POWER TO THE PEOPLE: MAPPING AND INFORMATION SHARING IN THE CHICAGO POLICE DEPARTMENT

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Abstract: *Community policing is intended to change the way police officers at all levels work. In support of these changes, the police department's information system should also be modified, in ways that may not be immediately apparent; if it is not modified, the full benefits of community policing may not be realized. This chapter describes the way the Chicago Police Department has reorganized its information system, and, more to the point, has changed its policies regarding the sharing of information, in support of a full implementation of community policing.*

As Chicago Police Officers Gail Hagen and Margred Colon prepared for their monthly meeting with residents on their beat, they sat in front of a personal computer at the department's 25th District. While one worked the mouse and picked criteria for their search, the other reviewed the previous month's products. The Information Col-

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lection for Automated Mapping (ICAM) system computer provided the officers with access to data on reported crime and community data for the district. By choosing the type of information that was discussed by them and members of the community at the last beat meeting, the officers created a series of maps showing problem areas on the beat and how conditions had changed after they began addressing issues identified at the meetings. After selecting the categories of robberies, burglaries and narcotics-related incidents, the officers prepared maps and listings for each category. They were quite pleased when they were able to see that since they had begun foot patrols on several side streets, all three groups of incidents had decreased in those areas. They knew, too, that the community would be pleased with their efforts and that all parties could see real results from using technology to support community-based policing services. Figures 1 through 3 depict the types of output that are done routinely and easily by police officers using the ICAM system.

ICAM represents, as of 1996, the latest point in an evolutionary process in the use of computerized information systems by the Chicago Police Department (CPD). The department and its community partners have, since the early 1980s, amassed considerable hands-on experience with using computers to interpret crime and community-based data and to create maps. These efforts have helped them to understand how people use these tools cooperatively to better enable the police and the community to "serve and protect." These experiences illustrate how all organizations' information systems need to change, and how police departments can respond to the changes required of them.

In this chapter we review the way the CPD has changed its policies with respect to information, and especially with respect to information sharing, in some fundamental ways. We should point out that this represents our own views of what has happened over the past few decades; others, both within and outside the department, have very different views of what the CPD is now doing and whether it should be doing it. In fact, one of the issues that any police department must face is determining to what extent its information should be shared, with whom and under what circumstances, and the political consequences, both internal and external. While this chapter does not directly address these questions, it does describe how and why the CPD has dealt with information sharing.

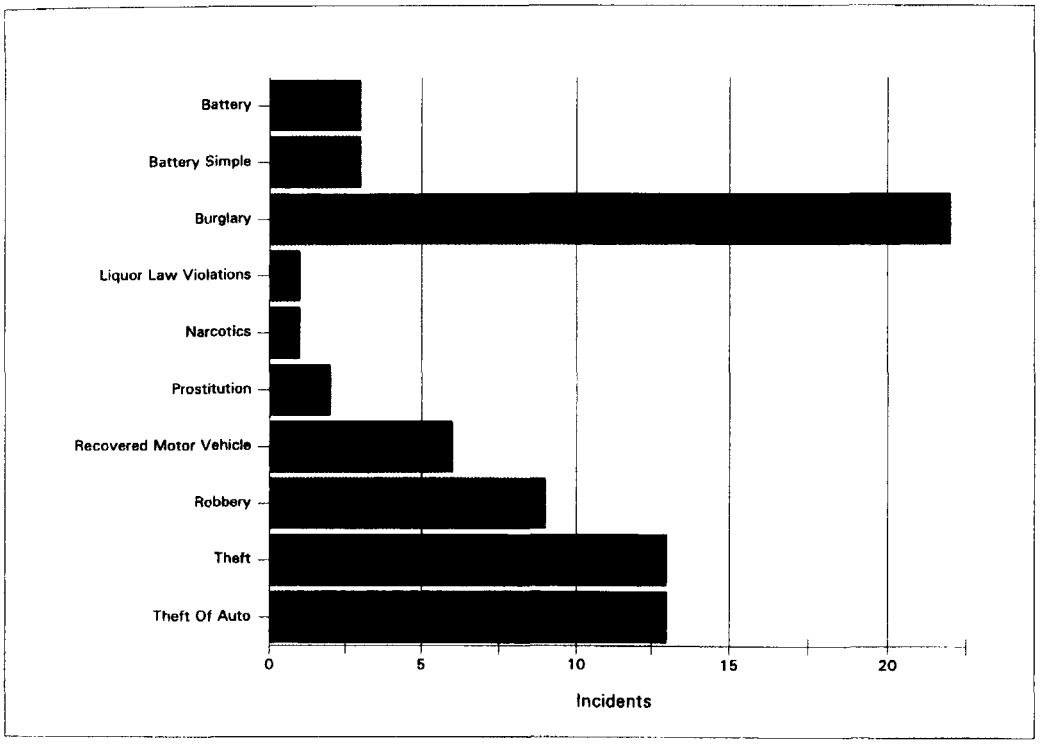
Figure 1: "Top Ten List" of Most Active Crime Types for the Beat

