9-1-1 CENTER OPERATIONS: CHALLENGES AND OPPORTUNITIES

The 9-1-1 center is frequently underestimated and misunderstood by the community it serves. Often attention and emphasis go to the technology that brings 9-1-1 calls into the center. More focus needs to be given to the human element—the dispatchers and their managers who are using that technology.

When properly trained and supported by the appropriate tools and quality improvement system, the dispatcher can become the first responder of a community's emergency care system—that is, the first professional available to help a victim. These dispatchers can handle every conceivable kind of call, and do so consistently, quickly, and safely.

This report illuminates the operations of the modern 9-1-1 communication center, which should function as the brain of the emergency care system, gathering critical information that improves care to the citizen, safety to providers, and that makes best use of a community's limited resources.

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INTRODUCTION

Consider two emergencies, both occurring at the same time in the same community. In the first case an elderly man collapses on the floor of a restaurant. His wife sees he is not breathing and asks another patron to dial 9-1-1 on his cell phone. In the second case, just a mile away, a young mother is worried because her child has been vomiting and seems hot to the touch. Without medical insurance or a regular pediatrician, she dials 9-1-1. The first case is a true life-and-death emergency. The second case may not be time critical but, to a parent, a child’s distress is always an emergency. Is your system designed to handle these two very different types of calls properly?

In the first, highly stressful case, can the dispatcher quickly and effectively question the caller, assess what is needed, and provide life support training such as CPR or Heimlich maneuver instructions over the phone? In the second case, can the dispatcher safely rule out a time-sensitive emergency and send the next available ambulance cold (with no lights-and-siren) or even arrange alternative transportation to a clinic, thus saving the city money and reducing the chance for an accident in which an ambulance is involved? Does your communication center have the physical tools and environment to enable emergency dispatchers to do their best work, call after call? Has management integrated a quality assurance system that monitors calls and provides performance feedback and continuing education to dispatchers, ensuring that every call is handled appropriately, safely, and according to policy? Depending on state law and the motivation of community public safety leaders, dispatchers’ training and tools can vary widely. This report provides up-to-date guidelines and issues that local government managers need to address.

ABOUT 9-1-1

The universal number for emergency services in North America is 9-1-1, and the National Emergency Number Association (NENA) estimates that nearly 98 percent of the U.S. population has access to this lifeline. The primary managerial, operational, and funding responsibilities for the approximately 97,000 public safety answering point (PSAP) employees have remained mostly in local hands. The attacks of September 11, 2001, heightened public interest in emergency services in general, and hiring, training, and retaining qualified 9-1-1 center personnel to meet the increasing call load and demand for emergency services have been key challenges for 9-1-1 center administrators. As the technology and sophistication of 9-1-1 systems advance, there is a movement across North America to take advantage of economies of scale among disparate public safety agencies to combine and regionalize 9-1-1 services, streamline staff, and provide for better statewide, province-wide, and region-wide coordination.

As public use of 9-1-1 has dramatically increased, there is a growing need to define the limits of emergency services. Many calls to 9-1-1 occur because of its easy access and reputation for rapid response, but they could be more effectively handled by other community resources. Many cities have introduced 3-1-1 as a nonemergency information and referral service to help reduce unnecessary calls on busy emergency phone lines. One of the more daunting challenges for 9-1-1 systems has been the rapid proliferation of cell phones.
during the early stages of the project. Consolidations often require 9-1-1 center employees who deal with one specific dispatching discipline (law enforcement, for example) to take on fire and EMS dispatching skills and duties as well.

Outsourcing of specialized 9-1-1 services is another option for cash-strapped jurisdictions attempting to contain service costs. For example, a primary PSAP agency may choose to contract its emergency medical dispatch services

A Case Study of Consolidation—Augusta, Georgia

During the 1980s, law enforcement, fire, and EMS in Augusta, Georgia, operated separate 9-1-1 entities in the same building. The sheriff's department answered all incoming 9-1-1 calls and then transferred them to fire or EMS when appropriate. Each agency operated under its own set of budgetary, administrative, and operational guidelines, which created a variety of challenges. Two decades later, the three entities were joined together. Phillip Wasson, director of the consolidated Augusta 9-1-1 center has described the process and lessons learned:

Q: What is a consolidated center?
A: A consolidated center is a unified entity of the three dispatch agencies: law enforcement, fire, and EMS. The center is managed by one director who directly reports to the city/county commission. All calls are handled by the same group of dispatchers who are cross-trained in each of the three public-safety disciplines. The workload is evenly distributed among calltakers, and each calltaker handles a specific caller all the way from phone pickup to hang-up.

Q: What problems did your call center face prior to consolidation?
A: There were administrative inefficiencies and operational problems with having three separate dispatch operations. Since the sheriff's department answered all incoming 9-1-1 calls, a client having either a fire or medical emergency needed to go through two calltakers before the needs were addressed. Also, there was always at least a five- to ten-second delay when transferring a call. An unequal distribution of work among the three dispatch agencies also resulted from the old system. Sheriff's dispatchers were required to take all incoming calls. Consequently, sheriffs were often overburdened, while their fire and EMS colleagues were left idle. Because most incoming calls dealt with law enforcement issues rather than EMS or fire, sheriffs had the majority of the work.

Q: What political obstacles did the agencies face as they progressed toward consolidation?
A: In 1998, the EMS dispatch center moved to a different location, where it continued to be managed by a private ambulance provider. During this time, police and fire services agreed to combine their dispatching functions, but they disagreed about which of the two would manage the combined center. In June of 1999, an act by the city/county commission created a 9-1-1 department completely separate from the police and fire departments. In the following year, the commission decided to incorporate the EMS dispatch into the city/county 9-1-1 center. Operationally, this occurred in 2002, which completed the unification of all three dispatch services.

Q: How is a consolidated center structured?
A: The 9-1-1 center is its own department and has a director who reports directly to the city/county commission. The stakeholder groups, including the sheriff's depart-
SCOPe AND RESPONSIBILITIES
OF A 9-1-1 SYSTEM

A local PSAP may be configured in several different ways. It may be strictly a call center—with calltakers trained to receive incoming 9-1-1 calls, identify the location and the nature of the problem, and then forward the caller to the proper emergency service dispatch agency for further evaluation and processing. Alternatively, the primary PSAP may handle the call processing, notification, incident tracking, record keeping, and two-way radio communication for one or more public safety service(s) on-site. In some cases, the primary PSAP is a combination of these two models. For example, in many large urban districts, the primary PSAP may provide complete call processing and radio dispatch for all law enforcement incidents, but calltakers transfer callers with fire and medical emergencies to the appropriate fire department or ambulance dispatch agency, often referred to as the secondary PSAP. At a minimum, a PSAP will provide:

- A single telephone access point for the public to reach local emergency response agencies—law enforcement, fire departments, and ambulance services
- Early identification of caller phone numbers, addresses, locations, and incident types
- Audio records of all incoming 9-1-1 and emergency telephone calls
- Written logs of all incoming 9-1-1 calls.

Other responsibilities that may be assigned to the primary PSAP or handled by a secondary PSAP service include:

- Rapid incident notification to emergency responders of addresses, locations, and incident types
- An incident identification, tracking, and monitoring system
- Dynamic management of responder resources to accommodate service demand and adequate geographic coverage
- Two-way radio and/or wireless electronic communications with responder personnel
- A standardized, scripted information-gathering process to elicit key information from individual callers
- A prioritization coding system for appropriately managing response
- Standardized, scripted instructions for callers during emergency and life-threatening situations

- Access to state, regional, and nationwide crime and fire databases and reporting systems
- Monitoring of calls for unusual discrepancies from historical patterns, providing early warning of public health emergencies.

