COST ALLOCATION AND GOVERNANCE METHODS IN JOINT DISPATCH CENTERS

Executive Analysis of Fire Service Operations in Emergency Management

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CERTIFICATION STATEMENT

I certify that 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.

Signed: ____________________________________________

William R. Metcalf
Abstract

The North County Fire Protection District was transitioning from its own dispatch center to the North County Dispatch Joint Powers Authority (NCDJPA). There was a question among user agencies about the voting and cost allocation methods used by NCDJPA. The problem was that there was no readily accessible information about how these issues were handled in other dispatch centers. The purpose of this research project was to obtain information about current practices in other dispatch centers concerning vote distribution and cost allocation. The project was a descriptive research project. The research questions were: 1. What methods are used to allocate or distribute costs among member agencies? 2. How are votes allocated? 3. Are there obvious advantages or disadvantages to the different approaches used for cost allocation and voting? 4. Should the NCDJPA make any changes in its cost allocation method and voting structure? A survey was developed, tested, and distributed to 46 dispatch centers. Twenty four centers responded to the survey. Nearly 100% of responding centers allocate 1 vote per user agency. Costs were allocated using one or a combination of 5 factors: call volume, population, assessed valuation, CAD usage, and console cost. Call volume was the most frequently used and was cited as being easiest to explain and calculate. The recommendation was that the NCDJPA continue its practice of allocating 1 vote per user agency and continue its practice of allocating costs based on proportional call volume.
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Introduction

The North County Fire Protection District (NCFPD) has recently begun the process of closing its in-house dispatch center and joining the regional dispatch center operated by the North County Dispatch Joint Powers Authority (NCDJPA). The NCDJPA operates with shared funding from member agencies and governance is accomplished through a board of directors composed of a single voting representative from each member agency. Among existing NCDJPA member agencies, there is dissatisfaction with the current method for allocating costs between the agencies (costs allocated proportionally equal to the proportion that the agency’s calls contribute to overall center call volume) and with the voting structure for the board of directors (each agency has a single, equal vote, regardless of size or call volume). The problem is that as NCDJPA members began to search for alternative approaches to cost allocation and voting structures, it was discovered that there is no readily accessible information on alternative funding or governance strategies for shared dispatch operations.

The purpose of this research project is to identify other joint or shared dispatch operations – both in California and elsewhere in the United States; collect information about funding and governance methods in place in those dispatch centers; compare and evaluate the various approaches to funding and governance; and recommend a funding method and voting model for the NCDJPA.

This is a descriptive research project. The research approach will include a review of the literature in an attempt to identify previous work in this area and to identify key factors that must be addressed in the project. A survey will be developed and distributed to joint or shared dispatch centers in California and throughout the country, seeking information about how costs are allocated between participating agencies and how votes are allocated on the governing
body. Results of the survey will be compiled in such a manner as to show the various
approaches that are currently in use. A recommendation will be developed for a cost allocation
method and a vote distribution method for the NCDJPA.

The research questions are:

1. For joint or shared dispatch centers that are funded by member agencies, what methods are used to allocate or distribute costs among the member agencies?

2. For joint or shared dispatch centers that are governed by representatives of the member agencies, how are votes allocated?

3. Are there obvious advantages or disadvantages to the different approaches used for cost allocation and voting?

4. Given the experience in other joint or shared dispatch centers, should the NCDJPA make any changes in its cost allocation method and voting structure?

Background and Significance

An essential component of any modern emergency services agency is its communications system and the dispatch center. The importance of the dispatch operation can be seen in a variety of national standards and benchmarks. Ten percent of a fire department’s overall grading by the Insurance Services Office, Inc. (ISO) is based on how well the fire department receives and dispatches fire alarms (Public protection classification, 1997). The International City/County Management Association (ICMA) states, “One of the main foundations of all strategic and tactical operations is communications” (Campbell, 2002, p. 447).
Echoing these national standards, the NCFPD in-house dispatch center has been a topic of concern for quite some time, dating at least back to 1994 during the last reclassification of the District’s ISO grading. In that reclassification, the District received only 5.61% credit out of a maximum of 10% credit for receiving and handling fire alarms. Negative issues identified in that classification process included the level of staffing (only one dispatcher on duty at a time), redundant communications with fire stations, monitoring of communications circuits, and lack of compliance with relevant NFPA standards (ISO, personal communication with then-Fire Chief Vanderlaan, February 1994).

