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9-1-1 Dispatching: A Best Practices Review

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Preface

This report is a best practices review of 9-1-1 public safety dispatching in Minnesota. It is the fourth in a series of best practices reviews conducted by the Office of the Legislative Auditor.

The 1994 Legislature established best practices reviews as a way to identify practices that aid in delivering local government services efficiently and effectively.[1] Our approach is similar to one used by the British Audit Commission in England and Wales to determine the state of the art in the delivery of local services.

Best practices reviews identify quality in the design and delivery of services. This focus distinguishes best practices reviews from traditional auditing, which identifies compliance and performance deficiencies. The Legislature intended that best practices reviews would help communities improve their service delivery by learning about effective and efficient methods used by jurisdictions similar to them.

When the Legislature created the best practices reviews program, it also established a local government advisory council to recommend topics for review to the Legislative Audit Commission. By law the best practices advisory council consists of three members appointed by the Association of Minnesota Counties, three by the League of Minnesota Cities, two by the Association of Metropolitan Municipalities, and one by the Minnesota Association of Townships. Appendix A provides a complete list of current council members. This advisory council recommended 9-1-1 public safety dispatching to the Legislative Audit Commission, which approved the topic in May 1997.

Our best practices reviews look at effective and efficient methods of delivering local government services.

We acknowledge and appreciate the help of many directors of public safety answering points, call takers and dispatchers, sheriffs and other law enforcement personnel, emergency response agencies, and local elected officials who provided us with information through interviews and surveys. The public safety community cooperated with this effort and its many contributions enhanced the final report.

The report was researched and written by Jody Hauer (best practices coordinator), Jennifer Moenck Feige, and Valerie Bombach, with technical assistance from Glen Morrow. For those with access to the Internet, this report and related material may be found over the World Wide Web at: http://www.auditor.leg.state.mn.us/pe9806.htm.

St. Paul, Minnesota
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1 *Minn. Stat.* §3.971, subd. 4.

9-1-1 Dispatching

A Best Practices Review

SUMMARY

This is a review of 9-1-1 public safety dispatching in Minnesota. By law, counties in Minnesota have been responsible for establishing 9-1-1 emergency telephone systems, either individually or jointly with other counties. The public employees who take the calls and dispatch the appropriate emergency response agencies have different titles around the state to reflect their varying duties, but in this report we refer to all of them as dispatchers.

Dispatchers process 9-1-1 calls as well as other emergency calls made to local law enforcement and fire departments that come to public safety answering points (PSAPs) through seven-digit telephone numbers. They also receive many calls that are not true emergencies but may require a public safety response, a transfer to another agency, or simply information. In dealing with emergencies, dispatchers must process calls quickly and accurately, and are usually required to perform several tasks simultaneously under pressure. Calls to PSAPs in Minnesota are answered on the average within five seconds of the first audible ring, according to our survey of PSAPs statewide.

In addition to answering calls, dispatchers serve as a vital communication link with police, fire, sheriff, ambulance, and other public safety units in the field. Dispatchers are generally considered to be as much a part of effective public safety as law enforcement officers on the street. In some PSAPs, dispatchers also provide emergency medical instructions to callers in advance of the arrival of medically trained personnel. Many dispatchers around the state also perform other functions, such as jailer, record keeping, or receptionist duties.

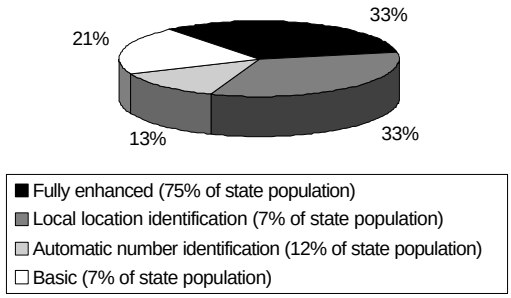
This review focuses on effective and efficient actions to help public safety answering points meet their goals.

9-1-1 DISPATCHING IN MINNESOTA

Although residents everywhere across the state can dial 9-1-1 for access to emergency services, the level of service varies. In 1997, 29 counties had "fully enhanced" 9-1-1 service, meaning the telephone company forwards to the PSAP the 9-1-1 caller's telephone number and address. With this information, the dispatcher can send help even when callers are injured or panicked; dispatchers are also able to call back when a caller is disconnected. Another 29 counties had "local location identification," where the telephone company forwards the telephone number, but the PSAP's own database supplies location or address information. In 11 counties, only the telephone number was automatically forwarded. Together, these 69 counties with some form of enhanced 9-1-1 represented about 93 percent of the state's population.

The remaining 18 counties, with about 7 percent of Minnesota's population, had basic 9-1-1 service in 1997, whereby 9-1-1 callers are connected to the PSAP but the dispatcher receives no information to locate the callers or call them back.

Minnesota Counties by Level of 9-1-1 Service, 1997



SOURCES: Department of Administration, *Minnesota 911 Program*, January 5, 1998; Minnesota Planning, *1996 Population and Household Estimates*.

The state and local governments share in financing 9-1-1 services. Minnesota collects a telephone user fee, currently totaling 22 cents per telephone line per month. In fiscal year 1997, the state collected about $7.6 million in user fee receipts, part of which pays telephone company costs for providing 9-1-1 service and part of which helps PSAPs upgrade to fully enhanced 9-1-1 systems. Local governments, however, have paid for most of the substantial costs of purchasing or leasing 9-1-1 equipment, developing local databases, and employing dispatchers.

9-1-1 calls made with cellular and other wireless telephones are handled differently. Currently, all wireless 9-1-1 calls are received at 1 of 10 State Patrol communications centers around Minnesota; the caller's number and location, however, are not available to the dispatcher. Recent orders by the Federal Communications Commission require wireless telephone providers by April 1, 1998 to begin forwarding the wireless telephone number and the "cell site" from where the call is made.

The 1997 Legislature passed a law that may alter the responsibility for wireless 9-1-1 calls; some law enforcement officials would rather receive these calls at their PSAP instead of having calls transferred to them by the State Patrol. In our view, some of the key factors for determining the responsibility for wireless 9-1-1 calls appear to be: (1) the share of calls originating in areas where the State Patrol has jurisdiction versus where local PSAPs have primary jurisdiction, (2) the extent to which current wireless 9-1-1 calls are being transferred to local PSAPs, and (3) the operational and financial capabilities of the local PSAPs to handle wireless 9-1-1 calls.

Local Government Structure for Providing 9-1-1

Minnesota has 112 local public safety answering points. Of the 87 counties, 78 operate a single public safety answering point; one county operates two. In the remaining eight counties, the county operates a PSAP and other local governments within the county operate separate PSAPs.

Over time the number of PSAPs in Minnesota has decreased as local governments consolidated their operations. Several sheriff offices have merged their dispatching with that of local police departments; some cities that formerly ran their own PSAP have since merged operations with those in nearby cities or the county.

Purpose of This Best Practices Review

This report identifies some of the effective and efficient practices related to 9-1-1 dispatching in Minnesota. It is based on a statewide study of current practices in the state's 112 public safety answering points and 10 State Patrol communications centers.

The purpose of this report is to catalog effective methods, demonstrate the conditions under which they appear successful, and encourage their adoption wherever appropriate around the state. Unlike a regular audit or evaluation, this report does not focus on deficiencies, but highlights successful practices.

We hope that Minnesota's local governments will actively use this report to examine their own practices and consider the ideas presented here that contribute to effective and efficient 9-1-1 dispatching elsewhere.

This best practices review is part of a program created by the Minnesota Legislature in 1994 to identify best practices in local government service delivery.

We compared the effectiveness and efficiency of cities operating their own PSAP with that of their counties' PSAP, using numerous measures such as the average time to answer a call, the completeness of telephone equipment, and access to emergency medical dispatching. Comparing these measures we found that in some cases, the city-operated PSAP offered higher quality or more services than its county PSAP. Even though residents of those cities pay twice for 9-1-1 services—once for their own PSAP and a second time for the county's—they receive better service than they would using the county PSAP. On the other hand, in some counties with multiple PSAPs, the county PSAP operated more effectively and efficiently than the city PSAPs. Particularly in these cases, consolidated dispatching may yield better service and lower overall costs.

We expect that future consolidations of PSAPs will be driven by opportunities to improve service through upgraded technology and equipment, reduce redundant functions, and save money. In the seven-county Twin Cities metropolitan area, the planning now underway for a digital, 800 megahertz "trunked" radio system may also be a factor. Although planned as a regionwide public safety radio system, some local governments are questioning the high costs of purchasing the digital equipment needed to participate. Through consolidating PSAPs or joint purchases of equipment, some local governments may see avenues for either (1) affording participation in the regionwide system or (2) operating radio equipment outside the regionwide system (but without the intercounty communication the regional system promises) for the medium-term future by using existing radio channels or applying for channels that have been "turned back."

Training for Dispatchers

Because of the vital nature of dispatchers' jobs, the communication links they provide with emergency response agencies, and the increasing technological complexity of public safety communications, dispatchers need comprehensive initial and ongoing training. Although Minnesota has not set minimum skill or training standards for dispatchers, we found that Minnesota PSAPs generally have a strong emphasis on dispatcher training. In 1996, at least two-thirds of PSAPs met or exceeded the minimum training guidelines in most subject areas recommended by a national organization of public safety telecommunicators. According to our survey results, PSAPs that met or exceeded all of these training minimums were more likely than others to have numerous characteristics of effective dispatching organizations.

An issue currently pending before the Minnesota Legislature would make dispatchers "essential" employees, thus prohibiting them from striking. Proponents of the legislation argue that highly skilled dispatchers could not be easily replaced during a strike without jeopardizing public safety. Opponents are concerned about the higher costs for dispatcher salaries that the essential designation may generate and dislike the inflexibility of binding arbitration to settle labor and management disputes.

Data were not available to allow us to compare dispatching effectiveness in states that allow dispatchers to strike with states that do not. With the data available we looked at a sample of states to see whether there was a connection between training, as a proxy for quality dispatching, and employees' opportunity to strike. The states we analyzed showed mixed results and we did not find a clear link between quality dispatching, as defined by high levels of training or statewide training requirements, and prohibiting strikes. We can conclude, however, that regardless of whether dispatchers become essential employees, high quality dispatching requires regular and comprehensive training.

GOALS, ACTIONS, AND BEST PRACTICES IN 9-1-1 DISPATCHING

Based on state statutes and professional standards, we identified two goals for effective and efficient 9-1-1 public safety dispatching.

The goals are:

- **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.

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

We identified seven actions that we believe will help PSAPs reach these goals. They are not the only actions that affect PSAPs' performance, but they are based on ideas and standards from the public safety communications industry and are applicable to all PSAPs.

Seven Actions for Public Safety Answering Points

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 used the goals and actions as a framework to identify best practices in 9-1-1 dispatching. In the text that follows, we describe the seven actions and provide examples of how some Minnesota PSAPs have implemented them in actual practice.

1. Develop and Use Standard Operating Procedures

PSAPs need to establish and follow guidelines that standardize effective practices in: receiving and processing calls, dispatching the appropriate response agency, communicating with response units, resolving complaints, and managing unanticipated malfunctions in the 9-1-1 equipment. This includes developing and testing written disaster recovery plans that specify what steps to take if the 9-1-1 system or another component of the PSAP's operation becomes inoperative for any reason. Our survey of Minnesota PSAPs indicated that about 78 percent of them had written standard operating procedures for some dispatching functions in 1996.

Scott County

In Scott County, the PSAP provides emergency medical dispatching through a private ambulance service. When dispatchers receive a medical call, they transfer it to the ambulance service. Trained emergency medical dispatchers at the company dispatch ambulances and offer medical instructions to the caller in advance of the ambulance's arrival.

This allows Scott County dispatchers to focus their attention on assisting field units and handling other emergency calls. It also avoids the county expense of ongoing training necessary for emergency medical dispatchers.

Additional standards are necessary for those PSAPs that provide emergency medical dispatching. They need a dispatch response system approved by an emergency physician, systematic prearrival instructions, appropriate training, and mechanisms to review procedures and correct them when necessary to ensure quality.

2. Support a Trained and Qualified Work Force

PSAPs need to take steps to hire the right people for the job and provide them comprehensive initial and ongoing training. Using appropriate hiring practices, such as realistic job previews, tests of applicants' skills, background checks, and probation periods, can help PSAPs avoid the high cost of early staff turnover. Our survey revealed that, when compared to other PSAPs, more PSAPs using realistic job descriptions and testing job applicants had high employee retention rates. Throughout dispatchers' tenure, PSAPs need to conduct regular personnel evaluations. These are especially important in PSAPs because of the need

to identify and correct performance problems before they diminish public safety.

Clay County/Moorhead

In Clay County, newly hired dispatchers undergo 16 weeks of training. During each of four phases of the training, the trainee observes experienced dispatchers and learns from an extensive written training manual. As trainees demonstrate proficiency in the subject, the experienced dispatchers sign off on their mastery of it.

The comprehensive and systematic training prepares trainees for many different and difficult situations. It also results in a corps of dispatchers who have all learned approximately the same set of skills. Overall, the training increases confidence in the dispatchers on the part of officers and others in the field, contributing to a smooth public safety response to emergencies.

Training helps ensure that dispatchers have the skills, knowledge, and abilities to perform a highly technical and pressure-filled job. Not only do PSAPs need to provide extensive initial training to new employees, but they also need to target ongoing training to the individual training needs of their experienced dispatchers. Nearly all PSAPs provided some initial training for dispatchers, according to our survey, and about 57 percent required annual training customized to dispatchers' own needs.

3. Maintain Adequate Communications and Network Equipment

Maintaining adequate communications and 9-1-1 network equipment and databases is paramount to timely and appropriate service delivery. PSAPs need to invest in telephone equipment, such as three-way conferencing and speed dial libraries, to help dispatchers process emergency calls efficiently. Some PSAPs, typically those with higher call volumes and larger staffs, have purchased computer-aided dispatching equipment to automate many dispatcher functions and increase their efficiency.

To guarantee round-the-clock access to emergency services, PSAPs need to have in place uninterruptable power supplies and backup power sources to keep essential equipment functioning in the event of a power failure. According to our survey, over 80 percent of PSAPs had uninterruptable power supplies for at least some PSAP operations in 1996.

By law, PSAPs must provide equal access to emergency communications for individuals with speech and hearing impairments. This means having and maintaining the appropriate telecommunications devices for the deaf (TDD), training dispatchers to identify and process TDD calls, and preparing backup plans. Nearly 66 percent of PSAPs reported that they provide the same level of service for TDD callers as other callers, and about 87 percent reported that half or more of their answering positions had access to TDD devices.

To maintain effective communication with officers, fire fighters, and ambulance services, PSAPs need reliable radio systems and sufficient radio channels to permit immediate radio access. They also need equipment that allows confidential communications between dispatchers and officers when security may be at risk.

St. Louis County

St. Louis County's two PSAPs use computer-aided dispatch (CAD) to automate dispatching and track calls for service. CAD assists dispatchers by providing a time and date-stamped automated record into which the dispatcher need only enter information on the incident at hand; the calling party's name, phone number and address are automatically displayed for all 9-1-1 calls. CAD also displays the appropriate response agency for any given incident and identifies the response units in closest proximity to the incident.

PSAP officials also use the CAD as a management tool to track calls and dispatchers' responses to them. Monitoring calls through CAD allows managers to quickly investigate and respond to service problems.

For all of their communications and network equipment, PSAPs need to perform routine maintenance. Ongoing equipment testing ensures that the telephones, radios, voice recorders, and network equipment function properly. To replace worn out or obsolete equipment, PSAPs should develop equipment replacement plans.

PSAPs typically have to design and maintain "master street address guides" of street names and address ranges or databases of their service area's residents, telephone numbers, locations, and emergency response agencies responsible for each location. In addition, they need procedures to routinely and constantly update these data sets to ensure that dispatchers have the correct information for dispatching emergency response agencies to the appropriate location.

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

Through the coordination of equipment purchases, PSAPs may be able to enhance their service and lower overall costs. For instance, coordinating the use of a single CAD system among PSAPs within a county can improve information sharing among jurisdictions and offer economies of scale in purchasing.

PSAPs should also consider arrangements, such as joint powers agreements, in areas where cooperative dispatching may yield better service and lower costs. With joint dispatching, local governments can gain savings by upgrading one communications center instead of two or more. One center will generally have fewer employees and less overhead than multiple centers. The cost of technological improvements are more easily borne when shared among multiple jurisdictions. Plus, a joint dispatch center can engender greater cooperation among public safety agencies in adjoining locations.

Because we cannot assume that cooperative dispatching will automatically produce benefits in every locale, each area has to analyze whether a joint effort will produce better service at lower costs. PSAPs considering joint dispatching have to manage operational, political, and governance difficulties. Furthermore, because some PSAPs use their dispatchers to perform multiple functions, such as those of jailers, they may not realize personnel savings. Even with a lower overall number of dispatchers, the jurisdiction may have to hire additional employees to fulfill those other duties.

Rice and Steele Counties

The counties of Rice and Steele, and the city of Northfield, are merging their three PSAPs into one. In 1997 these entities, plus the cities of Faribault and Owatonna, signed a joint powers agreement to manage and finance the merged PSAP, and they expect to begin operations in late 1998.

The joint effort has been driven in large part by major technological improvements that none of the individual PSAPs could afford on its own. Participants expect improved records management, increased dispatch efficiency, more effective deployment of law enforcement officers in the field, improved communication between agencies in different jurisdictions, and savings in both capital and operating costs.

Involving all interested parties in the planning and implementation of the merger has been important to its progress.

5. Keep Records and Measure Performance

PSAPs need to maintain records and measure performance in order to determine which of their practices are successful and where gaps in service need to be filled. Although not a simple task, by setting goals and collecting data to measure how well they meet their goals, PSAPs are positioning themselves to improve their service delivery.

PSAPs must record 9-1-1 calls for service and retain those records for a minimum of 31 days, according to state administrative rules. Beyond data on calls, PSAPs should collect management information on personnel and equipment. Doing so helps PSAP managers make informed decisions on items such as when to replace equipment and what

Burnsville

PSAP officials in Burnsville track service problems and complaints with a systematic records system. Whenever a problem surfaces, a supervisor completes a citizen contact report to detail the nature of the problem and how it was resolved. All complaint information is computerized for easy tracking.

The system has proved helpful to verify service problems, especially unfounded ones. With the system, managers have a written record that indicates how well the dispatcher conformed to the PSAP's standards for any given incident. The written record offers a valuable tool in reducing the PSAP's exposure to potential liability in tort cases. In addition, the system provides a way for the PSAP to be consistent in its responses to complaints.

training is necessary for individual dispatchers. Tracking complaints about their service also gives PSAPs the information they need to correct problems and prevent others from occurring.

6. Promote Information Exchanges among Public Safety Response Agencies

For an effective public safety response, PSAPs need to communicate regularly with all emergency response agencies and solicit feedback on how the dispatch and communications system is functioning and what can be improved. This means systematic contact with law enforcement, fire protection, ambulance services, first responders, and any other agencies dispatched through the PSAP. Opening regular channels of communication for feedback from emergency response agencies can help a PSAP make whatever adjustments are necessary to improve its public safety communications.

PSAPs should also establish protocols with emergency service agencies that detail the activities each will follow in responding to requests for service. This enables the PSAP and others to coordinate their activities in advance so they will be prepared to act in an integrated fashion when emergencies arise.

According to our survey, about a third of PSAPs met on a monthly or quarterly basis in 1996 with emergency response agencies to discuss PSAP operations. Another 47 percent met with these agencies on an as-needed basis.

Ramsey County

Representatives from the Ramsey County PSAP meet on a rotating monthly schedule with officials from either police or fire departments in the county. The forums afford an opportunity for participants to discuss requests for changes in dispatching procedures, concerns over equipment and 9-1-1 system operations, and other problems.

In this way, the PSAP manages small problems before they evolve into major ones. The meetings indicate to the police and fire departments that the PSAP is concerned about meeting their needs. In addition, they give the dispatchers and other public safety personnel a chance to personally meet and develop rapport with one another.

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

To improve the likelihood that the 9-1-1 system will be used as intended, PSAPs need to educate the public. Effective public outreach can encourage people to use the system, instruct them on what information is necessary to provide to a dispatcher, and help reduce the number of nuisance calls.

A public education program should be ongoing, not a single event. It should also employ a variety of media in order to reach a broad audience. PSAPs may need to target their outreach efforts to groups such as the elderly, to persuade them to use 9-1-1, or children, to teach them when to call and what to expect.

Our survey indicated that more than 81 percent of all Minnesota PSAPs conducted some public education efforts in 1996. They used a variety of methods, the most common of which was public speeches to, and meetings with, community groups and civic organizations.

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. Representatives from the sheriff's office meet with numerous groups throughout the year, provide data on 9-1-1 calls for a weekly newspaper column, and operate a booth at the county fair.

Despite the small population of the county, PSAP officials believe meeting with residents is important because they want the public to understand and have faith in the PSAP's work. They want to encourage senior citizens and others to call 9-1-1 even when the individual may not be sure a situation constitutes an emergency. In addition, the sheriff views the outreach activities as opportunities to let the public know how its public-safety tax dollars are being spent.

CONCLUSION

Although the level of 9-1-1 service varies among PSAPs around the state, we found examples of best practices in PSAPs of all sizes and locations. We observed that police, fire fighters, and others in the public safety community rely heavily on dispatchers at the PSAPs in order to perform their jobs in the field. Further, dispatchers as a group take seriously the need to do their job quickly without compromising accuracy.