Questions to Ask Your 9-1-1 Center Director

Is your center using the most current version of medical, fire, or police dispatch protocols?

If not, your dispatchers and your community don't have access to the latest science and standards, from small improvements in wording to significant changes in medical care and responder safety issues. If a lawsuit occurs, agencies are at a distinct disadvantage in trying to defend out-of-date protocols that no longer represent the standard of care.

Are your dispatchers following the protocols?

A comprehensive quality assurance program includes having a designated and trained quality assurance professional monitor the tapes of a random sampling of the calls taken by your dispatchers, listening to make sure that dispatchers are following the established standards and protocols.

Are your dispatchers getting continuing education and are they required to recertify?

The initial 24-hour training alone cannot create a professional. Does your 9-1-1 center require continuing education and recertification?

Are your dispatchers compensated as professionals commensurate with their role?

Many high-performing systems pay their dispatchers as much or more than field responders, but in many other places the salaries for calltakers or dispatchers are barely above minimum wage. A survey of communication centers conducted by the NAED in 2003 showed the average salary for a dispatcher was $15.48 per hour, with an average beginning rate of $12.74 and an average top rate of $18.76.

Are your dispatchers working in open, well-lit, well-designed spaces?

Dispatch is a high-stress job, and the physical environment, with well-designed work stations, is critical to the job.

Does your communication center director demonstrate full support for the concepts of emergency medical dispatch?

To institutionalize professionalism and respect for the system, management must have written policies and procedures in place. Find out whether the emergency medical services director is involved in developing and implementing those policies and procedures.

Is your center using its resources to match response to need?

NAED protocols only recommend various levels of response based on the circumstances of the call as gleaned by the dispatcher. Politics and agency policy dictate whether a fever and a sudden cardiac arrest get the same response. In other words, if the 9-1-1 center is using standard protocols and can demonstrate high compliance with those protocols by the dispatchers but does not rely on these procedures to determine graduated responses based on need, your emergency response system is not as safe and effective as it could be.
Recent technology advances have made it possible for both primary and secondary PSAPs to efficiently manage, process, and store large amounts of information, giving rise to new roles and responsibilities for these 9-1-1 systems. Strategic planning and future system design will most certainly require matching the technological and operational capabilities of 9-1-1 with evolving public needs and expectations.

STANDARDS, TRAINING, AND CERTIFICATION

Standards and curricula for training and certification for public-safety telecommunicators and for emergency medical dispatch, a subdiscipline of public-safety telecommunications, are widely established and well documented (see sidebar on page 4). Many states now have legislation that governs training and practice for public-safety telecommunicators and emergency medical dispatchers. See Additional Resources at the end of this report for information on model emergency dispatch legislation and rules and regulations.

Among the key elements of a sound emergency medical dispatcher program is the use of an emergency medical dispatch priority reference system (EMDPRS), which is a systematized set of caller questions, dispatcher actions, response-level coding, and pre-arrival instructions for use in all emergency medical call-taking and dispatch prioritization decisions.

Standards

The standards-setting organization, American Society for Testing and Materials (ASTM), has produced three separate documents that detail practice standards as well as training, certification, system management, and instructor qualifications for emergency medical dispatch (EMD). Together, these three documents, known as ASTM F-1258, F-1552, and F-1560, provide the fundamentals for establishing an EMD program. Numerous organizations have endorsed and supplemented the ASTM standards. For operations and management, in 1992 NENA (www.nena.org) developed "emergency number professional" standards and certification, which has gained widespread support among public-safety agencies and system administrators.

Training

The National Highway Traffic Safety Administration (NHTSA), an arm of the U.S. Department of Transportation, has published a national standard curriculum for EMD. The course, which requires 24 hours of in-class work, focuses on the specialized skill for handling medical emergencies over the telephone, including correctly identifying medical complaints, asking structured questions, providing pre-arrival instructions, and prioritizing cases based on verifiable information.

Several organizations, including the NAED, have developed training programs for both fire and law enforcement dispatching. The NAED offers a separate training program (24 course hours) for each of these specific disciplines, based on a proven, protocol-driven call-taking and incident-coding process. This training program, pioneered in Salt Lake City, in 1983 earned the city’s chief administrative officer ICMA’s annual Clarence E. Ridley In-Service Training Award for a “singularly significant training program.”

Certification

Certification has become commonplace as a way to validate dispatcher competence and knowledge. According to ASTM F-1560, “The emergency medical dispatcher should be a specially trained telecommunicator with specific emergency medical knowledge.” The National Association of EMS Physicians (NAEMSP) says, “Training as an EMT or paramedic does not adequately prepare a person for the role of an EMD.” EMD certification includes completion of a locally approved 24-hour training course, successful passage of a written or automated exam that evaluates knowledge and skills, and recognition of the certification program by a nationally established organization sanctioned by the governmental body with state EMS system jurisdiction.

Continuing Dispatcher Education

Ongoing training and education is a staple among the public-safety professions. Most police and sheriff’s officers, firefighters, paramedics, and emergency medical technicians are required to maintain and regularly update their skills and meet specific certification requirements. Because certification and practice standards for 9-1-1 telecommunicators are now well established, they will receive similar ongoing education. ASTM standard F-1560 states: “A sound, ongoing program of continuing dispatcher education is essential. Without regular educational experiences specifically directed to their practice, the EMD will become less proficient in the understanding of and compliance with the EMDPRS.” The standard also lists various elements of continuous dispatch education and categories of instruction and experiences suitable for dispatchers:

- Scenario drills/role playing
- Specific protocol and policy reviews
- Local planning and management meetings
Pre-Arrival Instructions in Dispatch

Pre-arrival instructions—carefully scripted instructions provided by dispatchers to aid callers and victims before trained responders arrive—are still not universally practiced among emergency dispatch agencies, in spite of overwhelming public expectations, unanimous professional acceptance, and high-profile successes in many communities.

The NAEMSP states that: “Pre-arrival instructions are a mandatory function of each EMD in a medical dispatch center. . . . Medically approved telephone instructions by trained EMDS are safe to give, and in many instances are a moral necessity.”


- Case review activities
- Audio-visuals
- Didactic lectures
- Field responder experience (ride-alongs)
- Attendance at remote professional conferences and seminars.

STAFFING THE 9-1-1 CENTER

Personnel costs for online staff make up by far the largest share of a PSAP’s operating budget. Managers must diligently seek the most cost-effective staffing solution while they meet all the needs of the community and public-safety system. Staffing plans must not only provide adequate line telecommunications personnel and supervisory staff around the clock, every day, but they must also make allowances and adjustments for varying skill levels of the staff and take into account the needs of the various public-safety agencies served by the center.

Many centers divide the responsibilities of their line staff into two distinct job classifications: calltakers and radio dispatchers (allocators). The calltaker works strictly as a telephone communicator, receiving and handling calls from the public, initiating and entering cases for subsequent handling by radio dispatchers. Radio dispatchers alert and assign responder personnel to cases entered by the calltakers. They communicate directly with responder personnel to track and record unit statuses, provide additional case details, and handle requests for additional responder units. Alternately, one person may perform both jobs—taking the call and dispatching the field units in sequence. Some centers rely heavily on part-time workers, scheduled overtime, or on-call workers. Each of these practices obviously affects a manager’s planning and staffing decisions. Also, the logistical capacity and physical limitations of the center must be considered; it does no good to staff ten positions on a given shift when there are only eight functional workstations. Neither does it make sense to have a fixed number of staffed positions as call volume waxes and wanes predictably.

Many systems are currently experiencing an acute shortage of qualified 9-1-1 center staff members. High stress, difficult shift work, compensation lower than most other public-safety positions, and a confined working environment all contribute to this problem. For more information, see NENA’s PSAP Staffing Guidelines Report. See Additional Resources at the end of this report for sample job descriptions.