In 2003, the District contracted with a consulting firm to provide an overall assessment of District operations and assist with the development of a strategic plan. The evaluation revealed a number of problems with the dispatch center and recommended that the District conduct a detailed assessment of the dispatch operation (Parrott & Blaul, 2004). This concern about the dispatch center is further reflected in the fact that addressing the shortcomings in dispatch was ranked as the highest priority goal in the strategic plan developed following the assessment (North County Fire Protection District, 2004, p. 38).

The NCFPD subsequently contracted for a detailed assessment of the dispatch operation. This assessment process compared the current dispatch operation with national standards and benchmarks, estimated the costs to bring the dispatch center up to the national standards and benchmarks, and compared those costs with the other available option, joining the NCDJPA. The consultants found a number of significant issues with the current dispatch center including lack of adequate staffing, aging equipment, unsuitable facility, and absence of appropriate QA programs. The consultants further found that these shortcomings were an operational danger and exposed the District to significant liability. The NCDJPA was found to
be compliant with all pertinent standards and appeared to offer a significant cost savings, both in transition and ongoing operating expense (Schwartz & Johnson, 2004).

Based on the clear direction from staff and consultants, the NCFPD board of directors authorized staff to begin the process of transitioning to the NCDJPA. Immediately, staff found a great deal of discussion among NCDJPA members about the appropriateness of the current methods for allocating costs among member agencies and about the method being used to allocate votes on the governing board. Specifically, the largest/busiest agencies were interested in exploring some sort of weighted voting system and there seemed to be a general interest in looking at alternative cost allocation methods. NCDJPA staff was unable, however, to provide data to answer the questions and concerns. Since resolution of this issue is critical to the future of the NCDJPA and to the dispatch services for NCFPD, finding answers to these questions is of critical importance, both to the author’s fire department and to the other NCDJPA member agencies.

This research problem is directly linked to the *Emergency Analysis of Fire Service Operations in Emergency Management* course within the Executive Fire Officer Program due to the critical component that an effective emergency communication center has to a community’s ability to prepare, respond, mitigate, and recover from major events (National Fire Academy, 2004, pp. 3-35 – 3-37). This research problem is also directly related to Objective #1 in the United States Fire Administration’s 5-Year Operational Objectives. Objective #1 is, “reduce the loss of life from fire by 15%” (United States Fire Administration, 2004). As observed by ICMA, the presence of an effective communications system is essential in achieving this goal.
Literature Review

A search of the electronic card catalog at the National Fire Academy’s Learning Resource Center (LRC) revealed no resources within the LRC holdings on the subject of cost allocation or governance for shared or joint dispatch center. A wider internet search and a search of the electronic documents catalog at our local library also identified no previously published work on this subject. An electronic search of the archives for 9-1-1 Magazine was also conducted with similar negative search results.

An e-mail was sent to the respondents to the survey conducted for this report, asking if they were aware of any published works on this subject. Only one document was identified by this mechanism, a 1999 unpublished report by Johnson, a dispatch center manager and consultant. Her report was, “compiled to provide an overview of the various types of user rate structures commonly being used by dispatch centers.” Johnson identified a number of methodologies for allocating costs to user agencies, either singly or in combination. Cost allocation factors identified include:

**CAD USAGE** – CAD computer tracks minutes of console time utilized by each agency. Of the total minutes used, agency percentage of use is calculated and used to allocate costs.

