A Study of the 911 Single Emergency Telephone Number

National Science Foundation

Grant No. GK-11358

March, 1970

THE FRANKLIN INSTITUTE RESEARCH LABORATORIES

BENJAMIN FRANKLIN PARKWAY • PHILADELPHIA, PENNA. 19103

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FOREWORD

The program described in this report was conducted under National Science Foundation Grant GK-11358 and was sponsored by the National Science Foundation and The Franklin Institute of the State of Pennsylvania. The program was performed by the Operations Research Laboratory of The Franklin Institute Research Laboratories' System Science Department.

The authors express their particular thanks to the many local and state officials and industrial representatives who willingly shared their time, knowledge, and experience with the project staff. The authors also wish to express their appreciation to Mr. Warren Potas and Miss Lois Sandt for questionnaire administration and editorial assistance respectively, and to Mrs. Norma Poindexter for typing assistance.

SUMMARY

Under the auspices of the National Science Foundation (Grant GK-11358) and The Franklin Institute of the State of Pennsylvania, The Franklin Institute Research Laboratories (FIRL) undertook a study to determine if a need existed for a single emergency telephone number and if the implementation of such a system were feasible.

A study of responses to questionnaires and discussions with persons in all phases of emergency work have led FIRL to conclude that a single emergency telephone number is feasible and should be implemented nationally.

Most of the objections to a single number arise because many individuals do not have a clear understanding of a single emergency number concept. FIRL found that those who have had experience with a single number are generally in favor of the system, while those who have not had experience with the concept are generally opposed. To eliminate these misconceptions, FIRL recommends that a national program of public education be initiated to inform the people of what a single emergency telephone number is, what it can do, and what it cannot do. Such a program could provide an additional benefit by educating the public not to misuse an emergency telephone number.

Many public safety organizations seem to find fault with a single number system when the fault actually lies within the organization. Organizations must be prepared to adjust to innovations in technology when these innovations are in the best interests of the public. FIRL recommends that public safety organizations consider evaluating their organizational structures to determine if, in fact, the inability to work with a single number concept is an organizational problem rather than a technological problem.

Kenneth R. Bordner
Co-Principal Investigator

J. Spenser Huston
Co-Principal Investigator

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SECTION 1
INTRODUCTION

PROGRAM GOALS

The Franklin Institute Research Laboratories (FIRL) undertook the study reported here to (1) determine the feasibility of implementing a national single emergency telephone number and (2) ascertain whether the promulgation of a national standard for implementing such a number is feasible. This was accomplished by investigating the *operational requirements* of both responding agencies and users of a single emergency number, and by examining the technical feasibility through the requirements to be imposed upon the communications industry. The results of this study and The Institute's conclusions and recommendations are presented in this report.

BACKGROUND

In response to repeated urgings of the Federal Communications Commission, the American Telephone and Telegraph Company (AT&T) announced, on January 12, 1968, that 911 would be made available as a single emergency telephone number. The implications of this announcement were immediately recognized by organizations and agencies responsible for providing community emergency services and by the independent telephone companies. National press releases by AT&T have generated many public demands for early implementation of the single emergency number on a nationwide basis.

Federal agency endorsements of the AT&T single emergency number, in both concept and operation, have been cautiously withheld. There has been just reason for such caution by officials who understand

that many technical, jurisdictional and operational problems require solutions before the maximum benefits from a nationwide single emergency number could be realized. If such a system is to have nationwide significance, the range of emergency situations and the authority of those answering emergency calls to direct emergency resources must be uniformly defined. In recognition of the problems involved, and the urgency of establishing a directed course of action among the many affected interests, The Franklin Institute Research Laboratories obtained government sponsorship to convene a Consultation of the Single Emergency Number in Philadelphia on March 18, 1968. The consultation was jointly sponsored by the Office of Law Enforcement Assistance, Department of Justice; the National Highway Safety Bureau of the Federal Highway Administration, Department of Transportation; and the U. S. Public Health Service, Department of Health, Education, and Welfare. The primary value of the consultation was that it initiated discussion among the various technical and managerial groups responsible for implementing a single emergency number system. As a result of the consultation, FIRL proposed to determine the requirements and investigate the feasibility of a single emergency number.

In December 1969, a conference on "Police Response Time" jointly sponsored by the National Institute for Law Enforcement and Criminal Justice (LEAA) and FIRL was held at The Franklin Institute Research Laboratories. This conference brought together over 30 representatives from police departments throughout the country to discuss and recommend research requirements related to police response time. Of the seven recommendations for research programs in communications, three involved public access to emergency telephones and two were specifically involved with 911. These latter two recommendations were:

1. Evaluate the efficiency of the various internal police communications configurations for processing calls from a single emergency telephone number system (911).
2. Investigate the benefits of including an automatic number identification system with 911.

