

**Evaluating Emergency Dispatching Services
For The Green Township Fire Department**

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A research project submitted to the Ohio Fire Executive Program

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CERTIFICATION STATEMENT

I hereby certify that the following statements are true:

1. This paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

2. I have affirmed the use of proper spelling and grammar in this document by using the spell and grammar check functions of a word processing software program and correcting the errors as suggested by the program.

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ABSTRACT

Green Township's emergency dispatching services are provided by the Hamilton County Communications Center (HCCC). The annual cost incurred for this service represents a significant percentage of the fire department's budget. The problem this research addressed was the increased cost associated with dispatching services.

The purpose of this study, using evaluative research, was to generate recommendations for the Green Township Trustees to determine the most cost-effective dispatching service provisions available for fire department operations.

Research questions were addressed, inquiring about the ten year span of dispatching costs, the cost for Green Township to operate its own communications center, and the cost for a collaborative effort.

Procedures used to answer these questions involved physical visits to existing communications centers, personal interviews, government record reviews, and extensive library research.

The results of the study identified various expenses involved with the given dispatching proposals. The cost increase which Green Township paid for dispatching services over the ten year period *was* considered excessive, but the Green Township Communications Center concept did not prove to be economically feasible. However, with four fire departments combining their resources, the Collaborative Communications Center was identified as a viable option.

The recommendations of the study were to share the CCC concept with HCCC in an effort to bring forth dispatching cost improvements, but also to accept the CCC notion to review with other affected agencies. Additionally, a committee had to be formed to establish an appropriate management structure in which to develop and operate the communications center.

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INTRODUCTION

Statement of the Problem

Fire Departments across the nation are facing an on-going battle of budget cuts, higher salary demands, and the rising cost of day to day operations. Unlike “Corporate America” the tax supported funding of most fire departments prohibits any type of “on the spot” price increases to overcome financial deficiencies. Hard working citizens are becoming less sympathetic to the non-stop demands of public entities, prompting fire agencies to consider alternative measures for maintaining efficient operations with minimal increases in funding.

The Green Township Fire Department’s emergency dispatching services, an essential component for emergency operations, are provided by the Hamilton County Communication Center (HCCC). The annual payment to the HCCC by the Green Township Fire Department represents a significant percentage of the annual fire budget, prompting a response for necessary evaluation.

The problem this research addressed was the increased cost factors associated with dispatching services utilized by the Green Township Fire Department, both currently and in the future. This project investigated the cost comparisons of the Hamilton County Communication Center versus other dispatching alternatives for the Green Township Fire Department.

Using a ten year projection, an economical analysis was conducted comparing the current dispatch services of HCCC with other measured recommendations. With this information, the fire chief can determine the feasibility of the recommendations provided.

Purpose of the Study

The purpose of this study using evaluative research was to generate recommendations for the Green Township Trustees to help them determine the most cost effective dispatching service provisions available for future fire department operations.

Research Questions

The research questions this study will investigate are:

1. Was the magnitude of cost increase , year over year , for HCCC dispatching services utilized by the Green Township Fire Department from 1992-2002 considered excessive?
2. Can the Green Township Fire Department's allocated funds for dispatching services be spent more efficiently using their own dispatch center?
3. Can the funds allocated for dispatching by the Green Township Fire Department and other neighboring fire agencies be spent more efficiently through a collaborative effort?

BACKGROUND AND SIGNIFICANCE

Green Township is located in the southwestern portion of Hamilton County, just east of Cincinnati, Ohio. The Mack Volunteer Fire Department, established as a private fire company in 1944, was the first established fire department in Green Township, named after the subdivision in which it was built. The volunteer operations continued until 1980 when the first career firefighters were hired. In 1983 the township took control of the fire division, renaming it the "Green Township Fire Department." By 1985, the fire personnel consisted of full time and part time employees, having relinquished all non paid personnel.

Prior to its dispatching contract with Hamilton County Communication Center, the Green Township Fire Department (GTFD) operated its own emergency dispatch center for all fire and medical details. During that time, volunteer firefighters were responsible for managing these communications. Due to the simplicity of the system and the absence of 911 technology, operational costs were minimal including only the fees for a designated phone line and a service contract for ongoing equipment maintenance. Regardless of run volume, the yearly cost to Green Township remained constant. In 1982 both Green Township and HCCC were using radio technology designed from the 1950s; that same technology was still functioning within HCCC until early 2002.

The early 1980's marked "the beginning of the end" for Hamilton County volunteer fire departments. This decline of volunteer personnel forced many local townships to begin paying an outside agency for emergency dispatching. The Hamilton County Communication Center (HCCC), a public dispatching agency operating under the direction of the county sheriff, was already providing dispatching services for the Green Township Police Department. This provided the most sensible, comparable communications service. Additionally, their affiliation

with multiple departments greatly enhanced communications during mutual aid incidents. Ironically, even though it was publicly funded through the county tax bill, the public safety agencies (EMS, Fire, Police) were required to pay an additional fee for dispatching, prompting additional monies from the local taxpayers. Although indirectly, Green Township residents were paying into two entities for the same service, one through the county tax bill and the other through the township fire levy.

Green Township has grown rapidly over the past 20 years and the cost for dispatching has increased more than the rate of inflation; which means it not only requires more money to run its services, but also creates a need for ongoing evaluation of its return on investment.

The potential impact this study could have on the Green Township Fire Department is the ability to:

- Function in a more cost-effective manner.
- Change the format of emergency communications.
- Improve communication between neighboring fire departments.
- Utilize a form of dispatching which custom fits the needs of its users.
- Create ideas for further collaboration efforts.

LITERATURE REVIEW

Exhaustive efforts were conducted to identify previous research material to support this project. The Learning Resource Center at the National Fire Academy was accessed to review research projects which had applicable information to the emergency dispatching field. However, because of the specific nature of the data necessary to answer the research questions, limited information was found. A search of related periodicals and applicable sites on the internet resulted in other information. Additional resources of reference were acquired through personal interviews and telephone interviews of industry professionals, as well as data received from public record requests from various fire service agencies and communication centers.

