongs with emergency response units in the service area can improve dispatchers' familiarity with the service area.[69] CAD and mapping technology allows dispatchers to immediately see the location of the call on a map and read the address on their screen. Some CAD systems display which emergency

66 Holt and Ricci, "Enhanced 911: Planning and Implementation," ICMA, 5. Joint dispatch centers, like other communication centers, require contingency plans that provide for a back-up PSAP or other means to allow ongoing access to emergency communications in the event of a disaster at the center.

67 Pivetta, *The 9-1-1 Puzzle*, 82.

68 Holt, *Emergency Communications Management*, 187.

69 APCO, *Standard Operating Procedure Manual*, 29-30.

response agency in the area should be summoned, as well as the services provided by each agency.

PSAPs also have to consider other common roadblocks to jointly operated PSAPs. These include political problems incumbent with altering who is ultimately in charge of the dispatch operation, potential problems with staffing if existing employees have to move or be laid off, differences from jurisdiction to jurisdiction in the expected levels of service, and disagreements over the physical location of the dispatch center.

In addition, governance differences may pose difficulties. Sharing decision-making authority among two or more jurisdictions may not be easy for persons accustomed to working in a single jurisdiction. Managers who have operated PSAPs in the past but stand to lose part of their control in a joint communications center may resist the merger. In some areas, elected officials may have a history of close involvement with the PSAP's operation that would not be duplicated in a merger. Smaller jurisdictions may not have the same levels of experience or resources as others in the technical and legal aspects of cooperative efforts, which can complicate or slow the effort. The larger the number of jurisdictions involved, the greater is the complexity introduced by different governance and management styles. Successful mergers involve public safety personnel in the discussion leading up to a consolidation decision as well as in its implementation. A broad base of support from local elected leaders is also necessary prior to and after a decision to merge.

The magnitude of potential savings in operating costs due to lower overhead and personnel efficiencies may be less in areas where PSAPs rely on dispatchers to perform multiple duties in addition to processing 9-1-1 and other calls. For instance, counties where dispatchers perform combined dispatcher and jailer duties may have to hire a replacement jailer if the dispatcher were to work at a jointly managed facility. This negates part of the anticipated cost savings. The local governments involved with a situation of this type would have to weigh the added benefits of focusing the dispatchers' attention on dispatching and communications with field units against the costs of employing replacement jailers.

Examples of Coordinated Equipment Purchases and Cooperative Dispatching

Coordinating equipment purchases or consolidating entire PSAPs has the potential to produce shared information across jurisdictions, reduce or share costs for upgraded equipment and personnel, and improve operations. The costs of these efforts include the time needed to plan and implement either shared equipment or joint dispatch centers. Additional difficulties arise from political problems involved with consolidation, such as issues over who will control a joint PSAP or how the number of employees will be reduced.

Coordinated Equipment Purchases

Ramsey County

Ramsey County's PSAP, serving 160,000 residents, uses a computer-aided dispatch (CAD) system that it shares with 14 cities in the county.[70] PSAP officials have found the shared CAD system enhances information sharing among the communities involved. It also enables the smaller communities to benefit from equipment they could not otherwise afford.

In 1990, Ramsey County's PSAP decided to purchase a CAD system. Because the city of St. Paul already had a CAD system in place, Ramsey County officials decided it would be more cost-effective to upgrade and share St. Paul's existing system instead of purchasing a separate county system. Ramsey County invested roughly $500,000 for seven CAD terminals at its PSAP, which included software and hardware. A joint powers agreement delineates the ongoing costs of maintenance, with St. Paul paying for two-thirds of annual maintenance costs and Ramsey County one-third. Additionally, a member of the St. Paul police department serves as the CAD manager and oversees administrative functions of the system.

70 Two cities in the county, Maplewood and North St. Paul, do not participate.

The CAD system computerizes all aspects of an incident, including the squad units dispatched and the location of the responding officers once they arrive on the scene. CAD retains every 9-1-1 call and other calls entered by the dispatcher, as well as all communication radioed by officers and deputies.

CAD information can also be shared through mobile data terminals (MDTs) in squad cars when secure communication is desired. In 1993, Ramsey County purchased the radio frequency backbone (towers, transmitters, etc.) for mobile data terminals in the squads for $250,000. The county then offered MDT access to police departments throughout the county, stipulating that police departments buy their own squad terminals, at roughly $3,000 each. Besides information security, MDTs improve communication by allowing all those connected to communicate with one another (*e.g.*, officer to officer, dispatcher to officer, officer to dispatcher). MDTs also allow officers to query other information databases (such as driver's license checks) from their cars, giving them more immediate access to information as well as relieving the dispatchers to focus on other tasks.

The countywide sharing of CAD and MDTs provides for more efficient public safety. It streamlines communication between different agencies, allowing dispatchers to send messages to squad cars and other agencies simultaneously—eliminating repetition of duties. This also saves time, since dispatchers can send one message to three-quarters of the county. Additionally, cost savings are realized through economies of scale. Smaller agencies have access to the CAD and MDT software purchased by Ramsey County that they could not otherwise afford.

Because multiple departments have access to a central database, confidentiality is a concern. Ramsey County has attempted to reduce this risk by requiring participants to sign on with a password, and allowing different levels of access for different individuals. Nonetheless, PSAP officials believe it comes down to trust and faith in public safety professionals. Another problem is system flexibility. Officials note that regardless of how flexible a CAD system is, users will still need to adapt to the system and not every CAD feature requested by an agency will be available.

Nonetheless, PSAP officials believe similar shared systems could work elsewhere around the state, especially where smaller communities could significantly benefit from, but not otherwise afford, such technology. They believe their shared equipment ultimately provides better public safety by extending information sharing across multiple service area boundaries.

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Scott County

Scott County's PSAP, serving a population of 71,500, uses a central records system shared by cities in the county. PSAP officials have found the central records system a more effective and efficient way to share public safety information.