These recommendations are indications that 911 as a useful tool in decreasing response time has been generally accepted by the police sector of public safety organizations.

SECTION 2
EMERGENCY RESOURCE SYSTEM

During this study, a complex set of problems associated with the implementation of 911 has been revealed. These problems range from geographical boundary considerations to parochial attitudes in those responsible for the various response elements in public safety organizations. Before these problems are discussed however, it is important to put 911 in its proper perspective with an emergency system. To do this, we shall consider the operational stages of a total emergency resource system.*

THE TOTAL EMERGENCY RESOURCE SYSTEM

The emergency resource system consists of the operational stages that permit the effective response of emergency resources to a situation or event in which assistance is required. Activation of the system occurs when notification of a need is communicated to the dispatching authority, and terminates when the emergency resource is prepared to respond to the next situation. The stages which define the operational modes of the emergency resource system can be defined as follows:

1. *Event* — Occurrence of any event that requires public safety assistance.
2. *Detection* — Awareness that an event has occurred.

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* Hereafter, a single emergency number is referred to as 911, not because we necessarily sanction that particular code, but because it serves as a convenient shorthand designation. The practicality or the human engineering aspects of the digits 9-1-1 have not been considered, since these are outside of the purview of this study.

3. *Notification.* Passing of information acquired during detection to emergency service resources and soliciting assistance.

4. *Dispatch* In response to the above, dispatch of emergency service resources to the scene of the incident.

5. *Closure* Travel by the emergency service resources from their readiness location to the scene.

6. *Action* Assistance rendered by the on-the-scene respondee such as:

   a. Fire fighting
   b. First aid
   c. Apprehension
   d. Investigation
   e. Delivery
   f. Transport

7. *Return to Station* Return of emergency resources to their readiness location.

Figure 1 illustrates the flow and sequencing of the stages of an emergency cycle.

Functional Subsystems

In order to meet the requirements of the operational stages of the total system effectively, an emergency resource system must include the following subsystems:

1. Communications
2. Transportation
3. Service
4. Documentation

Although each of these functional subsystems is important to the effectiveness of the total system, the implem ntation of 911 will have the greatest impact during the first four stages of the total system.

The four subsystems above contribute to the RESPONSE cycle. They represent the framework within which an emergency system can *respond* to a request for assistance. Figure 2 shows the elements of RESPONSE and the time segments.

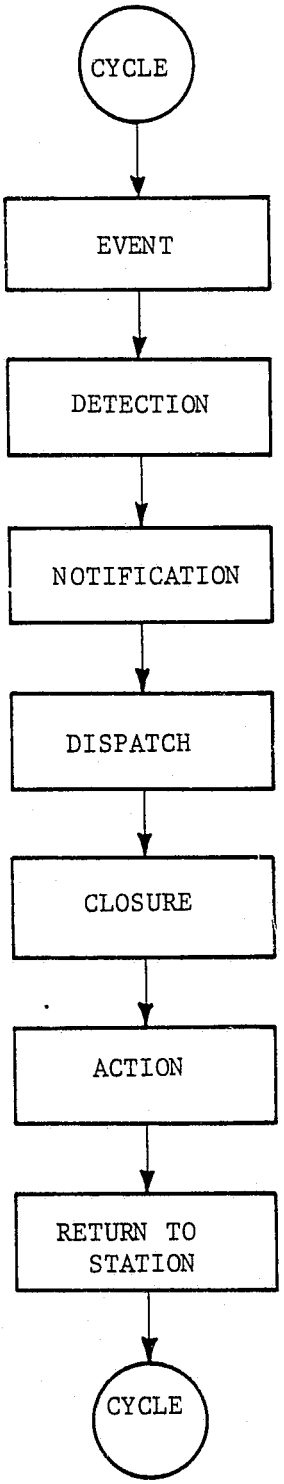

Figure 1. The Emergency Resource Cycle

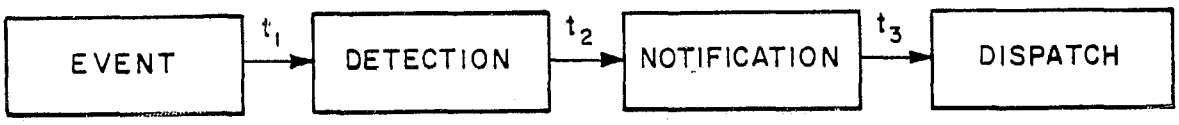

Figure 2. Response Cycle

It is axiomatic that an improvement in response time is an improvement in the emergency system. It is therefore important to look at the three time segments to see where 911 could shorten the time span. The first time segment (t_1) represents the elapsed time between the event and detection of the event. Since this segment is dependent on factors outside the classical communications system, 911 would have no effect on the elapsed time. In the third time segment (t_3), the time between the point at which the public safety organization is notified and assistance is dispatched is dependent on the specific nature of the public safety communications system. Again, 911 will have no impact on this time. It is on the second time segment (t_2) where 911 will have a significant effect. The time between detection and notification represents that part of the response cycle which provides interface between the public and public safety organizations.

