

**Document Title: Evaluability Assessment of Dispatch
 Prioritization Technology**

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Evaluability Assessment of Dispatch Prioritization Technology

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NIJ Guidance

The National Institute of Justice (NIJ) does not recommend an outcome evaluation of dispatch prioritization technology in the site assessed below (Chula Vista, CA). An evaluation of Automatic Vehicle Location (AVL) technology, however, may be possible in Chula Vista. Further, NIJ remains interested in evaluating the impact of dispatch prioritization technology in other sites where a prospective time series design is possible with multiple pre- and post- measures. Applicants who propose to evaluate this technology are encouraged to consider process and outcome variables typical to Computer Aided Dispatch Systems such as time call is received, time of dispatch, time of officer arrival, and time of completing on-scene response. Additional outcome variables related to public safety and accountability should also be addressed, as described below.

Applicants may depart from this guidance by providing appropriate rationale.

1. Technology Summary: A Computer Aided Dispatch System (CAD) is a computer database that can track calls for service, maintain status of units available, provide various reports, produce address histories, and support electronic mail. CAD systems create time savings by allowing officers to receive calls for service on their mobile data terminals rather than through the radio. When utilizing radio dispatch, officers in the field sometimes have to wait several minutes to radio in their status or to ask questions regarding the nature of individual radio runs. Officers often need to wait idly until calls have been clarified by the dispatcher-posing safety risks to both officers and crime victims. With the installation of integrated CAD systems, officers can receive all radio runs on their mobile data terminals and only use radios for serious emergency situations. This often results in improved response time and minimizes time spent waiting for instructions or follow-up information from dispatchers. Dispatch prioritization software can enhance CAD applications by electronically prioritizing calls for dispatchers based upon incident seriousness.

Scope of Evaluation: There are three viable options for an outcome evaluation. Based on the dispatch prioritization software alone, two options are available. The first potential evaluation would conduct a pre-post comparison group study in another agency that is just beginning to implement the dispatch prioritization technology—here, Chula Vista PD would not be an evaluable site, due to the maturity of its technologies in place. A second option that focuses on the dispatch prioritization software would be a post-comparison group design; this would compare another site (s) to Chula Vista, in order to compare outcomes and successes. This second option would serve the purpose of evaluating generalizability to the dispatch prioritization software. A third option for an evaluation would be to focus on the Automatic Vehicle Location software (AVL), which Chula Vista PD indicated would be in place shortly in the future. Chula Vista PD has an advanced system, and this new AVL addition has yet to be evaluated for successes. A pre-post comparison that evaluates the before and after of this technology would be helpful in determining whether or not the AVL affects targeted outcomes.

Summary of Evaluability Assessment Activity: The assessment of the feasibility of evaluating dispatch prioritization technologies began with a review of the literature, which revealed that this technology is relatively new to the field of law enforcement and is used by few agencies. Very little is known empirically about the effects of dispatch prioritization technologies.

The Urban Institute (UI) identified Chula Vista, California’s police department as having a mature application of dispatch prioritization. On December 10, 2007, NIJ and UI staff met with officers in the patrol division to discuss, and see firsthand, their advanced technology.

Finding: It would be difficult to implement a scientifically rigorous outcome evaluation of the dispatch prioritization technology and generalizability of findings might be difficult. As learned on our site visit, the technology heavily weighs on the sophistication of the CAD that the agencies use. Moreover, different agencies and communities have differing “priorities” to address: for example, Chula Vista, California is close to the border of Mexico, therefore a priority is detecting border-jumpers. Although UI ultimately recommends against an outcome evaluation on dispatch prioritization, there are three options to do an evaluation: to conduct a pre-post comparison study in another agency that is just beginning to implement the technology; to compare Chula Vista PD to a similar agency that is utilizing the dispatch prioritization technology; or to complete a pre-post comparison study in Chula Vista PD that evaluates the effect of AVL—a not yet implemented software that Chula Vista PD plans to use.