There was a time when the only tools of the customer service trade were people skills. Today's level of technology demands a service supported by computer function, saving time for everyone involved. A progressively active fire department not only wants to save lives and extinguish fires, it also wants to protect its citizens through public education and prevention programs, minimizing the time spent on critical incidents. Fire fighters, police officers, and emergency medical personnel are obligated to provide the taxpayer with the best possible service. Likewise, an emergency dispatch center, in keeping with recognized standards, must provide customer agencies with the best available service, assuring quality results at the end of the line. industry-related standard-communications (Miller, 1999)

In the scope of this research paper, the terms "dispatcher," "call taker," "operator," and "telecommunicator" are all synonymous. The term *detail* represents any time an emergency vehicle is dispatched via the communications center. This review addresses in order, the three questions posed previously.

1) Was the magnitude of cost increase, year over year, for HCCC dispatching services utilized by The Green Township Fire Department from 1992-2002 considered excessive?

In 1992, the Hamilton County Communications Center provided emergency dispatching utilizing the *basic 911* service. This was a decade old technology in other parts of the United States but relatively new to the Hamilton County area. During that same year, the bill incurred by the Green Township Fire Department for services provided by HCCC totaled \$6,656. The utilized fee formula included both the 911 calls and the dispatching services for the entire year. Simply put the basic 911 service offers citizens an easy number to dial, but not much else. "Basic allows a citizen to dial the three digits and reach the same public safety agency they had before with the seven digit number" (Pivetta, 1995, p. 9). This was especially beneficial to those with limited access to the emergency number listings. The National Emergency Number Association (NENA), established in 1982, was a key contributor in expanding the 911 service.

From 1992 to 2002, the Green Township Fire Department paid a significant amount of money to HCCC for dispatching services. The specific breakdown is identified in Table 1.

Table 1

GTFD Yearly Dispatch Fees per Detail from 1992-2002

Year	Total Details	Cost per detail	Yearly cost from HCCC
1992	3404	\$1.95	\$6,638
1993	3642	\$3.28	\$11,946
1994	3716	\$7.49	\$27,832

1995	3881	\$9.51	\$36,908
1996	4102	\$9.51	\$39,010
1997	4442	\$9.51	\$42,243
1998	4785	\$10.92	\$52,252
1999	5115	\$13.13	\$67,160
2000	5250	\$13.60	\$71,400
2001	5473	\$14.00	\$76,622
2002	5353	\$14.00	\$74,942

Note. Source: Green Township public record, 2003.

In 1996, HCCC upgraded its basic 911 service to the next level of technology known as Enhanced 911. “Enhanced 911 service-increasingly being rolled out by local public safety agencies across America-automatically provides emergency dispatchers with callers’ phone numbers and locations, allowing rapid dispatch of emergency units even if the caller is unable to speak” (DeWitt, 2003,p. 42). Using computer-based technology, all of the caller’s information is displayed on the dispatcher’s screen.

In 2002, The Green Township Fire Department experienced its first ever decline in emergency responses with a 2% decrease from the previous year. The total number of details equaled 5353 and the cost of HCCC remained at \$14.00 per detail, resulting in a yearly fee of \$74,942.00. Additionally in early 2002, the HCCC radio system was updated from an antiquated VHS Low-Band operation to a digital 800 MHz system. (M. Bailey, personal communication, April 22, 2003)

According to the U.S. Census Bureau, the population in Green Township was listed as 52,687 in 1990 compared to 55,660 in 2000. Hamilton County as a whole showed a decline in population going from 866,228 in 1990 to 845,303 in 2000 (US Census, 2000).

In 1998 a report submitted by the Hamilton County Building Department addressed new building activities within the county:

The continuation of a trend that began earlier this decade is evident. Recent development patterns have indicated that a majority of the development in Hamilton County has been concentrated in the un-incorporated areas (townships). These areas include Green and Colerain Townships (west), Symmes Township (northeast), and Anderson Township (southeast). Besides these areas, building activities remain steady and relatively low in most 'built out' communities in Hamilton County (Hamilton County Regional Planning Commission, 1999, p.3).

According to LDL International (1997), Green Township and Colerain Township, both in Hamilton County, are the two largest and most heavily populated townships in the state of Ohio.

In considering the cost increases over the ten year span, inflation was also recognized to help determine if a corresponding baseline existed. During this time period, the average inflation rate leveled out at 2.4% (US Dept of Labor, 2003).

Over the ten year span from 1992 to 2002 the cost per detail billed by HCCC grew from \$1.95 to \$14.00, a total increase of 617.9%. The annual cost to GTFD during that same ten year period increased from \$6,656 to \$74,942 (Green Township, public record, 2002).

In conducting a poll of 54 emergency communications centers across the United States, out of the 68.5% which replied, only 32.4% of the agencies required payment for dispatching by their respective Fire/EMS departments (see Appendix B).

Since 1992 significant changes have occurred in the area of emergency details for the Green Township Fire Department. Population increases, an influx of medical facilities, and major commercial developments have all contributed to the increase in details (Green Township, public record, 2002).

2) Can the Green Township Fire Department's allocated funds for dispatching services be spent more efficiently using their own dispatch center?

The Green Township Fire Department's last approved tax levy to date was in 1994. Since that time, the fire department has experienced a large increase in emergency details, necessitating additional funding. Because the cost of dispatching services exists as a significant portion of the budget, it also dictated a search for possible change (Green Township, budget report, 2000).

When configuring cost analyses for the operation of a fire department communications center, future estimates must be included when determining feasibility. That information combined with start-up and personnel costs were then used in a comparison with the current communications system.

In order to determine the cost needed to start up and operate a fire based communications center, individual equipment was identified. Chief Andrew Knapp, communications chief for Northeast Communications, operates a full service communications center for the city of Loveland, Ohio and Symmes Township, both located within Hamilton County. Three years ago, Knapp's communication center came on-line after utilizing HCCC exclusively for the twenty years prior. a , aPublic Safety Answering Point (PSAP) Equipment (Ragsdale, 2000

A Public Safety Answering Point is a communication center operated as an agency that is responsible for answering 9-1-1 calls and either a) dispatching a response or b) transferring the call to a Secondary PSAP for dispatch. A Primary PSAP is the first

communication center to take a 9-1-1 call. A Secondary PSAP is established to take calls from a Primary PSAP (Pivetta, 1995, p. 12).

There can be several PSAP's in one county area. For example, two neighboring townships could choose different configurations.