One of the strongest arguments advanced against the use of a 911 system is that it *may* increase the time an emergency service takes to respond once a call for service is received. This could be true, especially if a given emergency service receives its call from a central emergency communications center. The weakness in the argument, however, is that it does not recognize the time element that occurs *before* a call for service is received.

Figure 3 illustrates this point. If total response time (t_r) is equal to $t_1+t_2+t_3$, then any reduction in one stage would yield a reduction in t_r. In the figure, the response cycle with central dispatch and 911 shows a longer time for dispatch (t_3), but the ease of notification provided (t_2) more than compensates for the loss of dispatch efficiency. What may look like less efficient response to the public safety organization is really improved service to the public

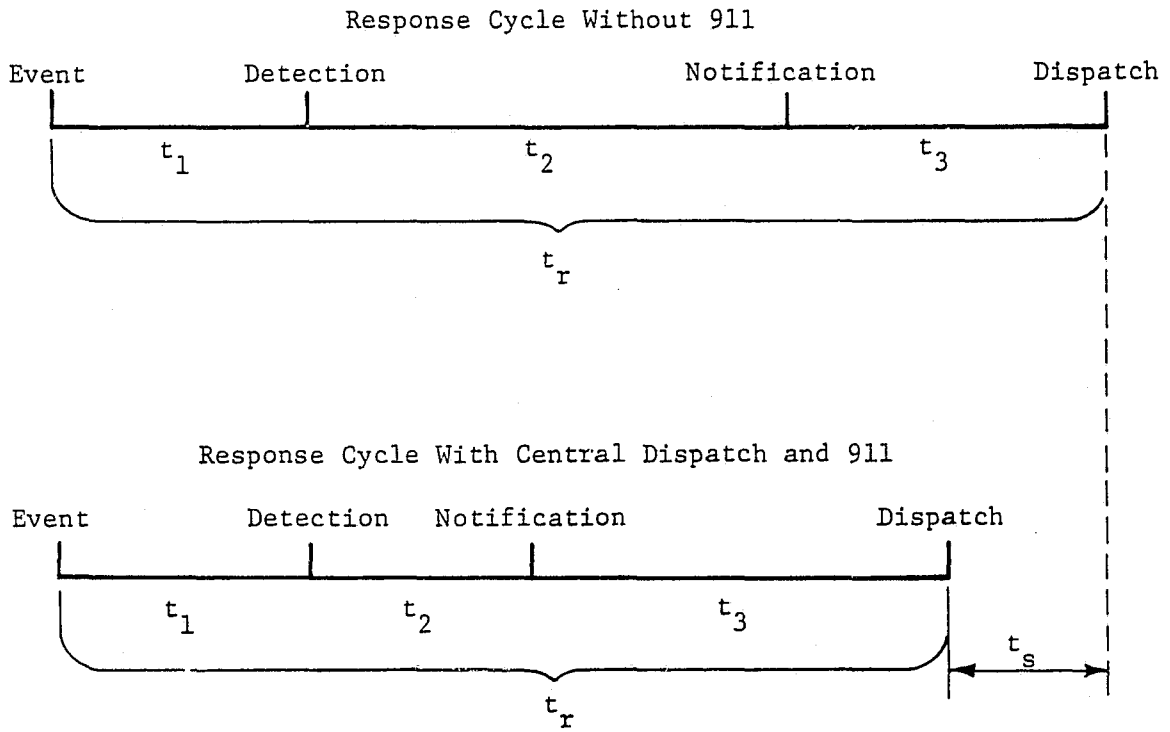

Figure 3. Comparison of Response Cycles

The measure of total response time saved (t_s) is the only true measure of the efficiency of the emergency resource system; 911 can contribute significantly to total time saved.

SECTION 3
IMPLEMENTATION OF A SINGLE EMERGENCY NUMBER

THE PROBLEM

Whenever an event is detected that requires the dispatch of emergency services, a burden is placed on the observer to communicate the necessary and essential information to the appropriate public service agency as expediently as possible. Usually under stress, the observer must locate a means of communicating and apprise the appropriate agency of the situation. To compound this problem, the critical time for response is between the occurrence of the event and notification since this time span represents the weakest link in the entire system.