2. Brief Literature Review

What do we already know about projects like these? Would this evaluation add to what we know?

Computer assisted dispatch systems can help law enforcement agencies prioritize incoming calls, relay information to all officers simultaneously, and keep track of officer

locations. The dispatch systems of all public safety agencies can be integrated, speeding appropriate response to emergency calls.

Data terminals installed in police cars often include GPS units, allowing the dispatcher to relay incident information to the officer most geographically relevant. A central server processes information quickly and then communicates it to dispersed units through text displays or two-way radios. Vendors include Priority Dispatch, InterAct Public Safety Systems, and Integrated Computer Systems.

Computer assisted dispatch systems are a critical part of the Law Enforcement Information Systems and Strategy Demonstration Project: *CRIMES*, by the Police Research Center of the College of Criminal Justice at Sam Houston State University (SHSU) for the Office of Science and Technology (OST) of the National Institute of Justice (NIJ). More information can be found in the project proposal at <http://www.ncjrs.gov/pdffiles1/nij/grants/209606.pdf>

No empirical evidence of outcome effectiveness was detected for dispatch prioritization, nor for the AVL software, which is also an option for an evaluation.

Which audience(s) would benefit from this evaluation?

The major benefactors of an evaluation of dispatch prioritization would be the law enforcement agencies who do not presently implement this technology, and policymakers. If the evaluation demonstrates that this technology more effectively and efficiently dispatches officers, it may lead to further policy development.

For an evaluation of AVL's, the benefactors would also be the law enforcement agencies who do not presently implement this technology. If the evaluation demonstrates that this technology more effectively and efficiently achieves outcomes, it may lead to further policy development. Chula Vista is already considered to be "advanced" in their technologies, and could serve as a model to PD's that are developing their technologies.

3. Level of Site Cooperation

Chula Vista expressed a willingness to participate in an evaluation, although there has been no formal evaluation to date, and none currently planned. They also expressed an immediate interest in implementing the AVL software.

4. Background History

Chula Vista originally implemented CAD in 1975. Prior to this, calls to dispatch were handled manually, including a process of time-stamping cards, codifying nature of call, and eventually transferred to paper. Chula Vista created their own CAD using a Burrows mainframe, and eventually changed to Unisys. The initial cost was \$10 million. Their CAD allows all calls generated from citizens, 911, and officers to go directly to the dispatcher. Presently, there are 82 patrol cars hooked up to the CAD system; all of these

cars utilize the dispatch prioritization technology. Each car has a mounted Toughbook laptop with hardware and add-ons. These laptops have a variety of features and applications, including touch screens, GPS modems, internet access (with filters and firewalls), and car-to-car chat. The wireless modem is handled by Sprint, and costs \$4,300 to \$5,000 per month. The city of Chula Vista's radio shop installs the hardware, which absorbs the cost of setup and staff. In order to train officers on the new technologies, there was a one-year transition, and technically savvy officers were selected to train other officers. In addition, a CAD vendor held a training session.

Reporting

Chula Vista police department utilizes the Automated Regional Justice Information Systems (ARJIS). ARJIS was created as a joint powers agency to share information among justice agencies throughout San Diego and Imperial Counties, California. ARJIS has evolved into a complex criminal justice enterprise network used by 71 local, state, and federal agencies in the two California counties that border Mexico. The secure ARJIS intranet integrates more than 6,000 workstations throughout the 4,265 square miles of San Diego County. There are more than 11,000 authorized users generating more than 35,000 transactions daily (www.arjis.org). ARJIS is used for tactical analysis, investigations, statistical information, and crime analysis. The ARJIS governance structure promotes data sharing and cooperation at all levels for member agencies, from chiefs to officers to technical staff.

Reports can be tailored to numerous factors, including but not limited to: location, crime, season, and response times.

5. Program Design

Target Population

The target population is the police officers who are on patrol, who will respond to alerts from dispatchers.