City A could be their own PSAP taking all 9-1-1 calls within their jurisdiction by providing call taking and dispatching within their own boundaries. Neighboring City B could choose not to answer their calls, joining a countywide PSAP that would take their calls and transfer them over for dispatching. This would make City B a Secondary PSAP (Pivetta, 1995, p13).

Out of the 56 fire departments currently operating in Hamilton County, 95% are utilizing the services of HCCC. Of those users, 6% operate as a Secondary PSAP, using HCCC as the Primary PSAP. The cost incurred by the fire departments using a Secondary PSAP is a straight fee from HCCC of \$12,768.00 for fire dispatching and \$12,768.00 for EMS dispatching (HCCC yearly report, 2002). For example, a fire department that responds only to fire calls would pay HCCC \$12,768.00 per year; a fire department which responds to fire and emergency medical calls would pay a total of \$25,536.00.

In a communications report written by David Hansen, president of the Massachusetts Communication Supervisors Association (MCSA), Hansen states that 911 is one of the most essential services provided and supported by local government. By definition, all 3 + million of the state's yearly emergencies - plus millions of other lesser incidents - are reported to and handled by 911 PSAP personnel. In addition, in the post 9/11 era, PSAPs were at the very heart of the initial response to, and management of, terrorists, hazardous materials, or Weapons of Mass Destruction Events. Hansen goes on to say that it is hard to overstate the fundamental

importance of PSAPs to the everyday life of our communities or to our future (Hansen, 2003, p. 6).

In a feasibility study conducted by The Sycamore Township Fire Department on dispatching options, Sycamore Fire Chief B.J. Jetter and Communications Director Dennis Ortleib investigated the cost of the equipment and personnel necessary to operate a township based communications center. Through their investigation and analysis of the large system which HCCC encompasses, they determined that communications center equipment can vary in cost according to the level of sophistication desired by the director. (B.J. Jetter, personal communication, October 7, 2003)

onal requirements and technical issues Parker explains that the minimum equipment needed for a communications center is often overshadowed by an individual's desire. "There is never enough time or funding for everything the user truly believes is necessary, let alone everything the user wants" (1997, p. 1).

Durand describes the early necessities of a communications center. "In the past all you needed was a telephone, a radio, pen and paper"(Durand, 2004, p. 2). The radio and telephone were stand-alone devices with no special features, unlike the systems of today.

Phone System – Communications centers will be allocated a specific number of incoming 911 lines. "Although these lines can be transferred or conferenced, they cannot be used to place outgoing calls. Seven digit emergency or non-emergency lines... at the PSAP should be saved for non-emergency, business and personal use" (Pivetta, 1995, p86).

Computer-Aided Dispatch (CAD) is a customer based computer system (software program) to aid in the dispatch and tracking of dispatch operations. It is designed to assist

dispatchers with an immediate status display, summarizing the calls in progress and the apparatus assigned to each (Geac, 2004, ¶ 4).

Radios- Currently, Green Township has the necessary radios needed in the vehicles, but additional base equipment would be necessary. However, if current radios were recalled due to conflict with the provider (Hamilton County), the township would have to purchase their own units. Using recent cost comparisons from the Motorola Company, the average cost for an 800mhz portable radio is \$3500.00 and a mobile radio is \$3900.00. (Mobile Communications Systems, personal communication, November 1, 2003) Green Township Fire Department operations call for 26 portable and 14 mobile radios.

It is essential that all personnel within the surrounding communities have the ability to communicate with each other and with the lead agency's emergency communications center (Klevesahl, 2000).

Other associated PSAP equipment such as tone generators and recorders are considered optional according to NENA (Ragsdale, 2000).

In order to satisfy prudent contingency planning procedures, NENA recommends an emergency generator to supply the PSAP when primary power is lost (NENA, 2001).

Listed equipment costs were provided by the aforementioned agencies. The cost to Northeast Communication Center for the CAD system, five dedicated computers, and the necessary trunk lines totaled just below \$130,000 with a console/tone generator combination costing \$25,000 (Northwest Communications, annual report, 1999).

According to the report from Sycamore Township, bid pricing for complete computer systems including CAD started at \$50,000 for a base model, and went to \$99,000 for a "top of the line" model (Sycamore Communications Document, 2001).

Marc Rocque of Valor Systems, a CAD software provider, offers a CAD System complete with hardware (computer equipment) for three separate users at \$1949.00/month. After initial set-up, the cost is strictly to maintain the license as well as cover any updates and technical support fees. An additional feature of the Valor System is the ability to move the CAD operation to a remote location by means of a simple computer entry. This becomes important if an unsuspected emergency requires evacuation of the communications facility (Marc Rocque, personal communication, February 6, 2004).

In Sycamore Township, the total equipment start-up cost including all radios for Sycamore Township, came to \$900,000, including the required phone equipment and accessories. However, that also included radios for all police and maintenance vehicles, allowing a cost of \$264,300 to be deducted (Sycamore Township Communications Document, 2001).

Based on comparisons from the information provided by the communications centers and vendors, it would cost approximately \$325,600 for equipment necessary to accommodate fire and emergency medical dispatching operations in Green Township. The breakdown is listed in Table 2.

Table 2

Estimated Baseline Equipment Costs for Green Township

Equipment	Cost
Base Radio	\$10,000
Portable Radios	\$91,000
Mobile Radios	\$54,600
Primary PSAP ^a Phone System	\$15,000
CAD/Computers/Cabling	\$75,000

Back-up Power/Generator	\$15,000
Console/Tone Equipment	\$20,000
Installation Costs	\$10,000
Other	\$35,000
Total	\$325,600

^a Secondary PSAP, add \$26,000 to annual operations cost to HCCC

Other remaining costs include operations and facility. Operations consist of personnel and any ongoing contracted services or usages. Two specific expenses included in operations are the service contract and recorder leasing fees. NCC uses a leasing option in regards to recording equipment, costing an estimated \$1800 / year. For all preventative maintenance and repair costs for computer and radio equipment throughout the course of a year, NCC incurs a cost of \$4300 (A. Knapp, personal communication, October 20, 2003). Lisa Durand, the director of Johnson County Emergency Communications Center in Kansas, describes a safe rule of thumb for the cost of equipment maintenance as 10% of the equipment's purchase price (2003).