**ASSESSED EVALUATION** – The total assessed valuation (property value) for all agencies is determined. The percentage of each user’s AV, as compared against the whole, is calculated and used to allocate costs.

**TOTAL CALLS FOR SERVICE** – Determine the total calls for service for all users, then calculate the percentage share for each user agency, using the percentage share as the basis for cost allocation.
**POPULATION** – Determine the total resident population for the entire geographic area served by the center, calculate the proportional share of each agency and use the proportional percentage as a cost allocation basis.

**COSTS PER CONSOLE** – Calculate the total costs per console position in the dispatch center. Then allocate costs to the users of each console position based on the proportion of calls on that console. For example, all user agencies may share proportionally in a call-taking console position, but the costs of a fire-dispatch position would be shared by the fire agencies.

Johnson also identified other issues that should be discussed or considered related to cost allocation including:

- A minimum user fee
- Allowing for growth
- Is the rate structure easy to understand?
- Will the rate structure accommodate changes in the number of member agencies?

The literature search was expanded to search for other published work related to cost allocation in other fields, also without success.

In summary, the subject matter for this project is one that has not been the subject of published works that can be retrieved by standard methods of performing literature searches. Communications center managers contacted in conjunction with the survey for this research project were unaware of any body of published research and relied instead on professional contacts and networks to share available information and common experiences. Although the body of literature is nearly nonexistent, Johnson’s report provided an initial starting point and identified factors to be considered in performing this research project.
Procedures

Since the author was unable to identify a national list or source for contacting joint or shared dispatch centers, an e-mail was sent to the author’s EFOP classmates for all three classes completed to date, as well as to other national emergency services contacts in the author’s contacts database. A total of 48 e-mails were sent, asking the recipients for their help in identifying joint or shared dispatch centers that allocate their costs among the user agencies and have a governing body made up of representatives of the user agencies. Based on the responses, 46 potential dispatch centers were identified.

A survey was developed and reviewed/tested by members of the San Diego County Fire Chiefs Association Communications Section. The survey was designed to collect demographic, geographic, and budgetary information, as well as the necessary information to answer the research questions. The final survey document (Appendix A) was mailed to 46 agencies (Appendix B). Twenty four agencies (52%) responded to the survey. Survey results were entered into a Microsoft Excel spreadsheet to allow for manipulation and sorting of the data, as well as simple mathematic calculations.

There are several limitations to this research project and the methods used. Since the author was unable to identify any sort of central registry or list of communications centers, the address list was built using personal contacts and networks. There is no way of knowing how representative the survey list is. The survey results are further limited in that all surveys were not returned. Although a 52% response rate is substantial, it is not a complete response and there is no way of measuring how representative the returned surveys are of the dispatch community across the country.
Results

Surveys were distributed to 46 dispatch centers. Responses were received from 25 centers for a return rate of 52%. Of the returned surveys, 5 were deleted from the analysis because, after reviewing their response, it was determined that they did not meet the criteria for inclusion (costs shared among multiple user agencies and governed by a representative board of directors). The remaining 19 (41%) surveys were subjected to further analysis.

The 19 surveys represented dispatch centers in 9 states as depicted in Figure 1.

![Figure 1. States represented by returned surveys.](image)

The dispatch centers responding to the survey cover a broad range of geographic areas, ranging from 14 to 3,600 square miles (average 1,075). The NCDJPA is on the low end of this range, currently serving approximately 200 square miles. Population served by responding agencies ranges from 22,000 to 1,500,000 (average 297,740). The NCDJPA serves approximately 300,000 population. Annual call volume ranges from 6,877 per year to 950,594...
per year (average 218,575). The NCDJPA experiences a current annual call volume of approximately 25,725. The number of dispatchers employed in the centers ranges from 9 to 112 (average 32). Call volume per dispatcher ranges from 491 to 11,198 (average 6,128). The NCDJPA currently employs 11 dispatchers with a ratio of 2,338 calls per dispatcher. 16 of the 19 responding agencies dispatched at least one law enforcement agency, in addition to fire and EMS. There were only 2 agencies other than NCDJPA that dispatched only fire and EMS. Budget amounts range from $850,000 to $13,293,864 per year (average $3,699,345). Cost per call ranges from $6.32 to $210.36 (average $30.87). The NCDJPA annual budget is $1,542,778 and the average cost per call is $59.00.

