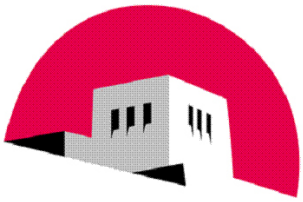

The University of New Mexico

Preliminary Draft: Analyzing Calls for Service to the Albuquerque Police Department

June 2008

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Introduction

This paper is the first in a series of four reports by the University of New Mexico, Institute for Social Research (ISR) addressing issues related to calls by the public for police services in the City of Albuquerque. ISR contracted with the City of Albuquerque to analyze calls for service data from the Albuquerque Police Department (APD). This report includes several sections: a review of the available literature on the topic of calls for service and contemporary aspects on the topic, a description of one month of data from the City of Albuquerque Police Department calls for service database, a review of potential research goals for future analysis including: number of calls, type of calls, reasons for calls, response time and dispositions of calls, the results of calls, and implications and benefits from further detailed analysis of call data and a summary. In a subsequent report we will describe our efforts to design a survey for collecting data, policies, and procedural information from selected police departments. Future reports will report the survey results. Finally, if possible, we will use other sources of information (telephone reporting unit, 311 data, and reported crime data) to supplement the APD data and subsequently analyze two years of data from APD. The final report will include temporal and spatial analysis. We discuss potential analyses in greater detail in the Potential Research Projects section of this report.

Literature Review

Effective and rapid response to emergency law enforcement situations is one of the highest priorities of the police. Increasingly, however, law enforcement officers are being required to fulfill many other roles. The ease and popularity of the 9-1-1 system for reporting crimes has led to overuse in some jurisdictions. Furthermore, the widespread use of cellular phones makes it easier for the public to contact the police. Unfortunately, the increased demands on the police are not being met with adequate resources in many departments. The New Castle Police Department in Delaware, for example experienced a 27% increase in calls for service from 1990 to 2000 while authorized personnel increased by only 4%. As such, it is important for the police to establish strategies which enable them to more effectively and rapidly respond to emergency situations.

This section of our report provides a review of the literature on calls for service to the police. We proceed in three broad segments. First, there is a discussion of why there has been an increase in calls for service. Second, potential solutions to the high number of calls for service are considered. Third, the Albuquerque calls for service data available to the researchers is discussed in the context of a variety of research prospects.

Why are there so Many Calls for Service?

Since the development of the 9-1-1 universal emergency number in the 1960s and 1970s, police departments have seen a steady increase in its use. While this is a testament to the utility, ease of use, and acceptance of using this simple and easy to remember means of contacting emergency services, it has also presented problems to first responders, particularly the police. With the advent of new technologies, specifically cellular phones, overuse, or what some call "misuse and abuse,"[1] of 9-1-1 has grown more prevalent. This segment summarizes commonly cited reasons for the abundance of 9-1-1 calls. Reviewing these reasons suggests a variety of research avenues that may be instructive with regard to practical remedies to 9-1-1 related problems.

A review of the literature on calls for service (CFS) highlights ten factors that influence the volume of 9-1-1 calls. Among the most obvious and well-known influences on CFS are temporal and weather-related variables (Cohn, 1996). Others have identified a number of non-emergency services for which the general public commonly dials 9-1-1 and to which police commonly, but perhaps should not, respond (Deloitte, 2007). Within this category are the very common occurrences of false alarms on buildings (Blackstone et al., 2007; Gilbertson, 2005; Sampson, 2007). The other reasons noted are exaggerated calls, misdials and hang-ups, prank calls, lonely complainant calls, and 'phantom wireless' calls (Sampson, 2002). Phantom wireless calls occur when 9-1-1 is inadvertently called by a cell phone because the numbers were pressed unintentionally while in the caller's pocket or purse. An additional cause of, at times unnecessary, expenditure of police resources are 'problem addresses' which repeatedly call 9-1-1 (Newcastle PD). A concerted effort by the police to effectively eliminate the 'root cause' of these repeat calls is an important strategy to insure the proper allocation of law enforcement services (ibid).

Police Called for Non-emergency Events

Some suggest that the creation of 9-1-1 was too successful. That is, it has been so institutionalized in American society that it is commonly used for improper purposes. While 9-1-1 was created as an easy way for civilians to alert emergency responders, many of the calls to 9-1-1 and subsequent police responses are for non-emergency events.

In a study of the city of the Memphis Tennessee emergency response efficiency, Deloitte (2007) found that 10.9% of CFS were for three types of incidents that likely did not require the response of an armed, sworn member of the police force. The first type of call that fits this description was non-injury car accidents. In

[1] Sampson, Rana. "Misuse and Abuse of 911" *COPS Problem-Oriented Guides for Police Series* No. 19. 2002.

2005, for example, Memphis police responded to 37,000 CFS for such accidents. The second type of call that did not require a sworn officer was abandoned vehicles. And the third type was for traffic and parking violations.

Deloitte (ibid) further suggested that calls reporting theft, vandalism, and harassment in which there is no threat of violent behavior do not require a response by a sworn officer. Other researchers (Alarid & Novak, 2008) suggest that phone harassment, identity theft, stolen property, and property damage are also non-serious incidents that could be reported or responded to by means other than having a sworn, armed officer physically go to the scene of the crime.