According to NFPA Standard 1221, *Standard on Installation, Maintenance, and Use of Emergency Services Communications Systems*, "The authority having jurisdiction shall ensure that the number of telecommunicators needed to affect the prompt receipt and processing of alarms shall meet the requirements of the established procedures" (2002, p. 15). In 2003 a Hamilton County Communications Center yearly report submitted by Joe Bobinger with HCCC related a yearly volume of fire and EMS details dispatched by HCCC totaling 50,465. Only one employee position operates the fire dispatching console throughout a 24 hour period. Although they utilize an average of seven phone operators, that position also feeds the police dispatching which came to 261,358 details for 2002. (J. Bobinger, personal communication, July

3, 2002). Staffing communications centers with the proper number of telecommunicators is not an exact science. Unfortunately, existing formulas are outdated and no national standard formula exists which can be reliable for current communications centers (Klees, 2001, ¶ 1). To simplify the process, Klees goes on to say that staffing needs and budget requests for communications centers are often driven by the number of calls they dispatch (Klees, 2001, ¶ 13).

In 2002, Northeast Communication Center (NCC) yearly report listed a total of 26,876 police, fire, and EMS details, using two dispatcher/phone operators from 7:00am to 3:00pm Monday-Friday, and only one during the other hours.

However, dispatchers must be adequately trained. In 1997, Ohio passed a bill (S.B. 5) which established a minimum telecommunicator training standard for Ohio's public safety communications personnel. This required a 40 hour basic training program and an 8 hour recertification program every two years (Hinkle, 1998). Fire dispatchers should hold qualifications consistent with NFPA 1061, *Professional Qualifications for Public Safety Telecommunicator*, to insure familiarity with fire department operations (Saskatchewan Public Safety, 2004).

Accreditation requirements are presented as a guide for emergency dispatch centers so they can become recognized officially as an Accredited Center of Excellence (ACE) by the National/International Academies of Emergency Dispatch. It serves as a common goal among accredited centers to improve public care and maximize the efficiency of 911 systems (National Academies of Emergency Dispatch, 2004). Accredited dispatch training for various certifications is supported by The National Academies of Emergency Dispatch (NAED), The Association of Public Safety Communication Officials (APCO), and The National Emergency

Number Association. Persistent training not only keeps dispatchers from getting lazy, it also allows them to meet the high demands of the job requirements

(T. Bodony, 2003, p. 3).

Sycamore Township's personnel plan consisted of both full time *and* part time employees. (Sycamore, 2001) Butler, Clermont, and Warren County Communication Centers, which all border Hamilton County, utilize full time and part time employees. Hamilton County Communications Center uses only full time employees (see Appendix C).

In a 1998 research project, Robert Avsec documented a NENA report reflecting a comprehensive study of salaries paid to emergency communications center employees. The results were adjusted to the year 2002 by the author, using the formerly documented average inflation rate of 2.4% per year. It is reflected in table 3. A first level supervisor makes 5% above the immediate subordinate, and an average of 30% must be added for full time benefits (Green Twp Finance Director, personal communication, November 6, 2003).

Table 3

Dispatcher's salary range according to region.

Region	Base Salary*	Salary + Benefits*	Supervisor Pay*
West Coast (AK, WA, OR, CA, NV, HI)	\$26,439	\$34,371	\$36,089
North Central (ID, MT, WY, ND, SD, NE, KS, MN, IA, MO, WI, IL, MI, IN, OH)	\$21,314	\$27,708	\$29,094
South Central (UT, CO, AZ, NM, TX, OK, AK, LA)	\$20,902	\$27,173	\$28,531
Northeast (ME, MA, RI, CT, DE, NJ, NY, PA, VT, NH, MD)	\$20,080	\$26,104	\$27,409

Southeast (WV, VA, KY, TN, NC, SC, GA, FL, AL, MS)	\$19,279	\$25,063	\$26,316
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Note. Source: Avsec, 1998. *Effective 2002, using average annual inflation rate of 2.4%.

For salary figures, two personnel (including one supervisor) are factored during the 40-hour workweek while one person operates the center during the non peak hours. This requires three full time employees and an additional part time employee position to cover 48 hours per week at \$12.00/hr.

According to Francis Holt, current standards regarding dispatchers do not mandate yearly training, but like all other professions that deal with critical aspects of a dynamic society, public safety dispatching will eventually see that continuing education is necessary for recertification (Holt, 1999, ¶ 2). “Schedules must allow for operations to be covered while dispatchers brush up on old skills and acquire new ones” (¶ 3). An allowance of 20 hours per year for dispatcher training is included, requiring necessary replacement personnel. Total cost for personnel comes to an estimated \$118,000 (see Table 4).

Table 4

Breakdown of dispatcher annual base salary plus training pay.

Position	Salary	Training Pay
Full Time Supervisor/Dispatcher	\$29,094	\$280
Full Time Dispatcher	\$28,000	\$540
Part Time Dispatchers (48 hrs)	\$30,000	\$480

The most obvious expense not yet discussed involves the physical facility. In order to maintain security, NFPA recommends that access to vital areas of a communications center should be limited (2002). One way to control access is to house the center separate from the fire station. Currently in Green Township, a former fire station still owned by the volunteer fire association is available for lease at a cost to the township of \$1.00 per year. Additionally, it still contains the physical layout for a communications center, including a 70' radio tower for clear receiving and transmitting. Aside from the previously mentioned equipment installation cost, an estimated \$50,000 would modernize the facility for active use (Mack Fire Incorporated, 2003).

Summing up the cost, a mid range estimation of \$422,000.00 would be necessary to adequately equip a Green Township Fire Communications Center by the year 2005. With added salaries of \$118,000, and additional cost for utilities, the first year investment for operations would cost approximately \$540,000.

3) Can the funds allocated for dispatching by The Green Township Fire Department and other neighboring fire agencies be spent more efficiently through a collaborative effort?

The consideration of a third option for comparison purposes can be twofold. Whether feasible or not, it explores the sharing of ideas among mutual departments, exposing each organization to other ideas for progressive growth. Sometimes the original subject being studied becomes "dead in the water" while new unanticipated concepts are generated.

Within contact of the outer geographical borders of Green Township are three other townships which utilize HCCC for their fire and emergency medical dispatching. They are

Colerain Township, Delhi Township, and Miami Township, each identified with its own characteristics.

The Hamilton County Regional Planning Commission prepared a community profile of Western Hamilton County. This included “A collaborative plan to help guide growth over the next two decades” (LDR International, 1997, pVII). A portion of this plan studied the various land uses for each township. This also helped identify potential for future growth.