Call Load

Perhaps the simplest way to start a staffing plan is to gather and examine historical data on call load by day of week and hour of day. Centers often show a distinct pattern of peak and off-peak call times. Peak hours are almost always during the late afternoon and evening hours, beginning with rush hour and after-work activities. Weekends and holidays may show different peak times based on seasonal, climatic, geographic, and other environmental factors. In many urban centers, it is not uncommon to see call load increase by a factor of 2 or 3 from the slowest to the busiest hour of the day.

Call Duration

If managers know the duration of the average phone call, they can combine it with call-load data to calculate peak-hour needs at the call answering positions. Because call durations vary widely, it is important to measure both mean and median durations as well as percentile groupings (e.g., 90 percent of calls take less than 180 seconds). Call duration is affected by numerous factors, discussed later in this report.

Fixed vs. Variable Positions

Although call load plays a key role in developing a staffing plan, certain positions must be staffed regardless of how slow or busy it is. These fixed positions are generally counted first, before adding in the variable positions needed to meet call load increases for a specific hour of day and day of week.

Shift Duration and Start Times

Various shift types are used in emergency call centers. The most traditional pattern, and perhaps the least flexible, is a series of three eight-hour shifts, each assigned a specified start-time. Typically, the day-shift team starts between 6 a.m. and 8 a.m., the swing-shift team starts between 2 p.m. and
4 p.m., and the graveyard shift starts between 10 p.m. and midnight.

Eight-hour shifts, while common, are far from universal. Shifts lasting 10, 12, and even 24 hours are used by many systems. Agencies are increasingly turning to alternative shift schedules and flexible staffing plans to address issues such as fluctuating call load, continuity of work flow at shift change, and staff work-schedule preferences.

**Specialized Skills and Training**

Agencies that handle numerous responsibilities for different public-safety entities may employ people who have skills to perform certain tasks, but not others. For example, a telephone calltaker may not have the skills to do radio dispatching of responder units. Or a calltaker trained to handle law enforcement calls may not have the required training and certification to handle medical-related calls. Staffing plans in centers where multiple functions are performed must take into account the various skills and training of individual employees.

**Staffing during Disasters and Situations of Extreme Overcapacity**

Occasionally centers will experience unusual or extreme conditions that overwhelm their capacity to manage incoming calls and assign responder resources. For times of extreme weather, major airplane or train accidents, terrorist attacks, and other events causing mass casualties, 9-1-1 centers should have contingency plans for staffing and managing queued incoming calls. Many 9-1-1 centers have inactive or makeshift consoles that could be activated. Often agencies build situation rooms, or emergency command centers, at the same facility as the 9-1-1 center. These areas can be equipped so that local and regional public-safety authorities can congregate under one roof, with immediate access to one another and to the 9-1-1 system to enable coordination in a tightly controlled, immediate fashion.

**Planning for the Future**

Flexibility is critical for planning future staffing. The center of the future will most likely be one in which shifts are staggered (at least one person will report for start-of-shift every few hours), centers are staffed hour by hour on the basis of need and historical call load, and staff are expected to perform a wide range of skills and functions. Managers must examine the staffing needs of their centers and develop plans based on established procedures and standards.

In many regions, emergency calls are increasing at a rapid rate. Also, in some areas, consolidation of services is leading to more activity in the local 9-1-1 center, and new roles and responsibilities are being created for existing staff. Historical changes in call load do not always reflect future trends, but they are usually a good starting point for predicting future staffing needs. With the best available change predictors, budgets should anticipate increases in staff. A staffing and budgeting proposal for future system development and expansion should be contained in each local government’s strategic plan.

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### QUALITY MANAGEMENT

To be effective, higher standards and better training must ultimately lead to a higher level of service for 9-1-1 system users. It's no surprise, then, that with better and more widely accepted dispatcher training and certification standards, developing better methods of evaluating and managing performance has become an issue. Regarding EMD, ASTM F-1560 says “it is necessary to establish sound medical management processes through a multi-component ... program administered ... in conjunction with the physician medical director.” A well-designed quality-management plan, properly executed, will improve service, control risk, and help shield the entire public-safety system from political, legal, and public relations disasters.

A comprehensive quality management process includes 11 key elements:

- Protocol selection and implementation
- Dispatcher/telecommunicator/staff selection
- Dispatcher/telecommunicator orientation programs
- Training program(s)
- Dispatcher/telecommunicator certification
- Quality oversight
- Continuing dispatch education
- Dispatcher/telecommunicator recertification
- Case evaluation and performance feedback
- Data collection analysis, and feedback
- Suspension, decertification, or termination.

Other parts of this document present many of these elements. In this section, we examine the main issues relevant to protocols, quality oversight, auditing, data collection, and performance-feedback processes.

**Protocols**

The use of established protocols—protocols are more structured and well-defined than guidelines or other types of
call-taking and prioritization systems; they are a specific type of EMIDPRS—as part of a comprehensive quality management process has garnered widespread support among emergency service professionals. In a 9-1-1 center, protocols are a set of written, approved procedures and practices for the evaluation of, response to, and provision of care to emergency callers and patients. The National Institutes of Health, NAEMSP, the ASTM, NENA, and NAED have all endorsed the use of protocols as the most effective method of handling 9-1-1 cases and managing performance. Protocols have a distinct advantage over guidelines and other less-structured practices that grant wide individual discretion because protocols provide clear standards and expectations that can be objectively measured to determine compliance with those standards. They provide essential consistency in the time-restricted environment of 9-1-1 decision making.

The concept of a unified protocol was established by the NAED as a means of bringing standardization and scientific validation to the emergency dispatching profession. By replicating a single public-safety protocol in multiple centers at multiple locations in North America, Europe, Africa, and Austral-Asia, agencies have been able to participate in large research projects that compare studies and individual data points to help identify universal patterns that are used as the basis for future system improvement and information management.

The basic elements of an emergency dispatch protocol are:

- Systematized caller interrogation
- Systematized pre-arrival instructions for callers (before trained help arrives)
- A prioritization process that specifically identifies the incident-type code and incident priority level
- A predefined response matrix that specifies response modes (emergency, urgent, and non-urgent, at a minimum) and provides for assignment of specifically trained personnel, vehicles, and equipment for each incident type code.

(See Figure 3 on page 17 of this report for an example of a protocol for a call concerning an outside fire.)

Measuring protocol compliance is an essential step in evaluating performance. Agencies should establish an audit process by which individual cases can be randomly selected and scored for compliance, with those scores recorded and shown to the original 9-1-1 calltaker or dispatcher as official performance feedback. A random audit process that results in clear, objective, and timely feedback to 9-1-1 staff has been proved to be an effective tool for achieving improved performance. Cumulative scores provide an objective method of defining call processing performance based on nationally accepted standards of practice. The current due process of employee remediation relies on clear, objective, and well-established performance standards.

Oversight

The quality process should be managed by several oversight groups, each responsible for certain activities:

- Quality Improvement Unit (QIU): A group of certified individuals who perform random audits, or case evaluations, by listening to audiotapes of individual cases and scoring them for compliance to protocol. Compliance scores are recorded and stored in a secured master database. 9-1-1 dispatchers and call-takers receive regular performance feedback based on these audited cases. Compliance summary reports are submitted monthly to the Dispatch Review Committee.
- Dispatch Review Committee (DRC): The working group of line emergency dispatchers, supervisors, field providers, and ancillary personnel responsible for identifying training, policy, and protocol needs after a thorough review of the data submitted by the QIU. The group generally meets monthly but may convene more frequently to meet departmental objectives.
- Dispatch Steering Committee (DSC): The decision and policy makers for the primary public-safety agencies and departments. These typically include the
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Police chief, fire chief, EMS chief, physician medical director, and 9-1-1 center director; this committee may include a legal representative. Their duties are to approve and/or modify those recommendations identified by the DRC, issue and update policies, and create a response plan that allocates public-safety responder resources based on incident type and a protocol-determined priority level.