Dispatchers and police departments around the county have access to the shared records system.

Scott County purchased the records system software, and offered it to all police departments at no charge. The county involved local agencies in the selection process, which created increased support among the users. A records committee, consisting of one representative from each agency, met once a week for four hours during the selection process to identify the best system for all users. The process was assisted by the implementation of a countywide computer-aided dispatch (CAD) system in the preceding month.

The central records system, which interfaces with the CAD system, allows every agency to view all initial complaint reports filed in the county and permits the addition of information as warranted. Each agency is responsible for depositing information in a master file, with security features allowing different levels of access depending upon the user's clearance. Currently, four of the seven cities in the county participate in the shared records system, with the three remaining cities expected to join.

The shared records system expedites information retrieval by creating a warehouse of information to which dispatchers and officers have access. For instance, local officers can retrieve all county information on the criminal history of a suspect, regardless of where in the county an offense occurred. Similarly, dispatchers assisting officers in the field have access to countywide data on criminal histories. The system also provides detailed criminal incident information. PSAP officials have used data from the records system to demonstrate the need for additional staff and to better staff existing shifts. Officials expect the shared records system will eventually include the county attorney's office, allowing prosecutors immediate access to criminal reports and other relevant information.

A shared records system is costly; Scott County paid roughly $350,000. The county purchased the records system and CAD system together with mobile data terminals for a total cost of $1.2 million, including a consultant's fee. The county also purchased an annual maintenance contract at a cost of $35,000 a year.

Counties interested in implementing a shared records system should understand that the implementation process can be slow, and agencies need to take it step-by-step. Scott County, along with the participating cities, invested a significant amount of time researching their options, writing the specifications, and importing 4,000 files into the system.

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Cooperative Dispatching

Anoka County

The Anoka County PSAP, serving a population of 279,000, provides dispatching services for all 21 cities and townships within the county. Between the county, cities, and townships, the PSAP dispatches for a total of 11 law enforcement agencies and 15 fire departments over 424 square miles. PSAP officials believe countywide dispatching provides significant cost savings to the county and its residents.

Anoka County's 9-1-1 communications center

Anoka County has operated with countywide dispatching since 1975, when the separate PSAPs of Coon Rapids, Columbia Heights, and Anoka County merged into one countywide operation governed by a joint powers agreement. The county had secured federal funding at that time to build a

radio system, and county and city officials decided it was more cost-effective to purchase one radio system instead of three.

To ease the transition, the county formed a joint law enforcement council to oversee the merger. One of the council's goals was centralized communication. To achieve this, the joint council recommended forging a new office to handle all public safety dispatching in the county. As a result, the county created Anoka County Central Communications and gave oversight authority to the Joint Law Enforcement Council. The Council, which still convenes quarterly and has 23 members, is made up of police chiefs, elected county and city officials, and citizens at large. PSAP officials have found it beneficial to have two county board members serve on the council, as these elected officials are more closely aware of the challenges facing the communications center and its ensuing financial needs.

The PSAP's annual budget, paid through the general county levy, is approximately $2 million for both capital investments and ongoing personnel costs—a price officials believe would double if three or four PSAPs operated in the county. Personnel savings have been evident; the PSAP currently operates with approximately 1 full-time equivalent dispatcher per 10,000 people. Additional savings come from maintaining one backup facility and its equipment instead of multiple backup facilities with duplicative equipment.

PSAP officials believe residents in Anoka County are receiving quality service. The change to centralized dispatching did not change response times to incidents because the emergency agencies are the same; a 9-1-1 call in Coon Rapids, for example, comes into the central PSAP but the caller still receives service from the Coon Rapids police. Although dispatchers may not have intimate knowledge of every service area, the problem is counterbalanced by the intensive training they receive on local geography, as well as by geographic data available on the PSAP's computer-aided dispatch system.

While officials believe the savings produced by countywide dispatching are great, some sacrifices have been made to achieve a smooth operation. Individual law enforcement and fire departments cannot customize their own policies and procedures; the policies and procedures must be fairly uniform in all cities for the PSAP to function effectively. Additionally, because several jurisdictions are involved, decision making is more complex than it would be in a single jurisdiction.

Merging multiple PSAPs may produce similar cost savings elsewhere, although the jurisdictions involved have to overcome political and technological hurdles. The savings in capital costs could prove especially large if each PSAP has to replace worn or obsolete equipment.

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Rice and Steele Counties

The counties of Rice and Steele and the city of Northfield are in the final stages of merging their three public safety answering points into a single communications center. The three PSAPs serve a total of approximately 85,000 residents over a combined 920 square miles. Following more than five years of deliberations, a consolidated dispatch center is expected to begin operations in late 1998. Rice and Steele counties, along with their county seats of Faribault and Owatonna, respectively, and the city of Northfield, signed a joint powers agreement in early 1997 to manage and finance the merger.

The joint effort is being driven in large part by major technological improvements that the merger promises. Without the merger, it would be very difficult for each of the existing PSAPs to afford the improvements that are planned. One of the improvements is computer aided dispatch (CAD) to automate many dispatcher functions. CAD will

automate the recording of incident information, verify the validity of addresses, display criminal history or other pertinent information related to the address of the caller, and suggest which emergency response agency should be dispatched.

The CAD will tie together a mobile data communications system and electronic record management system. With mobile data communications systems, officers can request and receive data from their vehicles. Instead of asking the dispatcher for information from the state's criminal justice information system and waiting for the response, for instance, officers can inquire directly to a remote database and receive the information in their vehicle. All officers with the terminals will be able to send and receive electronic mail messages from their vehicles.

The record management system automates the filing and retrieval of data and reports produced by officers, making it easier to find reports and analyze crime patterns and eliminating the need for multiple employees to reenter the same data. The system also allows jurisdictions to share data, when that is desirable. Eventually Rice and Steele counties expect to integrate the records system with the databases used for jail management, the courts, and county attorney offices.