Primary	Totals
Burglary	22
Theft Of Auto	13
Theft	13
Robbery	9
Recovered Motor Vehicle	6
Battery Simple	3
Battery	3
Prostitution	2
Liquor Law Violations	1
Narcotics	1

TOP TEN ON 2515

From: 02/22/1996 To 03/20/1996
From: 00:00 To 23:59 Hours

TOTAL: 73

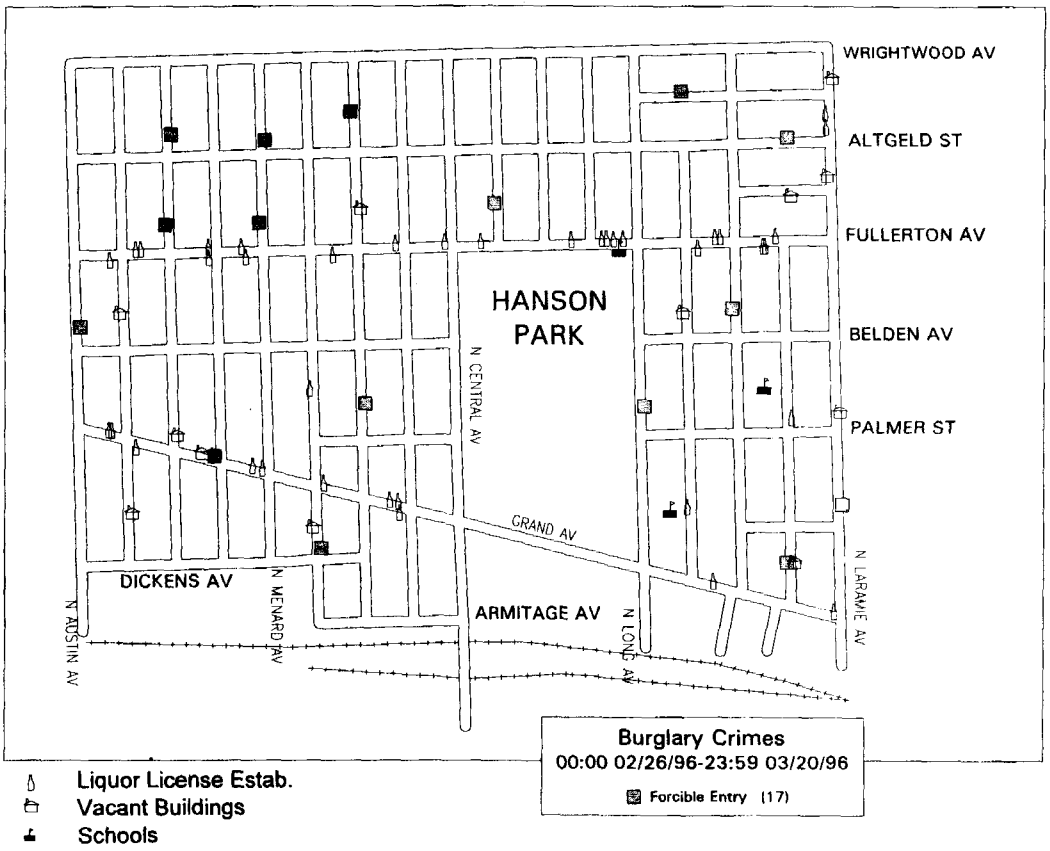


*These data reflect initial case classification based on facts known at the time the incident was reported. They may be revised at a later time.