Colerain Township, bordering Green Township to the north, is listed as the largest township in Ohio for land use (LDR International, 1997). New housing continues to develop with an increase of 3,950 homes from 1990 to 2000 (Hamilton County Regional Planning Commission, 2001).

Delhi Township borders Green Township to the south. Although much of Delhi’s land base has been developed, “a surge in housing accounted for 142 new residential structures in 2001 and 385 in 2002. Prior to these years the next highest housing figure was 78, which was listed in 1992” (Hamilton County Regional Planning Commission, 2002).

Miami Township shares borders with Green Township’s West Side. A large portion of the township is still undeveloped. (Hamilton County Regional Planning Commission, 2002)

The 12% population increase makes Miami Township the fastest growing township populace in Hamilton County to date (Ohio State University, 2002). What was largely rural land just ten years prior is quickly being developed into new homes and businesses. “A major controversy in the efforts to halt rural land loss is whether land-use and consumption decisions are the primary engines of urban sprawl, or whether it is the nation’s continuing population boom providing most of the power driving the expansion” (Numbers USA, 2003, ¶ 1).

Table 5 displays the population changes and increase in fire department details over the ten year period for Colerain, Delhi, and Miami Township.

Table 5

Changes of population and emergency detail data for bordering communities

Community	Sq. miles	1990 pop	1990 details	2000 pop	2000 details	Detail increase
Colerain Twp	42.9	56,781	4522	60,144	7327	62%
Delhi Twp	10	30,250	1429	30,104	2286	60%
Miami Twp	22.7	11,552	443	13,496	804	81%

Since all of these township fire departments share common communications through HCCC, the concept plan of a Collaborative Communication Center (CCC) is presented. The idea of consolidation among several user agencies may have some validity. Currently, radio communications between them occurs often as they share both jurisdictional borders and Automatic Mutual Response (AMR) Agreements.

Using a 2002 statistic for Colerain Township, Delhi Township, Green Township, and Miami Township, the total fire department emergency run volume comes to 16,388. With a “per detail” cost of \$14.00, the amount paid to HCCC is \$229,432. Additionally, all of the fire departments would be responsible for the purchase of their own unit radios, and infrastructure startup costs could be shared according to use.

Based on the startup and operational costs that were documented previously, a total of \$540,000 was reported. Subtracting the radio cost for Green Township at \$145,600 results in a net of \$394,400.

With all of the noted statistics recorded, there are still intangible factors to consider with this collaborative plan. These factors, both positive and negative exist within the everyday

operation of the fire service and communications centers. It is important to note that the cost of a particular service, regardless of which one, goes beyond that which only money can buy. In an applied research paper written for the National Fire Academy Executive Fire Officer Program, D.S. Riddle states that a communications center's reason for existence is to offer a service to the public. It is conceivable that consolidation might be a good idea if service will be greatly improved, even if the money savings isn't overwhelming (2001).

Regarding some positive factors for a CCC: The current county system incorporates 56 fire departments under one fire dispatcher. When affecting weather conditions (thunderstorms, snow storms) impact the entire area, it often becomes impossible to communicate directly to the dispatcher. In a time of emergency, this is critical. When only four fire departments are involved, decreased demand allows for more communication opportunities. Riddle relates to a consolidated effort among three or more smaller agencies. He goes on to say that this can result in significant capital savings initially, and long term human resource savings, as well as better service to the public (2001).

Another common issue is the need for specialized dispatch. Each fire department operates within its own criteria, prompting specific communications from the dispatcher. With 56 different requests to satisfy, the HCCC simply cannot meet those accommodations.

Some negative factors of a CCC are also cited in the following.

When mass casualty incidents occur in Hamilton County, it is conceivable for emergency units throughout the county to respond. With the inconsistencies of radio channels and dispatchers among the units, continuity among communications can be distorted. Politics also plays a part in the plan of collaboration. Perdue (2000), relates the issue of politics as a barrier to overcome when attempting to unite a communications center among multiple agencies. He goes on to say

that anxieties may be triggered by some when a communications center site is located in someone else's jurisdiction, taking them out of the spotlight.

By creating a central dispatch, some emergency personnel fear they will not understand other departments' ways of operation. This situation makes it more difficult for any agency to accept the idea of consolidation (Austin, 1997).

When considering other options for Green Township Fire Department's communications, three basic needs must be met. They include communication equipment, trained personnel, and a suitable facility. Since these costs have already been evaluated, a choice remaining is that which allows an outside dispatching organization to establish a contract with the fire department at a lower operating rate. Currently, in the Hamilton County Region, no private emergency dispatching agencies exist.

Another consideration to alleviate cost while maintaining services with HCCC is to campaign in favor of a 911 surcharge through the state of Ohio to help offset the costs associated with emergency communications. This is not a new concept. "In most states, a fixed charge on telephone bills is used to support the 911 services" (McCarthy, 2003, ¶ 2). McCarthy goes on to write that specifically in Ohio, the surcharge is limited to only "a few" counties, with no general surcharge throughout the state.

The literature review was intended to identify some key elements in determining practical solutions to Green Township's financial concerns regarding emergency communications. With alternatives available, a formed committee may need to draw conclusions based on the best interest of the tax paying citizens. Although a change of any kind will involve additional cost up front, the administrative branch of Green Township must take a leadership position and plan appropriately to ensure a progressive vision to the future.

PROCEDURES

In order to answer the included research questions, several resources were utilized. Because much of the information required data specific to previous and current statistics involving Green Township and other local governments, information was collected through local public records as well as personal conversations with administrative personnel. Emergency run statistics from individual townships were acquired through their web page listings or public record information received from their respective administrations. Green Township Fire Department records were also accessed interdepartmentally by the author. Additionally, a verbal request for public information from the Hamilton County Communications Center was granted via email in the form of an annual countywide statistics report for all of its customer agencies. The Hamilton County Land Use Study served as supportive evidence for the concept that the aforementioned townships have strong potential for future growth. This concept was the basis of future projections.

The author also made a physical visit to the Northeast Communications Center and the Sycamore Township Fire Department to better comprehend the usage of telecommunication equipment currently in use. These facilities were chosen due to the proximity of the author's residence, and ease of accessibility.