Plans also include digital mapping and automatic vehicle location functions. The mapping will display the location of an incident on a mapping screen when dispatchers answer a 9-1-1 call. Because they are digital, the maps can be updated easily and frequently. The automatic vehicle location feature will identify the location of the nearest available field units on the electronic maps. It also enhances the safety of officers because others can arrive at an officer's location for back up if the officer is away from his or her vehicle and unable to communicate. Public works vehicles could eventually be part of the automatic vehicle location system.

Printers and computer terminals will be installed in fire departments to receive telephone number and location information of the calls for service. Along with the call information, it will be possible to see any history on the caller's location, floor plans of particular buildings, or a map of the specific area.

The jurisdictions are also planning to upgrade their radio systems because they currently operate on separate frequencies. They expect to have two transmission frequencies and separate paging frequencies to allow intercommunications among agencies.

In addition to the technological improvements, citizens will have the benefit of emergency medical dispatching, which currently is only partially available. The law enforcement officers who currently spend time on scheduling, personnel issues, and other administrative affairs related to the existing PSAPs will no longer need to manage these matters because the project administrator will have that responsibility.

The cost of the remodeled communications center and upgraded technology is estimated at about $3 million, including radio system improvements. A U.S. Department of Justice grant is financing part of the mobile data communications system. Because of a reduction in the number of full-time dispatchers from 12 in the 3 existing PSAPs to 9 in the consolidated PSAP, and because of costs saved in upgrading only one communications center, the local governments expect to save operating and capital money. Savings in capital costs for comparable technological upgrades in one center instead of three are estimated at $2.9 million. Although the total number of dispatchers will be lower for the three entities combined, the overall number of employees for Steele County will not decrease. In Steele County, dispatchers have also served as jailers and the county decided it will maintain the same number of jailers after the merged center begins operating. Thus, the county may not achieve savings in personnel costs due to the merger.

The commitment of the local elected officials has been crucial to maintaining the momentum for the project over the years, according to county officials. Another useful component is the management and committee structure. Each of the participating cities and counties is evenly represented on the joint

powers board. In the first year of operation, the center's operating costs will be split 50/50 between the counties and cities, with the counties shouldering an increasing share in subsequent years until eventually they assume all operating costs. The cities' board membership will be reduced as their financial commitment decreases.

Participants will share costs of CAD, mobile data computers, and other technological improvements.

An administrative committee, consisting of the city managers, county administrators, and financial officers from the affected local governments, is in charge of overall direction and guidance for the project. Members of several other work committees set up to handle personnel matters, construction, and records management are also broadly representative.

From the perspective of Rice and Steele county officials, involving all interested parties in the process is important. They have been careful to seek consensus on issues that arose. They spent time initially deciding whether it would be advantageous for them to merge, leaving until later decisions such as where a new communications center would be located.

To involve other emergency response agencies, the project administrator invited members of the fire departments and smaller police departments to a product demonstration and solicited their input on features they would like to see in the mobile data communications system. The newly hired dispatchers, who came from the existing staffs of the three PSAPs, are being involved in revamping a set of operating procedures and in decisions regarding uniforms, scheduling, and furniture. Officials say it is also useful to involve the local media who can help spread the word to residents about the project's progress and what changes they can expect.

The pacing of the project is important. Participants urge others that may be considering mergers to be deliberate and go slowly. It is important to involve law enforcement and fire departments from the start because they will raise questions that have to be resolved before the project can proceed. Examples include: the need for a back-up facility in case the main communications center goes down, or the need for a separate air conditioning system to control the heat generated by electronic equipment.

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Summary Related to Considering Coordinated Equipment Purchases and Cooperative Dispatching

PSAPs that have joined forces to share equipment or consolidate dispatching have usually done so in response to local needs for upgraded equipment or improved operations. In addition, their cooperative efforts represented an efficient way to spread the costs of purchasing capital-intensive equipment that a single jurisdiction could not afford.

5. Keep Records and Measure Performance

Maintaining records and measuring performance makes it easier to plan and deploy resources, evaluate PSAP services, and identify system

problems.[71] Only by maintaining records and measuring performance can PSAPs determine which of their practices are successful and which could use improvement. A PSAP should establish the goals and measurable objectives it wishes to meet and assess how well those goals and objectives are met using data gathered from actual performance. According to our survey, in 1996:

- **About 25 percent of PSAPs reported that they measured their performance through a formal process of setting goals and measurable objectives or a peer review process.**

All calls for service should be recorded, preferably on a logging recorder equipped with dual decks or drives so that failure or unavailability of one will cause the other to automatically take over the recording function. The recording should include date and time signals generated from a master clock.[72] Records on 9-1-1 calls should be retained for a minimum of 31 days from the date of the call.[73]

Beyond voice recordings, PSAPs should systematically collect management information on calls, PSAP personnel, and operations.[74] Some PSAPs use computerized management information systems for this purpose, but a sophisticated system is not necessary. Information on incoming calls, for example, can help a PSAP schedule for busy and slow periods or determine whether it has enough phone lines and radio channels to serve the public. Data summaries can include the number of total calls received, number of abandoned calls, number of calls on a per trunk basis, number of calls on a call type basis, number of calls transferred, average time to answer a call, average length of a call, and average hold time.[75]

PSAPs should also keep records on other items pertaining to operations but not directly related to calls, such as information on the accuracy of answers to officers who request information and the time needed to provide them, and equipment downtime and repairs.[76] This information could help PSAP managers determine, for example, which equipment the PSAP needs to replace and areas where additional training will help dispatchers perform well.

To help determine their performance, PSAPs can track complaints generated by citizens dissatisfied with the PSAP's service. A complaint tracking system allows PSAPs to systematically monitor dissatisfaction with service delivery and record actions taken in response. This can help PSAPs rectify current problems and prevent future ones from occurring.