Research Question #1. For joint or shared dispatch centers that are funded by member agencies, what methods are used to allocate or distribute costs among the member agencies? The proportion of agency call volume to total call volume handled by the center was used as a factor in allocating costs by 13 of the 19 (68%) responding agencies. Proportional call volume was the only factor used to allocate costs by nine (47%) of the agencies. For those agencies that combined this factor with others, it accounted for 33%, 60%, or 80% of the overall formula. The second most frequently used factor is population served. A total of 6 agencies (32%) used this factor. Of those, 3 (16%) used it as the only factor for allocating costs. For those combining population with other factors in a cost allocation formula, population accounted for 10%, 20%, or 33% of the overall formula. The third most commonly used factor is assessed valuation (AV) of properties in the served area. AV was used by 4 agencies (21%). None of the agencies used AV as the only factor. Instead, it was always combined with another factor, accounting for 10%, 20% or 33% of the total allocation formula. Three (16%) agencies used proportional minutes of console use (as tracked by the CAD) as a factor. Two of
those agencies used a simple proportion, while another used a weighted formula based on the type of call. Two of the three agencies using this method used it as the only allocation calculation. The final method used in only one agency was to base payment on the console positions required by the agency. For example, all agencies share in the costs of a call-taker position, but only the fire agencies pay for the fire console and dispatch position. A summary of the factors used by responding agencies to allocate costs is shown in Figure 2.

### Cost Allocation Factors Reported by Survey Respondents

1. **Call Volume** (proportion of user agency call volume to total dispatch center call volume)
2. **Population** (proportion of population served by user agency to total population served by dispatch center)
3. **Assessed Valuation** (proportion of AV for user agency to the total AV for the dispatch center)
4. **Console Minutes** (proportion of console minutes used by each user agency to the total console use minutes)
5. **Pay for direct positions**

*Figure 2. Cost allocation factors reported by survey respondents*

**Research Question #2.** For joint or shared dispatch centers that are governed by representatives of the member agencies, how are votes allocated? One equal vote for each member agency on the governing board is the system used by 17 of 19 (90%) responding agencies. One of the agencies that reported a different method grouped all agencies that contribute less than 1% of the total costs into a single vote. The remainder of the user agencies receive one vote each. The final agency reported that user agencies either get a full vote or one
half vote, but did not explain how the allocation was determined. NCDJPA provides 1 vote for each user agency.

Research Questions #3. Are there obvious advantages or disadvantages to the different approaches used for cost allocation and voting? Johnson, in here 1999 paper, reported the following advantages and disadvantages for the cost allocation methods:

Call Volume:
   a. Simplest to calculate
   b. Easiest to understand/explain
   c. Does not account for the fact that some types of calls use a considerably higher amount of time/effort than others

Population:
   a. Easy to understand, although choosing data source is sometimes difficult
   b. Assumes a connection between population and activity level
   c. Does not account for areas with high daily or seasonal variations in population

Assessed Valuation:
   a. Uses single, objective data source (local tax roles)
   b. Assumes connection between AV and demand for service (no one has shown such a connection)
   c. Based on assumption that agencies with higher AV are able to afford to pay more than others (not necessarily true)

Console Usage:
   a. Difficult to explain and understand
b. Very labor intensive to gather statistic and manipulate data for this purpose

Research Question #4. Given the experience in other joint or shared dispatch centers, should the NCDJPA make any changes in its cost allocation method and voting structure? Will be addressed in “Recommendations.”