One fundamental distinction must be made between the QIU members and those who sit on the DRC and the DSC: the QIU consists of certified specialists whose primary job is to perform case evaluation and quality improvement through the audit process, while the members of two committees manage the quality process along with a number of other responsibilities as part of their overall roles in the system. In practical terms, that means 9-1-1 center managers must actively seek, hire, and train skilled quality improvement specialists. A link to sample job description is provided in the appendices of this document.

**Personnel Policies**

Hiring, training, certification, and continuing education are other key elements of an effective quality management process that often get overlooked. Because today's 9-1-1 centers are often fast-paced, high-tech centers with complex and demanding mental, emotional, verbal, and multitasking skills required of employees, a comprehensive hiring process—including interviews, skills testing, background and reference checks—is a necessity.

These higher skill levels bring a pressing need for more and better training, certification, and ongoing education. Managers and administrators must constantly review the latest industry standards and update their practice standards accordingly. To promote the highest levels of professionalism, in 1993 the NAED created accredited centers of excellence (ACE) standards. Accreditation is awarded by the NAED to communication centers that demonstrate adherence to the highest standards.

**Call-Processing Times**

One popular measure of a call center’s effectiveness is call-processing time. It is not a simple measure, however, and can be counterproductive when not properly evaluated.

Roughly defined, the call processing time is the elapsed time from the moment an emergency call is received at the 9-1-1 center until the closest available responder crew(s) have been notified with all incident information necessary to respond (Figure 1). The question of what is an acceptable call-processing time for 9-1-1 calls has been debated in public-safety circles for some time.

First consider how elapsed time is being measured. Older technology, including many computerized dispatch systems still in use, does not time-stamp a case as initiated, or entered, until the address or exact location has been verified in the system’s master street address guide (MSAG).

**Figure 1: Call Processing Time-Line**

Time ranges listed are ideal targets and do not represent actual empirical data. Diagram does not include elapsed time for transferred calls from primary to secondary PSAP.

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*Call received at PSAP: Telephone answered*

- 5–10 seconds

*Verification: Incident address and caller’s phone number*

- 30–40 seconds

*Initial assessment: Safety, imminent life threat, immediate treatment needs*

- 20–40 seconds

*Secondary assessment: In-depth scene/patient evaluation*

- 30–40 seconds

*Dispatch life support: Specific dispatch instructions to stabilize the scene and/or patient.*

- 30 seconds

*Notify responders for urgent calls without imminent life-threat*

- 120 seconds

*Notify responders for non-urgent calls. Most calls will be terminated within 2–3 minutes, but some will require extensive instructions and the ED will be online until units arrive*

- 180 seconds

*Notify responders of queued calls and those assigned low priority*

- 30–60 seconds

*Notify responders now for imminent life-threat. Limited instructions are given to begin scene stabilization*

- 30 seconds
This practice discounts a substantial amount of elapsed time, including the time it takes the calltaker to answer the phone, to enter the address or location in the system and verify it electronically.

The latest state-of-the-art interfaces between phone equipment and computerized dispatch systems capture the exact time the phone is answered, and generally the time it takes to answer the phone. Hence, when new technology is installed in a 9-1-1 center, there is often the illusion of extended call-processing times, sometimes raising questions about the adequacy of the new hardware and software, or about the performance of 9-1-1 staff and its operating procedures.

This technology gap explains in part why there are widespread differences among localities in reported call-processing times as well as total response times for emergency services. Recent data reported to the ICMA Center for Performance Measurement provides call entry-to-dispatch times for EMS cases among the 10 cities reporting this measure. Fourteen other cities and localities also queried did not report this data at all. Among respondents, the mean time for jurisdictions with a population of 100,000 or more was 71 seconds, yet jurisdictions of less than 100,000 reported a mean time of 31 seconds.

The National Fire Protection Association (NFPA) published a dispatch standard for 9-1-1 and emergency call processing that states: "Ninety-five percent of emergency dispatching shall be completed within 60 seconds." At present, no research or empirical data exist to support a one-size-fits-all time standard or suggest what that standard should be. No connection has been established between shorter average processing times and favorable case outcomes. In fact 9-1-1 centers and public-safety responder agencies across the country universally report that a vast majority of their cases are not life threatening and not even time critical. The perception that seconds count or seconds save lives is true only in a small fraction of total reported cases of specific incident types. Thera Bradshaw, former president of NENA, stated, "It's time we started doing it right, not just fast."

A disproportionate emphasis on time and speed may lead 9-1-1 calltakers and dispatchers to take hasty shortcuts with established protocol and procedure. Accidents due to "hurried" response tactics, such as failure to properly record and verify the correct address of an incident, result in hundreds if not thousands of lawsuits a year.

A variety of factors, both controllable and uncontrollable by the 9-1-1 center, determine total call-processing time. One of the most critical is the type of phone used by the caller—cellular or wire line. A 2001 study performed in Denmark indicated a substantially longer call-processing time for 9-1-1 calls originating from cellular phones. While mean call-processing time was 62 seconds, calls from mobile telephones took 22 seconds longer to process than calls from stationary phones. Other factors difficult to control include language barriers, the level of activity in the system, the nature of the call, the physical location of the caller and victim, as well as the caller's state of mind and knowledge of the incident type and location. Controllable factors include staffing, type of telephone and call-processing technology used in the 9-1-1 center, the availability of a reliable MSAG, the integrity of the geographic information database, and the proper use of dispatch protocols.

One component that often is overlooked, particularly in fire and EMS dispatch agencies, is the time it takes to transfer a caller from a primary PSAP to a secondary PSAP when the secondary site is responsible for notifying the responder crews. For example, a primary PSAP receives a call for a cardiac-arrest victim, requiring an ambulance and fire responder to provide early defibrillation. For the responder crews to be notified, the caller must be transferred from one 9-1-1 agency to another, unless technology is available to electronically link both centers together via modem or wide-area networking. This transfer process can take a minute or more, adding to total response time and diminishing the chances for patient survival.

Any meaningful evaluation of call-processing times must take into account the nature and urgency of the incident. Just as we have varying response-time expectations for our public-safety responders that are based on the priority assigned to a particular incident type, so too must we establish call-processing time expectations for our 9-1-1 staff that are consistent with case urgency.

Finally, it is important to recognize that call-processing time in a 9-1-1 center is only a fraction of the total response time to the victim, patient, or caller. Driving time to the incident location, average turnout time (sometimes referred to as out-of-chute time) for responding crews, and

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**Early recognition for critical cases**

The NAED has developed a method of early recognition for the most time-critical cases that prompts calltakers to initiate an immediate notification to the closest available responders once basic call information is obtained. Where safe conditions allow, and with good address information, these maximum priority (ECHO level) cases are normally processed within one minute. For example, recent data from a large urban system showed that in a sample of more than 4,000 cardiac-arrest cases, total EMD evaluation time, excepting address and phone number verification, was 25 seconds, while total evaluation time for all high-priority cases was 33 seconds.
even the time it takes responders to get from the curbside to the victim’s side exceeds the total call-processing time in most emergency responses. Call-processing times, therefore, must be evaluated in their proper context—as a percentage of total response time.