Project Goals and Objectives

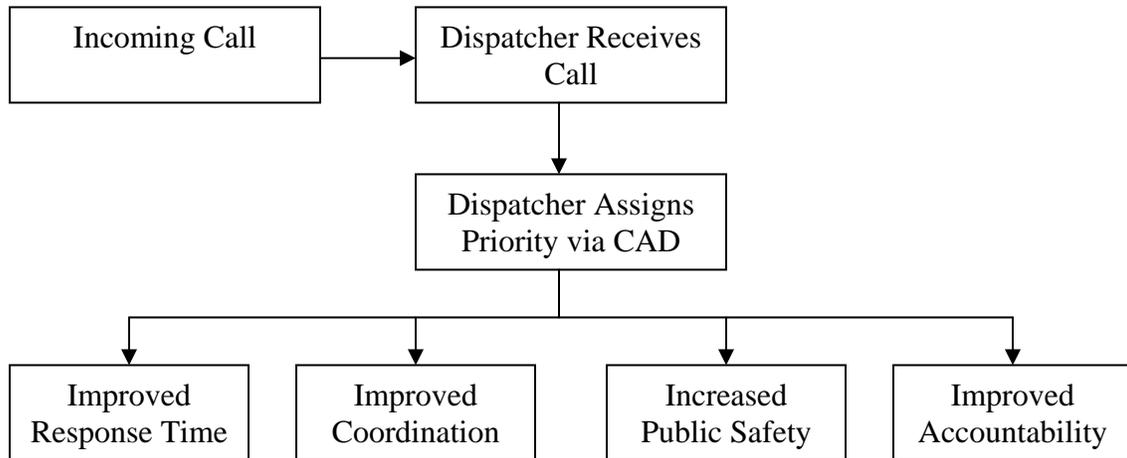
The key goal of the dispatch prioritization is to improve the response level of incoming calls. The objectives are to increase response time, improve coordination, increase public safety, and improve accountability. The key objectives of the AVL are to improve response times based on the additional knowledge of the exact location and headings of patrol vehicles.

6. Program Logic Model

Exhibit 1 presents the basic technology logic model. As the model demonstrates, the incoming calls (stemming from a variety of sources, including citizens and 911) are received by dispatch officers. The dispatch office is located onsite at the Chula Vista

police department, and at any given time, there are up to 10 responders. Dispatchers receive the calls, and based on the circumstances of the situation, assign a priority to the call. Supervisors oversee the decisions. The policy states that all calls for service will be dispatched upon receipt or as soon as possible to effectively manage field resources, and to ensure that calls for service are answered as quickly and efficiently as possible.

Exhibit 1. Dispatch Prioritization Logic Model



As the model shows, the outcomes are affected by the decisions made by the dispatcher. Therefore the hypothesized positive effect of the dispatch prioritization technology is contingent on accurate classifications made by dispatchers for each incident.

The priority dispatch system in Chula Vista has an established procedure for prioritizing calls. The procedures emphasize that the situational factors of a call should be the base for the category assignment, rather than the crime itself. There are 5 priority levels and mandating responses:

Priority 1 – Emergency Calls

- Life-threatening calls
- Felony in progress
- Probability of injury (crime or accident)

- Robbery or panic alarms
- Urgent-cover calls from officers

Response: Immediate response by two officers from any source or assignment, immediate response by paramedic/fire if injuries are believed to have occurred.

Priority 2 – Urgent Calls

- Misdemeanor in progress
- Possibility of injury
- Serious non-routine calls (domestic violence)
- Burglary alarms (one officer may be dispatched during daylight unless circumstances exist that facilitate the need for additional units)

Response: Immediate response by two officers from clear units or those on interruptible activities (traffic).

Priority 3 – As Soon As Possible Calls

- Routine cold reports where victim is calling from a public place
- Routine misdemeanor in custody
- Non-serious routine calls (non-violent disturbances)

Response: Immediate response, if possible, dependent upon activity levels. Callers should be advised of delays if necessary.