Discussion

All of the cost allocation factors identified in the single identified report on this subject (Johnson) were reported by the survey respondents. No cost allocation factors other than those identified by Johnson were reported. Johnson also raised the issue of establishing a minimum contribution and only one agency reported having established a minimum contribution rate by user agencies (5%). Therefore, it seems that this survey verifies the information previously published by Johnson.

Johnson’s report concludes with the statement (p.13):

Finally, there is no magical formula on how to develop rate structures. Each center and its user agencies must sit down and find the best combination of cost measurements to fit the needs of the whole. The only magical part is when all users agree on that one formula.

This research project has illustrated the point that there is nothing magic in the process of allocating dispatch center costs to user agencies. There are a finite set of data points that have some connection to the workload in a dispatch center. Those data points were identified by Johnson and were reiterated in the responses from dispatch centers across the country.

Assigning cost based on proportional share of call volume is clearly the most popular method and it is the only method used by nearly half of the responding agencies. Based on
comments, it seems that this choice is based on ease of explanation/understanding and simplicity of the data retrieval and calculation. Other factors have been added to the calculation by nearly half the agencies, with population being the second most popular factor used. Based on comments on the surveys, population is a viable factor by itself if the user agencies have a stable population that does not fluctuate significantly based on time of day or season of the year. If there is significant variation, the utility of this factor is diminished and it must be combined with one or more other factors to offset the variation or not used at all.

Assessed valuation is used by some agencies, although no one seems to have a good reason why it is used, other than it is easy to calculate. Johnson and survey respondents both admit that there is no connection between AV and activity volume and there is no connection between a user agency’s AV and its ability to pay. Tracking actual minutes of console time used seems like the most accurate method of dividing up costs, but it also is the most difficult to explain, understand, or calculate.

The NCDJPA is in the minority of the dispatch centers, in that it only dispatches fire and EMS agencies (no law enforcement). This likely contributes to the disparity in total call volume and ratio of dispatchers to call volume, since law enforcement activity seems to dramatically increase the activity level in a center. However, NCDJPA’s statistics seems typical in the other reported categories with nothing surprising to this author.

Implications of this research project are that the current methods of governance and cost allocation used by the NCDJPA are within the norm when compared to other dispatch centers surveyed.
Recommendation

Based on the survey results, the NCDJPA should not make any change to the voting allocation on its governing Board. The clear, almost universal, practice is to allocate one equal vote per user agency. While there is some difference in size and activity level among the full user agencies in the NCDJPA, the differences are not significant enough to warrant a change in voting structure.

The NCDJPA currently uses the most frequently used method of cost allocation to user agencies. That is, 100% based on proportional call activity. Based on the survey results and literature reviewed, this method seems simplest to explain and understand and is the best representation of actual activity load created by each user agency. Population is a factor used by other agencies, but would not be appropriate for this one due to the seasonal variations in the coastal communities. Assessed valuation would not be an appropriate factor to use anywhere in California because of the complete disconnect between reported AV and actual property values in California. While console usage could be traced, agencies are similar enough in operational methods that the allocation using this factor would likely not be significantly different than using the simple proportional call volume allocation.

In summary, it is recommended that the NCDJPA continue to allocate one vote per user agency on its governing board and to allocate costs based on proportional call volume. Both are the current practice and this recommendation is to maintain this current practice.
References


Appendix A

Survey
Governance Methods and Cost Allocation in Joint Dispatch Centers

National Fire Academy - Executive Fire Officer Program - Applied Research Project

Bill Metcalf, Fire Chief
North County Fire Protection District
315 E. Ivy Street
Fallbrook, CA  92028
(760)723-2012
wmetcalf@ncfire.org

FAX:  (760)723-2003

Name of Dispatch Center: _________________________________________________
Location (City, State):  _________________________________________________
Person Completing Survey:   ________________________________________________

Name    Phone # for Questions

Type and Number of Agencies Dispatched:  # of Agencies

Law Enforcement:  ___________
Fire Only   ___________
Fire & Ambulance  ___________
Non-Fire Ambulance  ___________
Other    ___________
(Explain:  ______________________________________)

Geographic Area Covered: ____________________________ (approx. square miles)

Population Served:   _________________________________

Total Call Volume for Most Recent 12 Month Period:  ___________________________

Personnel:
   # of Dispatchers (including supervisors):____________________
Other (including clerical staff, computer, etc.): _______________

Total Annual Budget for the Current Fiscal Year: _______________

**Briefly describe the governance model for the center.** If it is easier, use additional sheets or attach supporting documents.