These findings suggest avenues of research for studying APD's calls for service. Provided data limitations can be resolved, APD would benefit considerably from understanding if there are certain types of CFS (such as those discussed above) that do not require the presence of sworn officer. Such a research question would entail contrasting CFS types (e.g. burglary, theft, etc.) with the end result of the police officer's response.

While the role of police is to enforce the law, effective response to emergency situations remains perhaps the highest priority of law enforcement. As such, identifying those CFS which are not emergency situations will provide officers with more time and resources to spend on responding to higher priority calls.

False Alarms

False alarms at commercial, residential, and government properties constitute one of the greatest drains on police resources. Researchers have found that burglar alarms constitute 10-20% of CFS (Blackstone, 2007), yet 94-99% of these calls are false alarms (ibid). This profound waste of resources prompted a number of programs such as graduated fine schedules and having private security companies investigate calls prior to having an officer respond among others. Each of these potential solutions is discussed in greater detail in the next section. Nonetheless, prior to implementing any of the solutions, we need to determine the prevalence and scope of this problem as it pertains to APD.

Repeat Calls for Service

Repeat calls from the same address can place a burden on police departments that significantly drains resources. For example, the New Castle, Delaware police department (NCPD) found that among their 142,570 CFS in 2000, nearly 7% (or 9,500) were repeat calls. NCPD found that commonly, different officers responded to these repeat calls. Therefore, there was no continuity in the service provided. The police department was effectively spending greater resources repeatedly treating the symptoms of a problem that could more effectively be dealt with if one or two officers were held accountable for investigating a means to address the underlying cause of the repeat calls.

NCPD, as well as others, designed a strategy to deal with repeat CFS that are discussed in the next section. Nonetheless, as has been emphasized elsewhere, determining the extent to which repeat CFS contributes to APD's workload is a first necessary step.

Phantom Wireless Calls

As mentioned earlier, phantom wireless calls occur when cellular phones inadvertently call 9-1-1. Sampson (2002) identifies three common causes of phantom calls. First, some cell phones are preprogrammed to dial 9-1-1 when either the 9 or 1 key is held down. Second, after calling 9-1-1 to report an emergency, some callers accidentally hit redial. And third, some older cell phones randomly dial 9-1-1 when the battery gets low.

While phantom wireless calls present more of a problem for dispatch than for officers in the field, it is nonetheless a disconcerting trend simply because of its scope. As of 2002, the National Emergency Number Association estimated that as much as 25 to 70 percent of calls to 9-1-1 were phantom wireless calls in some U.S. communities (ibid). At such a rate, phantom calls may prevent dispatchers from answering true emergencies in a timely manner thereby delaying officer response to urgent emergencies.

Time

Temporal variations accompany significant variations in calls for services. This is true along a variety of scales. Within the day, CFS rise significantly in the afternoon and the evenings (Cohn, 1996). Within the week, weekends are times of increased CFS (ibid). Cohn (ibid) also found that there was an increase in CFS near the first of the month. While Cohn attributed this to the dispersal of welfare checks, other potential explanations include that this is commonly a time when bills are due. Thus, one would expect an increase in robberies and burglaries at the beginning of the month. Additional variation occurs by time of the year. From May-September there is an increased level of CFS (ibid).

Each of the patterns at the scale of the day, week, month, and year appear logical. When it is dark, there is likely to be more CFS (ibid) because darkness provides a cover for crime. Furthermore, there are more victims available during the evenings and at night because fewer people are at work. The same holds true for weekends. Additionally, from May-September are the summer months when teenagers and children are out of school and more people are outside.

Understanding temporal variations in CFS for different areas of the city can aid the police department in creating more nuanced deployment strategies. A more nuanced deployment strategy may reduce the workload on individual officers on particular beats that had formerly been required to handle a disproportionate

share of the overall police workload. Furthermore, having a deployment strategy commensurate with the temporal and spatial variation in CFS will ultimately provide timely and better law enforcement services. Thus understanding temporal-spatial patterns in CFS may be an important component of this study.

Weather

A number of weather related factors have been found to influence the number of calls for service. Both when temperatures were higher and when it was less windy, Minneapolis law enforcement agencies had a greater number of CFS (ibid). That more crimes are committed when the weather is nicer is a well-known pattern in criminology. Furthermore, these finding regarding weather reinforce the finding there is an increase in CFS during the period from May-September.

Others Factors that Increase the Police Workload

Among other causes of increased calls and workloads for police are exaggerated calls, misdials, hang-ups, prank calls, and 'lonely complainant' calls (ibid). While each of these types of calls is largely self-explanatory, it is important to attempt to understand the extent to which each of these types of calls affects APD. Each of these types of calls is of particular interest because in many police departments these types of calls require a response from an armed, sworn officer. Thus reducing each of these types of calls is very important. Strategies to accomplish this goal are discussed in the next section.

Potential Solutions Proposed in the Literature

The primary purpose of this literature review is to identify potentially relevant and important avenues for research to determine the practically remediable causes of APD's calls for service workload. Nonetheless, much of the literature on CFS contain previously utilized strategies for managing calls for service and police workload. These strategies are discussed below. Nonetheless, it is important to acknowledge that Albuquerque may present unique problems that need to be identified by research on local data. Furthermore, while each of the remedies discussed below may serve as a conceptual launching point for APD, each of them may need to be altered in order to serve the needs of APD and the broader Albuquerque community.