Given the lack of standardization in measurement methods, technologies, 9-1-1 center responsibilities, and operating conventions, benchmarking call-processing times with other agencies and jurisdictions presently has only limited value. Imposing nonscientific time standards and pressuring staff to more quickly complete required tasks simply to shave a few seconds from an average processing time has virtually no value in evaluating system performance, is often counterproductive, and contributes to serious decision-making errors. When time standards are established, they should take into account several factors, including the specific incident type, type of phone used (cellular or wire line), call source, and any technological or operational issues that affect workflow.

In general, 9-1-1 managers can ensure reasonable and efficient call processing times by implementing state-of-the-art technology, providing adequate training, and enforcing compliance with specific established policies, protocols, and procedures.

### RISK MANAGEMENT

Counties and municipalities incur certain risks associated with providing 9-1-1 services. A center’s best approach usually involves early identification and aggressive action to mitigate and manage controllable risk factors. Key strategies include risk assessment; ongoing, sophisticated quality processes; policies and practices that promote limited lights and sirens for responders; and an external accreditation process for the communication center. A 9-1-1 center’s goals for risk management are to promote safe delivery of quality 9-1-1 communications service through early risk recognition, identify and mitigate potential risks through well-developed quality processes, and protect the organization’s assets and resources.

**Common Risks**

Common communication center risks include incidents associated with negative case outcomes, negative media and community perception, and the risk of service disruption.

On the basis of lawsuit after lawsuit filed over the past two decades, the NAED has identified 15 dispatch danger zones that have contributed to negative case outcomes and significant liabilities.

- **Failure to verify address and callback number.** Failure to verify this critical information is clearly a breach of duty. A protocol or policy regarding how to verify addresses and telephone numbers should exist in all communication centers, and all call takers should be carrying out this important task in the same way.

- **No-send.** Policies that screen out some callers and provide no assistance result in no-send/no-help situations (no response or appropriate follow-up referral) that are inherently dangerous. No-send policies are often the result of another risky practice, such as dispatch diagnosis.

- **Dispatch diagnosis.** Dispatch diagnosis occurs when a dispatcher is pressured to decide which callers get help and which don’t. While symptoms can be evaluated to determine the level of help to be sent, attempts to diagnose a patient over the telephone almost always lead to inappropriate treatment. A properly implemented and managed priority dispatch protocol ensures that all callers will receive appropriate assistance.

- **Significantly delayed responses.** Callers requesting emergency help expect a timely response. A delayed response may signify negligent action and lead to intense scrutiny of the call. Most lawsuits involving response times show significant delays between 45 and 90 minutes. There has never been a lawsuit claiming negligence for responding without lights-and-siren, a responsible practice that typically has very little effect on response times.

- **More than one call for help.** Additional calls generally occur because of a delayed or absent response and are often the result of an error or problem in another dispatch danger zone. The very nature of multiple calls increases the potential for error. If different dispatchers handle subsequent calls, the caller may become frustrated with multiple interrogations.

- **No protocols to follow.** Dispatchers who have no protocol to follow are much more likely to be involved in lawsuits than dispatchers who are following an established, medically approved protocol. Without protocols, dispatchers tend to freelance questions and instructions. This practice inherently causes great variance in both dispatch decisions and patient care. Even well-trained field responders make critical errors when they are asked to instruct callers in the nonvisual environment of dispatch. In addition, written, pre-approved protocols provide a measure of liability protection as they are standard from case to case and approved before use.
• Failure to follow protocol exactly. Failing to follow protocol can be as dangerous as not having a protocol at all. Most protocol deviation problems can be traced to inadequate training or a poor quality-management process. A dispatcher who chooses to ignore the protocol, change the protocol, or act outside the boundaries of the protocol loses all protection provided by the protocol.

• Requesting permission to give pre-arrival instructions. Requiring the caller’s permission before giving instructions is inappropriate in the medical dispatch environment. By calling for assistance on an emergency line, the caller has already implied a need for all available expert care the dispatcher has been trained to provide, including pre-arrival instructions. No further permission is necessary. Occasionally, unwilling callers will refuse to comply with the dispatcher’s instructions even when they are given clear directions; for a well-trained dispatcher, however, this is rare.

• Omission of instructions. EMS agencies and dispatchers have long been concerned about the liability associated with providing instructions to callers. Such concerns have prevented thousands of patients from receiving pre-arrival care that may have saved their lives. Providing instructions to callers in need has become a public expectation and an international standard of care. Thus, not providing instructions has become a breach of duty, either for the agency that chooses not to implement and manage an approved protocol or the dispatcher who chooses not to follow an approved protocol.

• Asking to talk with the patient/victim (distrusting the caller). Asking to talk with the victim or the patient has historically been a sign of distrust and an attempt to judge the integrity of the caller, a dangerous attitude for a dispatcher. This action has been present in several of the classic legal cases where the dispatcher did not believe the caller and delayed care as a result. The dispatcher is obligated to be objective and take the caller’s word at face value.

• Attitude problems/argumentative interrogation. Many dispatch errors are caused by attitude problems. When a dispatcher becomes personally involved in a call and expresses anger, frustration, or apathy, the emotion sometimes escalates, judgment deteriorates, and the dispatcher makes critical errors and neglects the job at hand. The resulting omissions and commissions of protocol expose both the EMD and the agency to liability.

• Preconceived notions of caller’s motives and situation. A dispatcher’s judgment can be hindered by preconceived notions and imposed negative impressions. For example, if nonemergency calls are frequently received from a particular area or patient (often called the “frequent flyer”), a responder may assume that every call from that area or patient is not an emergency and might forgo the standard assessment. Another dangerous assumption is that the intoxicated patient somehow presents less of an emergency than the sober one; however, it is possible to be both sick and drunk. Drawing conclusions about a caller’s integrity or ability based on geography, accent, vocabulary, vocal inflection, or past history is inappropriate.

• Misinterpretation of the caller’s complaint. The key to an appropriate dispatch interrogation is understanding why the caller is requesting help. The chief complaint drives the structured interrogation and subsequent instructions of the protocol. How this initial information is obtained, both in demeanor and syntax, is critical. The most consistent way to correctly interpret caller complaints is to follow the dispatch protocol.

• Problems at shift changes. Problems at shift change can disrupt the dispatch process and cause errors. In general, when one caregiver transfers control of a patient to another caregiver, a thorough report is required to ensure that the subsequent provider is fully informed and able to make sound decisions regarding patient care. In addition to the care of the patient, the safety of responders and bystanders are at stake.

• First party “gone on arrival.” First-party callers (a caller requesting help for him or herself) represent 10 to 15 percent of all medical calls. Sick or injured patients may have trouble communicating. Because the condition of these callers might worsen before field personnel arrive, the first-party caller may not be able to respond to a knock on the door or a phone call from the dispatch center. If victims are found dead or critically ill by friends or relatives after responders leave without making contact with the victim, it calls into question the duty of both dispatcher and field personnel. The dispatcher’s responsibility ends only after field personnel actually locate the victim, not when field personnel arrive at the reported location. Dispatchers are obligated to inform responders of situations in which victim access may be a problem, and dispatchers should stay on the line with the caller when the caller is in obvious distress or is likely to deteriorate before the arrival of responders.
When NOT to Run Hot: Mitigation of Response Errors

The risks associated with emergency responses begin in the 9-1-1 center. Traditionally, agencies have viewed response risk as a one-dimensional problem with a simplistic solution: slow responses cause negative outcomes. Therefore every response must be fast, regardless of the nature of the call or the obstacles that must be overcome to get responders there immediately. This has led many fire and EMS agencies to send responses in a lights-and-siren mode for virtually every case, including those with only the most remote possibility of being urgent or time-sensitive.