Figure 2: Typical Map Prepared for a Beat Meeting

BURGLARY OFFENSES IN BEAT 2515 (17)*

ALL LOCATIONS



*These data reflect initial case classification based on facts known at the time the incident was reported. It may be revised at a later time.

The next section examines early modernization efforts of the CPD with respect to information systems. We subsequently explore the CPD computer mapping project, "Mapping Crime in Its Community Setting" (Maltz et al., 1991; see also Rich, 1995), that was the precursor to ICAM, and, in fact, to a great many police computer mapping efforts. The last section discusses some of the choices open to police departments in terms of information policies, and what we see as the advantages of the route chosen by the CPD, that of sharing information with the community.

Figure 3: Listing of Incidents Displayed on the Map

Address	Hse_Apt	Date	Time_1	RD_no	IUCR	Secondary	Location
21 N Mango Av		02/26/1996	1915	A-124857	0610	Forcible Entry	Residence
25 N Major Av		03/03/1996	0110	A-233172	0610	Forcible Entry	Residence Garage
52 W Altgeld St		03/04/1996	2000	A-161545	0610	Forcible Entry	Residence Garage
23 N Lockwood Av		03/04/1996	0630	A-216466	0610	Forcible Entry	Residence Garage
24 N Marmora Av		03/04/1996	0001	A-160204	0610	Forcible Entry	Residence Garage
25 N Marmora Av		03/06/1996	1315	A-164317	0610	Forcible Entry	Residence
29 N Parkside Av		03/06/1996	1400	A-164134	0610	Forcible Entry	Residence
20 N Latrobe Av		03/11/1996	1500	A-219049	0610	Forcible Entry	Residence Garage
22 N Long Av		03/12/1996	1600	A-174711	0610	Forcible Entry	Residence Garage
22 N Major Av		03/14/1996	2200	A-220402	0610	Forcible Entry	Residence Garage
23 N Austin Av		03/15/1996	1600	A-220477	0610	Forcible Entry	Residence Garage
24 N Menard Av		03/17/1996	2100	A-221460	0610	Forcible Entry	Residence Garage
53 W Deming Pl		03/17/1996	0930	A-183240	0610	Forcible Entry	Residence Garage
25 N Menard Av		03/17/1996	0001	A-183051	0610	Forcible Entry	Residence Garage
58 W Grand Av		03/18/1996	0615	A-222386	0610	Forcible Entry	Residence Garage
21 N Laramie Av		03/20/1996	1700	A-223289	0610	Forcible Entry	Residence Garage
24 N Luna Av		03/20/1996	0900	A-188832	0610	Forcible Entry	Residence

THE CPD AND TECHNOLOGY

As police departments go, the CPD was an early adopter of sophisticated automated information systems. In the late 1950s the department installed an IBM model 407 accounting machine. Several years later, in 1962, the department became the first police agency to install the IBM 1401 mainframe. Two years later, an upgrade brought in an IBM 1410 system. This push toward automation and modernization came primarily at the instigation of a new police superintendent, Orlando W. Wilson, who had been brought in to the CPD to clean house in the wake of a department scandal. In addition to computerization, a state-of-the-art radio dispatching system was installed at police headquarters, one that was much imitated throughout the world. And in the early 1970s, the department became one of many users of the City of Chicago's IBM System 370 mainframe.

These computing platforms, their applications, and the necessary support systems were adopted to accommodate the information needs of the department as they were then seen: information was collected at the bottom of the hierarchy, and then centralized and summarized so that decisions and policies could be made at the top. As early as 1969, the department had recognized the need to develop new policies for satisfying the growing information needs of all units within the department. At that time, a high-level committee consisting of the first deputy superintendent, the four deputy superintendents, and the director of the data systems division was created to set policy for information systems use.