Most PSAPs in Minnesota are run at the county level and managed by sheriff's offices or joint law enforcement agencies. About two dozen PSAPs, concentrated largely in the Twin Cities region, are operated solo by cities or units of government other than counties. We saw no consistent differences in measures of effectiveness and efficiency when comparing cities operating their own PSAPs and their respective county's PSAP. In some cases, the county PSAP ranked higher on measures of effectiveness, and in others, the city-run PSAPs did. Because of the increasingly complex technologies used to provide public safety communications today, and the costs associated with them, areas with multiple PSAPs may encounter additional incentives to consolidate their operations. In all cases, improvements in public safety must be the driving force.

Effective PSAPs offer comprehensive training to dispatchers, both when employees begin the job and over the years. Training in hard wire and wireless telephone technology, radio communications, effective telephone techniques, and the distinctions in service areas and responsibilities among response agencies are several of the subjects fundamental to successful dispatching. As PSAPs decide to provide emergency medical dispatching, the need for additional dispatcher training escalates.

We recommend that PSAPs around the state consider the seven actions we identified from industry standards for effective 9-1-1 service: (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 the coordinated use of dispatching equipment and for cooperative dispatching, (5) keep records and measure performance, (6) promote information exchanges among public safety response agencies, and (7) educate the public on the 9-1-1 system and services.

Although other actions may also contribute to successful 9-1-1 dispatching, we consider these seven to be essential. How a PSAP actually implements the actions can vary and we learned of many PSAPs around the state that demonstrate how these actions have benefited them.

Introduction

This report examines 9-1-1 public safety dispatching in Minnesota. Although many calls for assistance come from callers dialing 9-1-1, many others arise from calls on other public safety telephone lines. Public safety telecommunicators handle them all. Throughout the report, when we discuss 9-1-1 dispatching, we include responses to calls coming from both 9-1-1 and other seven-digit telephone lines, and 9-1-1 calls made on wireless telephones, for emergency and nonemergency situations.

In this review, we examined the operations, equipment, and personnel management of Minnesota's public safety answering points (PSAPs), which are authorized to dispatch public safety services.[1] County sheriff offices or law enforcement centers operate most PSAPs, although a few cities operate their own. We also included in our review the communications centers for Minnesota's 10 state patrol districts, which currently receive 9-1-1 calls made with cellular and other wireless telephones.

Each PSAP has developed its own techniques for 9-1-1 dispatching. We looked at the overall management, structure, and results of the PSAPs but did not evaluate the actions of individual public safety dispatchers. We studied, for instance, how many PSAPs offered medical instructions to callers at the scene of medical emergencies and the scope of the emergency medical services they offered, but did not monitor how individual dispatchers responded to medical calls.

This review defines successful 9-1-1 dispatching and gives examples of public safety answering points that use best practices.

The report describes many of the components necessary for effective and efficient 9-1-1 dispatching, as defined by national public safety organizations. It provides examples of Minnesota PSAPs that are using successful practices. Further, it encourages the adoption of these practices wherever appropriate around the state.

To conduct this review, we collected information in several ways. We began the project by holding a roundtable discussion to better understand the issues associated with 9-1-1 dispatching as viewed by sheriffs and other law enforcement officials, PSAP officials, county commissioners and administrators, and legislators. We reviewed literature published by national and local organizations within the public safety industry. For additional information we interviewed PSAP directors and some providers of emergency services, such as ambulance providers, and spent time observing dispatchers in action. With this information, we were able to define many characteristics of effective and efficient service.

To learn more about specific PSAP operations, equipment, and personnel, we surveyed by mail each

1 *Minn. Stat.* §403.02, subd. 5.

Minnesota PSAP. After identifying effective and efficient practices, we visited about a dozen PSAPs—small and large, urban and rural—for a better understanding of their particular methods and techniques.

Throughout the review, we relied on advice and feedback from members of a technical advisory panel. The 20-member panel, consisting of PSAP directors, sheriffs, and other local and state officials, offered its professional assistance and guidance as we conducted the study. We also hired a retired public safety communications officer to provide technical assistance. Appendix A lists the panel members and provides additional details on the methodology of this review.

This report has two chapters. The first chapter provides background information on the arrangement and financing of 9-1-1 public safety dispatching in Minnesota and describes how public safety answering points vary around the state. In this chapter we also discuss several current issues that have the potential to affect 9-1-1 dispatching in the future. Chapter 2 describes goals and actions for effective and efficient 9-1-1 dispatching. It also presents examples of local governments around Minnesota that use best practices in delivering their 9-1-1 service.

Background and Contemporary Issues

CHAPTER 1

People who need emergency services may dial 9-1-1 anywhere in Minnesota and receive immediate access to assistance for fires, injuries, crimes, road accidents, and other public safety incidents. This chapter describes the system in which public safety employees take these calls, determine their nature, and dispatch the appropriate emergency response. Although these employees' job titles vary according to their duties, in this report we refer to all of them as "dispatchers."

In addition to 9-1-1 calls, dispatchers receive many calls from people dialing the seven-digit number of their local law enforcement or fire agency. Some of these calls are requests for emergency assistance; others are not. Dispatchers often receive nonurgent calls from people, some of whom require public safety assistance, others of whom simply need information or a referral to another public agency. Although not every 9-1-1 call is an emergency, dispatchers can distinguish 9-1-1 calls from others because they come in on dedicated telephone lines and are typically assigned distinct audible tones and visual signals. Dispatchers generally follow specific procedures set up in their public safety answering points (PSAPs) to identify and give priority to calls that are truly emergencies.

Dispatchers also serve as a vital communication link with the police, fire, sheriff, ambulance, and other public safety units in the field.

The functions performed by dispatchers and the level of 9-1-1 service vary among public safety answering points.

Besides providing information about the circumstances of callers in need of assistance, dispatchers often offer pertinent information, such as on drivers license checks or outstanding arrest warrants, to help officers do their job. Dispatchers also relay critical information to public safety personnel at the scene of an incident, such as the location of explosive materials in a warehouse near a fire or the history of domestic violence calls at a given address.

Some PSAPs train dispatchers to also provide emergency medical dispatching, which is a specially designed program of offering medical instructions over the telephone in advance of the arrival of an ambulance. Further, in many counties around the state, dispatchers perform additional functions, for example those of jailers, on top of their dispatching and communication duties.

This chapter presents background information on the responsibility, financing, and arrangements for providing 9-1-1 public safety dispatching, as well as on the functions and training of dispatchers. In the chapter we ask the following questions:

- **Who has responsibility for 9-1-1 dispatching in Minnesota? What services do PSAPs provide and how does this vary?**

- **How are 9-1-1 services financed?**

- **What variations are there in the structure of the governmental responsibility for providing 9-1-1 service?**

- **What functions do dispatchers perform and how does this differ around the state? What training exists for dispatchers?**

- **What outstanding issues in today's public safety environment have the potential to affect PSAPs and their operations?**

As we learned about arrangements for handling 9-1-1 calls, we observed several unresolved issues related to public safety dispatching in Minnesota. These issues are: responsibility for wireless 9-1-1 calls, the appropriate governmental structure for delivering 9-1-1 services, and the right to strike for employees in dispatcher positions. This chapter also provides background information and our observations on these issues.

To answer our research questions, we relied in part on information we gathered by surveying all public safety answering points in Minnesota.[1] We also collected information by interviewing members of the public safety community and local elected officials. In addition, we depended heavily on literature written by organizations involved with the development and ongoing operations of 9-1-1 systems. Of particular value was information from two national professional groups involved with the 9-1-1 community and public safety dispatching: the National Emergency Number Association (NENA) and the Association of Public Safety Communications Officials International, Inc. (APCO).

9-1-1 SERVICE: LOCAL RESPONSIBILITY UNDER A STATE MANDATE

Under a state mandate, Minnesota's local units of government operate public safety answering points that process 9-1-1 and seven-digit telephone calls for public safety and other assistance. Currently, counties and cities operate 112 PSAPs statewide. In addition, the Minnesota Department of Public Safety's State Patrol operates 10 communications centers to answer 9-1-1 calls made by cellular and other wireless telephone users, as well as calls made to seven-digit numbers and by radio.

Although some localities had by the mid-1970s already developed systems of uniform emergency telephone numbers, in 1977 the state required all counties to establish 9-1-1 emergency telephone systems.[2] The systems were to be established by the end of 1982 in the Twin Cities seven-county metropolitan area and the end of 1986 elsewhere. Through a combination of state and local initiatives and funding, dialing 9-1-1 now links callers from anywhere in Minnesota with emergency response agencies. Minnesota is one of about 14 states where all residents have access to 9-1-1.[3]

Local and State Government Roles

Local governments have played a large role in the development of Minnesota's 9-1-1 system, including planning, designing, implementing, and operating public safety answering points. Local governments and the state have shared in financing the 9-1-1 system, as will be described in more detail later in this chapter.

In addition to financing, the state's role has been one of coordination and technical assistance to local governments. Within the Department of Administration's InterTechnologies Group, the Telecommunications Division established a 9-1-1 Program to set 9-1-1 operating standards, oversee the collection of fees and distribution of revenues

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

2 *Minn. Stat.* §403.01, subd. 1.

3 Department of Administration, Telecommunications Division, *Minnesota 9-1-1 Program*, January 5, 1998, WWW document, URL http://www.state.mn.us/ebranch/admin/intertech/services/svnc91.html, (January 19, 1998).

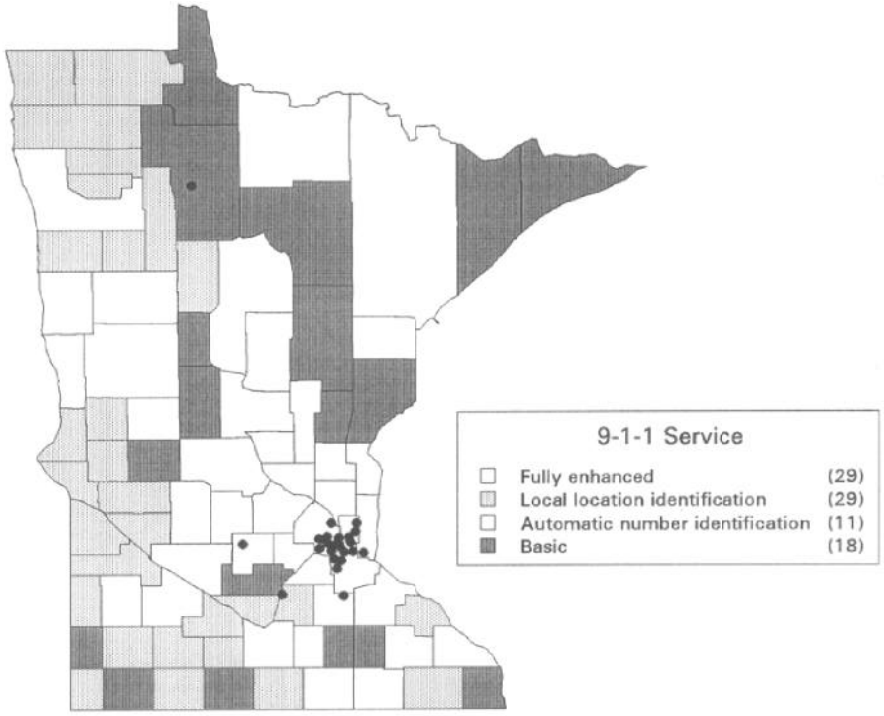
for 9-1-1, contract with telephone companies to provide the equipment and service that transmit 9-1-1 calls, and assist local governments with developing and improving their 9-1-1 systems. In addition, the Public Utilities Commission is involved by virtue of its oversight responsibilities for telephone companies that establish rates for providing 9-1-1 services.

Enhanced versus Basic 9-1-1

Despite statewide coverage of 9-1-1 telephone services, the level of 9-1-1 service varies among PSAPs. At the end of 1997, 29 counties, with about three-quarters of the state's population, had what is known as "fully enhanced" 9-1-1 service, which displays a caller's phone number (via automatic number identification or ANI) and location (via automatic location identification or ALI) to the dispatcher. (Figure 1.1 shows the location of PSAPs in the state; Figures 1.2 and 1.3 show the level of 9-1-1 service available.)

In an area with fully enhanced 9-1-1 service, the telephone company's computer matches the telephone number with the subscriber's name and location and forwards that information electronically to the PSAP within seconds of the placement of a 9-1-1 call. With that information displayed, the dispatcher can send help even when callers are disoriented, panicked, or otherwise unable to describe their location and situation. If a caller hangs up or is disconnected, the dispatcher can retrieve the caller's telephone number and call

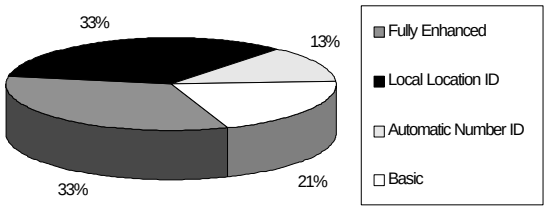
Figure 1.1: Level of 9-1-1 Service in Minnesota Counties, 1997



NOTES: Dots represent PSAPs operated independently of the county. In addition to the PSA Ps pictured, the State Patrol has com - munications centers in 10 locations: Brainerd, Detroit Lakes, Duluth, Mankato, Marshall, Rochester, Roseville, St. Cloud, Thief River Falls, and Virginia.

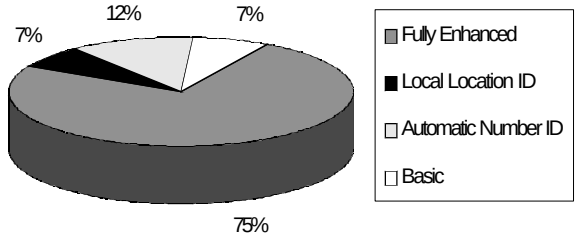
SOURCE: Department of Administration, *Minnesota 911 Program*, January 5, 1998, WWW document, URL http://www.state.mn.us/ebranch/admin/intertech/services/svnc91.html, (January 19, 1998).

Figure 1.2: Counties by Level of 9-1-1 Service, 1997



SOURCE: Department of Administration, *Minnesota 911 Program*, January 5, 1998.

Figure 1.3: State Population by Level of 9-1-1 Service, 1997



SOURCES: Department of Administration, *Minnesota 911 Program*, January 5, 1998; Minnesota Planning, *1996 Population and Household Estimates.*

back to determine whether emergency help is needed. Enhanced 9-1-1 also selectively routes calls to designated PSAPs based on the caller's location. None of this is available yet for 9-1-1 calls made by cellular telephone users.

Enhanced 9-1-1 also exists with alternate features that provide less information to dispatchers.

Twenty-nine other counties had equipment with ANI to display the telephone number of the caller and supplemented that with information from their own database to attain the address or location of the telephone's subscriber.[4] Another 11 counties had the ANI feature only, with no additional equipment to provide information on the address or location of the caller. Thus, a total of 69 out of Minnesota's 87 counties, representing about 93 percent of the state's population, had some form of enhanced 9-1-1 service at the end of 1997.

The remaining 18 counties had basic 9-1-1 service in 1997.[5] Basic 9-1-1 connects the caller to a PSAP over dedicated telephone trunks or lines, but it does not provide information on the caller's telephone number or location.

Many counties with basic 9-1-1 are in the process of upgrading their systems. As described later in this chapter, a special state-imposed telephone user fee now in place provides money to PSAPs for implementing and maintaining enhanced 9-1-1. Local governments will become ineligible for these revenues if they have not implemented enhanced service before December 31, 1998.[6]

Jurisdictions have different levels of 9-1-1 service because of the local political and financial decisions made about the service. Because the extent of some local governments' tax bases was greater than others, and because local governments had to pay the costs of installing the 9-1-1 system circuits and telephone features as well as of purchasing the PSAP equipment, PSAPs bought what they determined they could afford. In addition, differences in the expected volume of calls from one area to another affected purchasing decisions.

Differences in Calls and Service

Besides differences in the enhanced and basic features of 9-1-1 service, other differences exist in public safety dispatching around the state. Over 5.5 million 9-1-1 and other calls came in to PSAPs in

4 The feature on systems that use local (not telephone company) databases to identify the location of the subscriber's phone is referred to as Local Location Identification or LLI.

5 In a few counties, part of the area had basic 9-1-1 service and other parts had enhanced 9-1-1 at the end of 1997. For instance, basic 9-1-1 was available for about four-fifths of Lake of the Woods County's population, and local location identification was available in the remaining one-fifth.

6 *Minn. Stat.* §403.113, subd. 2 (c).

1996, according to our survey data.[7] Some PSAPs received many more 9-1-1 and other calls than other PSAPs. In 1996 the number of calls of all types ranged from slightly more than 4 per 100 residents to 992 per 100 residents among the 33 PSAPs that record all calls. The number of calls also varied regionally with PSAPs in the Twin Cities area receiving a median 125 calls per 100 residents in 1996 and PSAPs elsewhere receiving a median 83 calls per 100 residents. PSAPs record their calls differently; some do not track all calls, but instead track only those for which an initial complaint report is filed. Differences occur even among agencies that record only calls related to initial complaint reports; a report of a dog on the loose, for instance, may be cause for an initial complaint report in some communities but not in others. Some PSAPs record only those calls for which a field unit is actually dispatched. (Table 1.1 shows the range in number of calls by these differences in record keeping.)

Not all of the calls recorded by PSAPs are classified as emergencies. Our survey showed that calls requiring immediate action (our definition of "emergency") typically represented about one-quarter of the calls received by most PSAPs. Calls that were specifically medical in nature represented no more than 8 percent of the calls to most PSAPs in 1996.

To be effective, dispatchers have to work quickly. They need to respond to calls immediately because in certain situations a small amount of time can mean the difference between life and death. Around the state, the median time to answer a typical incoming call, measured from the time of the first audible ring, was five seconds, according to our survey. PSAPs estimated that the average time to answer calls varied from one to 18 seconds.

Most PSAPs dispatch and communicate with law enforcement, fire departments, and ambulance services, but the number of these agencies and the response units they operate vary and can affect dispatchers' workload. In the Twin Cities seven-county metropolitan area, PSAPs typically dealt with a smaller total number of these agencies than PSAPs elsewhere in the state, due in part to the larger number of fire departments typically found in the service areas of PSAPs outside the Twin Cities. (See Figure 1.4.) But when looking at the median number of emergency response units available at these agencies, the Twin Cities area PSAPs had a somewhat larger number of units available for dispatching during the PSAPs' busiest shifts than PSAPs elsewhere. (See Figure 1.5.)

Combined with a larger median number of calls in the Twin Cities area PSAPs, the data indicate that metropolitan area dispatchers typically dispatched

Table 1.1: Annual Number of 9-1-1 and Other Calls Received per 100 Residents, 1996

	PSAPs Recording All Calls (*N*=33)		PSAPs Recording Calls that Generate Initial Complaint Reports* (*N*=45)		PSAPs Recording Calls Resulting in Units Dispatched (*N*=5)		PSAPs Using Other Counts of Calls (*N*=4)	
	Twin Cities	Other	Twin Cities	Other	Twin Cities	Other	Twin Cities	Other
Minimum	35.5	4.4	35.7	3.8	79.8	29.5	8.2	10.9
Median	125.8	83.8	56.6	40.6	--	67.0	--	--
Maximum	437.1	992.0	236.3	130.4	113.7	120.6	45.4	465.5

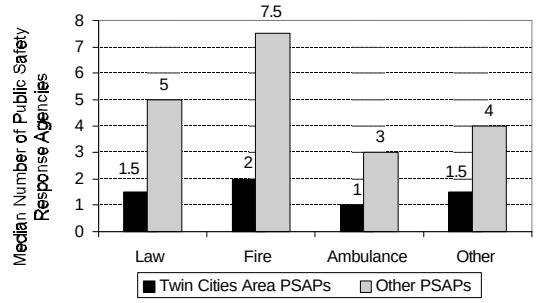
*Incidents that are cause for an initial complaint report (ICR) in some PSAPs may not genera te an ICR in others.

NOTE: Median figures are not available when the number of respondents is very small (two or f ewer).

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

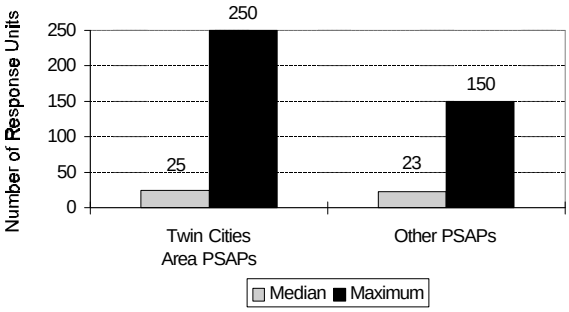
7 The actual number of calls is somewhat higher because some public safety answering points record only certain calls, not every call. In addition, 14 PSAPs did not respond to our survey and 11 PSAPs who responded did not report the number of calls received.

Figure 1.4: Median Public Safety Agencies in PSAP Service Area, 1996



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

Figure 1.5: Response Units Available for Dispatching During Busy Shift, 1996



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

more public safety units and more frequently than dispatchers elsewhere in 1996. Conversely, PSAPs outside the Twin Cities were more likely to assign dispatchers duties beyond processing calls and communicating with field units.