Extensive library research was conducted at the Hamilton County Central Library in downtown Cincinnati, the University of Cincinnati College of Applied Science Library, and the Cincinnati State Community College Library.

A thorough search of the EFO Applied Research Papers was conducted through the National Fire Academy via the internet. Some articles were identified and obtained through the inter library loan program. Many of the research papers were available only by contacting the

authors. This was conducted through lengthy computer research of those authors' affiliated fire departments, to identify their email addresses and phone numbers. Once identified, written emails and long distance phone calls were made to locate and request a copy of the papers. Current and former HCCC dispatchers were also questioned through telephone conversations which helped identify areas of importance.

After obtaining the necessary figures from public record, the author combined these numbers together to identify "use versus cost" over the given time period. Using consistent growth rates compared to past history, tabulations were generated to reflect estimated future results.

A list of national emergency communications centers was obtained from the website of Firehouse Magazine. Additional listings of communications centers were gathered through internet searches of state 911 centers. From these lists, 54 of the communications centers were surveyed through email or personal phone call with the intention of creating a wider spread of comparison.

The Hamilton County Auditor was personally interviewed by the author via telephone, revealing specific numbers relating to the operating budget of HCCC.

Although police agencies are the leading users of 911 dispatching, this research identified the fire service as the main focus.

Limitations of the Study

Some limitations were experienced including the inability of various communications centers to reply to the request for information. Out of 54 communications centers polled, 37 (68.5%) of them replied back to the author. Population and size sampling were not utilized when completing the communications center surveys. The author attempted to establish a localized

comparison to the HCCC but found little similarities. As a result, the author searched a credible industry website (Firehouse) and found a list of communications centers which spanned the United States. The directors of these various centers were then contacted via telephone or email and given the survey identified in Appendix C.

Steve Seitz, a national representative for NENA was contacted by the author for information regarding average detail costs for communications centers, but Mr. Seitz stated that the information was not obtainable. A representative of the NENA Ohio Chapter was also called (Dr. Robert Kobb) but no call back was received. After evaluating the surveys, the author was unable to calculate an *average cost per detail*. Each agency had its own unique way of billing its users, and too many variables existed among them.

Early documentation received from fire departments was acquired from hand written records (pre computer era), increasing the potential inaccuracy of specific numbers.

Much of the information gathered from the project was not found in written form. As a result, the author relied on verbal communication to substantiate the research.

Although the former decade of research showed a 26.5 % average annual increase from HCCC, the author chose to apply a more conservative figure for future projections; this appeared to be a more pragmatic expectation for the coming years.

The dispatching alternatives listed by the author were based on previous alternatives of other fire departments in the Hamilton County, Tristate area. Although more local options for dispatching were investigated, no documented research was found to substantiate it. Additionally, no other options proved feasible.

Definition of Terms

Telecommunicator. An individual whose primary responsibility is to receive, process, or disseminate information of a public safety nature via telecommunication devices. (NFPA 1061, *Standard for Professional Qualifications for Public Safety Telecommunicator, p6, 2002*)

Detail. An unplanned event in which Fire or EMS units are dispatched. (Green Township Fire Department Standard Operating Procedure Manual, 1995, p. 3)

Communications Center. A building that is specifically configured for the primary purpose of providing emergency communications services to one or more public safety agencies under the authority or authorities having jurisdiction. (NFPA, 2002, p. 6)

RESULTS

Through this research project, the author intended to identify the current cost of dispatching for the Green Township Fire Department and determine if that money could be spent more efficiently under other communications options. With this purpose in mind, three questions were asked:

1. Was the magnitude of cost increase , year over year , for HCCC dispatching services utilized by The Green Township Fire Department from 1992-2002 considered excessive?

Starting in 1992, the annual cost incurred by the Green Township Fire Department for communication services with HCCC totaled \$6,656. In 1994 the billing structure from HCCC changed. This required a higher amount of the total fire communications costs to be absorbed by the fire departments. By 2002, Green Township Fire Department's total budget for communications costs resulted in a figure of \$74,942. The ten year data is consolidated in table 6.

Table 6*Yearly run activity and associated communications cost for GTFD.*

Note. Source: Green Township public record, 2002 Although the run statistics increased over the ten year span, the "" increased an average of 26.5 % compared to the 2.4% average inflation rate during that same time period (see Table 7).

Table 7*Average inflation rates throughout the United States*

Year	% Inflation
1992	2.7
1993	3.3
1994	2.7
1995	2.4
1996	1.6
1997	2.0
1998	2.6
1999	3.5
2000	1.9
2001	1.3
Avg	2.4

Note. Source: US Department of Labor, Bureau of Labor Statistics, <http://www.bls.gov/>.

Over the ten year span from 1992 to 2002 (see Table 8) the cost per detail generated by HCCC grew from \$1.95 to \$14.00, a total increase of 617.9 %. The yearly cost to GTFD during that same ten year period increased from \$6,656 to \$74,942.

Table 8*Hamilton County Dispatch Rates from 1992-2002*

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	
Cost per detail (dollars)	1.95	3.28	7.49	9.51	9.51	9.51	10.92	13.13	13.60	14.00	14.00	Yearly average
% increase (from previous year)	-	68.2	128.3	26.9	-	-	14.8	20.2	3.6	2.9	-	26.5

Note. Source: Hamilton County Communication Center, 2003. Dashes indicate a 0% change from the preceding year.

In order to gather this data, a detailed review was conducted by the author, from the Green Township Fire Department emergency run statistics and the HCCC annual usage cost report. An email was received from Joe Bobinger at HCCC listing all generated emergency details from 2002 as well as the resulting cost to each customer agency. Research was conducted to determine the basic make up of a 911 system. Other factors were identified to show that Green Township's dispatching costs would likely continue to rise due to its growth. Other communications centers were included to show the reader that there are other agencies doing it differently. The cost increase which Green Township paid to HCCC over the ten year span of 1992-2002 *was* considered excessive. Over that time, the annual increase per detail averaged at 26.5% compared to an inflation rate of 2.4%.

2. Can the Green Township Fire Department's allocated funds for dispatching services be spent more efficiently?

With the cost for dispatching services on a constant upswing, an alternative was investigated for the Green Township Fire Department to create its own emergency communications center. After considering a basic cost breakdown of the equipment necessary to function as an emergency communications center, estimates were generated; staffing and operational expenses were also tabulated as seen in Table 9.