In recent years, as more research data have become available, the disastrous consequences of this practice have become evident. Numerous incidents of death and disability occur each year owing to emergency-vehicle collisions. In a recent 10-year study, the Denver EMS system reported that 59 of 82 claims (72 percent) against it were related to motor-vehicle collisions involving an ambulance, and these led to six lawsuits. For the cases where run status was known, 59 percent of the accident-related claims involved emergent (lights-and-siren) runs, compared with 50 percent of such claims for non-emergent runs. Emergent runs were involved in five of the six cases that went to litigation. The NFPA reported 15,300 collisions involving fire department vehicles during 2000, and an additional 1,160 collisions involving firefighters' personal vehicles while they responded to incidents.

Other research, articles, and case studies have demonstrated the limited value of lights-and-sirens use in the great majority of cases. The practice of "running hot" on every fire and EMS call becomes even less defensible in light of the research on the safety and efficacy of an established, well-managed 9-1-1 prioritization process. Dr. Samuel Stratton of the Los Angeles County EMS Agency has concluded: "Emergency medical dispatchers, using a formal system for telephone triage, are able to direct appropriate prehospital resources to the emergency scene." In October 2002, Dr. Jeff Clawson, former medical director of the Salt Lake City fire department, also reviewed the misconceptions and realities of inappropriate emergency response.

Given the large and growing body of evidence on the risks of lights-and-siren response, a 9-1-1 center strategy that limits such responses is imperative. Calltaker prioritization leading to differentiated, tiered responses for police, fire, and EMS cases is an essential component of every emergency call center. A specific priority code, assigned by the 9-1-1 calltaker and used to determine the type of response, including lights-and-siren mode, is required for each case dispatched.


Decision Support Systems

The use of a protocol such as the priority dispatch system (PDS) is central to limiting risks associated with sending the incorrect resources—both equipment and personnel—to an emergency response (this is called response determinant error). In addition to 100 percent usage compliance, communication services should commit to using expert system-dispatching software as well as interactive call-taking protocols and additional quality-assurance software that accurately measures compliance with retrospective case audits and evaluation. In emergency medical dispatching, it is critical to achieve the following compliance percentages (as verified by auditing 3 percent of calls in most systems):

- 95 percent — Case entry protocol compliance
- 95 percent — Chief complaint selection accuracy
- 90 percent — Key question protocol compliance
- 90 percent — Post dispatch instruction protocol compliance
- 95 percent — Pre-arrival instruction protocol compliance
- 90 percent — Subdeterminant code selection accuracy
- 90 percent — Cumulative overall score.

Through the use of online call-taking software and automated quality-assurance auditing, the risk of a negative case outcome—sometimes quantified by an award of damages through litigation—is reduced.

The use of such decision-support software and automated quality assurance represents a substantial commitment to reducing this particular risk factor, making the performance of the communication center both fully transparent and accountable to service leaders and regulatory officials.

Media and Community Interactions

Risk of negative perceptions involving response times is reduced by meeting defined performance standards. It is also reduced systemically by tightly integrating communication center management with responder operations; management and responders should work in concert and with the same priorities.

The risk of negative media interactions will be mitigated by operating transparently, courting positive media interaction, and facilitating local media involvement with communications. The risk of negative perceptions of community groups can be mitigated by developing regular opportunities to report on integrated system performance to a wide group of stakeholders, including the agency's internal leadership or governance structure, advisory committees, first responders, and other local stakeholders.
Potential Service Disruption

Potential service disruptions can be caused by technical and equipment failures, natural disasters, mass-casualty incidents, and human factors. Incident severity and the length of time the communication center could be rendered inoperable drive the range of potential mitigation strategies.

For scenarios that can be reasonably anticipated, a written plan for managing that risk should be developed and maintained at each position in the communication center. System redundancy is a commonly used technique to reduce the risk of long-term service disruptions. Every emergency call center should have a backup center that can be “turned on” in the event of total equipment failure or evacuation of the primary 9-1-1 center. All staff should have a clear understanding of all backup and evacuation procedures, with a written plan in place.

Plan to Minimize Risk

A variety of risks are associated with operating an emergency communication center. Risks can be assessed and mitigation control strategies should be developed. Agency-specific guidelines can be outlined regarding how and by whom mitigation controls are used and evaluated for effectiveness. These same principles are then used to assess and control risk throughout the emergency services organization.

The following five-step risk management process is recommended by Fitch & Associates, an internationally recognized public-safety consulting firm:

1. Conduct a risk assessment that identifies the hazards associated with the proposed operation. Assess each hazard in order to determine its potential impact.

2. Develop mitigation controls to eliminate or reduce hazards. The residual risk for each hazard must be determined, along with the overall residual risk for the mission or task. Then decide who is authorized to accept the risk.

3. Identify ways to implement controls. Coordinate and communicate control measures throughout the organization.

4. Identify how to supervise and evaluate the controls. Determine exactly how each control will be monitored, then evaluate the effectiveness of each control.

5. Routinely reevaluate the potential risks and effectiveness of all mitigation controls. Update the risk assessment every six months. It will be important to provide documentation of any revised risk assessment and controls to both agency and (contract) regulatory officials.

A PRIMER ON 9-1-1 CENTER TECHNOLOGY

The high-tech revolution has profoundly changed the makeup and operation of 9-1-1 systems over the past several decades. Advanced telephone, computer, and Internet technology has given system managers numerous solutions at varying prices so that even the smallest municipalities and counties can afford equipment and services not dreamed of 15 or 20 years ago. Although an in-depth discussion of new technologies and their features, advantages, and costs is beyond the scope of this report, a brief description of the standard hardware and software common in the modern center is provided.

Phone Systems

9-1-1 systems were developed decades ago around telephone technology that routed wire-line phone calls to a local emergency call center equipped with automatic number identification (ANI) of the calling party. Today’s telephone technology includes enhanced 9-1-1 (E 9-1-1), providing automatic location identification (ALI) for the calling party from wire-line phones. Currently, local jurisdictions are working to install wireless Phase 1 (ANI information for wireless phones) and Phase 2 (ALI information, also for wireless phones) technology. Computer telephony, which is relatively new, allows telephone systems to integrate more completely with other technology, including mapping software and computer-aided dispatch (CAD) software.

Computer-Aided Dispatch Systems

CAD systems are sophisticated packages of software and hardware that allow for numerous tasks and operations to be performed at each telecommunicator’s console or workstation; they contain multiple databases that can be accessed for various telecommunication and dispatch functions. Once a telephone call is received, address and location information can be verified in CAD using a geographic information system (GIS) that will supply map grids, intersecting street information, and closest-available-responder stations. Radio dispatchers use the CAD system to alert units via a paging interface. Responder units are tracked and statuses are changed by the dispatcher, who constantly updates unit information in the CAD system.

Automated Clinical and Situational Decision-Making Systems

Expert software protocol systems are embedded as subroutines in CAD; they direct dispatchers in the rapid but stan-
Radio Technology

Even before 9-1-1 systems, responder units were able to communicate verbally with each other and with a central dispatch center via mobile radios mounted in vehicles and handheld, or portable, radios. Today’s radio systems use very-high-frequency (VHF) and ultra-high-frequency (UHF) channels and talk groups to accomplish the same functions. Trunked radio systems allow for better use of available airspace (or bandwidth) so that more radio traffic can be accommodated.

Mobile Data Systems

Mobile data devices provide dispatchers and responders with a secure, fast method of communicating. CAD systems can digitally send text messages, pages, and mapping information to responder crews with vehicle-mounted terminals or handheld communication devices. Many responders are now equipped with devices that can query CAD information from the field.

Mapping and Automatic Vehicle Location Systems

A more recent innovation in 9-1-1 centers are sophisticated electronic mapping and automatic vehicle location (AVL) systems. These systems provide immediate incident-location information on an electronic mapping screen that can be zoomed-in or zoomed-out by the user. AVL gives real time location information on responder vehicles and marks their locations on the electronic map.