Paradoxically, the decision concerning which emergency services to notify rests with the person least likely to know - the citizen. It is ironic that a system intended to serve the public places the major burden on the public. Ideally, the emergency response system eliminates the necessity for the citizen to decide on the proper course of action. Conceptually, the single emergency number, properly designed, provides immediate access to the correct dispatching facility whose sole purpose is to make that decision.

The single emergency system would employ all current resources and, by concentrating implementation, increase its effectiveness. The properly configured telephone system would provide an effective response from all resources. It would be highly desirable, although not absolutely necessary, if all pay telephones were to have immediate dial tone response (IDTR). This would eliminate the need for coins, and the

possibility of delay. Simply by dialing 911 from any location, instant response for continuation of the emergency resource cycle would be available.

THE ROLE OF PARTICIPANTS

These problems and some solutions to them can be examined from four different perspectives:

1. Government officials at all levels
2. Public safety organizations
3. The telephone companies
4. The public

Government Officials

To government officials, 911 is a political football. For various officials, the rallying call for 911 has been made without much basis in reason. At lower levels of government, a 911 concept has been met with general apathy, primarily due to a lack of understanding and to pressures from some public safety officials. There has been no direct opposition to a 911 concept in the same sense that there has been no opposition to the control of environmental pollution. However, as with many other programs, the surest way to defeat a concept has been to ignore it.

Government officials must first be educated in the potential of 911 for the overall improvement of emergency systems. Second, they must understand how 911 would fit into a total emergency communication system for the areas within their political jurisdiction. Third, they must accept the general philosophy that public safety organizations exist to serve the public and anything that will improve this service is important. Last, they must recognize that to implement a 911 system properly, financing, which is not prohibitive, must be authorized and obtained to support the system.

It is significant that in most areas in which 911 has been installed, the decision to implement the system has been political; 911

has not been installed at the request of public safety organizations nor through the initiative of telephone companies, but rather because it was a politically wise decision.

Public Safety Organizations

In our discussions with public safety officials, four different classes of public safety organizations were identified: (1) law enforcement agencies (including local and state police forces and sheriff's offices), (2) fire fighting agencies, (3) ambulance services, and (4) poison control centers.

The major problem in the acceptance of a single emergency number system by public safety organizations is one of attitude involving a deep-seated parochialism. The attitude that "no one else can do our job as well as we can" is prevalent among public safety officials throughout the country. Another problem is the almost universal belief that delays will be an inherent part of a 911 system and that, consequently, public safety response will be increased. These two objections occur primarily because 911 as a concept is not well understood.

Public safety organizations must realize that their primary functions will not be jeopardized by 911, but rather, will eventually benefit because intelligent central dispatch will maximize the efficient use of emergency resources.

Telephone Companies

Telephone companies are obligated to provide 911 capability within their current dial-station facilities. They should not be expected to custom-design 911 configurations for each system nor should they be expected to finance the modified systems. Telephone companies should provide, however, a 911 code input to every central office, just as they provide 411 for directory assistance or 611 for repair service.

In addition to supplying 911 to the central office, the companies should also provide immediate dial tone response on all pay phones. This

improvement will allow an X11 call to be placed without the insertion of a coin, and other calls will be blocked until proper payment is made.

The Public

The public has a major role to play in the successful operation of a 911 system. If citizens are provided with a more effective means of communicating with public safety agencies, they must not abuse this service - 911 is designated an "emergency system" and, as such, is not to be construed as an ombudsman service, nor a means of airing personal grievances.

No attempt has been made to define "emergency" for the public, since the decision to term something an "emergency" is highly subjective, often based on circumstance. The public, however, should be properly educated in the nature of emergencies and the use of 911. A certain number of nuisance calls will of course occur under any circumstances.

A 911 IMPLEMENTATION PLAN

Assuming that the four groups discussed above understand their roles in 911, there is a 911 concept that would work in most geopolitical situations. Figure 4 illustrates the general concept of the system which is comprised of the following elements:

1. Telephone central office areas—shown as irregular geographical areas.
2. Various jurisdictional boundaries:
   a. A city—shown as a circle for ease of illustration.
   b. Miscellaneous surrounding townships, boroughs, villages, etc.
3. A communications center for the entire region.
4. Various public safety organizational locations (not shown in the figure). It is assumed that the city has police, fire and emergency care services and that similar services exist in each of the surrounding political jurisdictions. In some areas (the township, for example) the county sheriff may also be responsible for law enforcement