Most dispatchers search for and provide information at the request of the field unit personnel on items such as drivers' license checks, warrants, and criminal histories. In some jurisdictions, however, the availability of mobile data computer terminals in squad cars can significantly reduce the time dispatchers spend collecting these data. Mobile data computers allow officers in the squad to search electronic databases and retrieve relevant information. Instead of waiting for the dispatcher to enter an inquiry into a computer, obtain a response, and relay the response back to the squad, the officers themselves make the query directly. Some mobile data computers also interact with a computer-aided dispatch system at the PSAP, providing to the officers a visual display of the same information on callers and their locations that the dispatcher entered or verified.

Mobile data computers are typically expensive, however, and only about 20 percent of PSAPs have them, according to our survey. Those with mobile data computers tended to have higher than median call volumes. They also were located primarily in the metropolitan area; those few outside the metropolitan area with mobile data computers served large populations.

Differences in the availability of emergency medical dispatching were also evident. Dispatchers that provide emergency medical dispatching typically have completed additional training and have knowledge of emergency medical procedures to appropriately (1) determine the nature of medical calls, (2) mobilize the emergency response units and relay to them necessary information about the incidents, and (3) assist victims in need of medical attention before medically trained personnel arrive.

PSAPs' decisions about whether to offer medical instructions over the telephone have been a subject of controversy. Proponents point out that such instructions can be very valuable to individuals in medical emergencies and can even save lives. Others caution that unless the emergency medical dispatching follows a rigorous course of specialized training and quality control, the PSAP increases its liability to tort actions in situations when the medical instructions were not helpful. Table 1.2 shows that in 1996:

- **A somewhat larger share of the PSAPs outside the Twin Cities region than those within it either offered "prearrival instructions" to callers with medical emergencies or transferred such calls to other agencies with these services.**

Offering prearrival instructions means dispatchers provide instructions via telephone to people at the scene of incidents to assist injured individuals prior

Table 1.2: Availability of Prearrival Instructions for Medical Calls, 1996

	Twin Cities Area PSAPs (*N*=23)	Other PSAPs (*N*=70)
PSAPs offered prearrival instructions	26.1%	44.3%
Medical calls were referred to other agency for prearrival instructions	17.4	8.6
Total	43.5	52.9

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

to the arrival of ambulances or first responders trained in first aid. Especially in some rural parts of the state, where the distance between emergency medical personnel and accident victims can be great, prearrival instructions can be of great value.

In some areas, private sector medical transportation businesses make their services available to PSAPs. Their employees, trained as emergency medical dispatchers, take medical calls transferred by the PSAPs and talk directly with the 9-1-1 caller as the ambulance is dispatched. This arrangement allows PSAP dispatchers to return to communicating with other field units while emergency medical dispatchers provide medical instructions.

Some PSAPs transfer medical calls to private ambulance services or secondary PSAPs.

In a few areas, PSAPs have designated certain entities as "secondary" PSAPs and transfer medical emergency calls there.[8] For instance, the PSAPs at St. Paul, Minneapolis, and Rochester/Olmsted County transfer their medical calls to the St. Paul Fire Department Emergency Communications Center, Hennepin County Medical Center, and St. Mary's Hospital, respectively. Several other city-operated PSAPs in suburban Hennepin County that use ambulances dispatched from Hennepin County Medical Center have arranged in the past year to transfer their medical calls to the Medical Center. Emergency medical dispatchers at the secondary PSAPs process these calls and offer prearrival instructions while dispatching the appropriate medical help. The St. Paul Fire Department has also contracted with Roseville and Falcon Heights to dispatch emergency medical help and offer prearrival instructions.

Wireless 9-1-1 Calls

Emergency calls made via cellular telephones and personal communications services (PCS) are presently handled differently than traditional land-line telephone calls. Cellular telephones establish radio communication with radio towers; because the towers are placed in a variety of locations, users may carry the telephones to different locales and the phones will operate off the nearest towers. Personal communications services are a similar but more recent concept that provides wireless digital service operating off less powerful towers located much closer together. Users do not have to be connected to a telephone stationed in a building or vehicle to communicate.

This convenience to telephone users creates a new layer of complexity from a public safety standpoint. Unlike hardwire phones, the wireless telephones have historically not generated the ANI or ALI needed to forward the caller's phone number and location to a public safety answering point. Consequently, dispatchers may not be able to call back wireless callers or collect essential information when these callers are disoriented, injured, or in areas unfamiliar to them. Even information about the location of the "cell," or territory served by each radio tower, may not be useful as the caller may be moving among cells and the dispatcher may not have precise enough information to pinpoint actual incidents. In addition, some wireless 9-1-1 calls may be blocked and never answered if the subscriber is in an area that is beyond the range of the provider's coverage.

8 Secondary PSAPs do not initially answer 9-1-1 and other public safety calls but receive calls transferred from primary PSAPs.

Another key difference with wireless emergency calls is the usually high volume of calls per incident. One collision on the highway during rush hours may generate scores of wireless calls from passersby, all reporting the same accident, as may be true with particularly high-visibility incidents reported via land lines. In these situations, PSAPs need to take special steps to determine whether the calls are duplicative while making sure that their lines are not tied up preventing reports from coming through on simultaneous incidents occurring elsewhere.

FCC Rules on Wireless Calls and Minnesota's Response

To address some of the public safety concerns common to wireless calls around the country, the Federal Communications Commission (FCC) issued a report and order in 1996 that established two key mandates, among other things.[9] The first, referred to as "phase 1," required wireless service providers to forward 9-1-1 calls without interruption to designated PSAPs by October 1, 1997.[10] Further, it required these providers by April 1, 1998 to forward to designated PSAPs the ANI of the 9-1-1 caller, as well as the location of the cell site or base station receiving the 9-1-1 call. Wireless service providers need to supply the telephone number and location of the caller only if the designated PSAPs request such information, the PSAPs have the equipment and know-how to use the information, and a plan is in place to recover the costs of providing the service.

The second key mandate, referred to as "phase 2," requires wireless service providers by October 1, 2001 to provide the location of a 9-1-1 call by longitude and latitude within a radius of 125 meters in 2/3 of all cases. Again, this is required only if the designated PSAPs have requested the information, have the capabilities to utilize it, and cost-recovery mechanisms are in place.

In response to these mandates, the 1997 Legislature adopted provisions to implement the FCC requirements in Minnesota.[11] The law directed the Department of Administration to plan for the integration of wireless 9-1-1 calls in cooperation with the wireless service providers and PSAPs. Subsequently, the department produced plans for regions inside and outside the Twin Cities area; it will contract with wireless service providers and 9-1-1 telephone service providers with an expectation of beginning the new service April 1, 1998. State-collected fees will pay the costs of wireless providers for installation and recurring costs.[12]

At Issue: Responsibility for Wireless 9-1-1 Calls

In Minnesota, all wireless 9-1-1 calls are currently received by one of 10 State Patrol communications centers operating around the state.[13] Upon the advent of cellular technology, most cellular telephones were connected to vehicles. Thus, it was common around the country to route cellular 9-1-1 calls to the state patrols—those agencies that typically dealt with road emergencies. With the increasing use and reduced consumer costs of cellular communication, however, more and more cellular calls pertain to incidents other than those associated with vehicles and road accidents.

The volume of wireless 9-1-1 calls has grown tremendously. In the Twin Cities area alone, the number has jumped from an average 100 calls per

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9 *47 CFR* sec. 20.18 (October 1, 1996).

10 This date was subsequently postponed to November 30, 1997 to resolve issues over processing wireless 9-1-1 calls from uninitialized, or deactivated, cellular phones.

11 *Minn. Stat.* §403.08, subd. 7.

12 *Minn. Stat.* §403.11, subd. 2 (b).

13 The 10 centers are located in: Brainerd, Detroit Lakes, Duluth, Mankato, Marshall, Rochester, Roseville, St. Cloud, Thief River Falls, and Virginia.

month to the metropolitan district of the State Patrol in 1985 to over 20,000 per month, and up to 30,000 in busy months, in 1997.[14] According to our survey, the State Patrol received more than 804,000 wireless 9-1-1 calls statewide in 1996.[15]

Not all of the wireless 9-1-1 calls received by the State Patrol require a response by state troopers; some are for incidents over which local governments have jurisdiction. Depending on the month, the percent of wireless 9-1-1 calls coming into the metro communications center that required a response by the State Patrol varied between 55 and 65 percent; around the rest of the state, the percentage averaged closer to 70 percent.[16] State Patrol dispatchers transfer the remaining calls to local PSAPs, as warranted.

In recent years, some PSAPs have stated their desire to receive wireless 9-1-1 calls directly, instead of via transfers from the State Patrol communications centers. When the Legislature passed laws in 1997 to implement the FCC wireless requirements, it also established a process for allocating the responsibility to receive wireless 9-1-1 calls.[17] The law requires members from each county's 9-1-1 planning committee to deliberate with representatives from their respective State Patrol district to determine the appropriate answering point for wireless calls. These discussions have been stalled in some instances because certain wireless carriers have not made available the data on cell site locations and coverage needed to make the determination.

If the parties cannot reach agreement by April 1, 1998 in the Twin Cities area, and by June 1, 1998 elsewhere, the matter is to be resolved by outside committees whose members are determined by statute. Decisions made by these committees are due by December 31, 1998 and will be considered final.[18]

Discussions over the responsibility for wireless 9-1-1 calls have sparked controversies. Because the volume of wireless calls and share transferred vary considerably, the conviction to convey responsibility for these calls from the State Patrol to local PSAPs also varies. Ideally, agencies with public safety jurisdiction over the areas in which wireless calls originate would receive those particular 9-1-1 calls. That would prevent the need to transfer an inordinate number of 9-1-1 calls to other agencies for dispatching, thereby avoiding the possibility of lost or misdirected calls and saving valuable time that can be crucial to injured victims or in the apprehension of criminals.

While we did not conduct research to determine which entity should be responsible for wireless 9-1-1 calls for each area of the state, it is possible that the appropriate agency for these calls will vary from area to area. Depending on the circumstances of the calls, it may be appropriate either that the State Patrol continue to receive wireless calls in areas where the majority of calls require a State Patrol response or that local PSAPs receive these calls if the calls predominantly concern units dispatched by that PSAP. For instance, on roads where the State Patrol is beginning to coordinate with the Minnesota Department of Transportation's Traffic Management Services for better overall control of traffic flow and accident responses, the State Patrol may be the more appropriate recipient of wireless

PSAPs are negotiating with State Patrol districts over responsibility for wireless 9-1-1 calls.

14 Richardson, Richter & Associates, Inc., for Minnesota Department of Transportation, *Shared Traffic Management and Dispatch Environment Initial System Concept and System Requirements* (St. Paul, July 1997), 3; and "CAD 911: First Call for Help," *Orion Oracle,* no. 2 (Summer 1997): 3.

15 The actual number is somewhat higher because some of the districts reported only those calls for which an ICR was generated.

16 Richardson, et al., *Shared Traffic Management and Dispatch Environment,* 3-4.

17 *Minn. Stat.* §403.13, subd. 1.

18 *Ibid.*

9-1-1 calls.[19] Conversely, in areas where most of the incoming calls are already being transferred to local PSAPs, the local jurisdiction may be the appropriate recipient.

In practice, it is difficult to collect the information necessary to make this determination. The selective routing capabilities, by which a wireless telephone company's equipment automatically sends 9-1-1 calls to the most appropriate PSAPs, are not in place statewide.[20] Only after selective routing technology is in place will PSAPs have the information that describes the number of wireless 9-1-1 calls originating in specific cells, what percent have to be transferred, and to where.

Even with selective routing information, the jurisdictions of many public safety agencies overlap or are immediately adjacent to others, creating conflicts over which agency is the appropriate one to receive the call. As is true for emergency calls via land lines, for some incidents reported by wireless telephones, agencies from multiple jurisdictions may need to be involved, requiring the active participation of more than one communications center. Other complications occur in situations where the cell sector is changing because the caller is traveling from one tower's cell site to another, and the PSAP initially receiving the call may not be the appropriate dispatching center.

The fluid nature of the wireless industry adds another layer of complexity. Wireless companies may change their antennae or add additional antennae and towers that could change cell sectors and affect where a 9-1-1 call is received. As a result, the pattern of call origin locations is a dynamic one that is subject to change quickly.

In addition to the unresolved questions over jurisdiction, decisions to process wireless 9-1-1 calls through local PSAPs may alter these PSAPs' operations or affect their costs. To adequately prepare for wireless 9-1-1 calls, local PSAPs will have to plan how the influx of wireless calls will affect their number of 9-1-1 trunks, standard operating procedures, protocols, and even staffing levels (if the volume of wireless calls is large). PSAPs also have to consider the training needed to educate dispatchers about processing wireless 9-1-1 calls.

Despite the data limitations discussed above, in our view some of the key factors for determining the responsibility for wireless 9-1-1 calls appear to be: (1) the share of calls that originate in areas where the State Patrol has jurisdiction versus areas where local PSAPs have primary jurisdiction (including where "first responder" responsibility lies), (2) the extent to which current 9-1-1 wireless calls are being transferred to local PSAPs, and (3) the operational and financial capabilities of the local PSAP to handle wireless calls. If the wireless 9-1-1 responsibility shifts, the Legislature may wish to consider reevaluating the financing of these calls.

FINANCING 9-1-1 SERVICE

Financing 9-1-1 emergency communications in Minnesota has been a shared responsibility between the state and local governments. Historically, local governments have been responsible for the substantial costs of installing 9-1-1, purchasing or leasing new or replacement 9-1-1 equipment, developing local databases, maintaining the public safety communications centers, and paying the salaries of employees who work there.

Minnesota collects telephone user fees to finance part of 9-1-1 costs.

By contrast, the state has paid for modifying the switching equipment needed to recognize the digits "9-1-1" as the emergency number and for the recurring charges incurred by telephone companies for their 9-1-1 services and databases of subscribers' names,

19 Efforts to better coordinate traffic management have occurred primarily for certain Twin Cities area roads but are expected to expand to improve traffic management on roads in the Duluth, Mankato, and Rochester areas.

20 Jim Beutelspacher, Department of Administration, *Plan for Integrating Cellular 9-1-1 Service Into the Enhanced 9-1-1 Networks in Greater Minnesota* (St. Paul, December 1, 1997), 7-8, 21; and Jim Beutelspacher, Department of Administration, *Plan for Integrating Cellular 9-1-1 Service Into the Enhanced 9-1-1 Network in the Metropolitan Area* (St. Paul, October 1, 1997), 5, 13.

telephone numbers, and addresses. Until 1987, the state's share came from biennial legislative appropriations out of the state's General Fund. More recently, Minnesota has expanded its role in financing 9-1-1, with telephone user fees.

Most other states use telephone user fees assessed by either local or state governments to finance 9-1-1 services. In 26 states, local governments have authority to set fees on telephone subscribers; the states do not assess a statewide user fee.[21] Another 10 states, including Minnesota, collect telephone user fees statewide. In these states, local governments are expected to finance some of the 9-1-1 expenses but they do not have authority to impose telephone user fees to do so. Six states have a combination of state and local telephone user fees. The remaining 8 states use a variety of mechanisms, including taxes and telephone company subsidies, to finance 9-1-1 services.

In the 16 states with a state-collected telephone user fee, there is considerable variation in the type of fee, the share of 9-1-1 system expenses paid by the state, and the types of equipment, services, and personnel paid for with state funds. For example, some states assess the fee only on intrastate long distance telephone use. Some reimburse telephone companies for administrative expenses incurred for collecting the user fee. Those with predetermined user surcharges range from fees of 1 cent to $1.50 per telephone line. States pay for different functions; for instance, some states pay for equipment used in the local communications centers, others (like Minnesota) pay for only some of that equipment, and still other states pay for none.

Twenty states, including Minnesota, have implemented methods to finance wireless 9-1-1 services.[22] Most of these impose a monthly fee on customers of wireless services.

Original 9-1-1 User Fee in Minnesota

Prompted by local concerns about the reliability of General Fund appropriations to finance the state share of 9-1-1 costs over time, the Minnesota Legislature approved in the mid-1980s a uniform telephone user fee to finance the state's share of 9-1-1 costs.[23] The fee was set in law at a minimum of 8 cents and maximum of 30 cents per month for each telephone line; it now stands at 12 cents.[24] Telephone companies typically itemize the fee on their customers' monthly bills, collect the revenues, and forward them to the state.

Revenues from the emergency telephone fee have been used primarily to pay recurring 9-1-1 system costs and the Department of Administration's administrative and staff costs for managing the 9-1-1 program. A 1994 law change allowed the department to use excess revenues to offer improvement grants to counties in need of either (1) providing 9-1-1 access to the remaining residents without the service or (2) upgrading to enhanced 9-1-1.[25] Beginning in 1995, up to four cents of the emergency telephone fee can be used for qualifying costs incurred by the Metropolitan Radio Board.[26] (Figure 1.6 illustrates expenditures from the emergency telephone user fee.)

Until 1995, cellular telephone customers did not pay the emergency telephone user fee. A 1994 law, however, extended the fee to include any user of communications carriers from whose service a 9-1-1 call could originate; this included cellular

21 Department of Administration, Telecommunications Division, *Minnesota 9-1-1 Program,* January 5, 1998, WWW document, URL http://www.state.mn.us/ebranch/admin/intertech/services/svnc91.html, (January 19, 1998).

22 "Ten States Pass Legislation to Pay for Wireless Enhanced 9-1-1," *NENA News* 15, no. 4 (December 1997): 14-16.

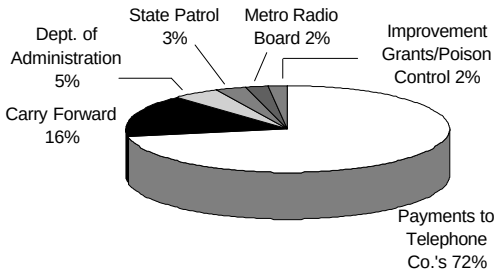
23 *Minn. Laws* (1Sp1985), ch. 13, sec. 330; *Minn. Laws* (1987), ch. 404, sec. 174.

24 Initially, the fee was 18 cents; the state lowered it to 14 cents in 1993, and 12 cents in 1995, due to 1) increases in the number of telephone customers, 2) the 1995 addition of cellular phone users to the user-fee base, and 3) an earlier accounting change in the calculation of the U.S. West telephone company's tariff for 9-1-1 services.

25 *Minn. Laws* (1994), ch. 634, sec. 22.

26 The Metropolitan Radio Board was created in 1995, with local elected officials as members, to oversee the development of a metropolitan public safety radio communications system. See *Minn. Laws* (1995), ch. 195, art. 1, sec. 3-4, 11.

Figure 1.6: Expenditures from 12-Cent Telephone User Fee, FY1997



SOURCE: Department of Administration, *911 Emergency Summary of Receipts and Expenditures,* FY1997.

telephone users.[27] A year later, the state slightly changed how revenues from these fees would be used. To defray part of the State Patrol's cost for processing wireless 9-1-1 calls, the 1995 Legislature reserved for the Department of Public Safety two cents per month of the user fee paid by wireless telephone subscribers.[28]

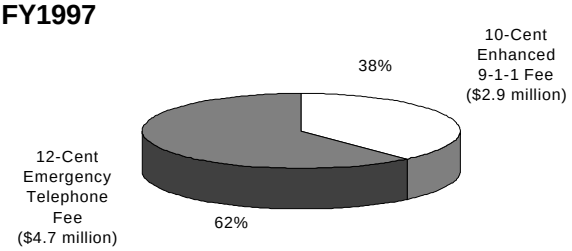
Enhanced 9-1-1 Fee

Action by the 1994 Legislature not only extended the original emergency telephone fee to users of wireless communications, but also established an additional 10-cent fee per telephone line exclusively for the purpose of financing enhanced 9-1-1 service at local PSAPs.[29] Although cellular customers were originally excluded from this new fee, a 1997 law removed this exclusion.[30] Wireless customers now pay the same emergency telephone fees that other telephone users pay: 22 cents per month, 12 cents of which is the original emergency telephone user fee and 10 cents of which is the enhanced 9-1-1 fee. (Figure 1.7 shows revenues collected from the two 9-1-1 user fees.)

This newer 10-cent fee represents a substantial state incentive to help local governments implement enhanced 9-1-1 services statewide. PSAPs have received nearly $9 million in enhanced 9-1-1 revenue between 1995 and 1997.[31]

Local PSAPs may use the enhanced 9-1-1 revenues to implement and maintain their enhanced 9-1-1 services—something not typically possible with revenues from the original 9-1-1 user fee. Statutes allow local governments to use these revenues for, among other things, purchasing or leasing telephone equipment; radio equipment; computers and

Figure 1.7: Telephone User Fee Receipts, FY1997



NOTE: Wireless customers began paying the 10-cent enhanced fee in 1997 and now pay the same fees as other telephone users.

SOURCE: Department of Administration, *Enhanced 911 Emergency and 911 Emergency Summary of Receipts and Expenditures,* FY1997.

27 *Minn. Laws* (1994), ch. 616, sec. 7.

28 *Minn. Laws* (1995), ch. 265, art. 2, sec. 29.

29 *Minn. Laws* (1994), ch. 616, sec. 7, 9-10.

30 *Minn. Laws* (1997), ch. 202, sec. 22.

31 Minnesota 9-1-1 Program, Department of Administration, *E-911 Payments Made in Calendar Year-Report as of December 97* (St. Paul, 1998). The enhanced 9-1-1 revenues are distributed in the following manner: One-half goes in equal amounts to all counties, the 10 State Patrol districts, and three PSAPs that serve, respectively, the Minneapolis/St. Paul International Airport, the University of Minnesota Police Department, and the Red Lake Indian Reservation in Beltrami County. The second half is distributed to counties and cities with PSAPs on a per capita basis based on their share of the total population served.

software for databases, automatic location identification, or local location identification; and dispatcher training.[32] Local governments that have not implemented enhanced 9-1-1 by the end of 1998 will become ineligible for these revenues, as mentioned earlier in this chapter.