Similarly, public opinion can also prove useful in performance measurement. PSAPs can use such methods as focus groups and citizen surveys to gain information on public perception of their services. Measuring citizen satisfaction, while incomplete by itself, can be a helpful tool when combined with other techniques to measure performance. Table 2.6 shows the percentage of PSAPs that used complaint tracking systems and measured citizen satisfaction in 1996.

PSAPs should collect information systematically. For example, PSAPs can design tracking worksheets to document call transfers, equipment inspections, or walk-up requests for services. In addition to output information (counts of services

71 NHTSA, *Emergency Medical Dispatch,* 3-5.

72 NENA, *Standards for PSAP Equipment,* 15; National Emergency Number Association, *NENA PSAP Master Clock Standard* (Coshocton, Ohio: NENA, January 1996), 6; National Association of State EMS Directors, *Planning Emergency Medical Communications, Volume I,* 45; National Association of State EMS Directors, *Planning Emergency Medical Communications, Volume II,* 16; and ASTM, "Standard Guide for Emergency Medical Services System Telecommunications," *1997 Annual Book of ASTM Standards,* 502.

73 *Minn. Rules,* ch. 1215.0900, subp. 5.

74 NENA, *Standards for PSAP Equipment,* 44; and ASTM, "Standard Practice for Emergency Medical Dispatch," *1997 Annual Book of ASTM Standards,* 618.

75 NENA, *Standards for PSAP Equipment,* 44.

76 ASTM, "Standard Practice for Emergency Medical Dispatch Management," *1997 Annual Book of ASTM Standards,* 898 and 900; and National Association of State EMS Directors, *Planning Emergency Medical Communications, Volume I,* 45.

Table 2.6: Use of Complaint Tracking and Citizen Satisfaction Measures, 1996

	Twin Cities Area PSAPs	Other PSAPs
Complaint Tracking System	64.0% (*N*=25)	32.8% (*N*=70)
Surveys or Questionnaires for Measuring Citizen Satisfaction	37.5 (*N*=24)	12.7 (*N*=71)

SOURCE: Legislative Auditor's Office Survey of Public Safety Answering Points, 1997.

the office provides or uses), PSAPs should collect information on outcomes (actual results of the agency's actions) and cost-effectiveness and efficiency (measured in terms of dollars, time, or personnel). For instance, the number of emergency response agencies appropriately dispatched is one outcome measure, and the amount of expenditures per call for service is one measure of efficiency. PSAPs that systematically collect information on their operations over several years can compare their annual performance with their own baseline data. (See Appendix B for additional information on performance measurement.)

Examples of Keeping Records and Measuring Performance

Maintaining records, tracking complaints, surveying citizen satisfaction, establishing goals, and evaluating performance enables PSAPs to identify and implement practices that result in consistent, high quality services. Records of PSAP activities and operations provide a resource for PSAP managers to determine appropriate staffing levels, develop equipment maintenance schedules, measure dispatcher and PSAP performance, and minimize PSAP liability. They provide information that allows PSAP managers to strengthen what is working well and adjust what is not.

Costs may include those for an initial investment in call-recording equipment or a records management system with software that tracks information such as number and type of calls. Time and expertise in performance measurement are necessary to identify appropriate goals, objectives, and measures of PSAP performance. Additional costs involve an ongoing commitment of time devoted to not only developing and using items such as complaint forms and customer surveys, but also evaluating the information collected and making whatever changes are necessary to improve services.

Keeping Records

Cities of Burnsville and Hopkins

PSAPs in the cities of Burnsville (population 57,000) and Hopkins (population 16,700) use formal record systems to track complaints about PSAP operations coming from the public or other emergency personnel. PSAP officials have found the complaint tracking mechanisms to be sound management tools that help control risk by minimizing liability.

When PSAPs receive complaints from residents or response units, a supervisor completes a written complaint form. The forms require information on the complaint, the person expressing concern, and the findings or resolution of the complaint. PSAPs store complaint information in computerized databases for easy tracking.

PSAP officials have found that the formal complaint systems provide consistency among responses to complaints. The systems are particularly helpful when complaints are unfounded, because they provide written records to indicate how well a dispatcher's actions conformed to standard operating procedures or office policies. Conversely, if action is needed to correct dispatching problems, the tracking systems provide the necessary documentation. Officials believe that keeping formal records of inquiries and concerns about dispatching practices is good management, ultimately protecting the PSAPs should liability issues arise.

The costs involved with complaint tracking involve time, although PSAP officials believe their time spent up front on documenting complaints saves time later. Staff spent 6 to 10 hours developing the complaint forms, plus committee meetings to

consider and adopt the document. The amount of time necessary to process complaints depends on the nature of the complaint, although the time burden on supervisors investigating and following up on complaints can be substantial due to the additional documentation required.

Officials suggest involving employees in the development of complaint tracking systems to help assuage the perception that they will be used against the employees. It is important to apply and use the systems consistently, so as not to suggest favoritism for certain employees.