Availability of advanced software and hardware at reasonable prices makes it seem that 9-1-1 system managers would be satisfied with the technology component of their systems. However, in a survey of NAED customers in 2003, 28 percent of respondents were either “dissatisfied” with their CAD vendors or felt they “needed improvement.” Thus, more reliable technology and better customer support for existing technology are needed.

Another obstacle to switching to more modern equipment is the difficulty in training calltakers and dispatchers to use the new technology. Finally, major barriers continue to exist in achieving regional and national data sharing of information received at the local 9-1-1 centers. As the Washington, D.C., sniper incident in 2003 dramatically demonstrated, most centers in the same area do not routinely share data with each other, even during a crisis. Internet technology and other solutions must receive more attention in future system designs.

Biosurveillance Systems

Since the 9/11 terrorist attacks, the national anthrax scare in the fall of 2001, the sniper incidents in the Washington area, and the 2003 SARS outbreak in Toronto, several organizations, including the NAED, have been evaluating potential new uses for data gathered in the 9-1-1 center. Pattern surveillance and its public health equivalent—syndromic surveillance or biosurveillance—have received attention for their potential to provide early warning of possible threats to communities and population centers.

Most research on biosurveillance concludes that a pressing need exists for better methods and practices of collecting and interpreting disease information among populations. A real-time biosurveillance system could assess the threat of smallpox five days earlier than current methods and reduce fatalities by five orders of magnitude, for example. Data from 9-1-1 calls are attractive to public health officials because they come from a centralized, standardized database in near real time. The NAED has recently formed a working group of experts—the Chemical, Biological, Radiological, and Nuclear (CBRN) Fast-Track Task Group—to facilitate the development of protocol enhancements to address these modern-day medical threats. Rapidly evolving technology is giving us new tools to meet the need for a faster, more reliable early warning system.

A system of integrated surveillance software called FirstWatch® is already installed in 16 emergency communication centers, covering more than 8 million Americans. It is being used to poll 9-1-1 data in real time and search for recorded symptoms that may be associated with specific contagious diseases or events. These data are continuously and automatically compared with historical records to see if any significant anomalies occur, automatically triggering an alert when they do. In San Diego, the system worked during the wildfires in the fall of 2003 to detect patterns of respiratory distress, and it has alerted public health professionals to outbreaks of flu in Oklahoma City, Tulsa, and Richmond.
ALLOCATING RESPONSE RESOURCES

Public-safety responders and their equipment and vehicles are a costly and finite resource that must be managed wisely. A priority dispatch process typically sorts calls first by a broadly defined priority level, then more specifically by clinical or situation-specific determinant code. Figure 2 shows six baseline priority levels (Echo, Delta, Charlie, etc.) for a hypothetical EMS system coupled with a response assignment with the mode denoting either a lights-and-siren (hot) response, or a response without lights and sirens (cold).

The priority levels are then further defined in the determinant coding scheme. Figure 3 is an example of the different determinant descriptor codes used for an outside fire in the Fire Priority Dispatch System (FPDS). Notice that the baseline priority levels of Ω, A, B, D, and E are subdivided into the more specific determinant descriptors. The determinant descriptors equate with a particular incident type or code (e.g., 67-D-2 is a large outside fire).

As part of the quality improvement and risk management processes, a steering committee—composed of key decision makers in the public-safety system—should create a predefined response assignment for each individual determinant code. In a sophisticated prioritization scheme, there will be hundreds of determinant codes, but generally only a few dozen different response assignment configurations.

Figure 2: Baseline Response Examples
This illustrates six baseline priority levels (Echo, Delta, Charlie, etc.) for a hypothetical EMS system coupled with a response assignment with the mode denoting either a lights-and-siren (hot) response or a response without lights-and-siren (cold).

<table>
<thead>
<tr>
<th>Level</th>
<th>Response</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECHO</td>
<td>Closest Apparatus—Any (IMMEDIATE RESPONDERS)</td>
<td>HOT</td>
</tr>
<tr>
<td>DELTA</td>
<td>Closest BLS Engine Paramedic Ambulance</td>
<td>HOT</td>
</tr>
<tr>
<td>CHARLIE</td>
<td>Paramedic Ambulance</td>
<td>COLD</td>
</tr>
<tr>
<td>BRAVO</td>
<td>Closest BLS Engine BLS Ambulance (trip to or on-site)</td>
<td>HOT/COLD</td>
</tr>
<tr>
<td>ALPHA</td>
<td>BLS Ambulance</td>
<td>COLD</td>
</tr>
<tr>
<td>OMEGA</td>
<td>Referral or Alternate Care</td>
<td></td>
</tr>
</tbody>
</table>

Hence, each code gets paired with one of the possible response assignment configurations. Because the determinant codes are based on priorities and call types, a response can be tailored to fit the specifics of a particular case in a given jurisdiction. Modern CAD systems are capable of storing response tables that contain the priority level, determinant code, and response assignment for each code. This information can be automatically displayed to the dispatcher at a workstation monitor for every incident dispatched. In this way, consistency of response is assured for each case and incident of a specific type. Response assignment plans should be reviewed annually, at a minimum, by the steering committee. For EMS systems, medical control physicians should play an essential part in establishing and approving final response assignments.

CONSOLIDATING AND OUTSOURCING SERVICES

9-1-1 consolidation provides valuable cost advantages to governments that are evaluating long-term capital expenditures in state-of-the-art 9-1-1 technology, new-building construction, site improvements, and maintenance of redundant backup locations. Careful planning by all stakeholders and system administrators is a prerequisite to realizing such benefits. Local communities and public-safety agencies should create a planning board and a regional 9-1-1 administrative board to develop and execute a detailed implementation plan.

For example, in Texas, a 1998 audit concluded that the statewide 9-1-1 organizational structure was inefficient because of overlapping 9-1-1 service, purchasing and revenue collection that was not cost-effective, and that consolidation "would eliminate $19.1 million (33 percent) of annual duplicative state and local expenditures. Local governments could realize additional annual savings of $34.2 million in reduced personnel expenditures." The U.S. General Accounting Office in its November 2003 report on nationwide implementation of wireless enhanced 9-1-1 (E 9-1-1) service cited numerous funding issues, patchwork implementation, and a lack of coordination among government entities and private telecommunications carriers as significant barriers to nationwide availability of wireless E 9-1-1 service.

These findings as well as the current budget realities of most states and localities make it no surprise that municipalities across North America are aligning emergency services and responder delivery systems to keep the costs of those services within their established budgets. Consolidation of 9-1-1 communications systems is often
seen as an opportunity to reduce service costs, enhance available services, or both.

Approaches to consolidation include:

- Single jurisdiction and cross-functional responsibilities. Typical arrangements involve a single designated department providing services to other departments (for example, police, fire, and EMS) within the same unit of government.
- Multijurisdictional centers that provide cross-functional services. Multijurisdictional centers that are cross-functional involve several communities working together, and they provide services for multiple agencies.
- Multijurisdictional centers with specialized functions. In this approach, multiple communities consolidate specialized functions, such as police communications.

Figure 3: Descriptor Codes
This is an example of the different determinant descriptor codes used for an outside fire in the Fire Priority Dispatch System (FPDS). Notice that the baseline priority levels of E, A, B, D, and F are subdivided into the more specific determinant descriptors. The determinant descriptors equate with a particular incident type or code (e.g., 67-D-2 is a large outside fire).

Advantages and opportunities of consolidation include economies of scale, improved technology capacity, specialization of skills, and independent or contractual funding sources. Obstacles include perceived poor responsiveness of consolidated centers to individual communities, loss of functional asset control, unrealistic performance expectations, and general resistance to change and bruised egos among personnel. Problems cited include accountability linkages, lack of meaningful performance standards, differing organizational objectives, and asset and equipment capitalization.