LOCAL GOVERNMENT STRUCTURE FOR PROVIDING 9-1-1 SERVICE

The provision of 9-1-1 public safety dispatching occurs primarily, although not exclusively, at the county level of government. Currently, 78 out of 87 counties operate a single PSAP that receives 9-1-1 and other public safety calls. One county, St. Louis, operates two communications centers in different parts of the county.

In the remaining 8 counties, the county operates 1 public safety answering point and at least 1 other unit of local government operates a separate PSAP, for a total of 112 PSAPs statewide. Four counties with multiple PSAPs are within the Twin Cities area and four are outside. (Figure 1.8 lists the counties containing multiple PSAPs.)

Figure 1.8: Counties with Multiple PSAPs, 1997

County	Additional PSAPs
Beltrami	Red Lake Indian Reservation
Dakota	Apple Valley, Burnsville, Eagan, Lakeville, and West St. Paul
Hennepin	Bloomington, Brooklyn Center, Eden Prairie, Edina, Hopkins, Minneapolis, Minneapolis-St. Paul International Airport, Minnetonka, Richfield, St. Louis Park, and University of Minnesota Police Department
Le Sueur	Le Sueur
McLeod	Hutchinson
Ramsey	Maplewood, St. Paul, and White Bear Lake
Rice	Northfield
Washington	Cottage Grove

Metropolitan 9-1-1 Board

The structure of 9-1-1 services in the Twin Cities area includes the Metropolitan 9-1-1 Board, a joint powers board approved by all seven counties. The Metropolitan 9-1-1 Board's purpose has been to plan and implement a 9-1-1 system that would transcend the numerous different service area boundaries between telephone exchanges and units of government in the region. On behalf of the seven counties, the Metropolitan 9-1-1 Board performs many functions including:

- monitoring the operation of the 9-1-1 system,
- identifying malfunctions in the system and having them corrected,
- seeking technological advances to improve 9-1-1 reliability and efficiency,
- acting as a liaison between the counties and telephone companies regarding matters of 9-1-1 system design, tariffs, and databases,
- contracting with U. S. West and the state of Minnesota for developing and paying for the 9-1-1 system installation and recurring costs,
- managing 9-1-1 public education efforts,
- developing standards for 9-1-1 services, and
- coordinating programs and addressing concerns related to 9-1-1 systems and emergency medical services.[33]

32 Minn. Stat. §403.113, subd. 1, 3. The statute also specifically prohibits spending enhanced 9-1-1 fee revenues on certain items, such as remodeling a communications center, purchasing emergency vehicles, or installing addressing signs.

33 Metropolitan 9-1-1 Board, *Joint Powers Agreement for Metropolitan 9-1-1 Board* , 1996-97 (St. Paul), 2, 4-7; and "Board Policies," Memorandum to Metropolitan 9-1-1 Board Executive Committee (St. Paul, January 7, 1998), 1-2.

The joint powers board concept allows one authority to represent the common interests of the members in implementing a regional 9-1-1 system while it retains the ability of individual counties to plan for their public safety and 9-1-1 services as best meets their own needs.

PSAP Support Functions

The Metropolitan 9-1-1 Board also reduces redundancy in the critical support functions among the PSAPs. These functions include conducting transactions with telephone companies concerning trunks, routers, and other technical elements of 9-1-1 service, and constructing and maintaining a master street address guide that defines the geographic service area and lists ranges of address numbers for all streets in each community. Without the board, each of the 27 PSAPs in the region would have to provide these functions individually. Outside of the Twin Cities area, where similar joint powers boards do not exist, each of the counties and individual PSAPs must deal with these same concerns on its own.

Changes in the Number of Public Safety Answering Points

Over time the number of PSAPs in Minnesota has decreased as local governments have consolidated their public safety communications centers. Many county sheriffs' offices, for instance, have combined their dispatching operations over the years with those of a local police department in the county. The Law Enforcement Center in Olmsted County, where the Rochester Police Department manages dispatching for the sheriff, police, and Rochester Fire Department, is an example.

In addition, several cities that in the past operated their own PSAP have since changed to using other nearby PSAPs. For instance, in 1994 South St. Paul began contracting for dispatching services with its western neighbor West St. Paul. West St. Paul now processes all 9-1-1 calls for both cities (as well as for Mendota Heights) and also receives public safety calls coming in on seven-digit lines after regular business hours.[34]

At least three other consolidations now in various stages of planning will likely further lower the number of PSAPs in Minnesota. By the end of 1998, the counties of Steele and Rice, along with the cities of Northfield, Faribault, and Owatonna, are scheduled to begin operating a joint dispatch center. Instead of three PSAPs (in Steele County, Rice County, and Northfield), one center will dispatch for all areas within the two counties, making this the first multiple-county dispatching operation in Minnesota.[35] In nearby Le Sueur County, the city of Le Sueur, which currently operates its own dispatch center, will cease operations and merge with the county PSAP located in Le Center. Hutchinson is currently studying the feasibility of merging PSAPs with McLeod County.

Three additional PSAP consolidations are in progress or under study.

Should all these mergers occur, the number of counties where 9-1-1 dispatching is done in a decentralized fashion instead of in a single countywide PSAP will be reduced to five: Beltrami, Dakota, Hennepin, Ramsey, and Washington.

At Issue: Cost and Service Quality in Counties with Multiple PSAPs

In Minnesota, overall costs for 9-1-1 service in counties with multiple PSAPs will be higher than other counties simply because of duplication in dispatching equipment, facilities, administrative costs, and personnel. At the same time, residents who pay more may be getting more for their money.

We compared the effectiveness and efficiency of cities operating their own public safety answering

34 Other recent changes include Golden Valley and New Hope contracting for 9-1-1 services with St. Louis Park, and the cities of Crystal, Chatfield, Robbinsdale, and Zumbrota receiving services through their respective counties.

35 Discussions on the feasibility of a multiple-county public safety answering point have been underway in South Central Economic Development Region 9, containing the counties of Blue Earth, Faribault, Le Sueur, Martin, Sibley, Waseca, and Watonwan. No agreement on plans for such a merger, however, has been reached.

points with that of their counties' PSAPs. We looked at several dozen measures of quality service, such as average time to answer a call, completeness of telephone equipment, availability of a backup facility, and access to quality emergency medical dispatching. (Appendix B lists the measures of effectiveness and efficiency that we used in this review.) We found that:

- **In some cases, the city-operated PSAP offered higher quality or more services in 1996 than the PSAP run by the county in which the city was located. In other cases, however, the effectiveness and efficiency of the county PSAP was equivalent to or better than that of the city-operated PSAPs located in the county.**

In cases where the city-operated PSAP offered higher quality, the elected officials may have decided that the value of the additional service warrants the expense. In essence, they have decided to have residents pay more because the service is better than what they would otherwise have received.

On the other hand, in the counties where a city-operated PSAP did not measure up to the level of service provided by the county, there may be incentives for discontinuing separate operations. Although consolidation may not be presumed to automatically improve service and lower costs in every case, it may be in the cities' best interests to assess whether continuing to operate their own PSAPs provides the best service to their residents for the dollars spent. The effectiveness and efficiency of service may be better through a different PSAP operated by another city or the county.

Factors Affecting the Future Structure of Public Safety Answering Points

Improved service, upgraded technology and equipment, reductions in redundant functions, and cost savings are often the key motivations behind merging PSAPs. In some areas, improving the level of service (for instance, adding a records management system) or purchasing advanced equipment (such as computer-aided dispatching hardware and software) would not be financially feasible without several units of government agreeing to share the costs.

Evolving telecommunications technology will also continue to affect the structure and operations of PSAPs. As the use of wireless telephones continues to expand in popularity and scope, the public safety community is adapting by changing the equipment used to route 9-1-1 calls and altering the structure of who is responsible for answering those calls. Another force likely to drive changes in the operation and structure of PSAPs is the proposed 800 megahertz (MHz) digital, trunked radio system, for which a contract to build is currently under negotiation in the Twin Cities area.

At Issue: Effect of the Regionwide Digital Trunked Radio System

State and local agencies are in the planning stages of building a digital, trunked public safety radio system, initially in the Twin Cities area, and potentially in other areas of the state.[36] The purpose is to ultimately serve all the public sector radio communications needs in the region. This includes public safety and public works agencies, among others. The intent of the system is to create sufficient capacity to relieve the congested radio channels that can at times prevent effective communication within and between agencies. It is also proposed to allow interagency radio communications and take advantage of the FCC-influenced move toward equipment that operates on the more efficient narrowband radio waves. To accomplish this, the system would integrate radio communications into a single network, replacing numerous stand-alone radio systems that local, regional, and state agencies currently operate. According to our survey,

- **35 percent of the PSAPs in the Twin Cities area had insufficient radio frequencies to meet their communications needs.**

36 A trunked radio system uses computers to efficiently assign and reassign open radio channels to various "talk groups" as users begin and end communications, with the effect of greatly expanding the capacity of the system through better utilization of available radio frequencies.

Participation in the digital, regionwide trunked radio system, however, is not required. Local governments have the option to continue with their existing radio system, upgrade their own system, or join the regionwide system.[37] Counties (and the cities of Minneapolis and St. Paul) have been directed by law to prepare plans for their radio needs, including the needs of cities and townships, and submit these plans to the Metropolitan Radio Board, created in 1995 to oversee the design of the regionwide system.[38]

Hennepin County, Carver County, and Minneapolis have opted to continue participating in the planning for the regionwide radio network. Anoka County plans to migrate to the regionwide system some time after 2002, when most radios now in use would reach the end of their useful life. Dakota County has delayed its decision to participate in the regionwide system to take advantage of the expected life cycles of its existing equipment and the possibility of lower equipment costs in the future as technology improves and competition lowers costs. Ramsey County decided against joining the regionwide system for the time being but wants to reserve that option for the future; St. Paul is expected to concur. Washington County has also opted to delay participating in the regionwide system. Further, in the absence of state financial assistance to encourage local participation in the regionwide system, Washington County wants to pursue a preliminary design of its own trunked radio network and seek licensing for additional radio capacity within the county.[39]

While we make no judgment on the proposed digital, trunked regionwide radio system itself because it is beyond the scope of this report, we recognize that it will affect PSAPs and could change their structure. As counties and municipalities consider their alternatives to the trunked regionwide network, they may realize increased efficiencies from working together on consolidating dispatching operations and radio channel allocations. Other possible options are joint equipment purchasing or cooperative planning with nearby jurisdictions in designing replacement communications systems.

A bill pending before the 1998 Legislature would allocate state matching grants to help local governments join the regionwide system. The grants would be distributed in part on the extent to which recipients share equipment or personnel for dispatching.[40]

A pending Twin Cities area public safety digital radio system could affect PSAPs' structure.

Costs of joining the trunked regional radio network may drive local governments in the Twin Cities area to instead compare the effectiveness and efficiency of their current communications arrangements with the option of consolidating some or all of the existing PSAPs. If consolidation is feasible, it may occur in lieu of joining the proposed regionwide trunked radio system, or to reduce and share the costs of participating in the system. Opting out of the regionwide system means agencies would need some other process for interagency communications.

Some of the questions that counties and PSAPs should ask when considering their options include: (1) As the existing radio equipment and dispatch consoles reach the end of their expected life cycles, what are the costs and benefits of replacing equipment in all of the centers versus in some of them? (2) What is the feasibility of continuing to operate separate PSAPs but jointly purchasing radio infrastructure to create talk groups among adjacent PSAPs? (3) Would a merger of PSAPs sufficiently reduce the need for separate radio channels so that

37 *Minn. Stat.* §473.905, subd. 1.

38 *Minn. Laws* (1995), sec. 4, subd. 1-7, 13. The Board was also given control over applications to the FCC for 800 MHz radio channels. It is currently negotiating with a vendor on the specific details of the first phase of the system, estimated to cost $28 million for the regional "backbone" of the system, and another $17 million for subsystems planned by Hennepin County, Minneapolis, and Metro Transit. See *Evaluation of Proposal for an 800 MHz Region-Wide Public Safety Trunked Communications System*, by Donald Wicklund, Chairman, Core Evaluation Team, Metropolitan Radio Board (St. Paul, October 29, 1997), 4-8.

39 Scott County has not yet submitted its plans to the Radio Board.

40 *Minn. House* 1998, H.F. no. 3083.

radio channels “turned back” by users of the digital 800 MHz regionwide network provide adequate capacity? If so, could needs for interagency and intercounty communications be met feasibly outside the regionwide radio system? (4) Would consolidating PSAPs make participation in the digital 800 MHz regionwide network more financially feasible?

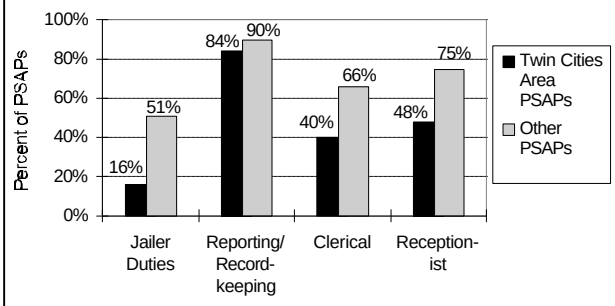
VARIATIONS IN DISPATCHERS' FUNCTIONS AND TRAINING

Although all dispatchers share some common public safety functions, their duties differ from PSAP to PSAP. In addition to fielding calls and communicating with emergency respnse agencies, dispatchers may have record keeping, clerical, receptionist, and jailer duties. For instance, we found that:

- **In about 41 percent of PSAPs, dispatchers performed jailer functions, such as booking and fingerprinting.**

Most of these PSAPs were outside the Twin Cities area. (See Figure 1.9.) Around the state, most dispatchers performed reporting and record keeping duties and many also had clerical and receptionist tasks. These other duties were also more common in PSAPs outside the Twin Cities area.

Figure 1.9: Other Duties Performed by PSAP Dispatchers, 1996



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

Another difference is reflected in how the dispatchers' duties are divided. Most Minnesota PSAPs operate with what is called “one-stage” dispatching. Under one-stage dispatching, one individual receives the incoming call, queries the caller, determines what units should be dispatched, and communicates with the dispatched field units. About 93 percent of PSAPs in the state used one-stage dispatching in 1996, according to our survey.

The remaining 7 percent used “two-stage” dispatching. In this arrangement, the person taking the call queries the caller and collects the necessary information, but another individual dispatches the appropriate response units. One arrangement is not inherently better than another. In certain circumstances, PSAPs have found two-stage dispatching to work more efficiently for them. For instance, all PSAPs with two-stage dispatching in 1996 had a relatively large volume of calls per dispatcher. All had computer-aided dispatch that electronically provides ALI and ANI for the caller on the screens of both the call taker and the dispatcher. None had a dispatcher workload that included official jailer duties. PSAPs using two-stage dispatching were nearly equally divided between the Twin Cities region and elsewhere.

Training for Dispatchers

Persons employed in emergency communications require special skills and knowledge. They have to deal with life and death issues on a regular basis. They must make split-second decisions based on their knowledge of multiple emergency response agencies and their different service area boundaries, emergency medical procedures, and the topographical features in their geographic area. They also need to communicate quickly yet effectively via radio and telephone equipment, stay calm in pressure situations, and be able to perform multiple tasks simultaneously.

Because of the vital nature of dispatchers' jobs, and the communication links they provide with the emergency response agencies, dispatchers are as much a part of effective public safety as law enforcement officers on the street. As a result, it is important that PSAPs hire individuals that can perform the job well and provide training that keeps dispatchers on top of their job.

Dispatcher Training in Minnesota

The demands placed on dispatchers today require employees who have successfully completed extensive training in a number of subject areas. Although we heard from long-time dispatchers who said they had started working years ago after only one or two days of training, all of them said this would be impossible in today's work environment.

Most of the training dispatchers receive is training at the job site, although some off-site classes and curricula are available. Because each PSAP works with different emergency response agencies, has different radio systems, dispatching consoles, and telephone equipment, and has developed its own protocols and procedures for dealing with given incidents, the bulk of the training has to be customized to the individual PSAP.

A certain set of skills and knowledge is necessary for all effective dispatchers. Training is not always easily accomplished in this profession, however, because of scheduling difficulties inherent to covering all shifts 24-hours a day, year round. In addition, the opportunities for dispatcher training are limited in some of the rural areas of the state.

Minnesota does not require minimum skill or training levels for dispatchers. Nonetheless, many national organizations associated with public safety and telecommunications have recognized the value of and need for dispatcher training. In 1996 the Association of Public Safety Communications Officials International, Inc. (APCO), an organization representing the interests of public safety communications, developed a minimum training standard that describes a base amount and content of dispatcher training.[41] As a minimum, APCO recommends eight training "modules" that cover subjects such as: the dispatchers' role on the public safety team; effective listening techniques; radio, telephone, and electronic communication technologies; how to classify the nature and seriousness of calls; and stress management techniques. In addition, APCO recommends that all dispatchers receive this training within the first 12 months of employment.

Minnesota has not set minimum training levels for dispatchers.

We found that:

- **Minnesota PSAPs generally have a strong emphasis on dispatcher training.**

As Table 1.3 illustrates, at least two-thirds of PSAPs in 1996 met or exceeded the APCO

Table 1.3: PSAPs' Training that Met APCO Guidelines, 1996

	PSAPs Statewide	Twin Cities Area PSAPs	Other PSAPs
Technology use (hard wire v. wireless phones, basic v. enhanced 911, recorders, CAD, radios, etc.)	84.1% (*N*=88)	87.5% (*N*=24)	82.8% (*N*=64)
Roles and responsibilities of the PSAPs and dispatchers	81.6 (*N*=87)	79.2 (*N*=24)	82.5 (*N*=63)
Telephone techniques/ call processing	73.9 (*N*=88)	79.2 (*N*=24)	71.9 (*N*=64)
Radio communication protocols, rules, and responder safety	72.7 (*N*=88)	83.3 (*N*=24)	68.8 (*N*=64)
Legal aspects of law enforcement, fire, and EMS agencies	69.0 (*N*=87)	58.3 (*N*=24)	73.0 (*N*=63)
Interpersonal communications including listening skills, processing information, and cultural diversity issues	66.7 (*N*=87)	70.8 (*N*=24)	65.1 (*N*=63)
Call classification by type of call and priority	65.5 (*N*=87)	79.2 (*N*=24)	60.3 (*N*=63)
Stress management	33.7 (*N*=86)	29.2 (*N*=24)	35.5 (*N*=62)

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

41 Association of Public Safety Communications Officials International, Inc.,*National Public Safety Telecommunicator Training Standard* (South Daytona: APCO, 1996), 4-8.

recommended number of training hours for seven out of the eight subject areas. A 1997 survey of local APCO members conducted by the Minnesota APCO chapter revealed similar trends.[42]

Only about 19 percent of PSAPs, however, met the recommended number of hours for initial training in all eight subject areas. Part of the reason may be that dispatcher training in Minnesota is generally paid for by local governments with limited tax bases. Since 1995, however, local governments have been able to spend revenues from the enhanced 9-1-1 fee on enhanced 9-1-1 training.

Dispatcher Skills Advisory Task Force

In 1990 the Legislature created a task force to investigate the issue of statewide standards for appropriate dispatcher skill levels and training needs.[43] Task force participants agreed that dispatchers throughout the state need a minimum amount of knowledge, skill, and ability.[44] They also listed 11 subject areas in which all dispatchers should have at least minimum abilities.

But the task force recommended against mandated dispatcher skill levels unless state funding for training was available. Instead, the task force called for the Legislature to create a "Dispatching Skills Board" to provide state accreditation of training courses and recommended that PSAPs hire only dispatchers who completed an accredited course. It also recommended that the state offer grants to match local government funds spent on improving dispatching skills. These recommendations were not enacted.

Statewide Standards Elsewhere

In contrast to Minnesota, 26 out of the 50 states have developed either mandates or guidelines for minimum dispatcher training, according to our review of state statutes, case law, and conversations with other states' representatives. Nineteen of these states set standards and require dispatchers to receive the training; the remaining seven have developed standards but local government compliance is optional.[45]

We looked at nine states similar to or nearby Minnesota for a comparison of dispatcher training requirements.[46] Four of these nine states, Iowa, Massachusetts, North Dakota, and Oregon, have mandatory training requirements.[47] Washington has voluntary guidelines; local governments choose whether to comply. Michigan has a process underway to establish standards although the proposed legislation does not require specific training hours. The other three states have not established statewide training standards or guidelines.

Of the five states with training requirements or guidelines, the number of minimum training hours ranged from 16 in Massachusetts to 117 in Oregon,

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42 Minnesota APCO Standards Committee, *Survey on Dispatcher Training Programs Results* (St. Louis Park, April 8, 1997), 2.

43 *Minn. Laws* (1990), ch. 490.

44 Minnesota Dispatching Skills Task Force, *Final Report and Recommendations of the Minnesota Dispatching Skills Task Force* (St. Paul, November 14, 1990), 19-20.