Who does the center manager/director report to? ______________________

If a Board of Directors, where do they come from? How are they appointed? ______

__________________________________________________________________________

If the governing body is made up of representatives of agencies dispatched, how are votes allocated? Does each agency get an equal vote or is there a system of proportional voting (bigger/busier agencies get more votes than smaller/less-busy agencies)?

__________________________________________________________________________

**Briefly describe how center costs are shared/allocated among the agencies being dispatched.** For example, some centers allocate cost based simply on a proportional share equal to the proportion of total calls that the agency contributes - - an agency that contributes 25% of the calls would pay 25% of the expense. Others use a base fee/minimum + percentage. Others factor in other factors such as geographic area served or population served or console minutes used. If it is easier, use additional sheets or attach supporting documents.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

Please return this survey and any supporting information by fax or US Mail to the address shown at the top of the survey. Due to the time constraints associated with this project, please respond by November 12, 2004. Thank you for your assistance with this research project.
If you would like to receive an electronic copy of the final report, please provide your e-mail address below and I will e-mail a copy after it has been submitted and graded by the National Fire Academy.

E-Mail Address: _____________________________________________________________
Appendix B

Agencies Surveyed
(Agencies returning surveys in **bold**)

ADCOM Dispatch (Adams County, CO)

**Astoria Police Department (OR)**

Broward County Fire Rescue (FL)

Central County Emergency 911 (Ellisville, MO)

**Central Lane County Communications (OR)**

Clackamas County Communications (OR)

Columbia 9-1-1 Communications District (OH)

**Corvallis Regional Communications Center (OR)**

**Cumberland County 9-1-1 (TN)**

Deschutes County 9-1-1 (OR)

Douglas County Dispatch (CO)

Douglas County Special Services (OR)

E-Comm 9-1-1 (Vancouver, BC)

El Paso County Sheriff Dispatch (CO)

Everett Fire Department (WA)

**Fayette County 9-1-1 (GA)**

Glendale Fire Department (CA)

**Grand Junction Regional Communications Center (CO)**

Hamilton County Department of Communications (OH)

Heartland Fire Communications (El Cajon, CA)
Jefferson County Sheriff’s Office (OR)

Klamath County 9-1-1 Communications (OR)

Lake County EOC (OH)

Lake Oswego Communications (OR)

Las Vegas Fire and Rescue (NV)

Lincoln County Communications Agency (OR)

McKinley County Metro Dispatch Authority (NM)

NORCOM (Woodburn, OR)

North County Dispatch Center (Rancho Santa Fe, CA)

Portland Bureau of Emergency Communications (OR)

Public Safety Joint Communications Center (Columbia, MO)

Regional Dispatch Center (East Lansing, MI)

Rogue Valley Consolidated Communications (OR)

SHASCOM (Redding, CA)

South Bay Regional Public Communications Authority (Hawthorne, CA)

South Clatsop County Communications (OR)

Southern Oregon Regional Communications (OR)

Southwestern Regional Communications Center (Bridgeport, CT)

Tillamook County Emergency Communications (OR)

TriCom Central Dispatch (Geneva, IL)

Washington County Consolidated Communications (OR)

WESTCOM Dispatch Center (West Des Moines, IA)

Willamette Valley Communications Center (OR)
Xenia/Greene Central Communications Center (OH)

Yamhill Communications (OR)

Yolo County Communications Emergency Services Authority (CA)