In the early 1980s, as computer technology changed, the department introduced personal computers to satisfy specialized automation needs on a limited basis. The ability to input and manipulate data of localized concern and then produce information for decision making closer to the "problem" was the impetus for a de facto change in information system procedures, if not formal policy. One of the primary motivations for this activity was the fact that, as first the Apple II and then the (IBM) personal computer and Macintosh hit the market, police officers throughout the department, on their own initiative, started putting their home computers to work on their own units' problems. One of the authors, then a district tactical officer, created a database of field contacts on his own personal computer (PC); a sex crimes detective developed a database of his own; and spreadsheets and databases of every stripe, on every conceivable platform, could be found in different units throughout the department.

While these local computer applications permitted their developers to deal more effectively with isolated problems, there was no coordination to allow different officers' pet applications, addressing similar needs, to effectively share successes and useful data. This was as much an organizational issue as it was a technical one. As a consequence, in the mid-1980s the department no longer had to be able to interpret reams of data to support its decision making. The creation of sophisticated graphs and charts became easier for the information user, and made data analysis possible for people without extensive training in statistics. Becoming informed became a matter of looking at a picture of the data and being able to visualize trends, rather than having to do this by scanning tables that summarized the data.

Besides the variety of bar charts, time-series plots, and other similar graphics, it became possible to represent data spatially using the computer. Both simple mapping programs and more complex geographic information systems could place location-based data onto a map. Using either separate or integrated data manipulation tools, relationships between the data took on new perspectives. Simply by looking at the resulting map images, an analyst, an internal user or a person from outside the organization could detect spatial patterns in the data.

Also in the late 1980s, the CPD was given access to the computerized map resident on the information system of the Chicago Planning Department. This system permitted location-specific data residing on the city's mainframe computer to be plotted on maps of the city and the various community areas. Officer Larry Bobrowski, a

computer-literate gang crimes detective, received permission to experiment with the department's data and mapping software. Utilizing case report information, he was able to generate maps with incident data marked on them. Essentially, he had automated the process of creating the typical police "pin map." This activity was soon superseded by a more ambitious mapping project sponsored by the National Institute of Justice (NIJ), the research arm of the U.S. Department of Justice.

COMMUNITY AND POLICE CRIME MAPPING IN CHICAGO

As we describe below, the Chicago crime mapping project was a rudimentary realization of a mapping system. It did, however, convincingly demonstrate the potential applicability to the day-to-day planning and resource allocation activity of urban police. Moreover, because of the special circumstances of its birth, the project also underscored the benefits that could accrue when the police and community work jointly to employ them. This section explains why community organizations were so heavily involved, the organization of the mapping project, and some of the broader lessons that resulted from the project — lessons that should be of use to any police department interested in developing or improving its crime-mapping activity.

As the crime rate rose in the mid-1980s, various communities were getting organized and making greater demands on the police for relevant information to aid in protecting themselves. With help from Northwestern University, these Chicago-area community organizations also began using data maps to visualize crime and its effects. The Chicago Alliance for Neighborhood Safety (CANS), a consortium of local community groups, had been using maps to show how community development investment in Chicago varied from community to community, and how some communities were shortchanged compared to others.

Finding the maps useful for this purpose, the community organizations wanted to use crime data in the same way. With political support from the late Mayor Harold Washington, they hammered out an agreement with Police Superintendent Fred Rice to receive tapes from the city's mainframe computer containing basic offense data. Even though the data were often over a month old,[1] they helped the community organizations understand what was happening within their communities. CANS created maps from the tapes, first using Apple II computers and later Macintosh computers, that provided a

means of integrating different types of data: the location of various crimes, community data such as abandoned buildings and taverns, and more static geographic data such as schools and parks — that is, the contextual milieu of the criminal activity. Each different type of crime was represented on the map with a different symbol or icon. Although users of the maps were not highly skilled in data analysis, they could easily determine patterns related to location. Thus, a successful information system had been created, taking different types of data, combining and analyzing them, and producing output of practical use.