Priority 4 – Routine Calls

- Routine cold reports
- Routine miscellaneous calls for service
- Non-urgent service calls

Response: Dispatch as soon as possible, dependent upon activity levels. Callers should be advised of lengthy delays if necessary.

Priority 5 – In-House Calls

- Calls handled in-house by dispatchers
- Officer initiated activities
- Calls that will not be counted in analysis of calls for service statistics

Response: Handled as received in-house.

Is the logic supported by empirical evidence?

Whereas the Chula Vista police department produces reports that have the capability to carry-out empirical testing, no such testing has been conducted to support the logic. Chula Vista PD is too far advanced to conduct a pre-post study of the dispatch software, however it would be a model site to conduct an evaluation of their not-yet-implemented AVL software.

Are there apparent contradictions or conflicts between certain activities and the outcome expected?

It is logical to use the priority dispatch system technology as a tool for law enforcement to improve the efficiency and effectiveness of the dispatch procedure. However, this technology is highly contingent on the training of dispatchers, and in some cases, discretion is necessary. Although the presence of an authoritative supervisor may mitigate these issues, it is possible that the outcome may be affected by a specific dispatcher.

7. Implementation Issues

Is the project being implemented as planned?

Yes. It appears that the Chula Vista police department has successfully integrated the technology into their existing CAD. In the case of the AVL, Chula Vista police department anticipates further updates. The department has this software and equipment to be launched in 2008; this would locate where the patrol vehicles are so that resources could be reassigned to be allocated more efficiently. In addition, they hope to have the fire department install the AVL in fire trucks and stations so that both agencies would be able to access the maps.

Describe staffing.

Presently, Chula Vista police department has 82 vehicles that utilize the CAD and dispatch prioritization technologies. All new officers are trained on the technology while in the academy, and existing officers received in-house training. There are approximately 43,000 dispatched calls per month, and at any given time, there are approximately 10 dispatchers receiving calls.

Describe the stability of the project over time.

Because CAD still requires the dispatcher to receive the calls and make the priority assignment, it is believed that the technology will evolve. It is anticipated that the call-taking process will enhance to reduce the number of dispatchers by features such as voice recognition, voice-to-text, and other language capabilities. Chula Vista hopes to automate the dispatch system completely.

What aspects of the project could be evaluated for outcome?

It is clear that a true experiment that utilizes randomization would not be appropriate for this technology. Once this technology is in place, it would be unethical to randomly assign some cases to prioritization, and have others revert back to the archaic system of telephoning. However, there are a couple outcome designs that may be worth considering for an evaluation of the dispatch technology.

One option is a post-only comparison with Chula Vista. Because Chula Vista police department is at a more advanced stage with their technology and has been implementing the technology for a longer period of time, it would be nearly impossible to gather

baseline data to compare the before-and-after. However, it would be possible to conduct a post-only comparison design using another police department as a comparison group. This design is not without limitations. Departments that utilize the prioritization technology are able to prioritize incidents based on the needs of the community, and therefore, priorities will differ among departments. Matching departments for a comparison would be difficult, and would need to incorporate many similarities, including: population, numbers of dispatchers, numbers of patrol officers, sophistication of CAD, and priorities.

A more rigorous approach that would be feasible is to conduct a pre-post comparison in a police department that has plans to implement the technology. The department would have CAD, but not yet using the dispatch prioritization technology. This design would allow for a time-series analysis, so as to compare outcomes before and after the dispatch prioritization technology.

On the site visit, it became clear that Chula Vista is in the process of updating their technologies, especially by enhancing their CAD. Because Chula Vista police department anticipates further updates and will be launching their AVL in 2008, it would be possible, and interesting to conduct a pre-post evaluation. Chula Vista has great data recording, and is willing to share their data with researchers. This type of research would demonstrate whether or not the AVL is effective in achieving outcomes (TBD).