Table 9

Total Projected Cost for the Green Township Communication Center for year 1 (2005)

Equipment/ Utilities Costs	Personnel Costs	Total
\$422,000	\$118,000	\$540,000

Using the same percentages of increase noted in the statistics of the past ten years, a future projection can be applied. After the initial start-up investment, the remaining years would reflect salaries and other operational increases. By 2008, based on a 3.0% yearly increase for salary, the operations cost comes to \$203,553. With a 4.7% average annual emergency run increase, the expected run volume for Green Township fire Department would be 7052. Jumping ahead to 2014, the tenth year of operations, Green Township can expect an emergency detail total of approximately 9288, with an estimated communications center operations budget of \$260,000. This compares to approximately \$262,000 on the tenth year using HCCC, based on a conservative estimate of 6 % per year, far below the previous 10 year average of 26.5 %.

Table 10 displays the ten year projection using HCCC.

Table 10

Estimated yearly operational cost to Green Twp. FD for communication services by HCCC (2005 – 2014).

Year	Cost/detail	# of details	Yearly c
2005	\$16.67	6144	\$102,420.48
2006	\$17.67	6433	\$113,671.11
2007	\$18.73	6735	\$126,146.55
2008	\$19.85	7052	\$139,982.20
2009	\$21.04	7383	\$155,338.32
2010	\$22.30	7730	\$172,379.00
2011	\$23.64	8093	\$191,318.52
2012	\$25.06	8473	\$212,333.38
2013	\$26.56	8871	\$235,613.76
2014	\$28.15	9288	\$261,457.20
		10 year total	\$1,710,660.52

Along with the consolidation of projected statistics, equipment cost quotes were determined through information from NENA and APCO, along with two communication sales dealers including Mobile Communications located in Cincinnati, Ohio and Valor Systems in Satellite Beach, Florida. Additionally, personal interviews and visits were conducted with Chief Andrew Knapp from Northwest Communications Center, and Chief B.J. Jetter and Dennis

Ortleib from the Sycamore Township Fire Department in order to determine the equipment necessary to establish a communications center. Chief Jetter also provided a copy of Sycamore's quote for a specialized communications center with a break down of required radio equipment. All of these communications professionals have experienced first hand the process of forming a communications center. Information regarding dispatcher salaries was obtained through an EFO research paper acquired directly from the author after locating him via the NFA website and several long distance phone calls. Salary information was also found at the websites of several communications centers in the *job requirements* sections. Library research along with several phone discussions with Marc Rocque of Valor Systems helped the author identify the required information on CAD systems and other computerized equipment and service contract costs.

Research was conducted to determine equipment function, needs and costs. Other factors were identified relating to the total operations such as staffing requirements, standards, and salaries.

In determining the efficiency of Green Township's allocated dispatching funds, Year 1 would cost approximately \$438,000 more to start up a GTCC versus contracting with HCCC. However, once the infrastructure became established, the second year costs decrease considerably. Year 2 would cost approximately \$86,000 more if Green Township operated its own communications center versus contracting with HCCC. From that point on, the value range between the two dispatch options is likely to stay relatively consistent, with annual increases affecting them equally. Green Township's allocated funds for dispatching can not be spent more efficiently through a Green Township Communications Center. More efficient spending exists through their current dispatching contract with HCCC.

3. Can the funds allocated for dispatching by the Green Township Fire Department and other neighboring fire agencies be spent more efficiently through a collaborative effort?

This question was partially answered in the research of question #2. With the proposal of only four fire departments consolidating their dispatching services under one unified system, no additional equipment or personnel was needed. As a result, the startup and operations cost remain the same as for the Green Township Communications Center.

According to a Hamilton County annual report from 2002, these departments' annual emergency details totaled 16,388 collectively. From that total, a percentage of usage is identified in Table 11.

Table 11

Percentage of HCCC usage among listed fire departments.

Fire Department	Percentage of Usage
Colerain Township	48%
Green Township	31%
Delhi Township	15.5%
Miami Township	5.5%

Additionally, all of the fire departments would be responsible for the purchase of their own unit radios, and infrastructure start-up costs could be shared according to use.

Using this same percentage of usage to disperse costs for the townships, the first year start up numbers can be determined as listed in Table 12.

Table 12

First year start up cost by fire department for CCC.

Fire Department	First Year Cost
Colerain Township	\$259,200
Green Township	\$167,400
Delhi Township	\$83,700
Miami Township	\$29,700

Based on this displayed percentage of use and the continuing rate of growth, a projected *tenth year* cost analysis has been configured for the year 2014 (see Table 13).

Table 13

Estimated projected yearly operational cost to local fire departments for communication services by CCC in 2014

Fire Department	Annual Percentage of Usage	Yearly Cost
Colerain Township	45.8%	\$119,080
Green Township	33.4%	\$86,840
Delhi Township	15.3%	\$39,780
Miami Township	5.5%	\$14,300

Each of the aforementioned fire departments has specific statistics. These statistics were acquired from departmental records (public record) which were provided by Chief Steve Ober from Miami Township, Chief Rick Niehaus from Colerain Township, and Lts. Doug Campbell

and Phil Klug from Delhi Township. Additionally, extensive research at the Cincinnati/Hamilton County Library's main branch in downtown Cincinnati was conducted using research librarians in the departments of government records and public documents. This information showed the pattern of development and probable future direction for each township. With that information, projections were established to identify future dispatching needs.

The cost analysis from question # 2 was resubmitted using the four township fire departments in a consolidated effort. Based on the financial figures shown, Green Township Fire Department's allocated dispatching funds *could* be spent more efficiently through the CCC plan compared to a contracted service with HCCC.

DISCUSSION

The research involved in this project pertains specifically to the Green Township Fire Department and how it can spend dispatching dollars more efficiently.

When looking at the cost of dispatching services paid by the Green Township Fire Department to HCCC over a ten year period, one may ask if this is excessive. The average annual increase over ten years was 26.5 % while the average inflation rate during that same period was 2.4% according to the U.S. Department of Labor. In reviewing the involved cost for a consolidated center, employee positions consisted only of a dispatcher supervisor and dispatcher. Because HCCC encompasses both police and fire dispatch along with a multitude of those agencies, several tiers of management are utilized. In 2003, the expenses incurred by HCCC totaled \$7,528,522. From that amount only \$1,495,455 came from the county's general fund with the remaining 80% or \$6,033,067 coming directly from the governmental agencies using the service (Dusty Rhodes-Hamilton County Auditor, personal conversation, April 8, 2004).