Responses to Non-Emergency Calls

There are essentially two broad categories of responses to non-emergency calls. They consist of alternative reporting methods and response by non-sworn civilian

police aides. Six alternative reporting methods (ARM) have been suggested in the literature: (1) establish a non-emergency police contact number (2) file a police report over the phone, (3) walk-in reporting in which the citizen comes to the police department to file the report, (4) mail-in reporting in which the citizen is mailed a questionnaire about the incident that they fill out then mail back to the department, (5) internet reporting which is essentially an online version of the mail-in reporting, and (6) delayed officer response.

Commonly the examples provided for the alternate number for reporting crimes are 3-1-1 systems. While this strategy is only used by an estimated 3% of police departments nation-wide, it has been found to reduce 9-1-1 CFS by 8% (Alarid and Novak 2008). Albuquerque currently has a 3-1-1 number which provides information and broader services to the public. Additionally, Albuquerque established an alternate number for reporting non-emergency law enforcement related matters, i.e. 242-COPS. At this point in the research process, it is not known by the researchers when the 242-COPS number was implemented. If data were available prior to the establishment of the number and after, the researchers could evaluate the success of this strategy for Albuquerque and in the process perhaps highlight additional steps to be taken to make the system work better.

The five other alternative reporting methods (ARM) are largely self-explanatory. Nonetheless, there is some concern regarding both public receptiveness to these ARMs and consequently, the extent to which they will reduce the workload of officer's in the field. Alarid and Novak (2008) conducted a survey of the general public in Kansas City, MO in order to evaluate public perceptions regarding the remaining five ARMs (those listed in the first paragraph of this segment) to six crimes deemed to be non-emergency in nature. The crimes considered were (1) phone harassment, (2) identity theft, (3) non-injury auto accidents, (4) stolen property, (5) property damage, and (6) stolen vehicles. In their analysis, Alarid and Novak (ibid) control for how much individuals take the law into their own hands,[2] the respondent's perception of equitable treatment by the police,[3] as well as demographic and economic indicators.[4]

Ultimately for all of the six crimes considered, phone reporting was the most popular ARM. Roughly one quarter (a range of 22%-26.7%) of respondents stated they would be willing to use internet reporting for all crimes considered. Walk-in reporting was more variable depending on the crime. There was a range of roughly 25% of respondents who would be willing to use the Walk-in ARM for damaged property to more than 40% of respondents who would be willing to use this method for non-injury auto accidents. The Delayed Officer Response was likewise considerably variable depending on the crime. Less than one-fifth of

[2] This was measured by a number of questions regarding how the respondent would act in a given situation in which the respondent was the witness to a crime.
[3] Five survey questions in which the respondent rated the police were used to control for this variable.
[4] Age, gender, race, ethnicity, education level, employment status, and whether the respondent was a renter or a homeowner.

respondents would be willing to use this ARM for phone harassment while more than 42% of respondents would be willing to use this method for damage to property. The least popular method for all crimes was Mail-in reporting. For almost all crimes, less than one-tenth of respondents would be willing to use this method.

In addition to these findings, the researchers found that non-whites, older respondents, renters (as opposed to homeowners), and those that felt police treated all equitably were less likely to favor ARMs in general. In contrast, women, those that had more than a high school education, and those more likely to take the law into their own hands were more likely to be willing to use ARMs.

Provided the relatively low levels of popular support for many of the ARMs, it is questionable how effective they would be in reducing field officer workload. Nonetheless, if certain reported crimes could reliably be designated as non-emergencies, 9-1-1 or 242-COPs phone operators could provide callers with alternative options for formally reporting the crime. When done in concert with an explanation of why ARMs are important for insuring public safety, callers may be more willing to employ one of the alternative methods.

Another ARM for non-emergency situations, as mentioned earlier, is having civilian police aides respond to the scene of the incident. This is currently a strategy employed to some extent by APD. At this point in the research project, however, it is unknown to what extent APD uses this method. The proper use of this method may effectively save considerable resources.

Responses to False Alarms

There are basically three remedies suggested in the literature for false alarms. The first was the establishment of a graduated fine program for the proprietors of addresses with repeated false alarms. The second approach is what Blackstone et al. (2007) call "Verified Response" (VR). The VR approach requires a private security company to verify that a response by an armed sworn officer is necessary. This entails the security company calling the physical location and/or sending a security guard to the residence. The third approach is simply placing alarms at a lower point in the hierarchy of calls to be responded to.

Responses to Repeat Calls for Service

There are two general approaches to dealing with repeat calls for service offered in the literature. The first is the use of third party mediation for disputing parties. The second approach is an organizational practice combined with a computer program adopted by the New Castle, Delaware police department that emphasizes officer accountability in solving an underlying cause to disputes.

One study that was reviewed considered the effect of volunteer third party mediation between disputing parties that were repeat callers of 9-1-1. In contrast to those that disputing dyads that did not undergo mediation, those that did undergo mediation were .331 times less likely to have called 9-1-1 within the following six month period.