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Measuring Performance

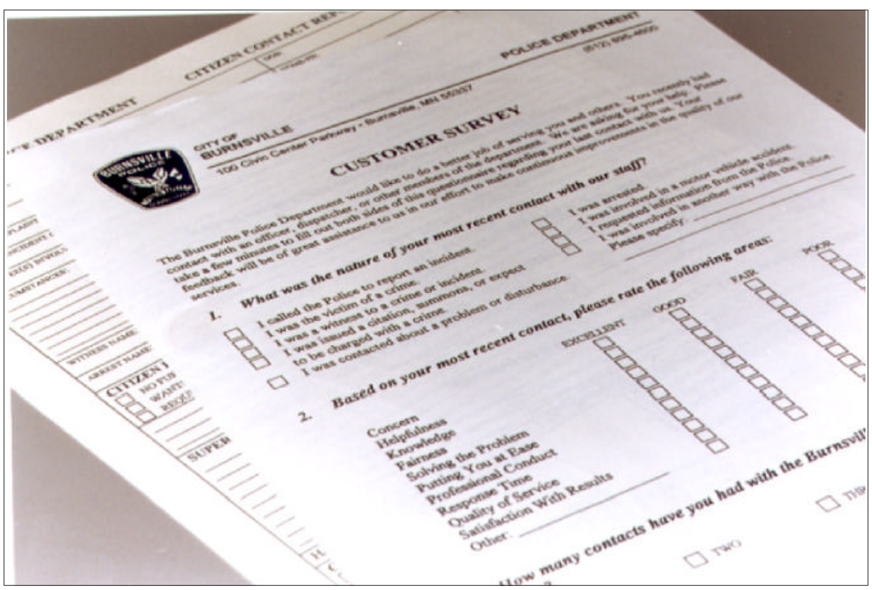
Cities of Burnsville and Hopkins

PSAPs in the cities of Burnsville (population 57,000) and Hopkins (population 16,700) regularly send customer surveys to people who have used PSAP services to help determine citizen satisfaction with their performance. PSAP officials have found the surveys to be useful in both identifying problems and validating successful practices.

Each month, Hopkins and Burnsville select a random sample of individuals that placed calls for service and send them a questionnaire. The one-page (front and back) questionnaires ask recipients to rate their last contact with the department on such items as helpfulness, fairness, professional conduct, response time, and quality of service. The surveys also provide space for recipients to write suggestions on how the departments can improve their quality of service. Individuals are asked to check boxes identifying their gender, race, age, and income so the departments can track patterns of response. Specifically, the departments want to ensure that there is equitable delivery of high quality service among all groups of individuals.

PSAP officials note multiple benefits to the customer surveys. They give the PSAPs an idea of how the public perceives its delivery of service. They also increase awareness of problems that the PSAP may not have known existed. Ultimately, the surveys are a feedback mechanism between the PSAPs and the public. Survey respondents have noted appreciation for requesting their opinions and feel that the departments are doing their part in listening to citizens.

The cost of the customer surveys is minimal. PSAP officials estimate they spent two to five hours developing the questionnaire. They spend an additional two to ten hours per month sending out the surveys and recording survey information in a database. The PSAP prints the surveys in-house, and also pays the cost of mailings.



Questionnaire to measure public opinion of PSAP services

While all PSAPs would benefit from receiving information from their customers, officials note that their customer survey process is not scientific. They do not analyze results for statistical significance and validity. Nonetheless, officials believe that with response rates of 40 to 60 percent, the surveys serve their purpose: to gain feedback from the people served. This process seems particularly useful in larger communities, where it is impossible to hear personally from everyone about their satisfaction with the service. Smaller cities may find the use of questionnaires unnecessary.

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Summary Related to Keeping Records and Measuring Performance

Providing high quality services requires PSAPs to solicit customer feedback, identify potential problem areas, and take corrective actions. These examples of best practices demonstrate a commitment to self-evaluation that can help a PSAP make informed decisions about modifying its operations. Tracking complaints and evaluating PSAP performance from the citizens' perspective help a PSAP deliver its services consistently and focus on meeting its customers' expectations.

6. Promote Information Exchanges Among Public Safety Response Agencies

PSAPs are in contact with a variety of public safety agencies when responding to 9-1-1 calls. They commonly dispatch law enforcement, fire protection, and emergency medical service providers.[77] Some PSAPs directly dispatch all response units; others dispatch only some units, such as law enforcement, and transfer calls for other units, such as fire and ambulance. For a united public safety response, PSAPs need to communicate directly with all emergency response agencies to solicit feedback on how the system works and what can be improved.[78]

PSAPs should request feedback to facilitate interagency communication, discuss commonissues, and share other pertinent information.[79] Face-to-face meetings on a regular basis, monthly or otherwise, should involve representatives from the PSAP and all public safety response agencies.[80] PSAPs can formalize interagency meetings by establishing a communications committee with official membership from each emergency response agency and regular meeting times.[81] We found that in 1996:

- **Forty-four percent of PSAPs in the Twin Cities area, and 28 percent of other PSAPs, regularly met with other members of the public safety community either monthly or quarterly.**

Another 27 percent of Twin Cities PSAPs, and 53 percent of other PSAPs, reported that they met with public safety personnel on an as-needed basis.

77 Among other agencies that can be involved with 9-1-1 response are those dealing with hazardous materials, public works, gas and electrical, auto towing, public transportation, and disaster relief.

78 Holt, *Emergency Communications Management;* 187-188. NHTSA, *Emergency Medical Dispatch,* 3-5.

79 National Association of State EMS Directors, *Planning Emergency Medical Communications, Volume I,* 58.

80 ASTM, "Standard Guide for Interagency Information Exchange," *1997 Annual Book of ASTM Standards,* 527.

81 National Association of State EMS Directors, *Planning Emergency Medical Communications, Volume II,* 19; and Parry, *Managing the 9-1-1 Center,* 15.

Ongoing interactions between the public safety answering points and emergency response agencies help prepare each agency when changes in one affect the others. Changes such as adding new police officers to the force, or the start-up of a new ambulance company, can affect dispatcher staffing levels. If a police department plans to initiate an intensive crackdown on drunk drivers, for example, the PSAP needs that information so that it can determine whether it has to add more personnel on shifts when the crackdown takes place. Without advance notification and preparation, the public safety answering points could be inundated with radio traffic and caught short staffed.