From a paper view of dollars and cents, the option of a consolidated communications center among four local fire departments appears prudent. But how well will these four departments work together to minimize problems? In a National Fire Academy research study, Austin describes the possible difficulties associated with dispatching agencies creating one central dispatch center. He states that some emergency service personnel have a specific way of doing business, and a consolidation could cause fear and anxiety among the workers (1997).

Currently, the Green Township Fire Department maintains an affable relationship with the three bordering fire departments, and already partakes in mutual training and collaborative

emergency response procedures. “Being aware of the possible obstacles before the consolidation took place would help in making a smooth transition to the combined answering/dispatch center” (Austin, 1997, p. 8).

The results of this study help to identify the possible costs associated with the operation of a communications center and its associated equipment in order to offer an alternative plan to Green Township. The cost for Green Township to operate its own communications center is significant compared to the cost of HCCC services. However, with a consolidated communications center, the operational costs can be divided four ways, making the total cost for Green Township more manageable. Moreover, the standard operating procedures and policies of the dispatch center can be customized to meet the specific needs of the four participating fire departments while still maintaining “state of the art” mutual aid communications. It is apparent that all four of these townships will continue to grow over the next several years. With growth, change is inevitable. Changing to a consolidated system now will help establish a fine tuned, progressive communications system for the future, one which can change with the ever growing needs. If implemented, the Green Township Fire Department may be able to attain better control of dispatching expenses, and direct some of that savings into other programs.

While conducting the research for this project, the author discovered a strong political connection between the HCCC and the Hamilton County 911 Counsel. In order to operate an independent Primary PSAP within Hamilton County, permission from the 911 Counsel must be granted. Although no written Ohio law was found to support this, the counsel has withheld this approval from other individual communications centers within Hamilton County, citing unwillingness for Hamilton County to lose control of communications.

RECOMMENDATIONS

The Green Township Fire Department is in the midst of a financial burden. When considering the cost of fire dispatching services, questions were researched to help identify if a more efficient form of spending for dispatching was a viable option, while maintaining quality communications for Green Township Fire Companies and bordering communities. As a result of the research, two primary recommendations were made.

The recommendations from this study are for The Green Township Trustees to:

1) Discuss the Collaborative Communications Center implementation options with the HCCC administration. Allow them to offer alternative plans to reduce current operational costs or develop other means of funding.

2) Approve the concept of the CCC as a more cost effective alternative to current communication services with HCCC. The approval of this proposal by the trustees necessitates additional action. This includes:

- The Green Township Trustees and Fire Chief should organize and hold an informational meeting with the elected officials and fire chiefs from Colerain Township, Delhi Township, and Miami Township to present the concept of the CCC and form a communications committee by March 1, 2005. The research identifies a cost savings benefit for all four townships. This assembly may also create other financially beneficial ideas which may apply for future collaborative efforts.
- Additional research should be conducted by the communications committee to determine an effectively proportioned management structure which best suits the

CCC as a whole. A clear understanding of all four townships during the planning stages will allow for a more progressive, positive working relationship.

- In order to generate a final plan of action to be reviewed by the trustees, the communications committee should establish current day pricing on required equipment, along with the proposed facility. This plan should not only describe the financial advantages, but also identify the communication benefits of a unified dispatching system.

In reviewing the results of this research, it is crucial for each individual township to recognize the benefits as they apply to the taxpayers, avoiding the negative influences of politics. Additionally, in order to implement the CCC effectively, it must be unanimously accepted by all involved agencies at the start of the process. Consideration for changes or other ideas must be exhausted before final commitment is made.

If one attempts to reproduce this topic of research in a future study, it is recommended by the author to aggressively gather statistical data from the involved agencies, in order to establish a basis for justifiable research. It is improbable that most of this specific information can be found in local libraries or academia, but all are necessary to substantiate the final results.

An option which was not addressed in this research paper is the potential merging of the police department's dispatching with the proposed CCC. Further research is necessary to recognize the specific needs of a police dispatch center and the advantages and disadvantages associated with a combination fire/police agency.

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APPENDIX A

Fee Formula established between HCCC and Green Township Fire Department for the cost of emergency details.

Annual dispatch cost = X

70% of X was paid by HCCC

30% of X was paid by Green Township

APPENDIX B

National span of communications centers to fire department financial relationships.

Communications Center	# of Fire / EMS agencies serviced	Cost to Fire / EMS agencies?
Shelby County (AL)	31	No
Mohave County (AZ)	3	No
Siloam Springs (AK)	6	No
San Mateo County (CA)	17	Yes
Verdugo Fire (CA)	9	No
Poudre (CO)	2	No
Litchfield County (CT)	37	No
Quinebaug Valley (CT)	42	Yes
Lee County (FL)	21	No
Champaign County (IL)	17	Yes
Tri Com (IL)	7	Yes
St Clair County (IL)	48	No
Johnson County (KS)	14	No
Sedgewick County (KS)	15	No
Caddo Parish (LA)	13	No
York County (ME)	16	Yes
Washington County (MD)	29	No
Polk County (MO)	11	No
McKinley County (NM)	23	No

Communications Center	# of Fire / EMS agencies serviced	Cost to Fire / EMS agencies?
Douglas County (NV)	3	Yes
Montgomery County (OH)	1	Yes
Warren County (OH)	13	No
Belmont County (OH)	22	No
Hamilton County (OH)	56	Yes
Orange County (NC)	12	No
Rowan County (NC)	4	No
Willamette Valley (OR)	9	Yes
Centre County (PA)	32	No
Lancaster County (PA)	106	No
Spartanburg County (PA)	54	No
Hamilton County (TN)	7	No
Williamson County (TN)	8	No
Valley Emergency (UT)	9	Yes
Chesterfield County (VA)	23	No
Wetzel County	15	No
Rock County (WI)	17	No
Kittitas County (WA)	14	Yes
Valley Communication (WA)	27	Yes

APPENDIX C*Survey questionnaire for communications centers*

- 1) How many fire and
- 2) agencies do you provide PSAP

- 6) Do you employ: Full time telecommunicators?
Part time telecommunicators?
Full time and part time telecommunicators?