Subsequently, the University of Illinois at Chicago, which had initiated a mapping project of its own, joined forces with these three organizations and obtained a grant from the U.S. National Institute of Justice to evaluate the effectiveness of crime mapping with respect to crime prevention and control (Mapping Crime in Its Community Setting, Grant No. 86-IJ-CX-0074). Through the grant from NIJ, and an accompanying one from the Apple Corporation for hardware and software, the project began to take shape.

Although the Chicago Police Department was the grantee, the project director was an academic (MDM), and all four entities — a police department, two universities, and a consortium of community organizations — were effectively equal partners. It was (and still is) quite unusual for a police department to work directly and on an equal basis with community organizations, some of which had in the past been confrontational with the police. Not only did this arrangement work, but it produced some results that are still worthy of being replicated. One of the main reasons for the project's unique configuration was that, although the police were the custodians of the data, the ones with the most experience in using crime data on maps were the community organizations.

It was decided to implement the project in one police district, District 25. One of the authors (Buslik), then a tactical officer in this district, was assigned by District Commander Mathias Casey to work with the other three organizations on a day-to-day basis. It soon became clear that the standard evaluation that the academics on the team had envisioned — taking stale crime data and seeing if mapping would illuminate patterns in the data — was not going to go over well with this district commander. He had current problems and wanted to use the mapping system to help him immediately and with current data. Therefore, a system was developed whereby his officers would enter the previous day's Uniform Crime Reports Part I offense activity into the computer every morning, by hand.[2]

This is when we ran up against the limitations of the hardware and, more acutely, the software. Computer mapping was then truly in its infancy. None existed for PCs, which had very limited graphics capability at the time. The mapping that was available for the Mac, while of great utility for real estate and business purposes (the applications for which it was developed), had severe limitations. For one, it did not automatically geocode the data: placement on the map of icons representing events had to be done manually, which just delayed the process — but not as much as the earlier delay that the community organizations experienced when the crime data came from the mainframe. For the experimental project, the district commander provided CANS with a diskette every few days, containing the district's criminal activity,[3] and CANS staff and interns placed the icons on the maps.

Despite the patchwork nature of the project, it produced some findings that are still worth underscoring, primarily because some of the current realizations of police computer mapping projects do not seem to take advantage of them. They can be summarized under the following rubrics: institutional memory, power to the people, and cognitive data analysis (Maltz et al., 1991).

Institutional Memory

Police officers who have spent a great deal of time on their beats often feel that they know their beats pretty well — who the bad actors are, what to watch out for, how and when things happen. What is more likely the case is that they know what goes on only during their specific tours of duty. An officer who works during the days sees a different set of activity and actors than does an officer employed evenings or on the graveyard shift. Moreover, on busy beats only half of the activity may be handled by the beat officer, who may be dispatched to assist in a neighboring beat and whose beat also may be covered at times by neighboring officers. So no one single person really knows what's going on in a beat.[4]

Detective activity is even further compartmentalized, since detectives may not deal directly with beat officers (and robbery detectives may not even deal with burglary or narcotics detectives). Much investigative and arrest activity, therefore, is hidden from the view of the officers who supposedly "own" the beat. Therefore, it is often the case that the only place where a person can get an overview of all activity on a beat is on a computer-based map; it serves as the *institutional memory* for the beat. The map provides beat officers with a con-

venient way to see what happened during the time they were not there.

Power to the People

Information is power, perhaps more so in police work than in other spheres of activity; and the "people," in this case, are those closest to the street who can benefit most directly from this power. In most police departments, information processing was developed for the managers, who have the authority to allocate resources. But it is the beat officer who needs detailed current information about beat activity, and the map provides it in a way that is readily assimilable.[5]

The word "people" also refers to members of community organizations, who also have a need to know what is happening in their neighborhoods and when and where it is happening — and who can provide the police with detailed information about the context of the activity. In fact, this sharing of information leads to "data fusion," whereby information from disparate sources is combined to aid in developing patterns and relationships in the data. Data fusion confirmed the value of the "co-production" of public safety through an improved relationship between the police and the community they serve. This information exchange led to a greater openness and facilitated the development of problem-solving strategies.