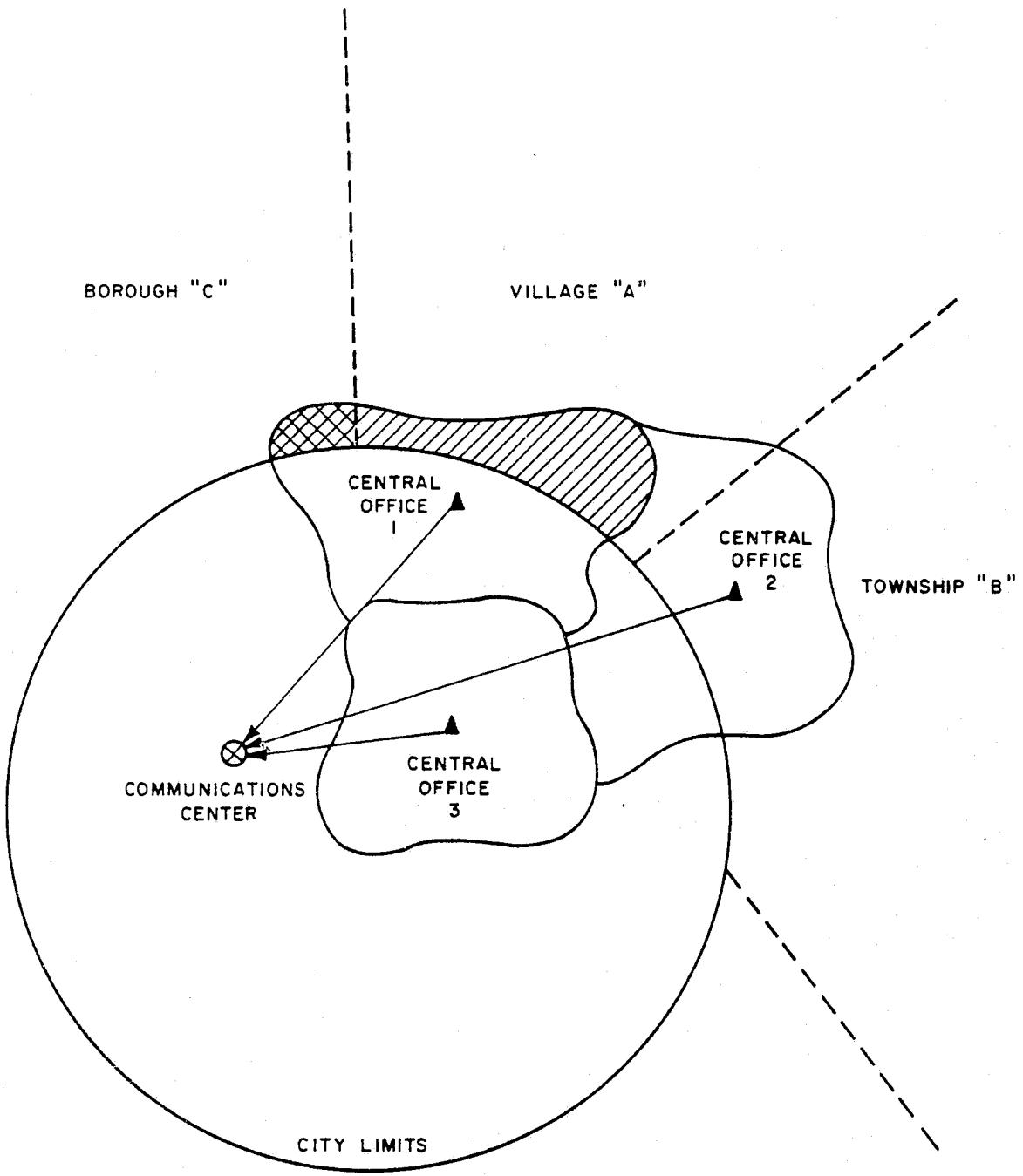

Figure 4. 911 Regional Concept

services. A poison control center would be located within the city serving the entire region.

In brief, such a system works as follows: A 911 call within a central office area is automatically relayed at the central office to an emergency dispatch operator at the communications center.* The operator elicits the exact details of the problem and notifies the proper response agency.

The following steps provide a more detailed description of a 911 system.