Communities considering consolidating centers should develop detailed business plans that fully address issues of governance, funding, physical plant and location, technology and assets, staffing, quality processes, medical supervision of centers involved in EMS, responsiveness to stakeholders, and the planned levels of innovation, accountability, and performance.

Training 9-1-1 communication center staff to handle new responsibilities and learn new skills must be considered
during the early stages of the project. Consolidations often require 9-1-1 center employees who deal with one specific dispatching discipline (law enforcement, for example) to take on fire and EMS dispatching skills and duties as well.

Outsourcing of specialized 9-1-1 services is another option for cash-strapped jurisdictions attempting to contain service costs. For example, a primary PSAP agency may choose to contract its emergency medical dispatch services

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**A Case Study of Consolidation—Augusta, Georgia**

During the 1980s, law enforcement, fire, and EMS in Augusta, Georgia, operated separate 9-1-1 entities in the same building. The sheriff’s department answered all incoming 9-1-1 calls and then transferred them to fire or EMS when appropriate. Each agency operated under its own set of budgetary, administrative, and operational guidelines, which created a variety of challenges. Two decades later, the three entities were joined together. Phillip Wasson, director of the consolidated Augusta 9-1-1 center has described the process and lessons learned:

**Q:** What is a consolidated center?

**A:** A consolidated center is a unified entity of the three dispatch agencies: law enforcement, fire, and EMS. The center is managed by only one director who directly reports to the city/county commission. All calls are handled by the same group of dispatchers who are cross trained in each of the three public-safety disciplines. The workload is evenly distributed among all calltakers, and each calltaker handles a specific caller all the way from phone pickup to hang-up.

**Q:** What problems did your call center face prior to consolidation?

**A:** There were administrative inefficiencies and operational problems with having three separate dispatch operations. Since the sheriff's department answered all incoming 9-1-1 calls, a client having either a fire or medical emergency needed to go through two calltakers before the needs were addressed. Also, there was always at least a five- to ten-second delay when transferring a call. An unequal distribution of work among the three dispatch agencies also resulted from the old system. Sheriff's dispatchers were required to take all incoming calls. Consequently, sheriffs were often overburdened, while their fire and EMS colleagues were left idle. Because most incoming calls dealt with law enforcement issues rather than EMS or fire, sheriffs had the majority of the work.

**Q:** What political obstacles did the agencies face as they progressed toward consolidation?

**A:** In 1998, the EMS dispatch center moved to a different location, where it continued to be managed by a private ambulance provider. During this time, police and fire services agreed to combine their dispatching functions, but they disagreed about which of the two would manage the combined center. In June of 1999, an act by the city/county commission created a 9-1-1 department completely separate from the police and fire departments. In the following year, the commission decided to incorporate the EMS dispatch into the city/county 9-1-1 center. Operationally, this occurred in 2002, which completed the unification of all three dispatch services.

**Q:** How is a consolidated center structured?

**A:** The 9-1-1 center is its own department and has a director who reports directly to the city/county commission. The stakeholder groups, including the sheriff's depart-

**Q:** Operationally and logistically, what were the biggest challenges to consolidating?

**A:** All line personnel had to be cross trained in law enforcement, fire, and EMS calltaking and dispatching. Also, there were several dispatch supervisors with the sheriff's department and some dispatchers with the fire department who did not want to change roles and work in the new 9-1-1 department. As a result, they were reassigned to other positions at their respective departments after consolidation occurred.

**Q:** What benefits accrued from consolidation?

**A:** Accountability is the biggest benefit. Under the old system, different departments (especially in the case of EMS and fire) would handle a 9-1-1 call, and each department would have its own policies, procedures, and infrastructure. If there was a problem, it was difficult to assign responsibility or to fix the issue since the problem involved conflicting departmental personnel and policies. Now, the director is ultimately accountable for all system personnel performance.

**Q:** Was there a net cost savings to consolidation?

**A:** Our budget has actually grown somewhat when compared with the combined budgets of the previously separate departments. We've been able to provide more and better training for our staff, and a much higher quality of service to the community. All dispatchers are now trained to follow specific call-taking protocols for law enforcement, EMS, and fire incidents, and we have staff trained to complete detailed, comprehensive quality improvement processes that help us detect performance issues before they become detrimental to our stakeholders and the community. We also have a computerized protocol for EMD and fire dispatching. In short, our standards are much higher now, and the tools we have are state of the art. By having all of the 9-1-1 money in a single pot, I'm better able to account for those dollars and budget for first-rate training and equipment. I can plan for major expenditures well in advance so the service continues to improve and grow.

**Q:** Are there any negative side effects for the community or other stakeholders in consolidation?

**A:** The community is getting better service overall because of the additional training and the ease of access to a single, cross-trained calltaker who provides all public-safety services. For the stakeholders, there was definitely a perception by law enforcement and fire officers that they no longer had their own dispatchers to address their specific agency needs, particularly since management no longer reported directly to the sheriff and fire chief. It was a typical loss-of-control situation. Over time, however, we've been able to build relationships with those departments to instill trust and understanding.
to a secondary agency, such as the local ambulance service or an adjacent 9-1-1 district that has specialized staff or training to provide effective caller interrogation, pre-arrival instructions, and case prioritization. Calls would be transferred from the primary PSAP agency to the secondary PSAP, where the call would be processed and dispatched with computer, telephone, and radio linkages between the two centers. Governments considering this type of arrangement should enter into formal contractual agreements covering financial arrangements, scope of work, and legal responsibilities.

The provision of only pre-arrival instructions should never be transferred to another center such as a hospital or responder. Contracts for specialized services must be detailed and legally binding.

CONCLUSION: CHALLENGES AND OPPORTUNITIES

9-1-1 systems have evolved rapidly in recent years, providing major challenges for local government authorities. Increased call volume, higher public expectations, evolving standards and training requirements, and new technology are driving costs up and creating shortages of qualified staff. A neglected 9-1-1 system can prove costly when things go awry, through both potential liability exposure and public relations problems. City and county managers must develop strategies consistent with local needs as well as state and national standards.

Because staffing costs are the largest part of a 9-1-1 center budget, local government chief executives should require 9-1-1 center directors to submit formal staffing plans annually, to include predicted future activity and budget requirements. Also, local government managers should receive annual quality-of-service reports that summarize system performance against key measures such as compliance with nationally recognized protocols, quality improvement, and training standards. Finally, effective risk management and quality management can be achieved only when local authorities align their 9-1-1 systems more closely with public safety responder agencies and public and community health agencies, and establish formal, regular communication links with both the media and the public. Steering committees and dispatch review committees must involve the 9-1-1 director and police, fire, and other stakeholder groups in order to ensure a planned, well-managed response to the wide array of emergency service and public-safety concerns that 9-1-1 systems will deal with now and in the immediate future.

ADDITIONAL RESOURCES

Model EMD legislation available at http://emergency.dispatch.org/ICMA/

Model EMD rules and regulations available at http://emergencydispatch.org/ICMA/

Sample job descriptions available at http://emergency.dispatch.org/ICMA/

Commonly identified dispatch risks and their mitigation available at http://emergencydispatch.org/ICMA/

1 According to the NAEDY, 2004 state-by-state survey, 20 states have passed legislation regulating emergency medical dispatcher training, certification and practice standards, and numerous other states are planning similar laws and statutes. Many states are also reviewing the need for requiring certification training for other 9-1-1 center activities. In Maryland, where there are 24 PSAPs, all entry-level trainees are now required to receive a 40-hour telecommunicator course with a state-approved curriculum.