"People" also refers to the district commander, who before the project began could only base deployment of personnel on statistics that were at best weeks old, by which time new crime patterns had emerged. With the advent of the computer mapping system, all this changed. Current information, in a form more usable than merely a list of crimes, dates, and addresses, was made available to the district commander, permitting him to allocate patrol resources more rationally. Instead of waiting for the patterns to emerge, this "proactive management" permitted the commander to nip incipient patterns and trends in the bud. Moreover, he took this information, often in the form of maps, to the community and enlisted their support in providing the contextual information to supplement the police information.

Cognitive Data Analysis

Inferring patterns from data is usually left to the "experts," the statisticians who deal with data professionally. But it was our opinion that the true experts were not the data manipulators so much as those who knew the local scene. Statisticians are very helpful in

spotting *known* patterns, and finding them in data when they repeat. But if there happens to be a rash of commercial burglaries where the mode of entry is through the roof, it really isn't necessary to program the computer to recognize this "pattern." If all such unique patterns were programmed into the computer, so that it would search for them all the time, the computer would very quickly become filled with algorithms that were no longer of any use.

A canny analyst, on the other hand, doesn't need a computer to analyze the data so much as he or she needs to present the data in a form suitable for pulling out patterns — which is exactly what crime maps excel at. We called this "cognitive data analysis" to distinguish it from statistical data analysis, and in recognition of the fact that the most useful "computer" for such analyses is the non-linear computing device behind the analyst's eyes. The addition to the map of symbols representing parks, schools, abandoned buildings, railroads, and highways facilitates the task of inferring patterns, while a computer would have difficulty in including these features in an algorithm.[6] Our goal was to use the computer not as an "autopilot," wherein the computer algorithm make the analytic decisions, but as "power steering," where the analyst chooses what data to analyze and how to analyze them.

Other Mapping Efforts

The Chicago project was the forerunner of the NIJ Drug Market Analysis Program (Maltz, 1995), some of whose projects are described in this volume. It was also contemporaneous with mapping activity in other Chicago-area (mostly suburban) police departments, implemented by the Illinois Criminal Justice Information Authority, during which time the map-based statistical program STAC (Spatial and Temporal Analysis of Crime) was developed and refined (C.R. Block, 1995). Coupled with a subsequent federally sponsored mapping project aimed at gang-related violence (Rewers and Green, 1995), and a community-based crime mapping project in the neighborhood of Loyola University of Chicago (R. Block, 1995), the foundation was laid for the CPD's ambitious ICAM project — the technical arm of its city-wide community policing program, CAPS (Rich, 1996).

The CPD's community policing initiative, the Chicago Alternative Policing Strategy (CAPS) program, was pilot tested in 1993 in five police districts, and has now been implemented throughout the city (Rich, 1996; Chicago Community Policing Evaluation Consortium [CCPEC], 1995). More than most other community policing programs, it relies on computerized mapping through its Information Collection

for Automated Mapping (ICAM) system. The mapping system has been specifically designed for ease of use, so that officers who have little experience with computer software can produce maps showing different kinds of activity for different periods of time at the beat, sector, or district level — all according to the officers' needs. Different overlays — vacant buildings, schools, establishments with liquor licenses, locations of Chicago Transit Authority "el" stops — can be put on the maps.

As described in the example at the start of this chapter, beat officers routinely call up maps and print them out. No keyboard entry is needed; this was a requirement put on ICAM by the deputy superintendent in charge of CAPS. Officers can specify the area, the time interval, the types of incidents to be displayed, and the overlays to be included merely by manipulating and clicking the computer mouse. Furthermore, these maps are routinely presented to community groups by the officers when they meet with the groups. Whereas in the past the primary contacts between community organizations and police were made by the district commander or the neighborhood relations sergeant, under CAPS the responsibility has been shifted to the patrol officers.

Moreover, one of the primary goals of this system is, in the words of the CPD superintendent of police, to "provide community members with up-to-date statistical information to help them in identifying and targeting problems" (Rodriguez, 1993). So ICAM was specifically designed to not only support the beat officer, but the neighborhood residents as well. The ICAM system is still in the process of being improved (i.e., ICAM II), and is being evaluated by the CCPEC as part of the overall CAPS evaluation (CCPEC, 1995). Although the evaluation is not complete, at this point it appears that the ICAM system is providing police officers with the information they need to patrol and plan more effectively, and residents with the information they need to gain an understanding of crime problems in their communities. In fact, there are plans to increase public access to crime maps by making them accessible to residents at public information kiosks throughout the city and on the Internet.