In addition to open channels of communication, PSAPs need to establish written guidelines outlining how they will coordinate with other agencies to effectively handle requests for service.[82] The guidelines should provide protocols for communicating with each emergency service agency and help ensure consistency in responding to emergency requests.[83] Once established, the written communication plans need to be tested (for example, with interagency drills) to ensure they function as designed.[84]

Examples of Information Exchanges Among Public Safety Agencies

Systematically soliciting feedback on PSAP operations from emergency response agencies can help identify equipment or procedural problems and provide information that leads to improved services. Additional benefits include preventing small conflicts from escalating into larger ones and enhancing relations between dispatchers and public safety personnel in the field. Advance planning between the PSAP and emergency response agencies in coordinating their responses to calls for service helps ensure quick, cohesive, and appropriate responses when real emergencies arise. For the PSAPs, the cost of these efforts is largely measured in time spent consulting with emergency response agencies and testing plans for coordinated responses to incidents.

Mahnomen County

Dispatchers from the Mahnomen County PSAP, serving a population of 5,200, meet quarterly with the emergency response agencies in its service area. After major incidents, the PSAP also holds a debriefing between the deputies and the dispatchers involved to review the response taken and make everyone aware of the outcome.

The quarterly meetings at the courthouse involve eight or nine people, representing the ambulance services, local fire departments, and dispatchers. During the meetings participants discuss responses to previous incidents and update each other on recent personnel or other changes in their respective organizations.

The meetings serve two main purposes: First, participants have a chance to discuss concerns they have with operations and work out any differences. For instance, at one meeting an ambulance service indicated that it did not want to use "10-code" language, a standardized set of codes designed to add brevity and secrecy to law enforcement radio communications; the dispatchers accommodated the request. Second, the meetings help acquaint the fire fighters, ambulance drivers, and dispatchers with each other. Because the fire fighters are all volunteers, and ambulance drivers are paid on a per-call basis, they do not work with the dispatchers on a full-time basis; the quarterly meetings offer time to become more familiar with one another and each other's work.

In addition, the dispatchers and deputies meet after most major incidents to review what worked well and what could have been done better. They review the calls, discuss each other's roles, and learn the reasons behind each other's actions. This type of feedback helps the participants adjust their procedures, if necessary, to make the operation work more smoothly in the future.

The only cost associated with the meetings is the time involved. From the dispatchers' perspective, it is time well spent because it allows the participants to reflect on how to improve their operations. It

82 ASTM, "Standard Guide for Interagency Information Exchange,"*1997 Annual Book of ASTM Standards,* 527.

83 *Ibid.*, 528.

84 *Ibid.*, 528; and National Association of State EMS Directors,*Planning Emergency Medical Communications, Volume II*, 15.

also gives the emergency response agencies the chance for feedback on PSAP procedures. Because of Mahnomen County's relatively small number of emergency service agencies, it may be easier for participants to meet regularly for follow-up discussions, although it is no less necessary for larger jurisdictions.

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Ramsey County

Officials from Ramsey County's PSAP, serving 160,000 residents, meet monthly with members of the fire and police departments. PSAP officials have found that these meetings provide important input on issues relevant to emergency service providers and dispatchers as well as improve interagency relations.

Begun in earnest in 1992 to standardize procedures, the meetings involve the PSAP and two emergency service groups: (1) chiefs of the five fire departments that the PSAP serves, and (2) five representatives appointed by the police departments served. PSAP representatives meet with each group every other month, rotating monthly between fire and police. To facilitate busy schedules, meeting locations also rotate between departments. The meetings, which typically last one to two hours, provide a forum for representatives from the PSAP and the fire or police departments to let others know how the past two months have gone. Participants cover such items as dispatching needs, equipment and system concerns, problems since the last meeting, and requests for new policies and procedures.

PSAP officials believe the monthly meetings are a valuable tool for improving interagency relations. The meetings improve rapport among participants and let public safety personnel meet dispatchers personally. The meetings also convey to the police and fire departments that the PSAP values their input and is concerned about their needs. Additionally, regular meetings allow participants to discuss problems and handle them before they become major issues.

The cost of the meetings is the time involved for meeting and subsequently typing minutes and distributing them to each department. PSAP officials caution not to let the meetings turn into complaint sessions. When officers dislike the way dispatchers handled a call, for instance, they should bring this to the attention of superiors immediately instead of waiting for the monthly meeting.

Police officers meet with dispatchers to discuss PSAP operations

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Summary Related to Information Exchanges Among Public Safety Agencies

As these examples show, regularly exchanging information with emergency response agencies can be part of a PSAP's initiative for continuous quality improvement. By seeking the perspectives of public safety personnel in the field, both small and large PSAPs position themselves to offer service that is well coordinated with law enforcement, fire fighters, and ambulance services.

7. Educate the Public on the 9-1-1 System and Services

Educating the public on the 9-1-1 system and services can increase the likelihood that the system will better provide services to those in need and, when necessary, reduce the number of nuisance calls.[85]

At a minimum, citizens need to know who to call, when to call, and what to expect.[86] A more in-depth public education program can increase awareness of the proper use of 9-1-1 and non-emergency numbers, provide information on the benefits of 9-1-1, and explain what the system can and cannot do.[87] Ideally, the public education program should be ongoing, not a single event.[88] PSAPs should periodically evaluate the program to determine its effectiveness and revise the program as necessary to meet its objectives.[89]

PSAPs should take multiple approaches to educating the public on 9-1-1 services. Posters, flyers, brochures, and pamphlets are inexpensive ways to highlight key facts. More detailed 9-1-1 information can be relayed through public speeches to, or informational meetings with, community groups and civic organizations. Presentations at local schools and those targeting special needs populations—such as TDD users, non-English speaking individuals, and the elderly—are especially useful because these groups are sometimes less informed about 9-1-1 service.[90] PSAPs should also use local media to convey important 9-1-1 information and reach a broader audience. PSAPs can arrange interviews with newspaper, radio, or television representatives or set up public service announcements.[91] Advertisements and press releases are other options. According to our survey:

- **Over 81 percent of Minnesota PSAPs used some technique to communicate information on 9-1-1 services to the public in 1996.**

Table 2.7 shows the various techniques used by PSAPs to educate the public.