1. A citizen, reporting an emergency, dials 911.
2. The call is automatically routed through the central office to the communications center.
3. The call is received at the communications center switchboard by a dispatch operator who is assigned to incoming calls from that central office. This receiving operation can be handled in one of three ways, depending on the preference of the communications center director:
   a. An operator handles all calls routed to him regardless of the degree of emergency.
   b. A primary operator ascertains the true emergencies and relays them to a secondary operator who handles the call. The primary operator retains and disposes of non-emergency calls.
   c. A primary operator handles the true emergency calls and routes the non-emergencies to a secondary operator for disposition.
4. The emergency operator determines the extent and nature of the problem and obtains information concerning identity and location of the caller. Location becomes a problem in central office areas such as that designated "central office 1" in Figure 4. In this case, the central office area encompasses three separate political areas (shown in the figure by cross-hatching).

*The communications center is not necessarily a separate agency. By mutual agreement, an existing service (such as police) can operate the communications center as a service to all agencies.

It is important that the operator determine from what political entity the call is originating. This is readily solved on calls from homes or businesses since it is assumed that most people know where they live or work. Pay phones present a different problem, however, because the caller honestly may not know where he is. This can be simply solved by providing the dispatch operator with a list of telephone numbers by political district or, alternatively (since the number of pay phones is relatively small), arbitrarily assigning a simple numeric designation to the phone on a permanent plaque which tells the caller where he is. Such a plaque might say: *You are calling from phone 21 in the Village of*_____. From this information, and an appropriate list, the dispatch operator can readily identify the location.

5. The dispatch operator notifies the appropriate organization in the proper jurisdiction of the nature and location of the problem.

This entire process, properly handled, would take less than 30 seconds and would ensure that the caller gets the help he truly needs. It is important to remember, however, that costs for trunk lines from the central offices to the communications center and lines from the center to the various jurisdictional entities must be financed by the region being served.

In this concept, the public safety organizations would retain their own telephone numbers if they desire, and would also retain control over the specific dispatch of their forces. No intermediate authority is interjected, but a more effective technique for the public to get emergency help is provided.

The above concept does not preclude the installation of a single-jurisdictional 911 system. In fact, virtually all of the 911 implementations to date have been single-jurisdictional. Obviously, it is far easier to institute 911 where there are no political boundaries to cross. A single-jurisdictional installation is probably the only way that many areas will be able to "cut-over" to 911 in the near future

and is totally satisfactory for large, urban areas. In suburban and rural areas, however, the multi-jurisdictional problems must be overcome if people in these areas are to be served.*

* The current study by the National Service to Regional Councils, Washington, D.C., will result in some definitive answers to the problems encountered in multi-jurisdictional 911 installations.

SECTION 4
SURVEY OF OPERATIONAL REQUIREMENTS OF AN EMERGENCY TELEPHONE NUMBER SYSTEM

SURVEY DESIGN AND OBJECTIVES

To assess the operational requirements of the agencies responsible for providing emergency services, FIRL developed a mail-back questionnaire designed to satisfy two major objectives:

1. To determine on a large scale the needs and operational requirements for a single emergency telephone number as seen by the persons and agencies whose day-to-day operations would be most affected.
2. To determine, as specified by the heads of agencies, the systems, facilities or personnel needed to provide the services required upon implementation of a single emergency number system.

In designing the questionnaire, it was considered desirable that it be as short as possible to elicit a maximum number of respondents, while adhering to a design that would yield answers defining the operational requirements of agencies providing emergency services. The questionnaire was constructed to be as open-ended as possible to solicit as many varied thoughts or ideas regarding emergency services. To further stimulate the thinking of those to whom the questionnaire was addressed, a cover letter explained the purpose of the questionnaire, summarized the currently proposed single emergency telephone number system, and presented a number of points of view regarding advantages and disadvantages to be obtained from such a system. The questionnaire as finally formulated consisted of the following:

1. Five open-ended questions probing the response ability of an emergency resource agency if they were to add the single emergency telephone number system to their operation.
2. Three questions of an objective nature concerning the organizational structure of the agency and selected demographic material.
3. One open-ended question directly soliciting fresh ideas for approaches to improve emergency operations.

A copy of the cover letter and the questionnaire is shown as Figures 5 and 6.

To obtain a 20 percent rate of return so that a sufficiently large sample of emergency services would be represented, 2107 questionnaires were mailed. The agencies to receive the questionnaire were chosen at random from the following sources:

1. Metropolitan Fire Chiefs: 78 questionnaires were sent to the metropolitan fire chiefs listed as members of the Metropolitan Committee of the International Association of Fire Chiefs. Most of the U. S. cities with populations of 150,000 or more were included.
2. Metropolitan Police Chiefs: 75 questionnaires were sent to the police chiefs of most cities with populations of 150,000 or more. (Three regional fire districts included above were not used in the police chief mailing).
3. Sheriffs: 533 questionnaires were sent to a representative sample of the sheriffs listed in the 1969 Directory of Sheriffs of the United States, published by the National Sheriffs Association. An attempt was made to give each state an approximately equal representation of sheriffs.
4. Poison Control Centers: 91 questionnaires were sent to a random selection of Poison Control Centers listed in Directory: Poison Control Centers, published by the National Clearinghouse for Poison Control Centers, U. S. Department of Health, Education, and Welfare.
5. "Small Town" Police Chiefs: 665 questionnaires were sent to a sample of those police and fire chiefs listed in Table XII of the Municipal Yearbook 1968, "Directory of City Officials in All Cities Over 10,000: January, 1968."
6. "Small Town" Fire Chiefs: 665 questionnaires were sent to a sample of those police and fire chiefs listed in

THE FRANKLIN INSTITUTE
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THE BENJAMIN FRANKLIN PARKWAY • PHILADELPHIA, PENNSYLVANIA 19103 • TELEPHONE (215) 448-1000

July 23, 1969

Dear Sir:

The Franklin Institute Research Laboratories is investigating, for the National Science Foundation, the requirements for implementation of a uniform national emergency telephone number. Phoning such a number would connect the caller into a regional common emergency answering center, from which the call would be directly routed to the appropriate agency (Police Department, Fire Department, Ambulance, Sheriff's Office, Poison Center, etc.). Although likely that the emergency answering center would be administratively independent of the police, fire or other departments served (for example: under a city's Communications Director); it is also possible some centers would be operated under the direct jurisdiction of a police or fire department. In order to assess the impact of such a system on the agencies involved, we would like to learn how you think your operation would be affected and what you think the implications of such a system would be.

We would appreciate your answering as fully as you feel you can, the few questions on the enclosed questionnaire and returning it in the enclosed postage-paid envelope. Extra space is provided for more extensive remarks.

The following items represent advantages and disadvantages of the system which the Institute has noted thus far. By means of this questionnaire we hope to uncover any additional problems or benefits which you might foresee because of your potentially direct involvement. Among the advantages would be the effective use of resources, greater reliability in rapidly contacting the proper emergency agency, and national uniformity of emergency telephone number (which would benefit travellers and other people who spend time in more than one region). The major disadvantages would include the large cost of implementation in terms of both manpower and money, and the possibility that the system might be more easily overloaded

Figure 5. Letter Accompanying Emergency Telephone System Questionnaire

than with the present system (unless even greater efforts were expended) in the case of some natural disaster or event of widespread concern. Thus if there was a sonic boom, for example, and many people called the police, someone wanting the Poison Center might have problems getting through because *all* calls would be going through the center. On the other hand, in this case, after the first few calls were actually put through to the police, the succeeding calls of the same nature could be screened by the Center personnel, avoiding unnecessary duplication of effort by the police in answering all these calls.

Thank you for taking the time to answer this questionnaire. The responses you give will be used only by the Institute in conducting this research and will otherwise be strictly confidential. Your answers will be most helpful in determining how the system should be organized.

Respectfully yours,

Kenneth R. Bordner

Kenneth R. Bordner
Principal Investigator

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Figure 5. Continued

1. Does your region presently have a single emergency telephone number? If yes, please answer the succeeding questions in the light of your experiences with the system and indicate here what your emergency number is and what region is served.

2. After considering all of the possible advantages and disadvantages, do you feel that a nationwide emergency telephone number with centralized answering facilities is essential? (Please list specific reasons for your answer.)

3. What problems (if any) do you foresee arising *in your own operation* by having all emergency calls routed through a common communications center?

4. Similarly, what benefits do you foresee *for your own operation?*

5. What sort of jurisdictional problems in your area, if any, do you visualize would be caused by a common communications center?

Figure 6. Emergency Telephone System Questionnaire

6. Do you feel that a common emergency telephone system would substantially improve response to emergencies in your area? (Please explain your answer.)

7. If your answer to number 6 is no, what other approach(es) would improve emergency responses?

8. Approximately, what population does your operation serve?

9. Approximately, what geographical area (in square miles) does your operation cover?

10. Do you know of any emergencies in which the availability of such an emergency telephone system would have resulted in materially improved response to the individual over response obtained by using the present system? If so, we would appreciate your indicating the nature of these particular emergencies.

Figure 6. Continued

Table XII of the Municipal Yearbook 1968, "Directory of City Officials in All Cities Over 10,000: January, 1968."

The sample selected from sources 5 and 6 above excluded the metropolitan cities included in the first and second police and fire chief mailings and all cities which did not list the names of separate police and fire chiefs. Cities whose Mayor's term of office expired before August 1969 were also excluded under the assumption that there was less chance of the police and fire chiefs' names changing while the listed administration was still in office. A random sample was taken of the remaining non-metropolitan cities, again attempting to give each state at least minimal representation.