The New Castle Police Department used a computer program to track which numbers were repeat calls. After three calls from the same number the address was determined to be a 'repeat call location.' Once established as a repeat call location, the computer program would track all developments from the address as entered by officers. This allowed NCPD to keep track of repeat callers while officers could understand the history of long disputes. In addition to the use of the new technology, an officer was assigned to repeat call addresses in order to have continuity in service to the problem address. The sworn officers also underwent problem solving training to allow them to attempt to resolve underlying conflicts that were the cause of the repeat calls (Charkoudian, 2005).

This resulted in considerable success. From January 1, 2000 to April 26, 2000, a period prior to the adoption of this new technology and strategy, 36.3% of calls were repeat CFS and there were 151 locations where NCPD responded to 15 or more CFS. For the corresponding period one year later, after the adoption of the new technology and strategy, only 21.6% of calls were repeat CFS and 54 of the locations that had 15 or more CFS were eliminated as repeat calling addresses.

Responses to Phantom Wireless Calls

Aside from responding to all phantom wireless calls and demanding that phone manufacturers address this problem, one additional way of dealing with this issue to funnel wireless calls through an automated answering system (Sampson, 2002). For example, in the United Kingdom, all cellular calls to the emergency number are answered by an automated message which prompts the caller to dial '5' if they are indeed in need of emergency services. If '5' is not pressed, the line is released. A similar program was initiated in California but was suspended after representatives from the deaf community expressed concern about deaf people's needs not being served by the automated answering system.

Responses to Temporal-Spatial Variation: Deployment

As was suggested above, understanding temporal-spatial variation of CFS can allow police departments to distribute field officers in proportions commensurate with the geographical and temporal distribution of calls. It must be understood that CFS can vary according to time of day, week, month, and year. Regularly tracking CFS in order to detect any new trends in CFS is a must to ensure that deployment strategies accord with changes in CFS rates.

Responses to Exaggerated Calls, Misdials, Hang-Ups, Pranksters, and Lonely Complainant Calls

Exaggerated calls, misdials, hang-ups, prank calls, and lonely complainant calls can all be dealt with in some capacity by public education. The public should understand that 9-1-1 is to be used when, and only when emergency services are required. A possible solution to deal with prank calls is simply a graduated fine schedule such as has been suggested for false alarms. Hang-ups present a difficult issue for police departments. While some simply send a sworn officer to the place of the call, other police departments have instituted a call-back program. In the event of a hang-up, the 9-1-1 dispatcher immediately calls the number back. If there is no answer, a reporting of an emergency, or anything suspicious, the dispatcher then sends a sworn officer to the address.

Review of Preliminary Data

In this section we review the City of Albuquerque calls for service data for January 2007. We briefly describe the data by first examining omitted and duplicate cases, then by examining the data by the types of calls for service. We anticipate many of the data related difficulties discovered in this one month of CFS data will also be present in the remaining 23 months of data. Following a descriptive analysis of the data, we present a short section describing potential research goals for future analysis.

The Data

Due to data importing difficulties this preliminary analysis excludes 2.6% (2,200 of 83,942) of January 2007 calls for service cases. Specifically, a problem exists with the use of commas in the raw data files. For 2.6% of the data rows, an additional comma exists in the raw data. Unfortunately, these additional commas are not always located in the same location in the data and make editing difficult. The majority of the comma errors are for property related offenses, 61.5% of the cases are thefts, and 22.1% are robberies. The presence of one of these commas results in the incorrect assignment of the variable directly after the comma and for each variable following the comma. This issue could be addressed by hand, but it would likely take a day of data cleaning. For the complete analysis of the 2006 and the rest of the 2007 data, this issue would require an extensive data cleaning effort that would take more than 40 hours. . Initially, it seems as though these errors are randomly distributed. Further discussions are necessary to determine the appropriate actions to take with these cases.

After excluding the cases discussed above, there are 81,742 cases in the January 2007 calls for service dataset. Only 52.6% of these cases are unique calls for service, with the remaining 47.4% being exact duplicates of other calls. The

source of these duplicate calls is not clear and requires discussions with the APD staff who manage this data. We believe these calls are multiple calls for service for the same incident. Approximately 30% of calls were completely unique, with no duplicate cases in the dataset. On average, there are 1.41 duplicates per unique case. If we exclude the completely unique cases, there are on average 2.01 duplicates per case in the dataset. The remainder of this analysis excludes the duplicate calls, resulting in a sample size of 43,008 cases.

The calls for service data contain columns for 63 variables. We do not currently have access to a codebook, making it difficult to ascertain the function of the data elements. The data includes a unique event number, address information type of call, source of call, time and date of call, responding officers and agency, other fields, and unused fields. Table 1 details the data fields in the calls for service data. There are two fields which are blank for all observations in the January 2007 calls for service data and a number of variables which are easy to categorize but difficult to define. In some cases, it is not imperative, given the context of our research goals, to identify the specific codes associated with each variable. It is unlikely, for example, that we will require specific officer information for any analyses, making it unnecessary to obtain value labels for the responding officer and agency variables. For other variables, it would be useful to have more detailed information on the variables, but again, it is not crucial. Several of the location variables, like ILO_AreaID and ILO_SectorPlan could prove useful in looking at calls for service trends across the city. Given that the calls for service data includes address and coordinate data, we are able to produce spatial analyses (maps) on the calls for service without all of the location variables.