45 National Emergency Number Association, *Telecommunicator Standards and Training, National Survey 1996* (Coshocton, Ohio: NENA, June 1996); and Gene Shepard, Iowa Law Enforcement Academy, Telephone interview by author, St. Paul, January 5, 1998; Steve Davidson, Lenexa, Kansas Police Department, Telephone interview by author, St. Paul, January 6, 1998; Peter Ostrowski, State Emergency Telecommunications Board E911 of Massachusetts, Telephone interview by author, St. Paul, January 5, 1998; Nate McClure, Michigan Chapter NENA, Telephone interview by author, St. Paul, January 5, 1998; Pat Peterson, Keith County, Nebraska Emergency Management, Telephone interview by author, St. Paul, January 12, 1998; Richard Robinson, North Dakota State Radio Communications, Telephone interview by author, St. Paul, January 2, 1998; Erik Gabliks, Oregon Public Safety Service Academy, Telephone interview by author, St. Paul, January 7, 1998; and Chris Fischer, Valley, Washington Communications Center, Telephone interview by author, St. Paul, January 5, 1998.

46 The nine states we compared to Minnesota are: Iowa, Kansas, Massachusetts, Michigan, Nebraska, North Dakota, Oregon, Washington, and Wisconsin.

47 Iowa's training mandates have not been implemented because the state did not finance them. Legislation to provide a state funding source is expected to be introduced in 1998. Source: Gene Shepard, Iowa Law Enforcement Academy, Telephone interview by author, St. Paul, January 5, 1998.

with a median of 50 (as compared to the APCO recommended minimum of 40 training hours). The content of the required training varies but both North Dakota and Oregon require subject matter similar to APCO requirements. In three of the five states, Massachusetts, Oregon, and Washington, the state provides revenues to defray or cover the costs of training. In North Dakota local governments pay for their dispatchers' training, and in Iowa the source of financing remains to be settled.

Linking Training to Quality Service Delivery

Among Minnesota public safety answering points, we compared those that met all APCO recommended training standards with those that did not and measured them against several indicators of high quality communications centers. The indicators included items such as whether the PSAPs used standard operating procedures, offered stress management methods, had an efficient ratio of expenditures per call, and customized training to best meet individual needs. We found that:

- **PSAPs that met or exceeded all APCO training standards were more likely than others to have numerous other characteristics of effective and efficient dispatching operations.**

This relationship between training and other indicators of quality dispatching reinforces the need for PSAPs to focus on comprehensive and ongoing training for dispatchers as an important component of effective service.

At Issue: Prohibiting Dispatchers from Initiating Work Stoppages

In past years, some representatives of the public safety community in the state have argued that because dispatchers need to be highly trained professionals and deal with increasingly sophisticated technological communications systems, state law should proscribe dispatcher strikes. Under the state's Public Employment Labor Relations Act, employees such as police and fire fighters are designated as "essential employees," meaning they may not legally strike or conduct other work stoppages.[48] State statutes require essential employees to submit matters to binding arbitration when they reach an impasse in resolving differences with management over employment terms or conditions.[49] A measure to designate dispatchers as essential employees was debated during the 1997 Legislature; although the Senate passed the bill, the House of Representatives sent it back to committee. The 1998 Legislature is reconsidering the same bill.

Comprehensive training for dispatchers is an important component of effective PSAP service.

Proponents believe that designating dispatchers as "essential employees" would recognize the true value of dispatchers' role in maintaining public safety, and ensure dispatch communications centers are staffed at all times with qualified personnel regardless of the status of labor negotiations. They are concerned that a strike by dispatchers could endanger public safety. Personnel who would not necessarily have the proper training would likely have to operate the communications center and try to assume all the duties of dispatchers during a strike. Further, strikes could last for a protracted amount of time and PSAPs may find it difficult to cover all shifts with an adequate number of replacements.

On the other hand, opponents are concerned with the impact that higher compensation would impose on local government budgets should the designation result in raising lower dispatcher salaries to the level of higher-paid dispatchers. They argue against the use of binding arbitration because of its expense and its use of third party arbitrators unfamiliar with either dispatching or local government administration; the inflexibility of arbitration prevents arbitrators from offering compromise solutions to the parties' final offers. Some oppose the concept of designating employees

48 Minn. Stat. §179A.18, subd. 1.

49 Minn. Stat. §179A.16, subd. 2.

as essential because of their support for employees' right to strike. Opponents have also said that local governments' strike preparation plans help prepare a PSAP by determining in advance which personnel would cover for dispatchers in the event of a strike.

For this review, we were interested in knowing whether the designation of dispatchers as essential employees is linked to quality dispatching. Because data that measure the quality of other states' PSAPs are not available, we could not directly compare dispatching effectiveness in states that allow dispatchers to strike with states that do not. Instead, we looked at the same nine states we reviewed for minimum training standards to see whether there was a connection between dispatcher training, as a proxy for quality dispatching service, and employees' opportunity to strike. Comparing these states we found mixed results.

- **Among the nine states we reviewed, we did not find a clear association between prohibiting dispatchers from striking and either (1) setting mandatory training standards or (2) requiring a high number of training hours.**

Three of the states with mandatory dispatcher training standards, and two without required standards, prohibit dispatchers from striking. One state with mandatory training standards, and three without, allow dispatchers to strike. The state with the highest number of required training hours prohibits dispatchers from striking, but so do states with no required training hours.

We would have preferred to analyze directly whether measurable indicators of quality dispatching can be associated with a proscription against dispatcher strikes. Because of the lack of data, this was not possible. We were limited to using training standards as a proxy for quality dispatching. Further, our study analyzed a limited number of states. Acknowledging these caveats, our research did not reveal a link between designating dispatchers as essential and quality dispatching service as measured by required training.

Throughout our study, though, we uncovered strong support for high levels of dispatcher training from the public safety community and from our own analysis. We conclude that:

- **Regardless of whether Minnesota dispatchers become essential employees, high quality dispatching requires ongoing and comprehensive training.**

Adequate training is paramount to successful dispatching. Employees inadequately prepared for the job will be of little benefit to the PSAP whether or not dispatchers retain the right to strike.

SUMMARY

This chapter describes 9-1-1 public safety dispatching in Minnesota. State statutes require counties to operate public safety answering points year-round to receive 9-1-1 and other calls and mobilize emergency response agencies, as needed. Minnesota is one of a handful of states with 9-1-1 service available statewide.

Because counties had to construct their 9-1-1 systems with local funds, the type of equipment available for 9-1-1 dispatching varies around the state. About a third of counties have fully enhanced 9-1-1 service, a third have local location identification features, 13 percent have automatic number identification features, and 21 percent have basic 9-1-1 service.

Services provided by PSAPs vary among counties. Some handle many more public safety calls than others. Some offer emergency medical dispatching and others do not.

Calls to 9-1-1 on wireless telephones currently go to the 10 State Patrol communications centers located around Minnesota. Responsibility for wireless 9-1-1 calls, however, is under review as some local PSAPs would prefer to receive these calls. A reasonable guideline for determining responsibility for wireless 9-1-1 calls may depend on where the calls originate, what percentages of calls are being transferred to local PSAPs, and what local governments can afford.

Both the state and local governments share in financing 9-1-1 services. The state collects

telephone user fees to pay (1) administrative costs for overseeing 9-1-1 development, (2) recurring charges to telephone companies for 9-1-1 service, and (3) development of enhanced 9-1-1 around the state.

Local governments have paid for installing 9-1-1 equipment, developing databases of telephone users and their locations, and operating and maintaining PSAPs. Recently, local governments have begun receiving state money for enhanced 9-1-1 service, including dispatcher training.

Minnesota has 112 PSAPs: one operated by each of 86 counties or joint law enforcement centers, two operated by St. Louis County, and 24 operated by cities or other local government units. The number of PSAPs has decreased as some public safety answering points have merged. Certain factors, such as the desire to take advantage of evolving communications technology and the expense of those technologies, have spurred mergers and are likely to continue to do so.

Around Minnesota, dispatchers have somewhat different functions. Some counties employ dispatchers to also perform jailer duties, for example. Although Minnesota PSAPs generally have a strong emphasis on training, not all have the same training requirements and dispatchers are trained at different levels.

Comprehensive and ongoing training for dispatchers is recognized as critical for effective dispatching. Although the lack of data prevented us from directly analyzing possible connections between quality dispatching and dispatchers' option to strike, we found no apparent link in a limited number of other states between high levels of training, as a proxy for effective dispatching, and prohibiting dispatchers from striking.

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.**

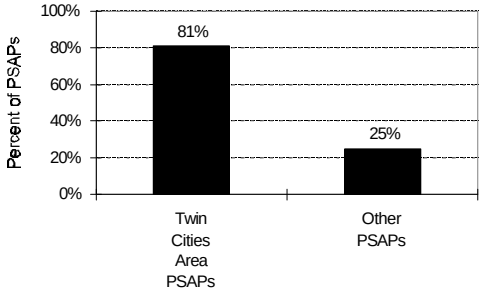
All functions of dispatching should be standardized: receiving and processing calls, obtaining information from callers, identifying and dispatching appropriate and available resources, communicating with response units, coordinating with other public safety agencies, resolving complaints and grievances, 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.

For more information contact:

Gary Kollman
Director of Communications
Ramsey County Sheriff's Communications
612/481-1318

or

Shari Hughes
Assistant Director of Communications
Ramsey County Sheriff's Communications
612/490-4514

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:

John Tonding
PSAP Manager
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.

For more information contact:

Diane Lind
Communications Supervisor
Burnsville Police Communications
612/895-4600

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

Rhonda Waltz
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.

For more information contact:

Colleen Johnson
Acting Director of Communications
Scott County Sheriff's Department
612/496-8291

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 Sy stems* (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.

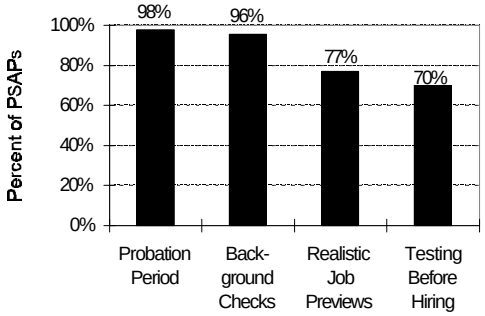
Testing applicants before hiring them helps PSAPs determine whether applicants have the requisite skills. Aptitude tests provide a standardized measure of applicants' aptitude for various verbal and performance-related abilities, such as keyboard skills. "Multi-tasking" tests measure the ability of applicants 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 generat e ICRs in others.

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

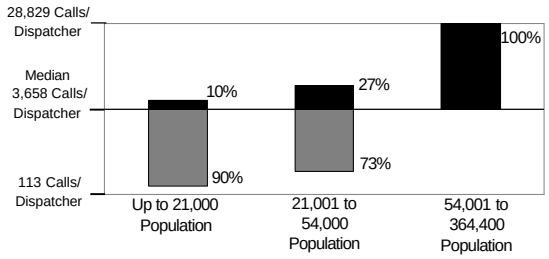
34 Holt, *Emergency Communications Management,* 42-48.

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.

For more information contact:

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Moorhead Police Department/Clay County Law Enforcement Center
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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.**

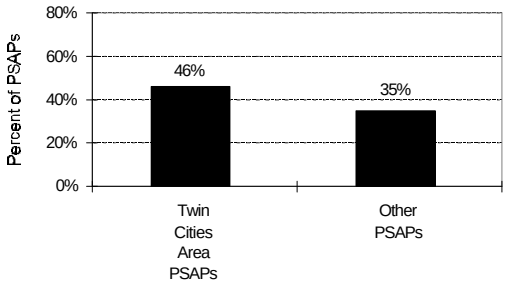
This high percentage may be due to differences in types of uninterruptable power supplies at PSAPs. For instance, some PSAPs may have uninterruptable power supplies solely for their telephone system while others may have a system sufficient to run all console equipment throughout the communications center. 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 Answering 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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Countywide Addressing

Renville County

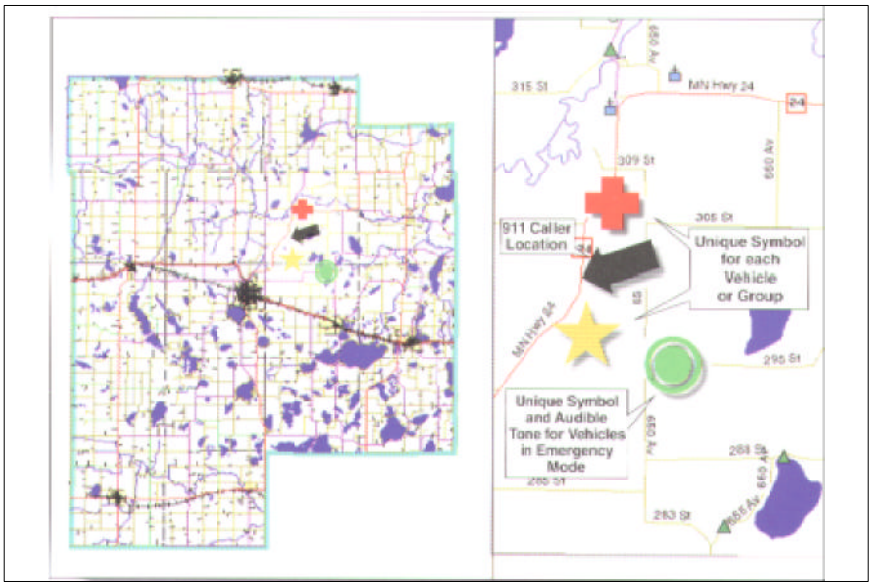
The Renville County PSAP, serving 17,600 residents, recently completed a project to assign addresses within all areas of the county. Before this project, about 25 percent of the county had only rural routes and did not have locatable addresses, which can hinder a public safety response. By June 1998, 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

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 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.

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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.

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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.

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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:

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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:

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Sheriff

or

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Mahnomen County
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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.

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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.

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Cottonwood County
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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

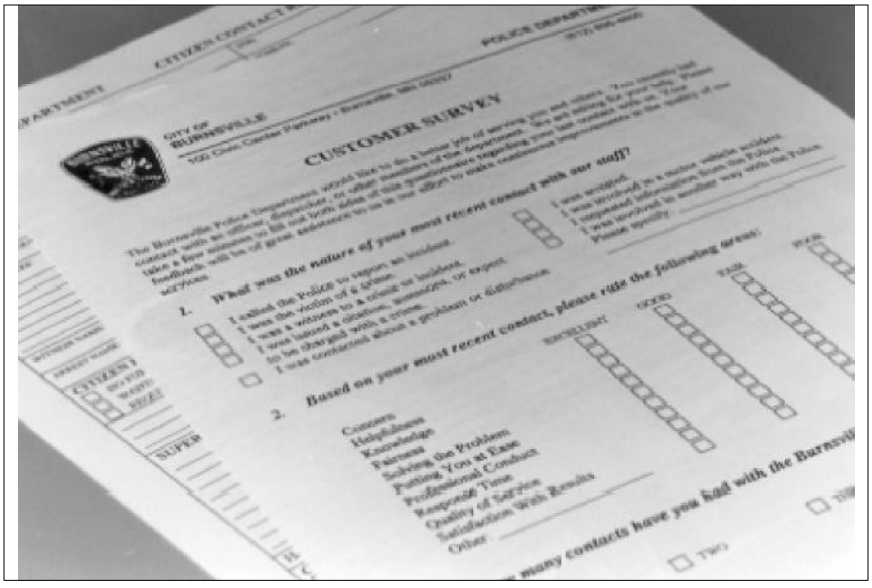
Cities of Burnsville and Hopkins

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.


CUSTOMER SURVEY

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.

Study Methodology

APPENDIX A

This appendix explains the process we followed to conduct the review of best practices in 9-1-1 dispatching. It lists the steps we took and also describes assistance we received from local government representatives and others involved with 9-1-1 dispatching.

GATHERING BACKGROUND INFORMATION

In conducting this review we collected information from a variety of sources. We began with a literature review of materials pertinent to public safety dispatching and 9-1-1 emergency number systems. Next we invited public safety answering point (PSAP) administrators, law enforcement officers, county and city officials, legislators, and others interested in 9-1-1 dispatching to a roundtable discussion in midsummer 1997. At this roundtable, 49 participants had an opportunity to present their perspectives on issues they believed the review should address. We also spent time in the summer and early fall observing dispatchers at work, speaking with PSAP administrators, and interviewing emergency response agencies and state officials involved with the topic.

TECHNICAL ADVISORY PANEL

Throughout the review we relied on feedback from a technical advisory panel. The panel's primary purpose was to offer our study the perspectives of 9-1-1 dispatching professionals. Panel members were practitioners in the field, either employed in the administration or operation of PSAPs or involved in issues affecting public safety dispatching and 9-1-1 service. Some members volunteered to serve following their participation in the summer roundtable discussion and others were recruited to assemble a panel representative of various regions of the state. We met with the panel four times, including one meeting in February 1998 to review a preliminary draft version of this report.

We are grateful for the help and advice of the panelists who gave us their comments and reactions during the review. The Legislative Auditor's Office remains responsible for the content of this report; panel members may or may not agree with the conclusions and recommendations of our study. The technical panel members were:

Jim Beutelspacher
9-1-1 Program Product Manager, Department of Administration

Ron Bolin
State Patrol Communications Coordinator

Tim Butler
St. Paul Fire Communications Chief

John Dejung / Susanne Griffin
Minneapolis Emergency Communications Director
Emergency Communications Operations Manager

Richard Dugan
Lieutenant, St. Paul Police Department Communications Center

Richard Esensten
Captain, Hennepin County Sheriff's Communications Division

Julie Heimkes
Rice and Steele County Public Safety Communications Administrator

Shari Hughes
Ramsey County Sheriff's Communications Assistant Director

Mary Jonas
Stearns County Sheriff's Office Dispatch Supervisor

James Kinsey
Captain, Cottage Grove Police Department

Diane Lind
Burnsville Police Communications Supervisor

Paul Linnee
GeoComm Corporation Sales Manager
Don McGlothlin
Captain, Washington County Sheriff's Office
Patrick Medure
Itasca County Sheriff
Jeff Nelson
W.M. Montgomery & Associates
Bill Nevin
Scott County Sheriff
Pat Pahl / John McGough
Metropolitan Radio Board Staff
Nancy Pollock
Metropolitan 9-1-1 Board Executive Director
Sue Pope
St. Peter Police Department Office Coordinator
Andy Terry
Mn/DOT Electronic Communications Office Director

Consultant

We hired a consultant to help us with technical questions and provide information on the strengths and weaknesses of various practices. The consultant also joined us on many of our visits to PSAPs in counties and cities around the state. Our consultant was:

Glen Morrow
Retired Lieutenant, Communications Division, Hennepin County Sheriff's Office

SURVEYING PUBLIC SAFETY ANSWERING POINTS

To supplement our background information and collect data on specific PSAPs, we conducted mail surveys of the 112 PSAPs and 10 State Patrol communications centers in Minnesota. In mid-October 1997 we mailed survey instruments and cover letters, asking PSAP administrators to return the survey after two and a half weeks. About a week later we mailed reminder postcards to every PSAP that had not yet responded to the survey. Three and a half weeks after mailing the original survey, we mailed follow-up letters and surveys to those PSAPs from whom we had received no response. In this final mailing we asked for a response within nine days.

We received completed surveys from 98 PSAPs and all 10 State Patrol communications centers, for a response rate of 89 percent. Survey results have a margin of error of plus or minus three percentage points, due to incomplete responses from all PSAPs. Because some respondents chose not to answer all questions in the survey, the margin of error may be larger for certain responses where the number of respondents is low. In addition, the practical difficulties of conducting any opinion survey may introduce other sources of error that cannot be isolated.

Readers will find the aggregate results of the survey at the end of this appendix. We report survey results for the 98 local PSAPs responding to our mailed questionnaire. The results do not include responses from the 10 State Patrol communications centers; however, these data are available from the Office of the Legislative Auditor upon request.

DEFINING EFFECTIVE AND EFFICIENT 9-1-1 DISPATCHING

While collecting background information, we identified goals for PSAPs and a number of actions to help meet the goals. These goals and actions were based on standards and criteria established by public safety organizations and the 9-1-1 emergency number industry and by state statutes and rules. (Appendix D contains a bibliography of our data sources.)

We used the numerous standards of effective and efficient 9-1-1 dispatching to define successful PSAPs. Using these standards, we compiled measures of performance to compare PSAPs. In December 1997, we reviewed the list of performance measures with our technical advisory panel and revised measures based on members' feedback. (Appendix B lists the performance measures we identified.) Then, in combination with survey data PSAPs had supplied, we used the performance measures to determine which Minnesota PSAPs met the definition of effective 9-1-1 dispatching.

VISITING PSAPS

Using the performance measures designed to identify effective and efficient PSAPs, we selected 13 PSAPs to visit and gather additional information. Many more PSAPs qualified as effective and efficient than we had time to visit. Consequently, we chose PSAPs representing different sizes and geographic locations of Minnesota local governments.

The examples of best practices in this report come from the 13 Minnesota jurisdictions we visited in December 1997 and January 1998. In selecting the 13 sites we do not mean to suggest that only these PSAPs use effective practices; to the contrary, we became aware of many other PSAPs that we could have readily used as examples in this report. Time constraints prevented us from visiting them all.

During visits to the 13 sites we looked first-hand at various practices. We asked PSAP personnel why the practices were begun, how they evolved, what advantages they offered, what they cost, and whether they could be transferred successfully to other PSAPs. To collect the information systematically during the visits, we used a standardized questionnaire with 13 open-ended questions. A copy of the questionnaire instrument follows.