However, the use of ICAM has not been without problems. While assigned to patrol districts, one of the authors observed deficiencies in its use, as has the ICAM project development team leader, Sgt. Jon Lewin. Perhaps because both are rather enthusiastic believers in this use of technology, they were surprised and perplexed that it was not being used by the average police officer to a greater extent. Officers were encouraged to use ICAM in thinking about what was happening

in their particular venue and in preparation for the community beat meetings. But most merely printed out a map of their beat and make it available to residents.

Why was ICAM not so readily assimilated into the officers' regular activities? Lewin believes that even though ICAM became a good source for information about what was taking place in terms of incident data, most officers felt that they didn't have enough information for the system to be useful to them in "policing" their beat, and believed that it was "just a map" (Lewin and Morrison, 1995). Perhaps training is the problem: Although every officer was shown how to produce the information and most are adept at using the system (in great part due to its ease of operation), there has been no real training in how to use the information. While certainly more intuitive than a typical listing of incidents, even this tool should be supported by some guidance as to its utility. Pattern development with even a trained eye is not easy (Ruiz, 1996). The range of experiences and skills in a police force makes assumptions as to an officer's ability to effectively use any tool suspect. All police recruits know how to drive a car, yet due to a variety of backgrounds, high speed driving is taught from a beginning level to all officers. The same should apply to the use of maps and other information tools as well. As the department has recognized these needs, changes have been made. With a recent police department written directive on the patrol officer's specific duties in providing community-based policing, the utilization of the ICAM maps and reports has been explicitly established. This will partially answer the question of what to do with this information.

The next generation of ICAM (tentatively called "ICAM2") is planned to address both the issues of quantity and quality. Under the category of "citizen information," the current ICAM products will be generated along with information on cleared crimes. This will provide the missing back-end to incidents and answer the question, "what did the police do after the report was made?" Under the menu selection "Crime Conditions," which will be available only for police officer use, both short- (weekly up to several months) and long-term (up to a year) trends can be developed. To make ICAM more useful as an analysis tool, training will address two levels of police user: the general field patrol officer and the specialist analysis officer. Additionally, problem-solving features are being tested, including the ability to generate "hot spots" by offense type and location using criteria set by the user. From this, the ICAM development team foresees that once field officers see what is available beyond the basic map and statis-

tics, they will want to use all the features to better arm themselves in providing service to the community.

While other police departments are also providing maps to the public, many do not show the details but rather an average offense rate for an area. And many also do not show current maps. In our opinion, the more information (and the more detailed the information) given citizens, the better, as Tufte (1983) has also argued. Residents can do more with maps that depict specific incidents — that show, for example, that a specific bar or fast food outlet is surrounded by many incidents — than they can with a choropleth map indicating that Beat 105 has 16.8% more robberies per year (but why per year — why not per resident or per business?) than Beat 106.

INFORMATION POLICY CHOICES IN POLICE DEPARTMENTS

From the above descriptions, it should be clear that restructuring the organization of information is an important aspect of the CPD's community policing initiative, and should be so in any community policing program. What information is provided; to whom; in what form; and with what delay are all important features of an information system. The CPD has addressed these issues by developing an information system that provides (a) detailed crime incident information (b) to patrol officers and community organizations as well as to supervisors (c) in map form with ancillary lists describing the incidents (d) within a day or two of the incident report's filing.

But this is not the norm; many departments maintain a centralized approach to mapping and information management, providing maps for the most part to the command staff and not to those who work the street, let alone to community organization. And even these maps are often choropleth maps rather than incident maps, used primarily for resource allocation and not for crime pattern analysis. Moreover, the maps often summarize a month's worth of data, and so are not very useful in tracking crime patterns that are often transitory. In such departments, information tends to flow from the lower levels of the hierarchy to the middle or highest levels of the organization and eventually resides in a centralized database; it does not flow back to the lower levels to provide the patrol officer with information he or she needs. Centralization of the information in a single database is certainly useful, permitting the integration of data from all sources, but it does not have to be at the expense of getting informa-

tion back out to the field. When this occurs, many street-level decisions may be made in an information vacuum.