What would the outcome measures be?

To measure the increase in efficiency and effectiveness, the primary outcome measure is the length of response. Faster responses indicate a more efficient system of dispatch, and a more effective system overall. Efficiency may be translated by patrol officers into a greater amount of time engaged in community policing or problem solving. In addition, officer perceptions of coordination and accountability could potentially be outcome measures. Intermediate outcomes would include the accuracy and consistency with which dispatchers make decisions on priorities.

Because this site visit did not focus on AVL, the outcome measures of this evaluation are unclear, but most likely include similar measures to the CAD and prioritization software.

How could an appropriate comparison group be created?

The city of Chula Vista would be an especially difficult one to create a comparison group. Chula Vista covers 55 square miles, and has more than 250,000 residents. Moreover, it borders with Mexico, which creates a unique situation when focusing crime efforts (smuggling, trafficking, and border-jumpers). It is not impossible to match other cities on specific characteristics, however there may be differences that would draw questions to the outcome effects.

Are the sample sizes statistically significant?

Chula Vista police department receives approximately 43,000 dispatch calls per month. Of those, approximately 8,000 are calls initiated from 911. This translates to more than 1,400 calls per day. This number will vary based on characteristics of the chosen site, however it is expected that those departments that have CAD will have statistically significant sample sizes.

Is random assignment possible?

No. As stated previously, it would be unethical to conduct a study where some calls are routed to the dispatch prioritization, and others are not. This would greatly compromise the department, and potentially the safety of its citizens.

Recommended Approach

It is not recommended that NIJ support a study of dispatch prioritization technologies. It is not believed that such a study would significantly contribute to the field. Each police department and community it serves is different. Outcomes would largely be affected by individual factors, such as training devoted to officers and dispatchers, and priorities and how they are developed. Moreover, the technological advances of the CAD system of a whole make it difficult to parse out which factors affect the efficiency and effectiveness of a response system. Departments can buy CAD in a bundle, or choose to add on features that meet the needs of the department (such as the case in Chula Vista). This creates confounding factors that make measuring outcomes difficult.

However, UI does recommend an alternative approach that would evaluate the AVL technology in Chula Vista. Chula Vista has the equipment in-place to launch this technology in 2008, and it would be important to conduct a pre-post comparison in order to determine if this technology is successful in obtaining outcomes.

Alternative Approach

If NIJ decides to fund an evaluation of dispatch prioritization technology, it is recommended that the study be carried out in a site that has CAD in place, but not yet has the prioritization technology. Baseline measures could be taken before the prioritization system is set up, and outcomes would be evaluated using time-series analysis. With the large sample size that would be expected in most cities, the evaluation is estimated to take under one-year, which includes baseline measurement, transition and training, and post evaluation. The estimated cost of the evaluation would be largely determined by the outcome measures; if only administrative data are analyzed, the cost could be under \$200,000. However if measure of perceptions were incorporated (such as a survey of officers), this could increase the cost exponentially.

8. Measurement Model

Potential outcomes are presented in the logic model.

9. Data

Comment on the quality and availability of project-generated data to support these measures.

The Chula Vista police department maintains extensive and sophisticated electronic databases that can be easily accessed for evaluation purposes. Much of this data is accessible to the public, via the ARJIS web site: www.arjis.org. The San Diego and Imperial counties have shared access to this data management system.

10. Summary Remarks

Recommendation for evaluation

It would be difficult to implement a scientifically rigorous outcome evaluation of the dispatch prioritization technology. Although UI ultimately recommends against an evaluation, it would be possible to conduct a pre-post comparison study in another agency that is just beginning to implement the technology, or to compare an agency that is utilizing the technology to an equivalent agency. UI does recommend an alternative approach that would evaluate the AVL technology in Chula Vista. Chula Vista has the equipment in-place to launch this technology in 2008, and it would be important to conduct a pre-post comparison in order to determine if this technology is successful in obtaining outcomes.

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