LOCAL GOVERNMENT ADVISORY COUNCIL

Before completing the report we reviewed it with two groups outside our office. One was the technical panel mentioned earlier. The second was the Local Government Advisory Council, created by the 1994 Legislature to recommend topics for Best Practices Reviews. Council members, mostly county administrators and city managers, read and provided comments on a draft version of this report in early March 1998. Members of the Local Government Advisory Council were:

Brandt Richardson (chair)
Dakota County Administrator
Dave Childs
Minnetonka City Manager
Chris Hagelie
St. Cloud City Administrator
Lynn Lander
Hermantown City Administrator
Charles Meyer
St. Louis Park City Manager
Steve Sarkozy
Roseville City Manager
James Schug
Washington County Administrator
Michele Timmons
Ramsey County Director of Risk Management
Lothar Wolter, Jr.
Young America Township Clerk

Office of the Legislative Auditor

9-1-1 Dispatching: A Best Practices Review

SITE VISIT QUESTIONNAIRE

Staff: _____ Date: _____

PSAP: _____ Phone: _____

Interviewee(s):

_____ Title: _____

_____ Title: _____

Best Practices:

(1) _____

(2) _____

(3) _____

1. Describe the practice. What is it? How does it work? When did you first implement it?
2. Why did you first begin the practice? What problems, if any, were you hoping to overcome?
3. Did the practice solve these problems? Why or why not?
4. Were there other options you considered at the time? If so, what makes this practice superior to those?
5. Does the practice produce savings in time, money, labor, resources, or hassles? Can you quantify the savings?
6. Have you found other advantages from using the practice?
7. Have you found any problems or disadvantages with the practice? Have you had to modify it over time to improve it?
8. Thinking back to when you began the practice, did you have any problems with the initial startup? If so, how did you overcome them?
9. What were the startup costs of the practice? What are its ongoing costs?
10. Do you think other PSAPs could also use the practice? What characteristics or attributes does a PSAP need if it is to successfully use the practice?
11. What would you suggest a PSAP should avoid if it is considering this practice?
12. What tips or advice would you offer to another PSAP to help make this practice a success?
13. Do you have any additional thoughts or comments?

Office of the Legislative Auditor

9-1-1 Dispatching: A Best Practices Review

SURVEY OF MINNESOTA PSAPs

Thank you for answering this survey on public safety answering points (PSAPs). Survey questions pertain primarily to the 1996 calendar year. We recognize that some questions may refer to data that you do not routinely collect, but encourage you to provide us with estimated answers in those instances where you may not have precise data. Questions using the term "telecommunicators" refer to PSAP employees who answer 9-1-1 calls, dispatch response units, or perform both of these functions. Direct questions about the survey to Jody Hauer at 612/296-8501.

Please return the completed survey in the enclosed postage-paid envelope by November 21, 1997.

1. **Name** _____
2. **Position** _____
3. **City, County, or District** _____
4. **Phone** _____

OPERATIONS

5. **How many answering positions (that is, appropriately equipped locations within the PSAP that receive incoming calls) did your PSAP have at the end of 1996?**

Total	Median	(*N*=95)
259	2	Answering positions

6. **For how many of the following agencies did your PSAP provide dispatching services at the end of 1996?** *(Please fill in the number of agencies in your service area.)*

Total	Median		
482	4	a.	Law enforcement agencies (*N*=98)
787	7	b.	Fire protection departments (*N*=96)
325	3	c.	Ambulance providers (*N*=90)
289	4	d.	Other *(Please specify.)* (*N*=46) _____

Comments:

7. **What was the maximum number of active public-safety response units available for dispatching at your PSAP during your busiest shift in 1996?**

Total	Median	(*N*=97)
2,121	23	Response units

Number	Percent	
34	35.1%	Unknown or unable to estimate

Because PSAPs record calls differently, we report the responses to questions 8 - 11 according to how agencies recorded calls: (1) all calls, (2) calls that resulted in an initial complaint report, (3) calls that resulted in a response unit dispatched, and (4) calls recorded in other ways.

8. Approximately how many of the following types of calls for service did your PSAP receive in 1996? (*N*=87)

Type of Call for Service		Median number of calls for service by type of call recorded: All Calls (*N*=33)	Calls/Initial Complaint Report (ICR) (*N*=45)	Units Dispatched (*N*=5)	Other (*N*=4)
9-1-1	a.	4,282.0	1,500.0	3,768.0	9,316.0
7-digit	b.	19,850.0	5,700.0	6,392.0	
Walk-up requests	c.	903.5	800.0	1,435.0	
TOTAL CALLS FOR SERVICE	d.	22,775.0	14,124.0	22,300.0	14,099.5

9. Approximately how many of your total calls for service referred to in Question 8 were emergency calls (calls that required immediate action) and how many were nonemergency calls (all other calls)? (*N*=90)

	Median number of emergency/nonemergency calls by type of call recorded: All Calls (*N*=20)	Calls/ICR (*N*=26)	Units Dispatched (*N*=3)	Other (*N*=1)
Number of emergency calls	3,750.0	1,468.5	4,320.0	5,000.0
Number of nonemergency calls	23,795.0	6,825.0	12,000.0	14,000.0

Number	Percent	
40	44.4%	Unknown or unable to estimate

10. What would you estimate was the total number of calls for service your PSAP received over the five-year period of 1992-1996? (*N*=91)

	Median total calls for service over 5 years by type of call recorded: All calls (*N*=26)	Calls/ICR (*N*=36)	Units Dispatched (*N*=4)	Other (*N*=3)
Total calls for service (1992-1996)	122,500.0	52,500.0	74,950.0	50,000.0

Number	Percent	
22	24.2%	Unknown or unable to estimate

11. Approximately how many of your total 1996 calls for service referred to in Question 8 were medical calls? (*N*=94)

	Median number of total calls for service by type of call recorded: All calls (*N*=27)	Calls/ICR (*N*=35)	Units Dispatched (*N*=5)	Other (*N*=2)
Number of medical calls	1,497.0	780.0	1,209.0	1,223.5

Number	Percent	
25	26.6%	Unknown or unable to estimate

12. Which of the following services regarding medical calls were generally available in 1996? *(Circle the appropriate response.)*

Service	Our PSAP Offered This for Medical Calls		We Referred Medical Calls to Another Agency That Offered This		This Service Was Not Available for Medical Calls		Uncertain/ Don't Know	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
a. Prearrival instructions (*N*=93)	37	39.8%	10	10.8%	42	45.2%	4	4.3%
b. Emergency priority response system (PRS) approved by a medical director (*N*=92)	11	12.0	7	7.6	61	66.3	13	14.1
c. Emergency medical protocol prompts (on either flip cards or computer) (*N*=94)	43	45.7	6	6.4	42	44.7	3	3.2
d. Appropriately trained emergency medical response telecommunicators (*N*=94)	35	37.2	6	6.4	49	52.1	4	4.3
e. A process to monitor and review EMS calls and practices to assure ongoing quality (*N*=92)	21	22.8	4	4.3	58	63.0	9	9.8
f. Other *(Please describe.)* (*N*=2)	2	100.0	0	0.0	0	0.0	0	0.0

13. What percent of calls at your PSAP do you estimate were answered within 10 seconds, with no more than three rings, during the busy hour of an average week of your busy month in 1996? *(Mark the appropriate box.)*

Number	Percent	(*N*=97)	
76	78.4%	a.	At least 90 percent
17	17.5	b.	At least 75 percent
1	1.0	c.	At least 50 percent
1	1.0	d.	Fewer than half
2	2.1	e.	Unknown or unable to estimate

14. What was the average time it took to answer a call at your PSAP in 1996? (That is, the average time between the first audible ring and the time the telecommunicator answered.)

Median	(*N*=98)
5	Seconds

Number	Percent	
18	18.4%	Unknown or unable to estimate

15. What was the average time it took to complete a call at your PSAP in 1996? (That is, the average time between the time the telecommunicator answered and ended the call--including time spent on call transfers.)

Median	(*N*=96)
51	Seconds

Number	Percent	
42	43.8%	Unknown or unable to estimate

16. Approximately what percent of outgoing calls transferred by telecommunicators at your PSAP do you estimate were transferred to the appropriate location in 1996? *(Mark the appropriate box.)*

Number	Percent	(*N*=96)	
25	26.0%	a.	100 percent
53	55.2	b.	At least 95 percent
10	10.4	c.	At least 90 percent
1	1.0	d.	At least 85 percent
0	0.0	e.	At least 80 percent
0	0.0	f.	Fewer than 80 percent
7	7.3	g.	Unknown or unable to estimate

17. Approximately what percent of calls transferred into your PSAP do you estimate were misdirected in 1996? *(Mark the appropriate box.)*

Number	Percent	(*N*=96)	
71	74.0%	a.	0 to 5 percent
12	12.5	b.	6 to 10 percent
3	3.1	c.	11 to 15 percent
2	2.1	d.	16 to 20 percent
0	0.0	e.	More than 20 percent
8	8.3	f.	Unknown or unable to estimate

18. For which of the following functions, if any, did your PSAP have written standard operating procedures in 1996? *(Mark all that apply.)*

Number	Percent	(*N*=98)	
69	70.4%	a.	Receiving calls for service
60	61.2	b.	Receiving and processing TDD calls
54	55.1	c.	Prioritizing calls (by level of severity and urgency)
45	45.9	d.	Controlling calls (directing the call through structured questions)
65	66.3	e.	Obtaining information from callers
65	66.3	f.	Identifying and contacting available response units
67	68.4	g.	Dispatching response units
63	64.3	h.	Communicating with response units
57	58.2	i.	Retrieving information for officers and other public safety units in the field
32	32.7	j.	Debriefing telecommunicators between shifts
49	50.0	k.	Managing unanticipated malfunctions in the 9-1-1 system or other equipment
66	67.3	l.	Radio communication
8	8.2	m.	Other *(Please describe.)* _____
4	4.1	n.	None of the above
21	21.4	o.	Standard operating procedures were under development
9	9.2	p.	Standard operating procedures were not developed

19. How often did PSAP employees meet or network with public safety personnel (or others for whom you dispatched) to discuss PSAP operations in 1996? *(Mark the appropriate box.)*

Number	Percent	(*N*=96)	
15	15.6%	a.	Monthly
16	16.7	b.	Quarterly
1	1.0	c.	Annually
45	46.9	d.	On an as-needed basis
19	19.8	e.	Other *(Please describe.)* _____

20. Which of the following techniques, if any, did your PSAP use to communicate information on 9-1-1 services to the public in 1996? *(Mark all that apply.)*

Number	Percent	(*N*=97)	
60	61.9%	a.	Public speeches to, or informational meetings with, community groups and civic organizations
15	15.5	b.	Posters
15	15.5	c.	Flyers
30	30.9	d.	Brochures
10	10.3	e.	Informational videos
16	16.5	f.	Public service announcements on radio or television
40	41.2	g.	Interviews with local media
14	14.4	h.	Advertisements in local newspapers or on radio or television
20	20.6	i.	Newsletter articles
30	30.9	j.	Press releases
13	13.4	k.	Other *(Please describe.)* _____
11	11.3	l.	None of the above
6	6.2	m.	Public communication techniques were under development
7	7.2	n.	Public communication techniques were not developed

21. How did your PSAP track complaints (expressions of dissatisfaction) about PSAP service delivery in 1996? *(Mark the appropriate box.)*

Number	Percent	(*N*=95)	
24	25.3%	a.	With a systematic tracking system that documented our responses to complaints
42	44.2	b.	Through informal tracking without extensive documentation
15	15.8	c.	Other *(Please describe.)* _____
6	6.3	d.	None of the above
0	0.0	e.	Complaint tracking was under development
8	8.4	f.	Complaint tracking was not developed

Comments:

22. Approximately how many complaints about PSAP service delivery do you estimate were received from the following groups, and approximately what percent of the complaints were resolved (that is, appropriate action was taken), in 1996? (*N*=95)

Complainant	Median Number of Complaints	Median Percent Resolved
Citizens	a. 4 (*N*=55)	b. 100% (*N*=58)
Response units (fire, police, EMS, public works, etc.)	c. 5 (*N*=50)	d. 100% (*N*=54)

Number	Percent		
35	36.8%	e.	Unknown or unable to estimate

Comments:

23. How, if at all, did your PSAP measure citizen satisfaction with dispatching services in 1996? *(Mark all that apply.)*

Number	Percent	(*N*=95)	
10	10.5%	a.	With questionnaires, surveys, or focus groups on dispatching
7	7.4	b.	With a survey on local government services of which dispatching was a part
31	32.6	c.	By tracking citizen requests and complaints
54	56.8	d.	By informal word-of-mouth
27	28.4	e.	Through comments brought to the elected city council or county board
5	5.3	f.	Other *(Please describe.)* _____
16	16.8	g.	None of the above
2	2.1	h.	Measurement of citizen satisfaction was under development
16	16.8	i.	Measurement of citizen satisfaction was not developed

24. How, if at all, did you measure the performance of your PSAP in 1996? *(Mark all that apply.)*

Number	Percent	(*N*=96)	
12	12.5%	a.	Through a formal process of setting goals and objectives and measuring them
16	16.7	b.	With a peer review process
48	50.0	c.	With performance appraisals of PSAP staff
51	53.1	d.	Informally, without extensive documentation
5	5.2	e.	Other *(Please describe.)* _____
4	4.2	f.	None of the above
5	5.2	g.	Performance measurement was under development
7	7.3	h.	Performance measurement was not developed

Comments:

25. What methods did you have, if any, for determining whether telecommunicators dispatched the appropriate response to calls for service in 1996? *(Mark all that apply.)*

Number	Percent	(*N*=98)	
26	26.5%	a.	Samples of taped calls were reviewed and critiqued by trained reviewers
24	24.5	b.	Telecommunicators' responses were monitored while they were on-line
29	29.6	c.	Telecommunicator peers periodically reviewed dispatching techniques and operating procedures
84	85.7	d.	Management monitored complaints about perceived inadequate responses to incidents and took appropriate action
7	7.1	e.	Other *(Please describe.)* _____
3	3.1	f.	None of the above
2	2.0	g.	Methods for determining appropriate responses were under development
3	3.1	h.	Methods for determining appropriate responses were not developed

Comments:

26. What steps had you taken in 1996 or earlier years to reduce the potential for liability at your PSAP? *(Mark all that apply.)*

Number	Percent	(*N*=97)	
6	6.2%	a.	Prepared a risk management plan
9	9.3	b.	Purchased liability insurance
58	59.8	c.	Implemented methods, such as standard operating procedures, to assure quality control for the communication center's operations
30	30.9	d.	Periodically checked the validity of PSAP databases
52	53.6	e.	Provided training to employees on liability issues
6	6.2	f.	Other *(Please describe.)* _____
9	9.3	g.	None of the above
8	8.2	h.	Steps for reducing liability were under development
6	6.2	i.	Steps for reducing liability were not developed

Comments:

PSAP AND NETWORK EQUIPMENT

27. Did your PSAP center have the following telephone features available in 1996? *(Circle the appropriate response.)*

Telephone Feature	Available		Unavailable		Under Development		Uncertain/ Don't Know	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
a. Call queuing or automatic call distribution (ACD) (*N*=89)	25	28.1%	54	60.7%	1	1.1%	9	10.1%
b. Ability to place call on hold (*N*=98)	97	99.0	0	0.0	0	0.0	1	1.0
c. Transfer capability (*N*=98)	85	86.7	11	11.2	1	1.0	1	1.0
d. Distinctive ring tones for 9-1-1 calls (*N*=98)	76	77.6	21	21.4	0	0.0	1	1.0
e. 3-way conferencing (*N*=98)	84	85.7	8	8.2	2	2.0	4	4.1
f. Speed dial library with minimum of 16 phone numbers (*N*=98)	82	83.7	9	9.2	5	5.1	2	2.0
g. Last number redial (*N*=95)	74	77.9	16	16.8	3	3.2	2	2.1
h. Caller ID on 7-digit lines (*N*=92)	19	20.7	64	69.6	9	9.8	0	0.0
i. Other *(Please describe.)* (*N*=6) _____	6	100.0	0	0.0	0	0.0	0	0.0
(*N*=1) _____	1	100.0	0	0.0	0	0.0	0	0.0

28. Which of the following information, if any, was displayed to the telecommunicator via your automatic location identification (ALI) for some or all calls in 1996? *(Mark all that apply.)*

Number	Percent	(*N*=97)	
69	71.1%	a.	Subscriber name
68	70.1	b.	Full street address
67	69.1	c.	Community
33	34.0	d.	Additional location information (e.g., records of caller or call-location history)
57	58.8	e.	PSAP name
68	70.1	f.	Responsible law enforcement, fire, and EMS agencies
17	17.5	g.	Other *(Please describe.)* _____
5	5.2	h.	None of the above
14	14.4	i.	ALI was under development *(Go to Question 30.)*
13	13.4	j.	ALI was not available *(Go to Question 30.)*

29. How long did the ALI display take for 95 out of 100 attempts during the busy hour of an average week of your busy month in 1996? *(Mark the appropriate box.)*

Number	Percent	(*N*=69)	
48	69.6%	a.	5 seconds or less
0	0.0	b.	More than 5 seconds
15	21.7	c.	Although we are unable to calculate it precisely, usually within 5 seconds
1	1.4	d.	Although we are unable to calculate it precisely, usually more than 5 seconds
5	7.2	e.	Unknown or unable to estimate

30. With which of the following, if any, did your PSAP's computer-aided dispatch (CAD) interface in 1996? *(Mark all that apply.)*

Number	Percent	(*N*=92)	
26	28.3%	a.	Your agency's incident records system
18	19.6	b.	Crime information systems (e.g., CJIS, NCIC, or NLETS)
11	12.0	c.	Law enforcement centers, fire stations, or ambulance stations
10	10.9	d.	Mobile data terminals in patrol, fire, or other response vehicles
5	5.4	e.	Other *(Please describe.)* _____
13	14.1	f.	None of the above
8	8.7	g.	CAD was under development
42	45.7	h.	CAD was not available

Comments:

31. Which of the following data, if any, did your PSAP's management information system (MIS) provide for some or all calls in 1996? *(Mark all that apply.)*

Number	Percent	(*N*=96)	
40	41.7%	a.	Number of total calls received
22	22.9	b.	Number of abandoned calls
19	19.8	c.	Number of calls on a per trunk basis
24	25.0	d.	Number of calls on a call type basis
6	6.3	e.	Number of calls transferred
13	13.5	f.	Number of calls per answering position
13	13.5	g.	Average time to answer
11	11.5	h.	Average length of call
6	6.3	i.	Average hold time
5	5.2	j.	Other *(Please describe.)* _____
21	21.9	k.	None of the above
10	10.4	l.	MIS was under development
32	33.3	m.	MIS was not available

Comments:

32. What was the percent of locatable addresses in your PSAP's jurisdiction in 1996?

Median	(*N*=95)
95	Percent of locatable addresses

Number	Percent	
45	47.4%	Unknown or unable to estimate

33. How did your PSAP designate responsibilities with local service providers for updating the master street address guide (MSAG) in 1996? *(Mark the appropriate box.)*

Number	Percent	(*N*=93)	
20	21.5%	a.	Written contracts
6	6.5	b.	Tariffs
15	16.1	c.	Informal agreements
8	8.6	d.	Other *(Please describe.)* _____
5	5.4	e.	None of the above
12	12.9	f.	MSAG was under development
19	20.4	g.	MSAG was not available
7	7.5	h.	Metro 911 board manages
1	1.1	i.	PSAP updates own MSAG
0	0.0	j.	Not applicable

34. How accessible was a local service provider for resolving 9-1-1 system problems should they have occurred at your PSAP in 1996? *(Mark the appropriate box.)*

Number	Percent	(*N*=94)	
76	80.9%	a.	24-hour per day access
11	11.7	b.	Part-time access
3	3.2	c.	Other *(Please describe.)* _____
4	4.3	d.	None of the above

35. Did your PSAP have the following equipment or services available in 1996? *(Circle the appropriate response.)*

Equipment or Service	Available		Unavailable		Under Development		Uncertain/ Don't Know	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
a. Uninterruptible power system (UPS) (*N*=96)	79	82.3%	10	10.4%	4	4.2%	3	3.1%
b. Backup generator or power supply (*N*=96)	94	97.9	2	2.1	0	0.0	0	0.0
c. Selective routing (*N*=93)	45	48.4	30	32.3	7	7.5	11	11.8
d. Alternate routing (*N*=90)	42	46.7	30	33.3	6	6.7	12	13.3
e. Master clock for date/time stamping (*N*=94)	37	39.4	48	51.1	4	4.3	5	5.3
f. Audio recorder with automatic second deck or second drive for each phone and any line on it (*N*=96)	86	89.6	10	10.4	0	0.0	0	0.0
g. Call detail logging (CDL) that records time and processing of calls (*N*=89)	49	55.1	29	32.6	2	2.2	9	10.1
h. Shared radio frequencies for interagency communi-cation (*N*=96)	91	94.8	4	4.2	0	0.0	1	1.0
i. Dedicated phone lines (*N*=96)	93	96.9	3	3.1	0	0.0	0	0.0
j. Mobile or cellular phones (*N*=95)	82	86.3	11	11.6	1	1.1	1	1.1
k. Communication capabilities with mobile data terminals in response vehicles (*N*=92)	24	26.1	57	62.0	9	9.8	2	2.2
l. Communication capabilities with mobile emergency communication command posts (*N*=94)	62	66.0	24	25.5	4	4.3	4	4.3
m. TDD detection device (*N*=94)	75	79.8	13	13.8	1	1.1	5	5.3
n. Access to weather reports (*N*=95)	88	92.6	5	5.3	1	1.1	1	1.1
o. Other *(Please describe.)* (*N*=0)	0	0.0	0	0.0	0	0.0	0	0.0