Unfortunately, a coding scheme for certain variables is likely unavailable. Specifically, the value labels for I_kTypeInfo appear to be arbitrary. While the variable I_kTypeInfo is a 3 to 4 digit numeric value that appears to correspond to a particular call type, there is not a unique number for each call type. Instead, the values associated with I_kTypeInfo appear to be associated with the text contained in the variable ITI_TypeText. This is problematic, because if the description of a call is slightly different in a new case, a new I_kTypeInfo number appears to be assigned to it. Therefore, calls described as "difficulty breathing" and "breathing difficulty" will have different I_kTypeInfo values. Also, in certain cases, different I_kTypeInfo values appear to be assigned to calls that have identical descriptions. It is not clear what is occurring, as the ITI_TypeText descriptions were truncated when APD originally pulled the data.

Table 1. DATASET FIELDS AND VARIABLES

Information Field	Variables in Dataset
Unique Event Number	I_EventNumber
Location Information	I_Address, I_CrossStreet1, I_CrossStreet2, I_Building, and I_Apartment, I_kLocation, I_MapX, I_MapY, I_CallerAddress, I_LocationText, I_MapReference
Type of Call	I_kTypeInfo*, ITI_TypeText, I_Priority*
Source of Call	I_kCallSource* and ICS_SourceText
Time and Date of Call	I_tTimeCreate, I_tTimeDispatch, I_tTimeArrival, and I_tTimeClose, IIU_tDispatch, IIU_tEnroute, IIU_tArrive, IIU_tEnrouteHospital, IIU_tArriveHospital, IIU_tClear, ILO_City
Responding Officers and Agency	I_kPrimaryOfficer1*, POF_OfficerName*, POF_OfficerAgency*, POF_OfficerNumber*, I_kPrimaryOfficer2*, POF_OfficerName2*, POF_OfficerAgency2*, POF_OfficerNumber2*, I_kPrimaryOfficer3*, POF_OfficerName3*, POF_OfficerAgency3*, POF_OfficerNumber3*, I_kPrimaryOfficer4*, POF_OfficerName4*, POF_OfficerAgency4*, POF_OfficerNumber4*, IIU_kOfficer1*, IIU_kOfficer2*, ILO_AreaAgency*, ILO_AreaID*, ILO_SectorAgency*, ILO_SectorPLan*, ILO_SectorID*, ILO_Beat
Other Fields (Unable to ascertain function)	I_kFlags, IDI_DispositionText, I_ResponseType*, IIU_klncident*, IIU_kUnit*, IIU_kDisposition*, IIU_kDisposition2*
Unused Fields	I_ReportingDistrict*, I_ResponseClass*

** indicates data fields with ambiguous meaning*

Classification of Calls for Service

There are 342 different I_kTypeInfo values in the January 2007 calls for service data. In order to make the data more manageable, we aggregated calls into 15 categories. These include:

Alarm
Animal
Auto Theft
Drugs/Narcotics
Hang-Ups
Medical Emergencies
Mental Patients
Other/Unknown
Other Emergencies
Property Offenses
Public Disorder
Sex Offenses
Suspicious Persons
Traffic
Violent Calls For Services

Table 2 lists the number of times each call was recorded in January 2007. The table also includes the four most frequent sample values of "ITI_TypeText" to demonstrate the type of calls that were aggregated into each category. If fewer than four sample ITI_TypeText values are present, this indicates that there were fewer than four calls aggregated into the particular category. For example, the category "Auto Theft" only has "Auto Theft" in the sample ITI_TypeText value column. This is because only calls described as an "Auto Theft" were assigned to this category. The category violent, on the other hand, lists the ITI_TypeText values "Family fight", "Aggravated Assault O", "Family fight escort", and "Assault unknown stat." This suggests "family fight" is the most common violent call for service, followed by "aggravated assault."

It should also be noted that the sample ITI_TypeText values are taken word for word from the original calls for service data file.[5] In the property crime category, for example, the ITI_Typetext value "Forgery or Bogus Che" appears in this exact form in the file. It is likely that the city has access to the full description for each call and parts of the description were truncated during the initial data extraction process. Unfortunately, even with the complete description, we would be unable to distinguish between bogus checks and other forms of forgery.

The ITI_TypeText values, along with the ILO_AreaAgency variable, are the only information contained in the data that can be used to classify the call. This, necessarily, introduces error into the classification scheme. For example, in the traffic category, the most frequent call for service is described as "Car stop or will be." While it is likely that many of these calls are, in fact, traffic related, a certain number of calls with this description could be the result of a BOLO. Additionally, the selection of categories is a subjective process. The mental patient category, for example, consists of calls described as "suicide", "mental patient", "suicidal (not threat)" and "jumper." Clearly, all of the individuals involved in the suicide related calls are not mental patients. Many of these individuals could have likely been classified in the medical or public disorder categories. The decision to classify these calls as mental patient calls is a judgment call, based on the assumption that these calls have more in common with the mental patient calls than with the any other type of call. Similarly, in the medical category, the most frequent call is described as a "wellfare check." Currently we do not what type of call constitutes a "welfare check".