Examples of Public Education

Public education efforts can benefit citizens as well as the PSAP. Citizens learn how 9-1-1 works and how to use it properly. PSAPs benefit because residents have a better understanding of the communications centers' operations and gain when callers can provide the kind of information that enables a quick and appropriate response to incidents. PSAPs' efforts to communicate with the larger community may also enhance their public relations. Costs to the PSAPs for public education include the time and resources needed to develop an

85 Pivetta, *The 9-1-1 Puzzle*, 99.

86 National Association of State EMS Directors, *Planning Emergency Medical Communications, Volume I*, 7.

87 *Ibid.*, 7; and ASTM, "Standard Guide for Planning and Developing 9-1-1 Enhanced Telephone Systems," *1997 Annual Book of ASTM Standards*, 727.

88 NHTSA, *Emergency Medical Dispatch*, 3-3.

89 ASTM, "Standard Guide for Establishing and Operating a Public Information, Education, and Relations Program for Emergency Medical Service Systems," *1997 Annual Book of ASTM Standards*, 639.

90 Pivetta, *The 9-1-1 Puzzle*, 100.

91 *Ibid.*, 102-104.

Table 2.7: Public Education Techniques Used by PSAPs, 1996

	PSAPs Statewide (*N*=97)
Public Speeches	61.9%
Interviews with Local Media	41.2
Brochures	30.9
Press Releases	30.9
Newsletter Articles	20.6
Public Service Announcements	16.5
Posters	15.5
Flyers	15.5
Advertisements	14.4
Informational Videos	10.3
Other	13.4

SOURCE: Legislative Auditor's Office Survey of Public Safety Answering Points, 1997.

outreach program and produce or purchase materials used during presentations. Further, the cost involves a sustained commitment to public education efforts that reinforce the PSAPs' messages over time.

City of Hopkins

The Hopkins PSAP, serving a population of 16,700, uses a public education program to increase awareness of 9-1-1. Since implementing the program in 1990, PSAP officials have found that citizens are using 9-1-1 more appropriately.

The Hopkins PSAP believed 9-1-1 was underutilized in the city, and wanted to boost awareness of the service. The PSAP began publishing 9-1-1 information briefs in the local paper, aimed largely at familiarizing citizens with 9-1-1 so they would feel more comfortable using the service and use the service as it was intended.

The communications center also provides general public safety education to local schools and public and community meetings, as well as 9-1-1 information individualized for local businesses. In many of these speaking engagements, the PSAP uses a computerized 9-1-1 simulator that replicates an enhanced 9-1-1 screen, which the demonstrators explain to participants. Hopkins also uses the simulator during city, fire, and police open houses as well as during community education week.

In addition to the simulator, the Hopkins PSAP includes in its school training a coloring book for younger students, emphasizing how and when to dial 9-1-1 and what to expect in emergency situations. Similarly, a brochure is available for the general public that describes the role of a public safety dispatcher, explains when to call 9-1-1, and encourages adults to teach children about 9-1-1. Additionally, Hopkins distributes a 9-1-1 response card, designed for use by local businesses, that highlights when to call 9-1-1 and what information the dispatcher will need once the call is placed.

The largest cost of the public education program is the time making the presentations. PSAP officials estimate spending approximately 50 hours a year on public education efforts. The coloring book and 9-1-1 response cards are published in-house. Hopkins obtains the 9-1-1 brochures from the Metropolitan 9-1-1 Board at no cost to the PSAP.

In addition to fulfilling their goal of more appropriate citizen use of 9-1-1, PSAP officials believe the public visibility creates more confidence in the system and helps dispel misconceptions about the service.

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Mahnomen County

The Mahnomen County PSAP, serving about 5,200 residents, has a public education program to keep the public informed about 9-1-1 service. Despite the county's small population, dispatchers and the sheriff participate in dozens of educational events each year.

Most of the public education effort is spent speaking with groups of people to encourage them to use 9-1-1 and describe what happens when a person dials 9-1-1. Representatives of the sheriff's office speak with up to 40 groups a year at township board meetings, in schools and community

education classes, and at meetings of organizations such as the resort association or seniors' associations. They also operate an information booth at the county fair in the summer.

When talking about 9-1-1, the presenters describe how the PSAP handles an emergency call, such as what information the dispatcher asks and how dispatchers communicate with the deputies and other emergency response agencies in the field. This helps the public understand what type of information dispatchers need in order to understand the type of incident and its severity, and to decide whom to dispatch and to what location. Dispatchers may also distribute brochures that briefly describe what services the public can expect when it dials 9-1-1.

In addition, the sheriff's office helps the editor of the local newspaper collect information about the calls coming into the PSAP. The weekly newspaper carries a column that summarizes the nature of the calls and responses to them.

The sheriff and dispatchers place a high emphasis on meeting with residents because they want the public to understand and have faith in their work. They want to encourage members of the public, such as senior citizens, to call 9-1-1 even when the individual may not be sure a situation constitutes an emergency. They also want to educate children's groups about the appropriate use of 9-1-1. Moreover, working to boost public confidence in the job performed by public safety personnel can sometimes aid investigations because witnesses may be more willing to cooperate. Information about 9-1-1 calls and responses in the weekly newspaper lets the public know how its public-safety tax dollars are being spent.

Outreach efforts build citizen confidence in the PSAP.

The PSAP spends about $1,000 annually on public education programs and believes that the payoff in terms of increased public knowledge and confidence is much greater. Mahnomen County's small population helps in this regard. For instance, newspapers in areas with larger populations may not have the space to devote to regular columns on PSAP calls. Because the size of the community allows the sheriff and officers to know many residents, it may be easier for them to participate in numerous public meetings with the appropriate groups than it would be in a large jurisdiction.

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Scott County

The PSAP in Scott County, which serves a population of 71,500, uses a public education program as a preventive public safety measure to ensure residents know when to dial 9-1-1. PSAP officials believe educating the public on 9-1-1 issues helps encourage appropriate use of the service.