36. Of the answering positions at your PSAP, how many had access to telecommunications devices for the deaf or speech-impaired (TDD, TTD, or TTY) at the end of 1996? *(Mark the appropriate box.)*

Number	Percent	(*N*=96)	
58	60.4%	a.	All answering positions
25	26.0	b.	Half or more of the answering positions
12	12.5	c.	Fewer than half of the answering positions
1	1.0	d.	None of the answering positions *(Go to Question 38.)*
0	0.0	e.	Telecommunications devices for the deaf or speech impaired were being installed *(Go to Question 38.)*

Comments:

37. Which of the following TDD features, if any, were available at your PSAP in 1996? *(Mark all that apply.)*

Number	Percent	(*N*=93)	
61	65.6%	a.	Same level of service (ANI, ALI, etc.) for TDD callers as provided to other callers
72	77.4	b.	Capability for telecommunicator to call back using TDD
8	8.6	c.	A TDD recorded message for callers who may be placed into a queue waiting for call to be received
13	14.0	d.	Alternatives for receiving TDD calls in the event of a single line or system failure
12	12.9	e.	Equipment capable of providing TDD access to other numbers or agencies to which the call may be transferred
39	41.9	f.	A systematic way of periodically testing the TDD service and maintaining TDD equipment
6	6.5	g.	Voice amplification for telecommunicator's voice
5	5.4	h.	Other *(Please describe.)* _____
3	3.2	i.	None of the above

38. How many incoming 9-1-1 trunks did your PSAP have at the end of 1996?

Total	Median	(*N*=79)
541	5	9-1-1 trunks

39. Was the number of trunks your communications center had at the end of 1996 sufficient to meet the needs of your PSAP? *(Mark the appropriate box.)*

Number	Percent	(*N*=98)	
89	90.8%	a.	Yes
9	9.2	b.	No

Comments:

40. What level of service did your communication center's trunks and other equipment allow your PSAP to provide during the busy hour of an average week of your busy month in 1996? *(Mark the appropriate box.)*

Number	Percent	(*N*=95)	
40	42.1%	a.	No more than one call in 100 attempts was blocked
4	4.2	b.	More than one call in 100 attempts was blocked
51	53.7	c.	Unknown or unable to estimate

Comments:

41. Did your PSAP have an equipment replacement plan in 1996 that provided funding to replace obsolete or worn-out telephone, radio, and other communications equipment? *(Mark the appropriate box.)*

Number	Percent	(*N*=97)	
62	63.9%	a.	Yes
35	36.1	b.	No

42. How did your PSAP maintain its telephone, radio, and other communications equipment in 1996? *(Mark the appropriate box.)*

Number	Percent	(*N*=97)	
25	25.8%	a.	We maintained our equipment on a routine basis
70	72.2	b.	We maintained our equipment on an as-needed basis
0	0.0	c.	Other *(Please describe.)* _____
0	0.0	d.	None of the above
2	2.1	e.	A routine maintenance program was under development
0	0.0	f.	A routine maintenance program was not developed

43. What remote maintenance capabilities, if any, were available to access PSAP telephone equipment from a remote location to help isolate and correct trouble in 1996? *(Mark all that apply.)*

Number	Percent	(*N*=90)	
9	10.0%	a.	Accumulate statistics on system performance
12	13.3	b.	Provide automatic remote alarm report
21	23.3	c.	Enable remote or local programming of all functions
14	15.6	d.	Constantly monitor system performance
30	33.3	e.	Take corrective actions
17	18.9	f.	Access the system for resetting alarm
5	5.6	g.	Other *(Please describe.)* _____
30	33.3	h.	None of the above
5	5.6	i.	Remote maintenance capabilities were under development
16	17.8	j.	Remote maintenance capabilities were not available

44. How did telecommunicators track, if at all, the location and availability of squads and other vehides they dispatched in 1996? *(Mark all that apply.)*

Number	Percent	(*N*=97)	
1	1.0%	a.	We used an automatic vehicle location (AVL) system
1	1.0	b.	We used a global positioning system (GPS)
30	30.9	c.	We used computer-aided dispatch (CAD)
67	69.1	d.	We required public safety personnel to radio or call in their location to telecommunicators
34	35.1	e.	Public safety personnel in the field used their judgment to decide when to alert the telecommunicator
1	1.0	f.	Other *(Please describe.)* _____
3	3.1	g.	None of the above
7	7.2	h.	Squad and vehicle tracking was under development
15	15.5	i.	Squad and vehicle tracking was not available

45. How many radio frequencies did your PSAP have at the end of 1996?

Total	Median	(*N*=93)
755	7	Radio frequencies

46. Was the number of radio frequencies your communications center had at the end of 1996 sufficient to meet the needs of your PSAP? *(Mark the appropriate box.)*

Number	Pecent	(*N*=97)	
73	75.3%	a.	Yes
24	24.7	b.	No

Comments:

47. For what percent of locations within your communication center's service area did your PSAP have reliable radio coverage between the center and either mobile or hand-held radio units in 1996? *(Mark the appropriate box.)*

Number	Percent	(*N*=98)	
21	21.4%	a.	100 percent
53	54.1	b.	At least 90 percent
12	12.2	c.	At least 80 percent
6	6.1	d.	At least 70 percent
6	6.1	e.	Fewer than 70 percent
0	0.0	f.	Not applicable

Comments:

48. For incidents when security was required, how did you maintain secure communication between telecommunicators and response units in 1996? *(Mark all that apply.)*

Number	Percent	(*N*=98)	
20	20.4%	a.	Through the use of mobile data terminals
6	6.1	b.	Through a trunked radio communications system
77	78.6	c.	Through the use of mobile or cell phones
68	69.4	d.	Through the use of land lines or hard wire phones
23	23.5	e.	With electronic scramblers and disabling repeater
6	6.1	f.	Other *(Please describe.)* _____
3	3.1	g.	None of the above
2	2.0	h.	Security features were under development
7	7.1	i.	Security features were not available

49. How satisfied were you with the security of radio communication between telecommunicators and response units in 1996? *(Mark the appropriate box.)*

Number	Percent	(*N*=97)	
25	25.8%	a.	Very satisfied
32	33.0	b.	Somewhat satisfied
16	16.5	c.	Neither satisfied nor dissatisfied
18	18.6	d.	Somewhat dissatisfied
6	6.2	e.	Very dissatisfied

Comments:

50. For what percent of the time would you estimate PSAP equipment and communication links enabled telecommunicators to communicate successfully with the following personnel involved with responding to incidents in 1996? *(Circle the appropriate response.)*

Communication Between Telecommunicator and:	Percent of Time Communication was Successful													
	100%		At Least 90%		At Least 80%		At Least 70%		Less than 70%		Unknown/ Unable to Estimate		Not Applicable	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
a. Law enforcement (*N*=97)	31	32.0%	58	59.8%	3	3.1%	4	4.1%	0	0.0%	1	1.0%	0	0.0%
b. Fire fighters (*N*=97)	27	27.8	50	51.5	16	16.5	3	3.1	0	0.0	1	1.0	0	0.0
c. EMS (*N*=96)	28	29.2	49	51.0	7	7.3	4	4.2	1	1.0	2	2.1	5	5.2
d. Ambulance (*N*=96)	27	28.1	51	53.1	6	6.3	3	3.1	0	0.0	1	1.0	8	8.3
e. Public works employees (*N*=96)	17	17.7	37	38.5	10	10.4	6	6.3	5	5.2	4	4.2	17	17.7
f. Telecommunicators from other communication centers (*N*=95)	27	28.4	47	49.5	8	8.4	3	3.2	2	2.1	2	2.1	6	6.3
g. Area hospitals (*N*=92)	19	20.7	33	35.9	3	3.3	2	2.2	1	1.1	0	0.0	34	37.0
h. Other *(Please describe.)* (*N*=0)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

51. How did your PSAP plan, if at all, in 1996 for recovering from such problems as PSAP outage, 9-1-1 network failure, or potential natural disasters? *(Mark all that apply.)*

Number	Percent	(*N*=96)	
22	22.9%	a.	We had written disaster recovery plans
22	22.9	b.	We had written agreements with a back-up facility
22	22.9	c.	We had written agreements with a neighboring PSAP
42	43.8	d.	We had disaster recovery plans or agreements but they were not written
7	7.3	e.	Other *(Please describe.)* _____
6	6.3	f.	None of the above
8	8.3	g.	Written disaster recovery plans or agreements were under development
13	13.5	h.	Written disaster recovery plans or agreements were not developed

Comments:

52. How did your PSAP prepare in 1996 for handling unanticipated malfunctions in the 9-1-1 system? *(Mark the appropriate box.)*

Number	Percent	(*N*=96)	
27	28.1%	a.	We had backup procedures and had ongoing tests of the system under varying conditions, such as using test calls throughout the service area
37	38.5	b.	We had backup procedures but had not conducted ongoing tests of the system
6	6.3	c.	Other *(Please describe.)* _____
19	19.8	d.	None of the above
2	2.1	e.	Backup procedures were under development
5	5.2	f.	Backup procedures were not developed

Comments:

53. In the event of a single equipment component failure in 1996, for what percent of the time would at least half of the 9-1-1 trunks and answering positions been operational (that is, providing indications of incoming calls and voice communication with callers)? *(Mark the appropriate box.)*

Number	Percent	(*N*=96)	
27	28.1%	a.	100 percent
24	25.0	b.	At least 90 percent
4	4.2	c.	At least 80 percent
0	0.0	d.	At least 70 percent
3	3.1	e.	Less than 70 percent
38	39.6	f.	Unknown or unable to estimate

54. For what percent of the time was all PSAP electrical equipment properly grounded and expected to function normally in 1996 in the presence of electric stress conditions, such as static discharge? *(Mark the appropriate box.)*

Number	Percent	(*N*=97)	
59	60.8%	a.	100 percent
15	15.5	b.	At least 90 percent
0	0.0	c.	At least 80 percent
0	0.0	d.	At least 70 percent
0	0.0	e.	Less than 70 percent
23	23.7	f.	Unknown or unable to estimate

EXPENDITURES

55. What were your PSAP's total operating expenditures in 1996 (excluding capital purchases)?

Mean	Median	(*N*=74)
$512,762.00	$238,112.50	Total 1996 operating expenditures

Comments:

56. Which of the following items were included in your estimate of total 1996 operating expenditures? *(Mark all that apply.)*

Number	Percent	(*N*=80)	
78	97.5%	a.	Salaries or wages (compensation for telecommunicators, supervisors, and other personnel involved with dispatching)
73	91.3	b.	Benefits (such as medical insurance, workers' compensation, leave, pension contributions, disability insurance)
64	80.0	c.	Supplies (such as office supplies, manuals, and noncapital equipment purchases)
67	83.8	d.	Training and professional development
48	60.0	e.	Insurance premiums
24	30.0	f.	Office building use and maintenance (such as space rental and utilities)
46	57.5	g.	Other current expenditures (operating costs, such as monthly billed costs for 9-1-1 system maintenance, that exclude capital expenses for furniture, major office equipment, computer hardware, display terminals, generators, land, or other capital purchases)

Comments:

57. Of your PSAP's total 1996 operating expenditures, approximately how much do you estimate was spent on the following areas?

Mean	Median	
$3,316.00	$2,100.00	Total spent on training and professional development of PSAP employees (*N*=67)
701.00	0.00	Total spent on public education programs (*N*=55)

58. What do you estimate were your PSAP's capital expenses on communications equipment over the five-year period of 1992-1996?

Mean	Median	(*N*=79)
$299,293.00	$101,383.50	Total capital expenditures on equipment (1992-1996)

Number	Percent	
31	39.2%	Unknown or unable to estimate

Comments:

PERSONNEL

59. How many full-time, part-time, and full-time equivalent (FTE) employees were employed at your PSAP at the end of 1996? (*N*=97)

Employee	Number of Full-Time		Number of Part-Time		Number of Full-Time Equivalent (FTE)	
	Total	Median	Total	Median	Total	Median
Telecommunicators	790	6.0	207	2.0	870.0	7.0
Supervisors or managers	121	1.0	2	0.0	122.0	1.0
Information systems technical support	28	0.0	4	0.0	30.0	0.0
Clerical support	68	0.0	17	0.0	74.1	0.0
Other *(Please describe.)*	9	0.0	3	0.0	9.2	0.0

60. Did you typically use one-stage dispatching (one telecommunicator both answers incoming 9-1-1 calls and dispatches response units) or two-stage dispatching (a call taker answers incoming 9-1-1 calls and a separate dispatcher dispatches response units) in 1996?

Number	Percent	(*N*=98)	
91	92.9%	a.	One-stage dispatching
7	7.1	b.	Two-stage dispatching

61. Based on your dispatch operations (one-stage or two-stage), what approximate percent of time did a telecommunicator at your PSAP spend on average performing the following duties during your busy month in 1996?

Type of Duty	ONE-STAGE DISPATCHING (*N*=78) Percent Time Spent by Telecommunicator Median	TWO-STAGE DISPATCHING (*N*=6) Percent Time Spent by Call Taker Median	Percent Time Spent by Dispatcher Median
Taking calls	30.0%	75.0%	7.5%
Dispatching response units	20.0	2.5	25.0
Monitoring field units	10.0	7.5	20.0
Providing information to field units	10.0	10.0	15.0
Reporting and record keeping	10.0	5.0	5.0
Clerical duties	3.0	2.5	2.5
Receptionist duties	5.0	0.0	0.0
Jailer duties	0.0	0.0	0.0
Other *(Please describe.)*	0.0	0.0	0.0

62. Did your PSAP provide, or have access to, interpreter services for communicating with any non-English speaking callers in 1996? *(Mark the appropriate box.)*

Number	Percent	(*N*=97)	
10	10.3	a.	Yes, we had in-house interpreters
71	73.2	b.	Yes, we contracted for interpreters
16	16.5	c.	No, we did not have access to interpreters

63. Did your PSAP have written personnel policies and procedures for staff in 1996? *(Mark the appropriate box.)*

Number	Percent	(*N*=96)	
78	81.3%	a.	Yes, we had written personnel policies
9	9.4	b.	No, we did not have written personnel policies
9	9.4	c.	Written personnel policies were under development

64. Which of the following practices did your PSAP use during the process of hiring new telecommunicators in 1996 or earlier years? *(Mark all that apply.)*

Number	Percent	(*N*=97)	
75	77.3%	a.	Realistic job previews that provide an applicant with an accurate picture of the job
95	97.9	b.	Probation periods
68	70.1	c.	Testing before hiring (*e.g.*, psychological or keyboard tests)
93	95.9	d.	Background checks
10	10.3	e.	Other *(Please describe.)* _____
0	0.0	f.	None of the above
3	3.1	g.	Hiring practices were under development

Comments:

65. How frequently were formal performance evaluations of telecommunicators conducted in 1996? *(Mark the appropriate box.)*

Number	Percent	(*N*=97)	
2	2.1%	a.	Twice a year
66	68.0	b.	Annually
8	8.2	c.	Other *(Please describe.)* _____
6	6.2	c.	None of the above
2	2.1	e.	Formal performance evaluations were under development *(Go to Question 67.)*
13	13.4	f.	Formal performance evaluations were not conducted *(Go to Question 67.)*

66. Which of the following practices were available for use during the process of evaluating employees' performance in 1996? *(Circle the appropriate response.)*

Practice	Available		Unavailable		Under Development	
	Number	Percent	Number	Percent	Number	Percent
a. Performance appraisals that included goal setting and review of employee's goal achievement (*N*=74)	57	77.0%	13	17.6%	4	5.4%
b. Incentives to encourage good performance, such as merit pay increases (*N*=69)	14	20.3	55	79.7	0	0.0
c. Identification of employee's needs for personal development, training, or counseling (*N*=77)	68	88.3	8	10.4	1	1.3
d. Administrative decisions that resulted in corrective or disciplinary actions (e.g., probations, transfers, or terminations) (*N*=76)	69	90.8	6	7.9	1	1.3
e. Employee recognition awards *(Please describe.)*						
(*N*=55) _____	29	52.7	22	40.0	4	7.3
(*N*=8) _____	5	62.5	3	37.5	0	0.0
f. Other *(Please describe.)*						
(*N*=3) _____	3	100.0	0	0.0	0	0.0

67. For which employees, if any, did your PSAP require annual training targeted to individual training needs in 1996? *(Mark all that apply.)*

Number	Percent	(*N*=90)	
52	57.8%	a.	Telecommunicators
39	43.3	b.	PSAP supervisors or managers
14	15.6	c.	Other PSAP staff
20	22.2	d.	Individual training needs were identified but training was optional
20	22.2	e.	Individual training needs were not identified but some annual training was required
10	11.1	f.	Individual training needs were not identified and annual training was not required

68. What types of employee training did your PSAP pay for in 1996? *(Mark the appropriate box.)*

Number	Percent	(*N*=96)	
61	63.5%	a.	All training
17	17.7	b.	Training customized to individual needs and training related to job functions
0	0.0	c.	Only training customized to individual needs
16	16.7	d.	Only training related to job functions
2	2.1	e.	No training

69. As of 1996, how many hours of the following types of training did your PSAP require for new employees within their first year? *(Circle the appropriate response.)*

Training Required	More than 8 hours		8 hours		7 hours		6 hours		5 hours		4 hours		3 hours		2 hours		Less than 2 hours		None	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
a. Roles and responsibilities of the PSAP and telecommunicators (*N*=87)	65	74.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	6	6.9%	1	1.1%	4	4.6%	5	5.7%	6	6.9%
b. Legal aspects of law enforcement, fire, and EMS agencies (*N*=87)	35	40.2	6	6.9	1	1.1	2	2.3	0	0.0	8	9.2	4	4.6	4	4.6	12	13.8	15	17.2
c. Interpersonal communications including listening skills, processing information, and cultural diversity issues (*N*=87)	48	55.2	7	8.0	1	1.1	2	2.3	1	1.1	5	5.7	3	3.4	8	9.2	3	3.4	9	10.3
d. Technology use (wire v. wireless phones, basic v. enhanced 911, recorders, CAD, radios, etc.) (*N*=88)	56	63.6	6	6.8	0	0.0	3	3.4	1	1.1	6	6.8	0	0.0	2	2.3	5	5.7	9	10.2
e. TDD equipment use and call processing (*N*=88)	13	14.8	5	5.7	0	0.0	0	0.0	2	2.3	10	11.4	4	4.5	16	18.2	35	39.8	3	3.4
f. Telephone techniques/call processing (*N*=88)	58	65.9	6	6.8	1	1.1	4	4.5	0	0.0	6	6.8	0	0.0	3	3.4	6	6.8	4	4.5
g. Call classification by type of call and priority (*N*=87)	53	60.9	4	4.6	0	0.0	6	6.9	1	1.1	5	5.7	3	3.4	4	4.6	6	6.9	5	5.7
h. Radio communication protocols, rules, and responder safety (*N*=88)	59	67.0	5	5.7	1	1.1	1	1.1	3	3.4	5	5.7	0	0.0	5	5.7	4	4.5	5	5.7
i. Stress management (*N*=86)	9	10.5	4	4.7	0	0.0	2	2.3	5	5.8	5	5.8	4	4.7	9	10.5	21	24.4	27	31.4
j. Other *(Please describe.)* (*N*=13) _____	8	61.5	2	15.4	0	0.0	0	0.0	0	0.0	1	7.7	0	0.0	2	15.4	0	0.0	0	0.0
(*N*=6) _____	5	83.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	16.7	0	0.0	0	0.0	0	0.0

70. How many telecommunicators and supervisors or managers at your PSAP had completed training in, earned certification from, or earned degrees in, the following at the end of 1996? (*N*=96)

Professional Area	Number of Telecommunicators Trained		Number of Supervisors/Managers Trained	
	Total	Median	Total	Median
CJIS certification	741	7	69	0
BCA police management/supervision certificate	5	1	10	0
APCO basic telecommunicator course	111	0	10	0
APCO supervisor and management courses or instructor courses	12	0	18	0
NENA certified emergency number professional program	6	0	3	0
Law enforcement associates degree	34	0	9	0
Community/Technical College diploma or associates degree in public safety communications	40	0	2	0
First responder	183	0	26	0
Emergency medical technician — basic, intermediate, or paramedic	82	0	10	0
Other *(Please describe.)*				
_____	69	0	6	0
_____	10	0	1	0

71. Which of the following, if any, did your PSAP provide for telecommunicators in 1996 to help manage the stress of their job? *(Mark all that apply.)*

Number	Percent	(*N*=95)	
63	66.3%	a.	Opportunities to participate in critical incident stress debriefing teams following particularly stressful emergency events
37	38.9	b.	Stress management training
31	32.6	c.	Exercise and general health programs
12	12.6	d.	Peer support groups
58	61.1	e.	Opportunities for professional counseling
32	33.7	f.	Innovative shift scheduling to minimize demands of the job
6	6.3	g.	Other *(Please describe.)* _____
10	10.5	h.	None of the above
2	2.1	i.	Stress management initiatives were under development
7	7.4	j.	Stress management initiatives were not developed

Comments:

72. For what percent of the answering positions at your PSAP were the following features available in 1996? *(Circle the appropriate response.)*

Feature	100%		75%		50%		25%		None	
	#	%	#	%	#	%	#	%	#	%
a. Individually-controlled lighting at answering positions (*N*=94)	57	60.6%	6	6.4%	3	3.2%	2	2.1%	26	27.7%
b. Self-adjustable seating (*N*=96)	88	91.7	3	3.1	1	1.0	0	0.0	4	4.2
c. Height-adjustable consoles at answering positions (*N*=93)	13	14.0	1	1.1	0	0.0	0	0.0	79	84.9
d. Immediately adjacent restroom facilities (*N*=94)	77	81.9	1	1.1	0	0.0	0	0.0	16	17.0
e. Opportunities for physical exercise in same or adjacent building (*N*=93)	22	23.7	2	2.2	0	0.0	4	4.3	65	69.9
f. Other *(Please describe.)*										
(*N*=4) _____	3	75.0	0	0.0	0	0.0	0	0.0	1	25.0
(*N*=3) _____	1	33.3	0	0.0	0	0.0	0	0.0	2	66.7

73. Over the five-year period of 1992-1996, what was the retention rate for telecommunicators at your PSAP? *(Mark the appropriate box.)*

Number	Percent	(*N*=95)	
15	15.8%	a.	100 percent
52	54.7	b.	99 to 75 percent
23	24.2	c.	74 to 50 percent
3	3.2	d.	49 to 25 percent
2	2.1	e.	24 to 0 percent

Comments:

CONCLUSION

74. What innovations or effective methods does your PSAP employ that improve its ability to provide service?

75. Are you aware of any innovative or effective methods or equipment used by other PSAPs? If so, please describe.

76. Do you have any additional comments?

Thank you for completing this survey!