[5] The only exception to this rule is for the ITI_TypeText value of "Blank" for the category Other/Unknown. In the original dataset, the ITI_TypeText field was empty for cases described as "Blank."

Table 2. DESCRIPTION OF APD JANUARY 2007 CALLS FOR SERVICE

Category	Number of Calls	Percentage of Calls for Service	Sample ITI_TypeText values
Traffic	14,684	34.1	Car stop or will be, "Accident no injuries", "Direct traffic", "Aggressive driver/dw"
Other/unknown	7,205	16.8	Periodic Watch, "Do you have contact", "Field Investigator", "Blank"
Suspicious Persons	4,539	10.6	Suspicious person or, "Prowler or peeper"
Medical	4,247	9.9	Wellfare Check, "Injuries", "No Priority Symptoms", "Possibly Dangerous I"
Public Disorder	4,096	9.5	Disturbance/Disorder, "Panhandler/homeless", "Loud music", "Loud party"
Violent	2,425	5.6	Family fight, "Aggravated Assault O", "Family fight escort", "Assault unknown stat"
Alarm	2,108	4.9	Alarm, "Silent Alarm"
Property	1,159	2.7	Vandalism, "Shoplifter complaint", "Forgery or Bogus Che", "Theft"
Auto Theft	879	2	Auto Theft
Hang up call	780	1.8	911 Hang up call
Mental Patient	360	0.8	Suicide "Mental Patient", "Suicidal (Not Threat", "Jumper (Threatening)
Other Emergency	328	0.8	Small outside fire, "Vehicle fire", "Fire", "Light smoke"
Drugs/Narcotics	79	0.2	Narcotics
Animal	72	0.2	Animal Call, "Large Animal", "Animal Rescue"
Sex Offenses	47	0.1	Rape, "Sexual assault unkno", "Rape possibly danger", "Sex offense"

Ignoring the difficulty in classifying calls, the most obvious finding from the frequency analysis of calls is the majority of calls are not necessarily made in response to a crime. Traffic related calls are the most common call for service and account for over a third of all calls for service (14,684). A cursory view of the traffic data reveals that 63.6% traffic calls for service were field initiated. Other/unknown, suspicious persons and medical calls are the next three most common calls for service, accounting for 16.8, 10.6, and 9.9% of all calls respectively). Despite the fact the majority of calls are not made in response to a crime, APD is the primary responding agency for the majority of calls. Using the ILO_AreaAgency field, the code "AP", this appears to stand for Albuquerque Police, accounts for 85.7% of all calls for service. Conversely, the code "AF" which appears to stand for Albuquerque Fire, accounts for 14.1% of calls.[6] In future calls for service analyses, it may be more appropriate to omit all cases not involving the police.

In addition to examining all categories of calls for service, we can also focus on a single type of call within a category of calls for service. For example, if we focus exclusively on the property crimes category, we can determine which type of property crime calls are most frequent. Table 3 presents the frequency for each ITI_TypeText value for the calls coded as "Property" in the January 2007 data.

Table 3. PROPERTY CATEGORY CALLS DURING JANUARY 2007

Type of Property Call	Number of Calls	Percent
"Burglary"	17	1.5
"Forgery or Bogus Che"	157	13.5
"Shoplifter Complaint"	266	23.0
"Theft"	19	1.6
"Vandalism"	700	60.4
Total	1,159	100

We note 'vandalism' is by far the most common type of property call in January, followed by 'shoplifting', 'forgery', 'theft', and 'burglary.' There was also one (1) call in the January 2007 data that had an ITI_TypeText value for 'robbery.' Currently, this robbery case is included in the violent call category, as robbery implies the threat of force. This, like much of the classification scheme used, appears to be an arbitrary choice. It seems unlikely that there was only one robbery call for the entire month in a city the size of Albuquerque. It should be noted we omitted 92 robberies due to comma errors, demonstrating the need to address this issue. It is also likely several incidents were robberies but were described incorrectly in the ITI_TypeText data field.

[6] These figures rest on the assumption that AP = Albuquerque Police Department and AF = Albuquerque Fire Department. This assumption seems safe, given that incidents described as "fire" have the value "AF" in the ILO_AreaAgency variable, while the violent incidents (like "family fight") have the value "AP".

Current Data Issues and Needs

As noted in various places through this review of the preliminary data, there are a number of data quality issues with the calls for service data. It should be noted, most of these issues are resolvable and none of them will hamper our ability to perform interesting and useful research with the data. For the sake of clarity and planning, this section briefly reviews the current data problems and potential fixes.

There are numerous cases, 2.6% for January 2007, which have to be omitted due to errors in the comma delimiters. For a single month of data, this is not a substantial problem and could probably be addressed by hand. For all 24 months of data, this would require a substantial investment of time to fix. There are a number of potential fixes for this issue. Clever programming, which can probably be done by one of the current ISR employees, can probably address the comma error issues. It is also possible the individual who initially extracted the data is not aware of the problem and, if made aware, may be capable of addressing this issue on their end.