Scott County dispatchers attend community fairs and open houses, answering questions about 9-1-1 and distributing educational materials, such as pamphlets that describe when to use 9-1-1 and stickers to place on the phone with instructions on what to do in case of an emergency. Tours of the communications center are offered to the public, and are especially popular with children.

The PSAP has spent a lot of time creating a 9-1-1 education program tailored specifically to school children in the county. A dispatcher with an interest in art developed two coloring books explaining 9-1-1. When asked to speak at schools, dispatchers distribute the coloring books to children, along with 9-1-1 stickers, bookmarks, crayons, and pencils. PSAP officials are currently looking into creating a similar program tailored to senior citizens. Officials have found children and the elderly more likely than others to underuse or misuse 9-1-1 services.

Since implementing its public education program, the PSAP has received more calls for service. In addition to the increased knowledge and awareness that come with public education, officials believe the public outreach makes citizens more comfortable using 9-1-1. To help non-English speaking callers feel more comfortable, the PSAP employs two dispatchers fluent in Spanish. While speaking a second language is not required of its dispatchers, the PSAP does state in job postings that bilingual individuals are preferred.

The costs of the public education program are funded through the county's general fund, and estimated at roughly $4,000 annually printing stickers, pamphlets, coloring books, and other educational materials. The cost does not include time spent by staff at the community fairs, open houses, and speaking engagements.

While similar public education endeavors would prove beneficial elsewhere, PSAP officials suggest that the success of the program depends largely on staff involvement. Scott County dispatchers look forward to participating in public education opportunities and are enthusiastic when relaying information, which strengthens the program and its message. Officials also note that public education needs to be an ongoing process, not a one-time event.

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Summary Related to Public Education

These examples of public outreach highlight the importance to PSAPs of well prepared and multifaceted public education programs. They illustrate how PSAPs in rural and urban jurisdictions can use public education programs strategically to both help citizens and improve PSAP operations.

CHAPTER SUMMARY

In this chapter we identify two goals for 9-1-1 dispatching. The first goal is to provide 24-hour per day availability for receiving 9-1-1 and other public safety calls and either (a) dispatching law enforcement, fire protection, and emergency medical and ambulance services as needed or (b) transferring calls to the appropriate public agency. The second goal is to provide an effective and efficient system that processes incoming calls and, as necessary, dispatches response units in an accurate and speedy manner.

We recommend seven actions that can help PSAPs meet these goals. These actions are appropriate for PSAPs around the state, although how they are implemented may vary depending on factors such as PSAP size or location.

The first action is to develop and use standard operating procedures. Standard operating procedures are written guidelines that standardize PSAP functions and explain how employees are to conduct business. Following written guidelines provides consistency in operations, allowing PSAPs to provide professional and reliable service.

As part of its standard operating procedures, PSAPs should develop and test disaster recovery plans that specify what steps they will take to maintain public access to emergency communication should the primary 9-1-1 system become inoperative. Additionally, PSAPs that provide emergency medical dispatching need standards that govern prearrival instructions, an emergency medical priority response system approved by a medical director, appropriate dispatcher training, and a quality assurance program.

The second action we identified recommends that PSAPs support a trained and qualified work force. Using appropriate selection and hiring practices helps PSAPs find qualified employees. These include realistic job descriptions, tests of applicants' aptitudes and skills, background checks, and probation periods.

Providing initial and ongoing training targeted to employees' individual needs, evaluating personnel regularly, and offering stress management measures help ensure that dispatchers have the skills, knowledge, and wherewithal needed for the job. Regularly scheduled personnel evaluations determine how well employees are meeting established standards and complying with agency protocols. Appropriate staffing levels mean PSAPs have a sufficient number of personnel for processing calls and communicating with emergency response agencies in a timely manner.

The third action is to maintain adequate communications and network equipment and databases. It recognizes that without proper equipment in good repair, dispatchers cannot perform their duties effectively. PSAPs must also have equipment to ensure that individuals with speech and hearing impairments have equal access to emergency communication. Likewise, PSAPs should ensure through interpreters that non-English speaking populations have access to emergency communication.

Radio equipment must be sufficient to permit communications throughout the PSAP's service area. Confidential communications between dispatchers and officers is necessary for times when security may be at risk.

Routine maintenance and testing help ensure that equipment is functioning as intended. Ongoing maintenance of PSAP databases is also important. Using an equipment replacement plan can prepare PSAPs to finance large capital purchases for obsolete or worn equipment.

The fourth action is to consider coordinating the use of dispatching equipment and cooperative dispatching. By coordinating the purchase and use of equipment with nearby jurisdictions, PSAPs may be able to improve intercommunications and share or lower overall costs. Similarly, PSAPs should consider arrangements, such as joint powers agreements, in areas where cooperative dispatching may yield better service and lower costs. For effective coordination, PSAPs have to recognize that the amount of time involved is substantial and be prepared to deal with political problems and governance differences.

The fifth action recommends that PSAPs keep records and measure their performance. Maintaining records and measuring performance makes it easier for PSAPs to plan and deploy resources, evaluate their services, and identify system problems.

The sixth action is to promote information exchanges among public safety response agencies. It advocates that PSAPs communicate directly with all emergency response agencies and solicit feedback on PSAP operations. Ongoing interactions between PSAPs and emergency response agencies help prepare each agency when changes in one affect the others.

The seventh action recommends that PSAPs educate the public on the 9-1-1 system and services. Educating citizens can increase the likelihood that the system will better serve those in need and, when necessary, reduce the number of nuisance calls. PSAPs' public education programs should employ multiple strategies and be ongoing.

We use these seven actions to help identify best practices related to effective and efficient 9-1-1 dispatching. Many Minnesota PSAPs have implemented practices that embody these actions, using a variety of strategies.