Please return the completed survey in the postage-paid envelope by **November 21st** to:

Legislative Auditor's Office
Centennial Building - First Floor South, 658 Cedar Street
St. Paul, MN 55155

Or fax to: 612/296-4712

Performance Measurement

APPENDIX B

This appendix briefly describes how we measured the performance of public safety answering points (PSAPs). We first explain the importance of performance measurement and how it can be useful to PSAPs. Then we list the measures of performance we used in this review. In evaluating their performance, PSAPs may choose to use these measures or develop ones of their own.

THE VALUE OF PERFORMANCE MEASUREMENT

Developing goals, objectives, and performance measures allows a PSAP to evaluate the level of services it provides. The yardsticks a PSAP uses to measure its performance provide quantifiable information on its impact, efficiency, and effectiveness. Information from measuring performance allows PSAPs to make strategic, more informed decisions about their own operations. In other words, performance measurement provides a record to show what value a PSAP is getting for the dollars it spends on dispatching.

Used over time, performance measures can help PSAPs identify both achievements and areas needing improvement. Measures can also help PSAPs justify spending requests by demonstrating their real needs with actual data on workload, personnel, and other resources used in dispatching. Moreover, with the information gained from measuring their workload and effectiveness, PSAPs are better equipped to communicate the actual results of their work to elected officials and the public.

We wish to neither underestimate the enormous task involved with measuring the performance of governmental functions nor imply it can be done quickly. Performance measurement can be particularly difficult when the results of a program are not readily quantifiable and cannot be easily measured. In addition, the use of some measures in isolation could actually lead to unintended consequences. A PSAP interested in measuring only efficiency, for instance, might have a relatively high number of calls per dispatcher but be lacking in the quality of its service.

To be useful, the process generally requires an initial investment of time to develop suitable measures. It also requires ongoing resources to measure actual results over time and manage appropriate responses to them. Support from agency leadership is crucial. Without the backing of PSAP management, performance measurement will likely have less meaningful impact as a tool for helping set direction. At the same time, involving dispatchers in the process is important because they are the individuals who are most directly affected by changes in practice or procedure that could result from performance measurement.

DEFINING THE MISSION, GOALS, AND OBJECTIVES

Typically, the first step in measuring performance is articulating the PSAP's mission. The mission defines the fundamental purpose of the agency and its programs. The mission provides a foundation from which the PSAP's goals, objectives, and performance indicators flow.

The next step is setting goals. Goals are broad statements that describe outcomes the PSAP hopes to achieve. For instance, one goal might be to process 9-1-1 calls in a timely manner. Together, the mission and goals determine the priorities for a PSAP. Developing the mission and goals can be a time-intensive process, not reflected in the brief attention we give it here.

Once it adopts a mission and goals, a PSAP can set objectives to describe what results it expects to

achieve and by when. Objectives are usually very specific and measurable, targeted to particular programs or efforts, and relate directly to the PSAP's mission and goals. They describe how the PSAP intends to meet its goals. As an example, in line with the goal of processing calls in a timely manner, an objective might be to increase by two percent annually the percent of 9-1-1 calls answered within 5 seconds.

Goals and objectives are likely to vary with each PSAP although some things, such as the goal to provide 24-hour per day availability for receiving 9-1-1 and other public safety calls, may be common to all. Similarly, PSAPs may find useful some but not all of the performance measures we describe below. They may want to supplement these examples of measures with others that more closely fit their own mission, goals, and objectives.

PERFORMANCE MEASURES

We identified numerous performance measures related to the two goals and seven actions described in Chapter 2. All of the measures are based on recommendations of professional groups in the public safety industry, such as the National Emergency Number Association, or on state statutes or rules.

Some of the measures are important outputs—counts of services that a PSAP provides or uses. The number of 9-1-1 calls a PSAP processes annually is an example of an output. Sometimes output measures simply indicate the existence of a certain desirable characteristic, such as the use of standard operating procedures, without also measuring the degree of that characteristic's effectiveness.

Other measures describe the outcomes, or actual results, of a PSAP's actions. Outcome measures indicate the actual impact of PSAP actions. An example is the percentage of calls dispatched to the appropriate emergency response unit.

Still other indicators measure efficiency by examining costs per unit of output. Efficiency can be measured in terms of dollars, time, or personnel. For instance, the amount of expenditures per 9-1-1 emergency call is one indication of efficiency.

Cost-effectiveness measures look at costs per unit of outcome. These measures indicate the capacity to produce desired results with minimal expenditures of time, energy, money, or other resources. Cost per call dispatched to the appropriate emergency response unit is one measure of cost-effectiveness.

Not all of the following performance measures are easy to measure. In fact, we were unable to use all the measures listed below because of the lack of data. We include several measures that individual PSAPs may find important to measure despite our observation that few currently collect the information.

The indicators of performance listed in this appendix can serve as tools for PSAPs to track their own achievements and assess the quality of their service delivery. We list some measures that are compared to a median statewide ranking calculated from our survey data, such as the "number of calls per dispatcher is at or above the state median." Individual PSAPs using these measures would instead compare the measures to their own baseline data.

To the extent possible, we grouped the measures into categories linked to the actions we recommend in Chapter 2 for effective and efficient dispatching. We begin with measures of a general nature that apply to most or all actions taken by a PSAP and that are not tied specifically to one of the seven actions we recommend. Following that we list measures for each of the recommended actions. We do not list separately the action related to considering opportunities for cooperative dispatching. Determining whether cooperative efforts will improve services or lower costs requires using all the performance measures listed here.

General

These measures apply to most or all actions for effective and efficient dispatching.

Output Measures

- Number of emergency calls (9-1-1 and other) received and processed annually

- Number of nonemergency calls (9-1-1 and other) received and processed annually
- Number of calls requiring the dispatching of public safety or other response units

Outcome Measures

- Not more than 1 call out of 100 incoming calls is blocked or receives a busy signal during the busy hour of an average week of a busy month
- At least 90 percent of calls are answered within 10 seconds, with no more than 3 rings, during the busy hour of an average week of a busy month
- At least 95 percent of outgoing calls are transferred to the appropriate location
- High percentage of calls are dispatched to the appropriate emergency response unit
- High percentage of citizens are satisfied with PSAP performance

Efficiency Measures

- Total calls per full-time equivalent dispatcher is at or above the state median
- Emergency calls per full-time equivalent dispatcher is at or above the state median
- Calls per total full-time equivalent staff at PSAP is at or above the state median
- Cost per 9-1-1 call is at or below the state median
- Cost per other calls (non-9-1-1) is at or below the state median
- Cost per all calls is at or below the state median
- Cost per capita is at or below the state median
- Cost per answering position per call is at or below the state median

Cost-Effectiveness Measures

- Cost per call at minimal level of service (at least 90 percent of calls answered within 10 seconds, with no more than 3 rings, during the busy hour of an average week of a busy month) is at or below the state median
- Cost per capita at minimal level of service (at least 90 percent of calls answered within 10 seconds, with no more than 3 rings, during the busy hour of an average week of a busy month) is at or below the state median
- Cost per call transferred to the appropriate location is at or below the state median
- Cost per call dispatched to the appropriate emergency response unit is at or below the state median
- Cost per citizen satisfied with PSAP performance is at or below the state median

Develop and Use Standard Operating Procedures

These measures apply to our first action listed in Chapter 2 for effective and efficient dispatching, including standard operating procedures, disaster recovery plans, and emergency medical dispatching.

Output Measures

- Availability of written standard operating procedures for PSAP functions
- Availability of written disaster recovery plans
- Availability and testing of backup and emergency procedures and facilities

- In PSAPs that provide emergency medical dispatching, availability of prearrival instructions, an emergency medical priority response system approved by a medical director, medical protocol prompts on flip cards or computer, appropriate dispatcher training, and a quality assurance program

Outcome Measures

- High percentage of calls received and dispatched according to PSAP standard operating procedures
- High percentage of dispatchers satisfied with PSAP standard operating procedures
- High percentage of emergency response agency personnel satisfied with PSAP standard operating procedures
- High percentage of effective medical instructions provided via phone to callers at scene of medical emergencies

Support a Trained and Qualified Work Force

These measures apply to our second action for effective and efficient dispatching, related to selecting, hiring, and training dispatchers.

Output Measures

- Availability of hiring and selection practices that include realistic job previews, background checks, testing before hiring, and probation periods
- Availability of training for new employees that meets or exceeds the Association of Public Safety Communications Officers (APCO) minimum training standards in eight subject areas
- Availability of professional development for PSAP managers and administrators
- Availability of ongoing training targeted to employees' individual needs
- Availability of written personnel policies and procedures
- Employee performance evaluations conducted at least annually
- Employee performance evaluations that include goal setting, incentives to encourage good performance, and use of corrective or disciplinary actions when warranted
- Availability of stress management practices

Outcome Measures

- High percentage of dispatchers with training that meets APCO training standards
- High percentage of dispatchers with certification for use of automated criminal justice information systems
- High percentage of PSAP managers and administrators with professional certification
- High percentage of dispatchers reach objectives of their personnel evaluation
- Low percentage of dispatchers with stress-related illnesses that are left unmanaged
- High percentage of shifts with adequate dispatcher staffing
- At least 75 percent employee retention rate over five years

Efficiency Measure

- Cost per dispatcher of training that meets APCO training standards is at or below the state median for such training

Maintain Adequate Communications and Network Equipment

These measures apply to our third action for effective and efficient dispatching, including adequate equipment and features, routine equipment maintenance, database maintenance, and other support functions.

Output Measures

- Availability of speed dial library, last number redial, three-way conferencing, and distinctive ring tone for 9-1-1 calls
- Availability of selective, alternate, and default routing
- Availability of automatic number identification and automatic location identification or local location identification
- Availability of logging recorder with automatic second deck or second drive
- Availability of emergency weather reports
- Availability of uninterruptible power supplies and backup generators
- In PSAPs with computer-aided dispatch (CAD), availability of interface between CAD and other systems, providing automatic number and location identification and answering position identification
- Availability of system to track calls for management information on caseload, transferred calls, length of call, etc.
- Availability of system for monitoring the location of vehicles in the field
- Availability of ergonomic features at answering positions, such as individually-controlled lighting, self-adjustable seating, or height-adjustable consoles
- Availability of telecommunications devices for the deaf (TDD)
- Availability of TDD detection device
- Availability of interpreter services for non-English speaking callers
- Availability of features to maintain secure communications, such as portable and cellular phones, mobile data terminals, scramblers, or trunked radio communications system
- Availability of written contracts for responsibility and maintenance of all databases
- Availability of 24-hour per day and 7-day per week access for resolving 9-1-1 problems
- Availability of equipment inspection and routine maintenance
- Availability of equipment replacement plan
- Availability of remote maintenance capabilities
- Availability of master clock to synchronize internal clocks and provide consistent time stamps to event records and voice recordings
- Availability of audible signal simultaneous with trunk seizure on incoming 9-1-1 call

Outcome Measures

- At least half of 9-1-1 trunks and answering positions remain operational in the event of a single equipment component failure
- 100 percent of PSAP electrical equipment is properly grounded and expected to function in the presence of electric stress conditions

- 100 percent of electrical and physical interfaces of PSAP equipment meets state and local requirements
- Number of radio frequencies is sufficient for the radio traffic
- Number of trunks and equipment are sufficient to ensure not more than one call in 100 attempts is blocked during the busy hour of an average week of the busy month
- At least 90 percent of locations within PSAP service area have reliable radio coverage between the center and either mobile or hand-held radio units
- Hearing- or speech-impaired callers receive the same level of service as other callers
- High percentage of satisfaction with security of radio communications
- High percentage of locatable addresses in the PSAP service area
- High percentage of incidents where radio and other communications equipment allow PSAP and emergency response units to communicate with each other
- All calls are automatically alternately routed if PSAP 9-1-1 trunks are busy
- No calls in progress are interrupted, nor are incoming calls blocked, due to power disruptions

Efficiency Measures

- Cost of capital equipment per call, over five years, is at or below the state median for a particular level of service (fully enhanced, local location identification, automatic number identification only, or basic service)
- Cost of annual equipment maintenance per call is at or below state median
- Cost and time of database maintenance per record is at or below state median

Keep Records and Measure Performance

These measures apply to our fifth action for effective and efficient dispatching, related to maintaining the records necessary to evaluate PSAP performance.

Output Measures

- Availability of a formal process of setting goals and measurable objectives or a peer review process for measuring PSAP performance
- Availability of systematic data collection and information management systems
- Availability of systematic documentation of citizen complaints and their resolution
- Availability of systematic documentation of emergency response agency complaints and their resolution
- Availability of questionnaires, surveys, or focus groups to measure citizen satisfaction

Outcome Measures

- 100 percent of calls for service recorded, date and time stamped by a master clock, and 9-1-1 call records retained for a minimum of 31 days
- High percentage of citizen complaints resolved by PSAP
- High percentage of emergency response agency complaints resolved by PSAP
- Ongoing improvements in service over prior year

Promote Information Exchange Among Public Safety Response Agencies

These measures apply to our sixth action for effective and efficient dispatching, regarding systematically soliciting feedback on PSAP operations from emergency response agencies.

Output Measure

- Availability of regular meetings between PSAP employees and other public safety personnel for feedback on PSAP operations

Outcome Measures

- High percentage of PSAP employees satisfied with PSAP operations
- High percentage of other public safety response personnel satisfied with PSAP operations

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

These measures apply to our seventh action for effective and efficient dispatching, pertaining to public outreach programs.

Output Measure

- Availability of techniques used to communicate information on 9-1-1 services to the public

Outcome Measures

- High percentage of citizens knowledgeable about 9-1-1 services
- High percentage of calls received by PSAP are appropriate in nature, as determined by the PSAP

Efficiency Measure

- Cost per capita of public education program is at or below the state median

Cost-Effectiveness Measure

- Cost per capita of public education program in areas with high percentage of citizens knowledgeable about 9-1-1 services is at or below the state median

Typical Costs for Effective and Efficient 9-1-1 Dispatching

APPENDIX C

As part of this review, we gathered information on current costs of various equipment, training, and other features related to the seven recommended actions for effective and efficient public safety answering points (PSAPs). All of the items listed below have an impact on the quality of service that dispatchers provide and on the operations of PSAPs. To collect this information, we contacted vendors of public safety telecommunications equipment and 9-1-1 related services, as well as professional organizations that offer services to dispatchers and PSAPs. We also contacted several PSAPs to gather information on recent purchase costs of equipment and services.

Our list of equipment and features and related costs is not exhaustive. The information reflects ranges of minimum costs based on our contacts with multiple vendors and PSAPs; PSAPs may incur actual costs that are higher or lower. The list is a starting point and the figures do not include vendor fees related to installation and ongoing maintenance. Purchase, installation, and maintenance costs may vary greatly depending on the location and needs of the PSAP. In light of the evolving technology in the area of public safety communications and dispatching, the costs for these items, as well as desired options and features, are subject to change over time.

We organized the lists below according to the actions recommended in Chapter 2. Additional cost information for certain items is included in the Chapter 2 examples of best practices used by specific Minnesota PSAPs.

Develop and Use Standard Operating Procedures

Emergency Medical Dispatch Priority Response System

Emergency medical dispatch manager training	$99 to $295 per course
Emergency medical dispatcher training	$179 to $250 per course; $50 per hour for instructor on-site at PSAP
Medical protocol prompts on flip cards	$445 to $465 per set
Medical protocol prompts on computer software	$1,400 to $2,250 per answering position; $2,500 per site license

Support a Trained and Qualified Work Force

Selection and Hiring	
Testing	$175 and more, depending on number tested; includes testing knowledge, multi-tasking ability, personality, etc.
Training	
Basic telecommunicator course	$179 per individual
Communications center supervisor course	$279 to $1,495 per individual
Human resources management course	$279 per individual
Americans with Disabilities Act training	$99 per individual
Stress management training	$99 per individual
National Emergency Number Association (NENA) Certified Emergency Number Professional	NENA member: $485; nonmember: $625 (includes books)
Bureau of Criminal Apprehension Criminal Justice Information Systems Certification	No course costs
Bureau of Criminal Apprehension Police Management/Supervision Certificate	$520 to $820
Minneapolis Community Technical College Diploma/Associates of Arts Degree	$2,000 to $4,500

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

Public Service Announcement (PSA)	
Produce and broadcast PSA video or text	No direct costs to PSAP if contracted through its local government access cable television network. Local government pays network franchise fees for cable television services.
Broadcast PSA video or text	No cost if aired by public access cable television organization or other network stations.
Produce PSA video or text	$5,000 to $50,000 through private company
Literature and Other Materials	
National Crime Prevention Council 9-1-1 brochure	$150 for 1,000 brochures
National Crime Prevention Council coloring book for children	$460 for 1,000 books
APCO 9-1-1 education kit for children	$35 each (includes instructional video, presenter's guide, and materials for 35 children)

Maintain Adequate Communications and Network Equipment

Phone Equipment Features	
Automatic call distribution (ACD) software	$1,130 (basic software) to $10,870 (ACD and customized records management software)
Three-way telephone conferencing, speed dial, last number redial	No additional cost; included within 9-1-1 system
Selective routing	$7 and more per 100 population
Telephone trunks for alternate routing	$40 per trunk plus 10¢ and more per routing mile
AT&T language line (interpreter services)	No costs to PSAPs for 9-1-1 or emergency calls; all other phone calls: $3 per minute
Telecommunications Devices for the Deaf (TDD) Equipment	
TDD	$450 to $550 (retrieves ASCII)
TDD detector	$399 (includes 2 1/4” printer)
TDD system	$1,195 (for TDD, detector, printer, headset)
Other Communications Equipment	
Mobile cellular phone	$150 to $200; or $650 (for two-way radio, pager, and cell phone)
Portable radio	$1,000 to $2,000 (VHF); $2,500 to $4,000 (800 MHz)
Radio frequency pager for fire emergencies	$200
Phone pager	$100
Mobile radio base station repeater	$10,000 to $20,000
Trunked Radio Systems	
Mobile radio (digital)	$2,000 to $3,500
Portable radio (digital)	$2,500 to $4,000
Repeater (digital)	$17,500
Mobile data systems computer	$7,200
Mobile data repeater	$45,000
Message switch	$500,000
Network controller	$120,000
Voice Protection/Scramblers	
Two-way radio scrambler	$125 to $700 per radio (plus $120 installation)
Cellular phone and scrambler	$700 to $2,900
Land line scrambler	$1,000 to $2,100 per line
Mobile data computer (MDC) scrambler software	$1,000 per server; $1,500 per squad car computer

Continued ...

Uninterruptible Power Supply	
Primary back-up system	$10,000 to $30,000
Generator	$2,000 to $15,000
Batteries	$500 to $600 per generator
Other Equipment	
Computer-aided dispatch (CAD) server software	$35,000 to $100,000 (may include various management information software); $14,000 and more for redundancy software
CAD answering position software	$16,500 per answering position; up to $100,000 per site license
CAD and MDC interface software	$3,000 to $75,000
CAD server (hardware)	$50,000 to $75,000; $75,000 for redundancy
MDC (hardware and software)	$10,000 per squad car
Complete CAD system	CAD system costs vary widely, from $500,000 to several million dollars. For example, one $2,300,000 system includes application software licenses, system software and hardware, miscellaneous hardware, installation, integration and interfaces with entire PSAP network information systems, and warranty and maintenance costs for: 12 dispatch/calltaker workstations, 1 training workstation, 1 supervisor workstation, and 3 administrative workstations; hardware also includes 2 CAD servers, 1 communications server, and 2 records management servers
Height-adjustable console at answering position	$6,500 to $9,000 per position
Self-adjustable chair	$625 to $1,080

Keep Records and Measure Performance

Personnel scheduling software	$1,995 to $4,995
Records management software	$3,300 per answering position; up to $60,000 per site license
Telephone line logger	$4,000 (handles up to 20 lines)
Digital recorder (voice recorder)	$38,000 to $45,300
Voice logging and call logging software	$12,000 and more (handles up to eight lines); $2,300 for additional increments of eight lines (includes redundancy and remote maintenance)
Master clock	$2,495 to $4,455

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