There are numerous identical duplicate cases, which we are currently unable to explain. It is possible these identical duplicate cases result from multiple calls for a single incident, although, again, we currently have no way to address this possibility. This problem is substantial, as the inclusion of the duplicate cases will dramatically alter our maps and quantitative analyses. Currently, we are addressing this issue by omitting all extra duplicates. It would be prudent to ask the City or APD staff who was involved with the calls for service data about the duplicate cases in the dataset.

We are unable to identify the meaning and values for several variables in the dataset. There is some evidence many values are system generating, and there is no codebook available for the calls for service data. If this is the case, we can still benefit from discussing the data with someone from the City who is familiar with the data. Because of this issue, it is difficult to determine the specific details of a given call and, accordingly, is difficult to classify calls into useful categories. Additionally, many of the call descriptions are truncated in the data we were given. We will ask for wider columns for the extraction of data in the future.

And finally, it would also be useful to have information on the projected coordinate system that was used to create the x-y coordinates for the calls for service data. The current coordinates, appear to introduce about 50 feet of error into the plotting of incidents. We could remove this error from our maps if we knew the specific system used in the APD management system.

Potential Research Projects

There are a number of research avenues that can be pursued with the calls for service data. Given two complete years of data (2006 and 2007), our first step should be to provide a descriptive overview of the calls for service. This process would first entail creating a coding scheme, similar to the one used for the January 2007 data, which disaggregates the call categories into call types. This would allow us to provide basic descriptive statistics on the calls for service over a two year period. With this data, we would be able to answer basic questions, like: Which calls happen most frequently? Are different types of calls more likely during different parts of the year? Using 24 months of data, we can be fairly certain that our analysis would not be inordinately influenced by month to month fluctuations. In addition to completing the above analysis on the various categories of calls, it is also likely that we would complete the analysis on each category of calls of special interest. With this within category analysis, we could complete a trend analysis of specific types of calls. For example, we could address the question of whether or not the specific types of property calls have changed over the two year period of our data.
In addition to describing the trends in calls for service, we can also examine temporal issues related to different types of calls. Using the time variables in the data, we can calculate the amount of time it took for the police to arrive on the scene and the length of time the incident lasted. With this data, we can determine which calls are being responded to more or less quickly and which calls are taking up large amounts of time. Using either the priority variable included in the data or a priority system of our design, we can determine which calls are not being responded to quickly enough and which calls are accounting for substantial blocks of officer time. And finally, we can examine trends in response and call time, by looking at differences over space and time. Again, this analysis could be completed both between and within calls for service categories.

The calls for service data should be relatively easy to map, as the data comes with x-y coordinates. We will need to know the projected coordinate system used for the calls for service, to ensure the location of the points on the map is accurate. Mapping the calls for service data can provide information on which areas make the most calls and the geographic pattern to the calls, that is, are certain areas more likely to make all calls for service, or just certain types of calls for service?

Unfortunately, it is not feasible to merge the calls for service data we received from APD with our current reported crime level data. The calls for service data do not include any identifiers that directly match with APD reported crime data. Instead, we would have to match the calls for service data to the incident data based on type, date, time, and location of the incident. Because of the relatively ambiguous and preliminary nature of the calls for service descriptions, matching these data sets would have to be done primarily by address, date, and time. This would be less than ideal and is subject to error for two reasons. First, the address

may not be exactly the same for example, in the calls for service data, cross streets may be listed while the incident data contains an exact street number. Second, in the majority of cases, the time will not be exactly the same. Thus, we must use approximate time, within 30 minutes or so. Matching cases in this way would be labor intensive and would require us to verify that the automated matches made are truly matches. The APD's new data management system includes an identifying variable that can match the calls for service to the incident data, it makes sense for us to wait for new data for any projects that require the matching of calls for service and incident based data.

We can map the calls for service data and compare it with the incident based data. We can do that for year 2006 or earlier, as only this incident data is currently geo-coded. Potentially, if we limited the time frame to the first two months of 2007, we could compare incident and calls for service data spatially for those months. If the project is extended through the end of the year, we can, at a minimum, compare 2007 violent crime incidents with calls for service data. We may also be able to compare property crimes.

However, one of the major complications with comparing the current calls for service data and the incident data is that the offense types may differ. For example, in the calls for service data, an offense may be listed as a disturbance, but in the incident data as an aggravated assault. Thus, when comparing hotspots for aggravated assaults based on calls for service data, we would likely see something very different than what we would see with the incident data simply due to the difference in the listing of the offense type.

One way to get around this would be to compare monthly hotspots from the incident data and compare those results to those found by APD analysts on the Problem Oriented Policing website. For example, we could compare auto burglary hotspots generated by the calls for service data on their website to the incident data. Ideally, we want 2008 incident data which we currently do not have, as the Problem Oriented Policing website only appears to display recent hotspot maps. It would be possible, however, to compare hot spots to incident level data for 2006. The advantage of this approach is that we already have incident-level data geo-coded for 2006. The disadvantage is it is likely we would have to recreate the calls for service hot spots for the year. This effort would require additional information on what APD uses as the criteria for a hot spot.