One of the key elements of problem-oriented policing is the greater inclusion of the individual officer in the formal decision-making process. In order to do this, he or she must have access to some of the same information as management personnel. Thus, we need to have a new definition of "management information systems," one in which the beat officer is recognized as an information manager, a client of the information system, at a new level of decision making.

In virtually all realizations of community policing, street officers require more (and different) information because they are responsible for more of their environment. To support them in this responsibility, police departments must recognize that their information systems must change. This does not mean that the information systems need be decentralized; what it does mean is that access to that information must be distributed throughout the organization, since local decisions require local information.

The information needs of the operational level become redefined as we change the locus of decision making in a police agency. Processing of the data must be done in a manner that supports the kind of questions that are asked of the data. When crime data are seen only at the upper levels of the hierarchy, there is too much for managers to comprehend and the data must be summarized. This means that decisions are made in terms of resources provided to districts. However, when crime data are seen at the beat level and cover relatively short periods of time, there are sufficiently small numbers of crimes so that they need not be summarized. This means that beat officers can focus on individual crimes, crime patterns, or offenders. One of the ancillary benefits of an information system geared to the beat officer is that the input data can be expected to improve. As officers realize that the information they provide is of use to them, and they can see the results of their reports ending up on maps that they themselves use, we expect that they will improve the quality of their reports.

The most controversial aspect of the CPD's ICAM project is not just its provision of (very detailed) crime information to the public, but its *institutionalization* of providing this information. Many police departments are concerned about this, and it may be a mixed blessing. Different departments have different relationships with community organizations. Moreover, different community organizations may react differently to police-provided information. Some may see it as useful and are inclined to work with the police cooperatively, others

may use it against the police, and still others may try to hide it so the true state of affairs is not known to the public at large. Yet in order for community policing to work, it is axiomatic that decentralization of the dissemination of information must take place, and this requires police departments to think hard about the way they deal with information.

The opinions expressed herein are those of the authors and do not necessarily express those of the Chicago Police Department, the University of Illinois at Chicago, or the U.S. Department of Justice.

NOTES

1. At that time, District Commanders had essentially two sources of data on crime: monthly statistical breakouts of the districts' activity, unavailable until weeks after the month ended; and 24-hour activity reports — daily compilations of incidents occurring over the past 24 hours, prepared at 6 a.m. (using a typewriter) based on a manual review of incident reports.

2. This was done at virtually no labor cost. Since the district commander was already provided with a typed "24-hour activity report" every morning, all we did was arrange to have the report typed into the Macintosh computer, and make sure that the form we provided on the Mac to enter the data would also generate this report.

3. For the purposes of maintaining an acceptable level of confidentiality while at the same time providing useful data, the last two digits of the address were excised.

4. This set of circumstances is being addressed in the CPD's community policing implementation (Chicago Alternative Policing Strategy, or CAPS) by having patrol officers handle virtually all the incidents on their beats, so as to develop their own feel for the beats.

5. Of course, during the project not all officers appreciated the maps. Many saw them as superfluous, because they "knew" their beats. Others saw them as just another form from the top that they had to deal with, and there were doubtless others who were simply "spatially challenged" when it came to reading maps.

6. This raises the question of whether expert system, neural net, or artificial intelligence approaches would provide a better means of inferring

patterns from such spatial data. We doubt it; these approaches may be very useful when trying to look for patterns of, for example, a disease, where the essential aspects of the disease manifest themselves in different cases in similar ways. This is not the case in crime analysis, unfortunately, because each burglar may have a radically different modus operandi (MO). Training a computer algorithm to recognize burglary patterns from the MOs of burglars 1 through 99 will probably not be of much benefit in having it recognize burglar 100. In other words, to a computer analyst a "pattern" is a condition to be diagnosed (like jaundice) while to a burglary detective a "pattern" is not so much a condition (like burglary) but an MO that relates to a specific offender.

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