SURVEY RESPONSE AND DISTRIBUTION

Table 1 presents a summary of the distribution of the questionnaires returned:

Table 1. Questionnaire Response

Agency	Number Sent	Number Responding	Percent Responding
Metropolitan Fire Chiefs	78	44	56.4
Metropolitan Police Chiefs	75	39	52.0
Sheriffs	533	84	15.8
Poison Control Centers	91	31	34.1
"Small Town" Fire Chiefs	665	185	27.8
"Small Town" Police Chiefs	665	163	24.4
Totals	2,107	546	25.9

Of the 546 questionnaires returned, 19.4% of the jurisdictions had a single emergency number, although not necessarily 911. Since these communities had experience with the operation of a single emergency number system, their views and comments are discussed first.

RESPONSE OF AGENCIES OPERATING A SINGLE EMERGENCY NUMBER SYSTEM

The jurisdictions with a single emergency number were evenly divided about whether any substantial benefit was derived from

having a single emergency number. The benefit specified most frequently was the coordination of activities when more than one public safety agency was required to dispatch resources or provide service. Although positive benefits were specified in detail, no loss of benefits currently available was mentioned by those not indicating a positive benefit. Thirty-eight percent of the communities with a single emergency number felt that the system improved their response to emergency situations. One of the major objections to a single emergency number involved the conflicts or number of problems that arise over jurisdiction. Eighty-five percent of those with the system thought that the jurisdictional problems which arise are surmountable through interagency cooperation. Such cooperation, however, requires considerable effort in simply "getting together". Once cooperative arrangements are established, the various agencies are able to develop a plan which provides an effective unified response to emergency situations which is satisfactory to all concerned.

The objections to establishing a 911 system seemed to frequently take the form of "petty jealouses" and a fear of "empire builders" as articulated by some respondents. As a whole, the survey indicated that problems of jurisdiction are resolvable and do not constitute a major impediment to the implementation of the basic system.

Most of the answers to questions about advantages and disadvantages were redundant, reflecting answers to questions relevant to benefits and response. The major advantages cited were the coordination of multiple agency response to situations requiring such aid and the speed and efficiency with which the services could be supplied. Several of the respondees implied that they were able to react to calls for assistance from persons who lacked familiarity with the area. This is one of the substantial benefits to be derived from the system—*increased access for the public to an agency capable of providing the appropriate response to an emergency*.

It can be concluded that the individuals who currently operate single emergency number facilities have found the basic system operable

and beneficial. Interestingly enough, none of the respondees with a single emergency system mentioned the peripheral equipment which can alleviate many of the jurisdictional problems that may arise. Such equipment includes automatic number identification employing sophisticated automatic data processing equipment and a "called party hold" feature (the ability of the called party to hold the call without disconnect by the calling party).

RESPONSE OF AGENCIES WITHOUT A SINGLE EMERGENCY NUMBER SYSTEM

Of the 440 respondees who did not have an operational single emergency number system, 28.6% felt that there were substantial benefits to be derived as a result of implementing such a system. Those who were able to foresee a benefit considered an improved response (88.7%) as the major benefit along with an increase in area coverage for the emergency resource. This coverage would increase from either 8 or 12 hours a day to a full 24 hours a day. Eleven of the agencies surveyed plan to implement a single emergency system within the next 1 or 2 years.

Three of the respondees who did not have a single emergency number system envisaged the operation of such a system by a separate level of government. Although the number is quite small, it reinforces the previously discussed lack of understanding often associated with the single emergency number concept.

SECTION 5
CONCLUSIONS AND RECOMMENDATIONS

This study has led The Franklin Institute Research Laboratories to conclude that a single emergency telephone number is feasible and to recommend that it be implemented nationally.

Most of the objections to a single number arise because many individuals do not have a clear understanding of a single emergency number concept. FIRL found that those who have had experience with a single number are generally in favor of the system, while those who have not had experience with the concept are generally opposed. To eliminate these misconceptions, *FIRL recommends that a national program of public education be initiated to inform the people of what a single emergency telephone number is, what it can do, and what it cannot do.* Such a program could provide an additional benefit by educating the public not to misuse an emergency telephone number.

Many public safety organizations seem to find fault with a single number system when the fault actually lies within the organization. Organizations must be prepared to adjust to innovations in technology when these innovations are in the best interests of the public. *FIRL recommends that public safety organizations consider evaluating their organizational structures to determine if, in fact, the inability to work with a single number concept is an organizational problem rather than a technological problem.*

END