Summary of the Preliminary Draft

In our review of literature related to the issue of calls for service, we discovered it is important for police departments to establish strategies which enable them to respond effectively and rapidly to emergency situations. In last two decades it has become very easy for the public to access the emergency dispatch system via the 9-1-1 function. Ease of service has been a two-edged sword for the police and

other emergency agencies. The 9-1-1 function has had a major impact on the number of police calls for service. The increasing number of calls handled by the emergency dispatch system has also increased the necessity for handling these calls efficiently while meeting the needs of the public.

For our preliminary draft analysis we were given a sample dataset containing one month's worth of calls for service, i.e., January 2007. We spent time cleaning, identifying the values, and duplicate cases in the data. In the future we hope to spend less time cleaning the data. To acquire a cleaner dataset our staff will communicate with the City of Albuquerque staff who pull the data and clarify our data requirements with them. We must understand the data better in order to know the function of duplicate cases and be able to determine the number of "repeat" calls, (i.e., the number of calls per single location). Additionally, our analysis would probably benefit by having access to the CFS data structure document which outlines the table structure of the data, variable values, and user codes. We are also looking forward to discussing the use of the mapping coordinates and the relationships we can make between the CFS data and incident data.

Our review of the January 2007 data revealed similar trends to those in larger documented studies we found in our review of the literature. An obvious finding from the frequency analysis of calls is the majority of calls are not necessarily made in response to a crime. We found Traffic related calls were the most prevalent (34.1%) among all categories. Additionally, the Suspicious Person category and a miscellaneous category (i.e., Other/unknown) contain approximately 27.4% of the calls in our dataset. One notion is emergency calls to burglar alarms amounts to a large number of the calls for service handled by the police. Alarms amounted to approximately 5% of the calls for service during January 2007. We think a detailed review of category and types of calls is warranted.

Future data analysis should include a variety of tests focusing on the types of calls within call category. Which calls happen most frequently? Within category analysis, we could complete a trend analysis of specific types of calls. For example, we could address the question of whether or not the specific types of property calls have changed over the two year period of our data.
Analysis of the data by time, i.e., temporal variables, will give us descriptions of the amount of time it took for the police to arrive on the scene and the length of time the incident lasted. We can determine which calls are being responded to more or less quickly and which calls are taking up large amounts of time. Using a priority system we can determine which calls are not being responded to quickly enough and which calls are accounting for substantial blocks of officer time. This analysis could be completed both between and within calls for service categories. In the 'macro' we can look at the effect of seasonal variations on calls for service. Additionally, as pointed out in the literature the weather may have an impact on calls and comparing CFS with weather data (temperature and conditions) may clarify these influences.

Alternative Reporting Methods are an important tool for managing calls for service. In order to measure the impact and significance of ARM's to calls for service in Albuquerque we need to know APD's procedural policies regarding ARM's. We should also understand APD's policies regarding their response to alarms, repeat calls, and non-emergency types. It is vital for APD to give us CFS data which occurred prior to the implementation of the 242-COPS program. We should be able to measure the success or impact of the 242-COPS program using these data. Who within the community uses the 242-COPS and other ARM's which APD has implemented? Should APD "market" the use and misuse of 242-COPS, 9-1-1, and 3-1-1? Should further ARM initiatives be piloted, i.e., allowing civilian police aides to respond to the scene of an incident or other non-emergency situation? These are possible questions we should answer in relation to ARM's.

Additionally, our research should assist APD rank officers to economically manage their response to CFS types. By examining "non" calls, i.e., hang-ups, misdials, prank calls, and phantom we can determine the extent of the impact of these calls on APD staffing patterns. APD may benefit by understanding whether certain types of CFS require the presence of a sworn officer. Such a research question would entail contrasting CFS types (e.g. burglary, theft, etc.) with the result of the police officer's response. Realizing deployment efficiencies for non emergency situations may provide APD with more time and resources to expend on higher priority calls. Subsequently, efficient manpower deployment in times of economic stress will benefit the patrol efficiency of the APD.

References

Alarid, Leanne F. and Kenneth J. Novak. "Citizens' Views on Using Alternate Reporting Methods in Policing" Criminal Justice Policy Review 2008; 19; 25.

Blackstone, Erwin A, Andrew J. Buck, Simon Hakim. "The economics of emergency response" 2007 *Policy Sci* 40:313-334.

Charkoudian, Lorig. "A Quantitative Analysis of the Effectiveness of Community Mediation in Decreasing Repeat Police Calls for Service" Conflict Resolution Quarterly, Vol. 23, no. 1. Fall 2005.

Cohn, Ellen G. "The Effect of Weather and Temporal Variations on Calls for Police Service" American Journal of Police. Vol. XV, No. 1, 1996.

Deloitte Consulting LLP. "City of Memphis: Efficiency Study Final Report". March 16, 2007.

Gilbertson, Troy A. "Reducing False Security Alarm Calls for Police Service: A Policy Research Note" Criminal Justice Policy Review 2005; 16; 499

Newcastle, Delaware Police Department. "Thinking Globally, Focusing Locally: Repeat Call Analysis as the Cornerstone of Problem Solving."

Sampson, Rana. "Misuse and Abuse of 911" *Problem Oriented Guides for Police Series*. No. 19. August 2002.

Sampson, Rana. "False Burglar Alarms." *Problem Oriented Guides for Police Series. No. 5.* August 2007.